OECD Reviews of School Resources

Responsive School Systems

CONNECTING FACILITIES, SECTORS AND PROGRAMMES FOR STUDENT SUCCESS

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BETTER POLICIES FOR BETTER LIVES

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Foreword

Evolving educational objectives, changing student needs and demographic developments require school systems to be highly responsive to new patterns of demand and adapt their provision accordingly. The organisation of school facilities, sectors and programmes plays a key role in doing so and in providing students with a high-quality education where they need it. This report aims to assist governments in efficiently and equitably organising school infrastructures and services to achieve their education policy objectives. It offers a systematic analysis of the governance of school networks, their adaptation to demographic changes and student needs in urban, rural and remote areas, as well as the vertical and horizontal co-ordination of education services across levels, sectors and programmes.

This report is the second in a series of thematic comparative reports, which brings together the findings of a major OECD project on the effective use of school resources, the *OECD Review of Policies to Improve the Effectiveness of Resource Use in Schools (School Resources Review)*. The first report of the series was published in 2017 and analysed funding policies (*The Funding of School Education: Connecting Resources and Learning*). The next report will focus on the management of human resources in school education. The School Resources Review was launched in 2013 to help countries learn from one another by exchanging best practices, and to gather and disseminate evidence on effective school resources policies. The project highlights issues and explores ideas for policy development that may be difficult to raise in national debates. It seeks to inform discussions among stakeholders with new and different perspectives that are based on research and evidence from different countries.

Like the other thematic comparative reports of the series, this publication draws extensively on the experience of the nineteen school systems that were actively engaged in the preparation of this report. They vary significantly in their economic and social contexts, and illustrate a wide range of approaches to governing and adapting their school networks, and co-ordinating educational levels and sectors. This approach allows this report to take a comparative perspective on key policy issues. Although the analysis also considers the broader research evidence, and evidence from other OECD and partner countries, it nevertheless is important to acknowledge that the report – to a certain extent – reflects the practices and priorities of the participating education systems. The country examples cited in the report should not be assumed to reflect international best practices, but rather serve to expose policy makers to a wide range of country experiences, good practices and lessons learned. In addition, readers should bear in mind that policy initiatives that work well in the context of one school system are not necessarily transferable to others. The review has attempted to be sensitive to this by analysing policies pertaining to the organisation of school facilities, sectors and programmes in relation to the values, vision and organisation of different countries' school systems, as well as their broader economic, social and political contexts.

This report was co-authored by Luka Boeskens (co-ordinator), David Liebowitz, Gonçalo Lima and Thomas Radinger with analytical contributions from Alfonso Echazarra from the OECD Directorate for Education and Skills. The work on this report was led by project manager Deborah Nusche (January 2017 to March 2018) and interim project manager Cláudia Sarrico (since April 2018) under the responsibility of Paulo Santiago, Head of the Policy Advice and Implementation Division. Eléonore Morena provided key administrative and logistical support for the review and editorial support during the early stages of the report's production. Claire Berthelier was responsible for the copy-editing, layout and final formatting of the report. Henri Pearson co-ordinated the report's production and supported its communication.

Acknowledgements

This report would not have been possible without the support of the 19 education systems that are actively engaged in the School Resources Review. Participating countries committed substantial resources and opened their school resource policies to review and debate. National co-ordinators (listed in Annex B) played a key role in this exchange, enriching discussions with their insights from diverse contexts and co-ordinating their countries' participation in the project.

The OECD Education Policy Committee (EDPC), the Group of National Experts (GNE) on School Resources, and the delegates to both bodies provided essential support and analytical guidance since the inception of the project, and offered valuable feedback on drafts of this document. Leading up to the publication of the report, the GNE was chaired by Mr Jørn Skovsgaard, Senior Advisor of the Danish Ministry of Education; and had as vice-chairs Ms Marie-Anne Persoons, International Policy Advisor in the Strategic Policy Support Division of the Flemish Ministry of Education and Training and Mr Matej Šiškovič, Director of the Educational Policy Institute at the Slovak Ministry of Education, Science, Research and Sports. The dedication and leadership of the chair and vice-chairs is gratefully acknowledged.

The School Resources Review and this report also benefited from the active involvement of different stakeholders with an interest in education. The Business and Industry Advisory Committee to the OECD (BIAC) and the Trade Union Advisory Committee to the OECD (TUAC) participated as permanent observers in meetings of the GNE on School Resources and had the opportunity to comment on drafts of this report. During individual country reviews, students, parents, teachers, school leaders, researchers and employers made their time available to meet with review teams and to provide their perspective on school resource policy issues.

This report was prepared within a broader framework of collaboration and a partnership with the European Commission (EC), which was established for the OECD School Resources Review. The support of the EC has covered part of the participation costs for members of the European Union Erasmus+ programme and contributed significantly to the preparation of a series of thematic comparative reports, including this publication. The European Commission's support for the School Resources Review is gratefully acknowledged. The review team would like to thank in particular colleagues at the EC Directorate-General for Education and Culture, Mónika Képe-Holmberg (*Unit A.2: Education and Training in Europe 2020* under the leadership of Denis Crowley), Marco Montanari (*Unit B.2: Schools and Multilingualism* under the leadership of Michael Teutsch) and many others whose contributions are acknowledged in Annex B.

In addition, the Review's collaboration with Eurocities, the European Agency for Special Needs and Inclusive Education, Eurydice, the Inter-American Development Bank (IDB), the United Nations Educational, Scientific and Cultural Organization (UNESCO), UNESCO's Global Education Monitoring Report, and the World Bank created synergies between the work undertaken by different organisations and we are grateful for the valuable input they provided into the project and this report.

The review is equally indebted to the many experts who contributed to the country review visits and the resulting country review reports that are part of the publication series *OECD Reviews of School Resources* (for the composition of the country review teams, see Annex B). Their expertise, analytical contributions to the country-specific reports and professional exchanges with OECD Secretariat members provided the foundation for the comparative perspective of this report. The background reports prepared by participating countries provided a further important source of information and thanks are due to all those who contributed to their production. In addition to this publication, by July 2018, the review had generated 16 reports by participating countries, 11 reports by external review teams and multiple research papers (all available on the OECD website at www.oecd.org/education/schoolresourcesreview.htm).

Within the OECD Directorate for Education and Skills, the work on this thematic report was carried out by the Policy Advice and Implementation Division under the leadership of Paulo Santiago. David Liebowitz, Deborah Nusche (project manager since December 2016), Thomas Radinger, Paulo Santiago (project manager between January 2013 and July 2016) and Claire Shewbridge assumed leadership for the individual country reviews on which this report is based. Important contributions to the country reviews were also made by Anna Pons (who led the review of Kazakhstan), Tracey Burns (who participated in the review of Uruguay), Alfonso Echazarra (who participated in the review of Colombia) and Gonçalo Lima (who participated in the review of Portugal). Cláudia Sarrico provided guidance for the completion of this report as the project's interim manager since April 2018. Claire Berthelier was responsible for the copy-editing, layout and final formatting of this report. Eleonore Morena provided editorial support during the early stages of the report's production and took responsibility for the administrative work within the review, the organisation of meetings and communication with the countries until May 2018. The team would also like to thank Andreas Schleicher and Yuri Belfali for their overall guidance and support for the project.

Gratitude is also extended to current and former team members who supported the work of the project at different stages. Macarena Ares Abalde, Francesc Masdeu Navarro and Alette Schreiner provided substantial input into the project's knowledge base and Samuel Kim supported the project's preparatory work on human resource policies. Luka Boeskens, Tala Fakharzadeh, Anna Gromada, Gaëlle Leduc, Gonçalo Lima, Antoine Papalia, Kerstin Schophol and Oliver Sieweke provided research assistance and summarised key areas of the literature on school resources during their internships with the review. Joris Ranchin led the initial preparation of the qualitative data collection on countries' approaches to school funding.

The OECD Review team is grateful to numerous colleagues within the OECD who provided valuable input and advice at different stages of the report's production. In particular, the report benefited from collaboration with the Programme for International Student Assessment (PISA), the Early Childhood Education and Care (ECEC) team within the Early Childhood and Schools Division, the Vocational Education and Training and adult learning team within the Skills Beyond School Division, the Strength Through Diversity project, the Learning Environments Evaluation Programme (LEEP), the INES Network for the Collection and the Adjudication of System-Level Descriptive Information on Educational Structures, Policies and Practices (NESLI), the Centre for Educational Research and Innovation's (CERI) work on Governing Complex Education Systems and Strategic Education Governance, and the Economic Analysis, Statistics and Multi-Level Governance Section within the Centre for Entrepreneurship, SMEs, Regions and Cities.

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Abbreviations and acronyms

CBR	Country Background Report
DBFM	Design-Build-Finance-Maintain
EC	European Commission
ECEC	Early Childhood Education and Care
ERDF	European Regional Development Fund
ESCS	Economic, Social and Cultural Status
ESF	European Social Fund
EU	European Union
GDP	Gross Domestic Product
GIS	Geographic Information System
GNE	Group of National Experts
ICT	Information and Communication Technology
IDB	Inter-American Development Bank
IIEP-UNESCO	UNESCO International Institute for Educational Planning ISCED
ILO	International Labour Organisation
ISCED	International Standard Classification of Education
OECD	Organisation for Economic Co-operation and Development
PIACC	OECD Programme for the International Assessment of Adult Competencies
PISA	OECD Programme for International Student Assessment
PPP	Public-Private Partnership
SEN	Special Educational Needs
TALIS	OECD Teaching and Learning International Survey
TRC	Teacher Resource Centre
UNESCO	United Nations Educational, Scientific and Cultural Organization
VET	Vocational Education and Training

Executive summary

This report is the second in a series of thematic comparative reports bringing together the findings of the OECD Review of Policies to Improve the Effectiveness of Resource Use in Schools (School Resources Review). It provides analyses and policy options to assist governments in promoting educational quality, equity and efficiency through the organisation of school facilities and education services in a context of changing demand for school places and evolving student needs. Following the introduction, the report's three main chapters focus on the thematic areas below:

- Chapter 2: How the distribution of responsibilities for the school network and different steering tools can contribute to the effective organisation, distribution and size of educational facilities.
- Chapter 3: How the school network can be adapted to demographic changes and student needs to support policy objectives in urban, rural and remote areas.
- Chapter 4: How education services can be co-ordinated across levels, sectors and programmes to support students' vertical and horizontal transitions.

Chapter 1 introduces the trends that motivate the report and provides the context for the subsequent analyses. Countries are confronted with demographic trends, economic and social changes, as well as new and evolving educational objectives. Adjusting educational infrastructures and the services they deliver in response to these trends is crucial to ensure that students can continue to benefit from a high-quality education where they need it. Although physical resources account for a relatively small share of total educational expenditure in most school systems, they are critical to enable all actors in the system to work as effectively as possible towards students' success.

The governance of responsive school networks requires effective steering and co-ordination

Chapter 2, *Governing the school network*, analyses the roles and responsibilities different actors assume in governing a system's school facilities and how the relationships between them affect the system's capacity to respond to changing educational demand and student needs. As OECD school systems have grown in administrative complexity, they are increasingly characterised by multi-actor and multi-level governance arrangements. These developments generate both opportunities and challenges for the governance of school networks and depend on an adequate allocation of responsibilities and strong co-ordination between national, regional and local authorities. Education authorities have a range of steering and co-ordination mechanisms at their disposal that they should use to facilitate the strategic planning of school networks at the central, regional and local levels. To ensure that the school network is responsive to the needs of today's and tomorrow's learners, the chapter recommends that reforms should seek to: invest planning authority at the appropriate level of government and strengthen horizontal co-ordination mechanisms; build capacity for school network planning supported by the collection and maintenance of high-quality data; balance incentives for network efficiency with the need

to maintain high-quality provision in small schools and remote areas; and ensure equitable access to capital funding.

Efficient regional responses to changing educational demand are guided by equity and students' needs

Demographic shifts, regional economic developments and changing student needs have generated costly mismatches between educational demand and the supply of school places in many OECD countries. Chapter 3, *Adapting the school network to changing needs in urban, rural and remote areas*, analyses efficient responses to this challenge and assumes a territorial perspective to acknowledge the significant heterogeneity that many countries face across different parts of their school network. In this context, responding to changing demand and student needs requires strategies that are sensitive to local contexts and take educational quality, equity and student well-being as their guiding principles. To do so, authorities need to identify and address equity concerns early on, engage relevant stakeholders and carefully evaluate ongoing network reforms. School network consolidation may be unavoidable to guarantee adequate learning environments for all students. Nevertheless, systems need to carefully weigh its costs and benefits and consider the potential efficiency gains afforded by sharing resources across providers, school clustering or the strategic redistribution of education services across sites. To adapt school networks to changing demand and student needs, the chapter recommends that reforms should aim to: consider a range of strategies to enhance the efficiency of school networks with overcapacities; compensate for efficiency, quality and equity challenges experienced by remote schools; and strategically respond to capacity shortages in urban school networks.

Educational levels, sectors and programmes must be aligned to support students' vertical and horizontal transitions

Chapter 4, *Co-ordinating educational levels and sectors to improve student trajectories*, examines the distribution of the educational offer across levels and pathways in schools and the co-ordination between its different components. A failure to effectively co-ordinate the educational offer risks the duplication or fragmentation of services. It also creates barriers to students' smooth progression across levels and their transition into post-secondary education or the labour market. To improve student trajectories, systems need to consider both the vertical co-ordination of levels and grades as well as the horizontal co-ordination of parallel sectors and programmes. Providing a variety of educational pathways has the potential to more closely match each student's interests and needs but also risks increasing segregation and a fragmentation of the educational offer. Tackling duplications between programmes, enhancing their alignment with post-secondary opportunities and guiding students to programmes that correspond to their interests and needs thus plays an important role in reaping the benefits of a diversified offer. To improve the co-ordination of educational levels, sectors and programmes, the chapter also recommends that reforms should seek to: enable students' smooth vertical progression by improving collaboration across levels and addressing grade repetition and drop out; ensure greater permeability between educational pathways; and strengthen the identification and supportive placement of students with special educational needs.

Responsive school systems: Main findings and policy pointers

The need for responsive school systems

A number of demographic trends, economic and social changes, as well as new and evolving educational objectives have required countries to respond and adjust the way they organise their school infrastructure and the education services it delivers to meet their students' needs. Demographic shifts, regional and international migration have caused a drastic decline in some countries' school-age population, reinforced regional variations in the demand for school places and led to greater student diversity. Changing family patterns and increased female labour market participation have raised the demand for early childhood education and care, while changing labour market needs have created pressures for vocational education and training (VET) and other sectors to adapt their educational offer. Finally, evolving educational objectives, including a strong commitment to inclusion as part of the UN's Sustainable Development Goals, require the adaptation of school services and new forms of collaboration across sectorial lines. These trends make the organisation of school facilities and their educational offer a central issue for the effective use of school resources.

Beyond these developments, multiple considerations have motivated this report:

- Providing adequate facilities where they are needed is a critical condition for teachers to create effective learning environments and enable their students to succeed. Although physical resources account for a relatively small share of total educational expenditure, efficiently organised school networks can enable all actors in the system to work more effectively towards students' success.
- The size and distribution of school facilities is intricately connected to their educational goals and the services they provide. The report's holistic perspective seeks to do this justice by analysing the organisation of school infrastructure alongside that of educational levels, sectors and programmes. It can thereby highlight the synergies that may arise from fostering or re-thinking the connections between schools and the various elements of their educational offer.
- Efficiency alone is not the main concern of school systems but needs to be achieved alongside the quality and equity objectives that are at the heart of education. The report therefore focuses on how school facilities, sectors and programmes can be organised so that available resources best support high-quality teaching and provide equitable learning opportunities for all students.

This report was prepared as part of a major OECD study on the effective use of school resources resulting in the publication series OECD Reviews of School Resources. Nineteen school systems (referred to as the "OECD review countries") were actively involved in the preparation of this report by participating in a qualitative data collection, preparing detailed country background reports and/or participating in OECD-led country reviews. In addition, the analyses in this report draw on the broader research and policy

literature, bringing together findings from as many OECD and partner countries as possible.

Governing the school network

Over the last decades, OECD school systems have grown in administrative complexity and are increasingly characterised by governance arrangements involving multi-level decision-making processes. The governance of the school network (henceforth defined as the entirety of a system's educational facilities) is therefore frequently subject to complex relationships between multiple actors across different levels of government. Although the degree of local autonomy varies significantly across countries, in most of them, the central level remains a significant actor in steering the distribution and size of schools and shaping the relationships between them.

Strengthening horizontal co-ordination mechanisms and clarifying responsibilities for the school network

Decentralisation processes have led to the emergence of increasingly autonomous and powerful local actors sharing responsibilities with national and regional authorities in many OECD education systems. In this context of multi-level and multi-actor governance, many inefficiencies in the planning and organisation of school networks are rooted in weak co-ordination mechanisms across disconnected subsystems and communities. A key political and administrative challenge is therefore to reflect on the allocation of planning responsibilities between different authorities and their effective co-ordination. While motivations vary across countries, giving local actors significant planning responsibilities (e.g. for the opening or closure of schools) is typically expected to improve the school network's adaptation to local conditions and the needs of local communities. This relies on adequate capacity at relevant levels of government and strong horizontal co-ordination. Particularly in systems with a high degree of municipal fragmentation, where local authorities oversee a small number of schools, ensuring students' access to all relevant parts of the educational offer while avoiding duplication across municipal boundaries requires strong co-ordination mechanisms.

Pointers for policy: Mechanisms to support the planning of school networks need to reflect a system's governance structure, the roles it assigns to local, regional and system-level entities as well as their respective capacity to carry out these responsibilities effectively. Particularly in systems where small, local authorities with little capacity are responsible for the governance of the school network, regional platforms can allow them to co-ordinate their provision more effectively across administrative boundaries. To improve the regional planning of the school network, authorities should seek to build on existing regional structures and co-ordination mechanisms, where possible, or institutionalise previously informal modes of co-operation. Where planning is hindered by fragmented responsibilities for different parts of the school network, a clearer division of labour can be another way to facilitate its efficient planning and oversight, reduce undesired competition between different public providers and increase the potential for co-operation among schools operating at the same level of education.

Monitoring demand and supply of school places and building planning capacity at relevant levels of government

High-quality data on the current capacity of school facilities and reliable forecasts of future demand are essential for the strategic planning and organisation of school networks. Effective monitoring and forecasting mechanisms can help countries develop strong administrative tools that enable them to recognise and respond to capacity challenges early on. The requisite data may be collected locally or centrally, on an ad hoc or regular basis and may include both quantitative and qualitative information on the capacity and condition of buildings and learning spaces. Particularly in decentralised systems, training local authorities to interpret and use capacity data or providing them with access to centrally administrated databases and infrastructural indicators can enhance their ability to plan their school networks effectively.

Pointers for policy: Combining robust models to forecast enrolment with high-quality data on the current state of educational provision can help authorities to identify and respond to discrepancies between the supply and demand for school places. Data collections and inventories are most effective if they are subject to regular updates and cover facilities across all relevant providers and sectors. Crucially, this data can also serve as a basis to assess the viability and expected effects of competing strategies to enhance the efficiency of the school network, such as sharing, clustering or closing facilities. If supplemented with information on the quality and condition of learning spaces, infrastructural inventories can also help to identify investment priorities and forecast renovation or maintenance needs. Capacity building should ensure that authorities at relevant levels can leverage the potential of these planning tools strategically.

Designing regulations and incentives for network efficiency that are sensitive to student needs and local contexts

The structure of a school network, including the size and distribution of its constituent units, has a significant impact on the resources required to operate and maintain its facilities. The average school size and proportion of very small providers varies considerably across OECD countries. Given the cost associated with excess capacity and instruction in very small schools or classes, this has prompted concerns about the efficient use of public funds in some systems. Steering tools such as minimum school and class size regulations can promote the provision of education services at an efficient scale and the parameters of funding formulas can create incentives for greater network efficiency. Strict per capita funding, for example, places larger providers with lower fixed costs at an advantage and encourages school consolidation. So can one-off payments in support of rationalisation projects. However, given the heterogeneity in regional and local contexts, it is important to bear in mind that there is no "one size fits all" solution to the size and distribution of schools. Many systems therefore face the challenge to reconcile incentives for a rational organisation of the school network with the recognition that high-quality instruction in small schools is more resource intensive and should be supported accordingly, particularly where consolidation is not an option.

Pointers for policy: Regulations and incentives for network efficiency need to be sensitive to student needs and local contexts. While incentives for the increase of schools' size may improve educational quality and efficiency in some contexts, enforcing a lower bound may be neither feasible nor desirable in geographically isolated areas. To address this tension, authorities can exempt schools from size requirements if they are identified as meriting protected status to avoid placing student in remote areas at a disadvantage.

Thresholds should also reflect the pedagogical requirements and needs of students in different age groups and take into account the special attention required, for example, by disadvantaged students and those with special educational needs (SEN). Supporting network restructuring projects with direct grants provided outside the main funding formula can be another flexible solution that allows giving adequate consideration to schools' role within their local educational context.

Supporting educational quality and network efficiency with adequate licensing procedures

Licensing procedures that regulate the creation of new schools play an important role in supporting equity, educational quality and efficiency in dynamic school networks. Low barriers to entry and incentives for the establishment of new (public or private) schools can be a way to increase the supply of school places and broaden parental choice. At the same time, it can lower educational standards, contribute to the fragmentation of the school networks and thwart efforts to consolidate excess capacity. To support quality, equity and efficiency, licensing criteria thus need to be well-aligned with policy priorities. Divided responsibilities for licensing new schools and funding can diminish incentives for network efficiency and reduce the scope for strategic planning, just as decentralised licensing procedures can raise concerns about transparency and the consistent application of quality assessment procedures.

Pointers for policy: Particularly in systems seeking to adapt their school networks, licensing procedures should be aligned with policy priorities. In regions without evidence of capacity shortages, authorities should ensure that the licensing of new providers and the allocation of public funds is conditional on the positive assessment of both quality and needs, for example by demonstrating demand for a sufficient number of classes above a minimum threshold. Needs-based assessments can also support the efficiency and relevance of the vocational offer by taking into account the views of and demand from relevant stakeholders and social partners in the licensing of schools or the accreditation of new programmes. The implementation of such needs-based licensing procedures relies on the formulation of clear, adequate and transparent criteria, their reliable measurement as well as sufficient capacity among school authorisers to carry out the corresponding assessments.

Ensuring equitable access to capital funds and the efficient management of infrastructural investment

Although – compared to staff salaries – a relatively small share of educational expenditure is devoted to physical resources, funding for educational materials and the construction and maintenance of school buildings is one of the most significant investments in public infrastructure. The mechanisms by which these capital and maintenance funds are distributed play an important role in ensuring that they are used effectively and reach the areas and facilities most in need of investment. While funding for current expenditure is usually allocated using earmarked grants or restricted block grants, the distribution of capital funding tends to rely on ad hoc grants and investment programmes. While these distribution mechanisms provide the requisite flexibility to redress the greatest infrastructural needs as they arise, they often require technical capacity and experience on the part of schools or local authorities, which can exacerbate inequities. Even if they succeed in accessing capital funding, some authorities may lack

the means to effectively manage large infrastructural developments, procurement processes and the purchase of materials and services.

Pointers for policy: To ensure a fair distribution of capital funding to the schools and locations that need it the most, distribution mechanisms should minimise barriers for recipients with less technical expertise and experience. Capacity building for schools and local authorities should ensure that they can successfully bid for infrastructure funding where necessary. Professional development programmes should equip them with the skills needed to provide effective oversight over capital development projects to ensure they are getting value for money. Central guidelines for the construction of school facilities can further reduce the costs of planning procedures and ensure the fulfilment of quality standards and policy objectives related to issues such as environmental performance or accessibility. Likewise, sharing best practices among schools and facilitating their co-ordination of procurement processes can improve the cost and time of constructions.

Adapting the school network in urban, rural and remote areas

To develop and maintain infrastructures that provide all students with adequate spaces to learn is a critical condition for an accessible and high-performing education system. Schools that are overcrowded or inadequately maintained, that lack facilities conducive to students' learning, health and comfort or that are too distant from their homes are a significant barrier to achieving this goal. At the same time, demographic shifts, regional economic developments and changing student needs have exposed many school systems to costly mismatches between educational demand and supply in both rural and urban areas. Adapting the school network in response to these challenges has therefore become a central aim for systems seeking to enhance their efficiency to free up resources for the improvement of student outcomes. Place-based challenges and territorial heterogeneity in the structure of school networks call for strategies that are highly sensitive to local contexts.

Selecting appropriate strategies to enhance efficiency in school networks with excess capacity

Operating fragmented school networks with a large number of small schools or facilities with significant overcapacities can place a significant financial burden on education systems. Many OECD review countries have responded to this challenge by closing selected schools and transferring their students to proximate sites. Larger schools with lower per-student fixed costs may offer their students greater curricular diversity, specialised teachers, better equipment and facilities as well as the ability to organise all instruction in single-grade settings. Nevertheless, the disruptive experience of relocation and increased travel distances can negatively impact students' well-being and learning outcomes in the short term. In addition, the process of consolidation can generate substantial public and private transition costs that need to be weighed against any economic benefits. In this context, many education systems are struggling to respond to an enduring decline of student enrolment in parts of their school networks while preserving students' access to high-quality education and accounting for the needs of local communities. Yet, OECD review countries have used different strategies to successfully adapt and enhance the efficiency of their school networks, ranging from the shared use of facilities to the clustering of schools under a shared administration.

Pointers for policy: When adjusting school networks to enhance their efficiency and free up resources to improve student outcomes, policy makers should consider a range of different strategies to select the approach most suited to a given context. In many cases, fostering co-operation and resource sharing between providers can allow smaller institutions to benefit from economies of scale and enhance efficiency while leaving the number, size and distribution of school facilities intact. Where possible, authorities should encourage this practice and reduce barriers or disincentives for small schools to engage in voluntary collaboration. This may include jointly providing specialised services or curricula; sharing human resources, facilities and back-end infrastructure; jointly purchasing materials or services; co-ordinating student transportation; and jointly offering professional development opportunities for teachers.

If properly administered, the creation of school clusters under joint administration can also generate significant improvements in efficiency and educational quality without diminishing the geographic coverage of the school network. In light of its complexity, the successful introduction of a centralised leadership team and budget for multi-site schools may require active support from regional or central authorities and an effort to build the requisite capacity for pedagogical and administrative leadership. Finally, authorities should take a modular approach to the educational offer and consider more targeted, selective forms of consolidation by rethinking how grade levels and different types of provision are combined and distributed across school sites.

When engaging in consolidation, authorities need to carefully weigh the benefits of school closures against their social and economic impact on surrounding communities, the transition costs generated in the process and the public and private expenditure on longer commuting distances. They need to ensure that the transition process is as smooth as possible, consult relevant stakeholders, identify and take precautions against any negative impacts on equity or local development and ensure that adequate transportation arrangements are in place by the time students are reallocated. A combination of policy levers including financial incentives and direct support can facilitate the closure process and assist the remaining schools in integrating transferred students.

Compensating for efficiency, quality and equity challenges experienced by remote rural schools

Very small rural schools often have difficulty recruiting and retaining teachers in certain subject areas and preparing them to teach effectively, for example in multi-grade settings. They may also lack the student numbers and personnel to offer specialised courses and after-school activities, and they can struggle to provide a supportive learning environment for specific student groups, such as special needs or academically gifted students. While the performance differential between rural and urban schools is largely explained by their students' socio-economic background, rural students' educational aspirations are significantly lower on average. Factors related to schools' resources and regional economic conditions likely contribute to this gap. Particularly in remote rural areas, these problems are frequently compounded by geographic isolation, which limits the scope for inter-school co-operation, clustering or consolidation. A range of compensatory policies, including targeted funding and the use of ICT, can ameliorate the limitations imposed by the course offering and personnel of small rural schools and put them in a better position to provide their students with the high-quality education they deserve. Given that these schools are often embedded in tight-knit communities and serve an important role in their social life, many of them have sought to leverage the support of parents, small businesses and other local actors to ameliorate their condition. A lack of transparency and overly

rigid regulations of volunteer involvement, however, can create uncertainties and barriers that reduce the ability of rural schools to draw on local support.

Pointers for policy: Where consolidation, inter-school co-operation and other means to improve the efficient provision of quality education are not an option, authorities should consider providing struggling schools with targeted financial support. In light of the higher per-student cost faced by small remote schools and their difficulty in attracting specialist teachers, dedicated compensatory funding or targeted programmes can support their teachers' professional development or collaboration and vital services such as school transport arrangements. In addition, support for initial teacher preparation and effective "grow your own" programmes can help to alleviate concerns about teacher shortages in rural settings. While distance education and other forms of ICT-supported learning can offer remote schools a way to expand educational access and broaden their course offering, it is critical to build capacity among teachers and principals to use these tools effectively. Finally, to ensure remote schools can leverage the support of their local communities, a constructive regulatory environment should be combined with monitoring to ensure that health and safety regulations are adhered to and public resources are spent effectively.

Responding strategically and sustainably to capacity shortages

Particularly urban areas in many OECD review countries are faced with rising demand for school places, caused by residential development, increased birth rates and regional or international migration dynamics. These trends can be long-lasting or short-lived and appear with varying degrees of predictability, which makes it difficult to respond to them effectively under significant space constraints. Initiating new construction in response to temporary spikes in enrolment can render school buildings obsolete before the investment has paid off. Conversely, short-term solutions such as the intensified use of existing buildings or temporary facilities are unlikely to be efficient and beneficial for student learning if the level of enrolment remains high in the long run. While a high density of schools and students can enable cities to provide a rich educational offer and extensive choice, urban school networks are also more vulnerable to socio-economic segregation. To ensure that all students benefit from the rich educational opportunities afforded by dense school networks, policy responses should address the multi-faceted causes of segregation, bridging multiple domains from education to transport and housing.

Pointers for policy: Authorities in high-density areas need to cultivate strategic foresight and the capacity to distinguish long-term enrolment trends from short-term fluctuations to ensure that the school network's capacity grows in line with increased long-term demand. This may include providing the responsible authorities with the analytical tools and capacity to identify areas of heightened demographic pressure and the sites where new school constructions can most effectively pre-empt or alleviate overcrowding. Contingency plans and guidance materials should be used to help schools and local authorities find adequate solutions where increases in student enrolment are expected to be temporary or occur too rapidly for new constructions to offer sufficient relief. These can include optimising schools' use of their available spaces, re-directing students to undersubscribed providers, temporarily relaxing maximum class size rules, or deploying mobile classrooms. These prefabricated classrooms can add flexibility to the school network and attenuate the negative impact of acute overcrowding. Nevertheless, high standards should ensure that they not only guarantee the students' health and safety but also provide them with a high-quality learning environment. To ensure that school networks expand in line with long-term educational demand, developer contributions can

be an effective way to share the burden for infrastructural investments and local authorities should be enabled to negotiate satisfactory agreements if they are subject to site-by-site negotiations.

Making educational quality, equity and student well-being the guiding principles for network reforms

Education policy has an important role to play in ensuring that school networks are sufficiently adaptable to ensure their long-term efficiency and sustainability. Regardless of whether this goal is pursued through greater school collaboration, consolidation or the expansion of capacity, advancing educational quality, equity and student well-being should be the guiding principle for any network reforms. While school consolidation, for example, can provide students and teachers with access to better learning and professional development opportunities in some cases, it may result in prohibitively long travel distances in others. Making students' educational benefit central to network reforms thus requires policy makers to acknowledge the limits of consolidation and to ensure that access to schools at a reasonable distance remains a priority, particularly for younger children. For school network reforms to benefit students of all backgrounds and needs, it is also essential for authorities to identify their potential impact on equity and the well-being of specific student groups in advance to take the necessary steps to address them.

Pointers for policy: As with any major reform project, the reorganisation of school networks should be preceded by the systematic consultation and engagement of all major stakeholders. This can help to resolve conflicts before they arise, hold authorities to account, yield solutions that are suitable to the local community's needs and ensure that stakeholders are willing to effect change and possess the tools to implement a reform as planned. Authorities should contribute to this process by maintaining a high level of transparency, articulating a clear educational vision for the reforms and demonstrating that it will bring about tangible improvements in educational quality. Central guidance on when and how to conduct consultation procedures can be an effective means to support local authorities and align expectations among all actors involved. For school network reforms to benefit students of all backgrounds and needs, careful projections based on research evidence and the continuous monitoring of equity developments should be integrated into their planning and design from the outset. At the same time, representatives of vulnerable groups can be consulted and involved at key stages of the proposed reforms' design and implementation. While authorities should draw on best practices and international experiences with network reforms, generating and sharing evaluation results at the sub-system level can also be effective in fostering system-wide learning and can generate reliable insights into the effects of networks adjustments on students.

Co-ordinating educational levels, sectors and programmes

Providing all students with a high-quality education where they need it depends not only on the construction and maintenance of school facilities, but also on the rational distribution of education services across school sites and the co-ordination of its various components. The failure to effectively organise educational levels, sectors and programmes risks causing the duplication and fragmentation of school services, barriers to students' smooth progression through the system and their inadequate preparation to transition into post-secondary education or the labour market. Authorities therefore need

to engage in both the vertical co-ordination of school years and levels as well as the horizontal co-ordination of parallel sectors and programmes.

Easing students' vertical transitions across school years and levels through effective co-ordination and targeted support

Ensuring that students' transition smoothly across school years and levels is a critical condition for their successful vertical progression throughout compulsory and upper secondary education. Misaligned course contents, a lack of guidance or support, and weakly connected remote schools are just some of the many barriers that students can face along the way. Consequences such as year repetition, early school leaving, and unsuccessful transitions beyond secondary education remain a challenge in many OECD review countries. School systems are keenly aware of the significant individual and social costs that this problem imposes and have sought to address it by easing transitions and providing targeted support to those who stand to benefit from early intervention. Many school systems, however, struggle to anticipate students' failure, which prevents them from providing intensive, individualised support to struggling students and identifying systemic or organisational difficulties in supporting student with specific profiles. Likewise, while career and guidance counselling can be effective in enhancing students' transitions between levels of education and into the labour market, they are severely under-resourced in many OECD review countries.

Pointers for policy: Strengthening connections between levels of education through administrative co-operation or even their integration can ease students' transitions while also rationalising resources and reinforcing equity, professional collaboration and supervisory capacity. Designing explicit transition programmes or combining different levels of schooling into a single organisation in areas with high rates of early school leaving can help to ease vertical transitions for all students. These structural approaches should be complemented with targeted strategies to support students early on and address learning gaps before they widen. Early warning indicators that identify students who are at risk of grade repetition and dropout can provide a strong basis to prevent unsuccessful transitions and school failure, if combined with effective support and interventions. Strategic investments in data-supported counselling is resource intensive but can have a meaningful impact on students' transitions and long-term trajectories. Lower-cost strategies involving insights from behavioural science, such as nudges to promote enrolment in tertiary education programmes, can be effective complements to remedy specific challenges.

Ensuring the VET offer's continued relevance and facilitating its students' horizontal transitions

The desire to improve the quality of educational provision and ensure that it matches each student's interests and potential, has led many school systems to offer a variety of educational pathways and parallel programmes. The risks associated with this approach include increased segregation, mismatches in students' pathway choices and a fragmentation of the educational offer. The horizontal co-ordination of education services across sectors and programmes and the ability to guide students to programmes that correspond to their interests and needs is therefore critical to reap the benefits of a diversified offer. Part of this challenge is to improve the fluidity between vocational and general education programmes and the evidence suggests that such transitions remain

rare, even in systems that aspire to strengthen horizontal transitions and provide the requisite pathways.

Vocational education plays a central role in training highly-skilled young adults for the jobs of the future and the significant amount of resources devoted to VET students makes its efficient organisation and alignment with labour market needs a priority. Nevertheless, a lack of structured consultation procedures with industry representatives and limited use of labour-market forecasts has frequently resulted in VET programmes offering training that no longer reflects the structure of regional labour markets. In addition, despite the proven benefits of work-based learning, many VET programmes remain insufficiently connected to the world of work and overlook the potential for a broader involvement of employers in upper secondary VET. Complex governance arrangements in vocational education, fragmented school networks and a lack of co-ordination or oversight can add to these challenges. Poor planning and weak incentives for co-operation between local authorities are also prone to generate inefficient duplications in the educational offer, such as schools offering similar vocational programmes in close proximity to one another.

Pointers for policy: Regular consultations with labour market actors and rigorous forecasting of projected labour market needs can strengthen the system's capacity to provide students with a VET offer that is aligned with industry needs. Including a substantial work-based component in VET programmes has not only been shown to improve the labour-market outcomes of graduates, but also provides opportunities for mutually beneficial cost-sharing arrangements between public and private actors. The design of funding mechanisms can also play an important role in setting incentives for the efficient provision of the vocational offer, just as fostering collaboration between regional providers can reduce duplication and make VET programmes more coherent. Facilitating students' transitions between vocational and general education pathways has the potential to give more students access to tracks that match their interests and potential and to reduce the impact of socio-economic background on track choice or student outcomes.

Addressing infrastructural, administrative and pedagogical barriers between SEN and mainstream education to support inclusion

Over the past 40 years, at varying rates, OECD countries have recognised the imperative to provide equal educational opportunities to students with special educational needs (SEN). Recent evidence has added weight to the moral argument, demonstrating improved academic and life outcomes from educating students with SEN in the least restrictive environments while providing additional supports. Nevertheless, many systems still have a long way to go to create more welcoming and productive classrooms for students with special needs. Difficulties in the valid and reliable identification of special needs students have emerged as a significant obstacle to successful inclusion practices in some systems. While the paucity of international standards and comparable data limits the knowledge base on identification and inclusion practices, there is evidence of systematic over- or misidentification in some systems, which can have serious negative consequences for the students concerned and create negative externalities for the education system as a whole. The cost of educating students with SEN is high and the failure to accurately target these resources may come at the expense of those who need them the most.

As systems move towards integration and greater numbers of SEN students are educated in mainstream settings, co-ordination and collaboration across sectors plays an increasingly important critical role. Education systems may need to make significant

investments and build capacity to reduce infrastructural, administrative and pedagogical barriers between special education and general schools. In some countries, for example, special education schools are governed by different authorities than mainstream schools. In addition to the difficulties this creates in monitoring school quality, licensing teachers, co-ordinating resources, and the creation of staff development plans, divided responsibilities can make the partial integration of students difficult.

Pointers for policy: The valid and reliable identification of students' needs is a cornerstone of the effective co-ordination between mainstream and special needs education. Developing clear, standardised protocols for teams of educators and health professionals to recognise students' special needs is an important step in this direction. They can also ensure that all relevant actors (students, families, teachers, school leaders, social workers, guidance counsellors, psychologists, health professionals and others) can have a voice in the decision-making process. Linking these protocols to data collections can help agencies to recognise irregularities and monitor whether all steps of the identification process have been taken. To support these efforts, governments should ensure that funding formulas do not create perverse incentives to over-identify SEN students or retain them in separate schools. This could mean equalising weighted per-student allocations across placements and differentiating them based on students' objectively identified category of SEN. Likewise, appropriate monitoring procedures should ensure that these funds are used at the school level to serve SEN students or early intervention practices. Depending on the existing degree of integration, a range of measures can help systems improve the collaboration across sectors by reducing infrastructural, administrative or pedagogical barriers between them. Permitting staff working in special education schools to support instruction in mainstream settings and offering transferable licenses can, for example, facilitate the conversion of special needs schools into service providers offering multiple mainstream schools specialised assistance for the integration of SEN students.

Chapter 1. Introduction

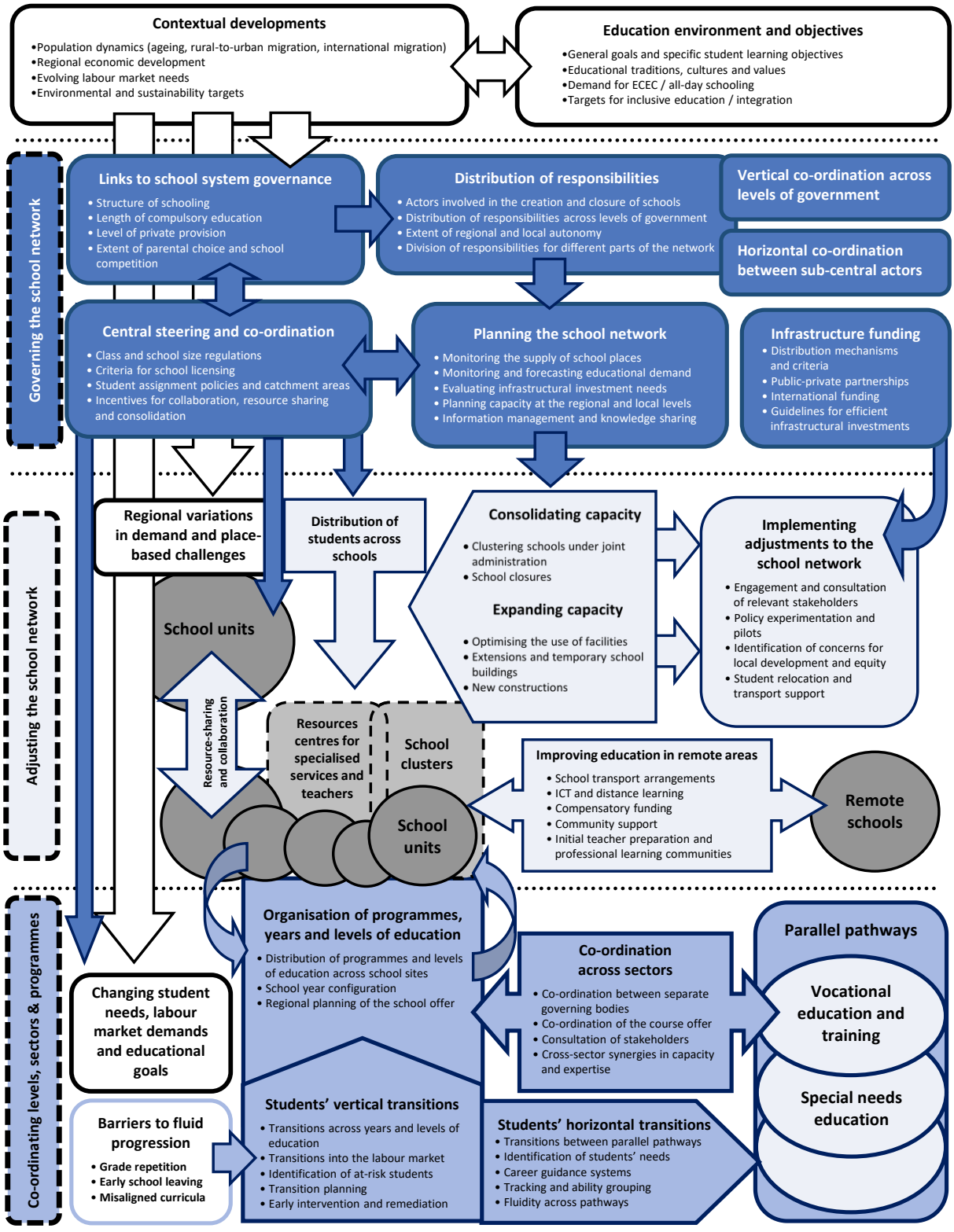
This report analyses policies that can help countries improve the organisation of school facilities, sectors and programmes to advance educational quality, equity and efficiency. This chapter introduces and provides the context for the subsequent analyses. First, it explains why the organisation of educational infrastructure matters and how the distribution and size of schools can affect a system's educational performance and efficiency. Second, it highlights the importance of coordinating educational levels, sectors and programmes to support these goals. Third, it explores major developments and trends in educational demand and students' needs that school systems need to respond to. The chapter then explains the report's methodology and the evidence on which it draws.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

This report provides analyses and advice on policies concerning the organisation of school facilities, sectors and programmes, considering both the physical school network (i.e. the entirety of a system's educational facilities), and the organisation of education services within this network. It is intended to help school systems meet their quality, equity and efficiency objectives and ensure that all students can benefit from a high-quality educational provision where they need it. The first part of the report (Chapter 2 and Chapter 3) is primarily concerned with policies affecting the size and distribution of school facilities as well as the relationships between them. The second part of the report (Chapter 4) focuses on education sectors, levels and programmes, the way they are co-ordinated and distributed across school sites and how this affects students' horizontal and vertical transitions through the system (see Figure 1.1 for an analytical framework and the themes explored in this report). A wide range of endogenous and exogenous developments, including demographic trends and policy changes, mean that educational demand and students' needs are constantly evolving. The central challenge addressed by this report is how the organisation of school facilities, sectors and programmes can enable school systems to respond to these changes and promote student success in an efficient and equitable way.The report examines how the distribution and size of schools impact expenditure, how the responsibility for their construction and maintenance is distributed, and which governance arrangements can facilitate the school network's ability to adjust in the face of changing demand and students' needs. It also analyses how assignment policies, parental choice and transport provisions shape the distribution of students across schools and takes stock of promising strategies to reduce student segregation and inequities in access. Finally – assuming the students' perspective – the report considers how the distribution of education services across school sites, the articulation of pathways and the relationships between sectors (including general and vocational, mainstream and special needs education) can support students' successful progression through the school system. The modalities of students' horizontal and vertical transitions, including tracking, selection and grade repetition policies, are evaluated both in terms of equity and their effectiveness in matching students to programmes that correspond to their interests and needs.

It should be noted that the subject of this report is in many ways linked to those of other thematic comparative reports prepared by the OECD School Resources Review, namely the funding of school education (OECD, 2017[1]) and the management of human resources (forthcoming in 2019): Efforts to improve the organisation of the school network and education services must be complemented by supportive funding mechanisms that are aligned with policy priorities and educational objectives. Likewise, adjustments to the school network affect both teachers and principals and the provision of high-quality education relies on qualified personnel to deliver it. While these issues are touched upon in the report at hand, more in-depth analyses of school funding and human resource policies can be found in the OECD review's first and third thematic reports.

Figure 1.1. Framework to analyse the organisation of educational facilities and services



1.1. Why physical resources in education matter

Although – compared to staff salaries – a relatively small share of educational expenditure is devoted to physical resources, funding for educational materials and the construction and maintenance of school buildings is one of the most significant investments in public infrastructure. Non-staff related spending accounts for 28% of the average OECD education budget and varies considerably across countries, ranging from 20% or less in Belgium, Ireland, Mexico and Portugal to more than 40% in the Czech Republic, Finland, Hungary and Latvia (see Chapter 2, Figure 2.5). There is no doubt that attracting, developing and retaining effective teachers is central to building a high-performing education system[1]. Yet, providing adequate facilities and materials where they are needed is a necessary condition for teachers to realise their full pedagogical potential and create effective learning environments with their students. The efficiency with which school systems employ physical resources and organise their educational offer and to achieve this end is thus critical to enhance their performance and their ability to focus on what matters the most for students' success.

Spending on physical resources in education is, in part, a function of the size and location of schools, their age and condition, as well as the educational programmes they provide, which may account for some of the observed variation across school systems. Yet, the level of spending on infrastructure and school materials also depends on the efficiency of their use, the timing of investments and negotiations at the point of purchase, as well as schools' capacity to enter mutually beneficial resource-sharing arrangements and to rationally distribute education services across school units.

Developing and maintaining infrastructures that provide all students with adequate spaces to learn is a fundamental condition for an accessible and high-quality education system. Meta-analyses have found particularly young students to be affected by the condition of their school buildings (Gunter and Shao, 2016[2]) and evidence suggests that some infrastructural improvements can exert a positive impact on teachers, students and the wider community (Cellini, Ferreira and Rothstein, 2010[3]; Conlin and Thompson, 2017[4]; Neilson and Zimmerman, 2014[5]). A central aspect of this is to ensure the geographic coverage of school networks and the proximity of education services to students' homes. Excessive distances and inadequate school transport arrangements can be detrimental to both attendance and students' outcomes. In and it itself, enhancing existing infrastructures beyond the point of adequacy is rarely the most effective way to improve students' learning experience. Yet, schools that are overcrowded or inadequately maintained, that lack facilities conducive to students' learning, health and comfort or that are too distant from their homes can thwart an education systems' pursuit of excellence.

1.2. Why the organisation of educational levels, sectors and programmes matters

Providing all students with a high-quality education where they need it depends not only on the construction and maintenance of school facilities, but also on the rational distribution of education services across school sites and the co-ordination of its various components. The failure to effectively organise educational levels, sectors and programmes risks causing the duplication and fragmentation of school services, barriers to students' smooth progression through the system and their inadequate preparation to transition into post-secondary education or the labour market. Authorities therefore need to engage in both the vertical co-ordination of school years and levels as well as the horizontal co-ordination of parallel sectors and programmes.

The vertical co-ordination of students' pathways across school years and levels of education is critical to ensure their smooth progression throughout compulsory and upper secondary education. Misaligned course contents, a lack of guidance or support, and weakly connected remote schools are just some of the many barriers that students can face along the way. Consequences such as year repetition, early school leaving, and unsuccessful transitions beyond secondary education remain a challenge in many OECD review countries. The failure to design pathways conducive to a smooth vertical progression of students throughout the system leads to both an inefficient and inequitable use of school resources, imposing significant individual and social costs (see Chapter 4, Figures 4.3 and 4.4).

The horizontal co-ordination of education services across sectors and programmes is equally critical for the efficient use of school resources. Offering students and families a variety of educational pathways and parallel programmes promises a diverse educational provision that matches each student's interests and potential. At the same time, it may lead to increased segregation, mismatches in students' pathway choices and a fragmentation of the educational offer. The horizontal co-ordination of education services across sectors and programmes and the ability to guide students to programmes that correspond to their interests and needs is therefore critical to reap the benefits of a diversified offer. Complex governance arrangements, fragmented school networks and a lack of co-ordination and oversight can contribute to misalignments or duplications in the educational offer and make it difficult to students to access programmes that match their interests and needs. In vocational education, for example, poor planning and weak incentives for co-operation between local authorities or between public authorities and private providers is prone to result in schools offering similar vocational programmes in close proximity to one another and, by extension, duplicating costs. Likewise, supporting students with special educational needs (SEN) relies on the effective co-ordination of resources and expertise between special needs providers and mainstream schools.

1.3. Trends affecting the organisation of school facilities, sectors and programmes

A number of demographic trends, economic and social changes, as well as new and evolving educational objectives have required countries to respond and adjust the way they organise their school infrastructure and the education services it delivers. They have caused changes in educational demand (that is, the number of school places required in a given area across educational levels and sectors), students' needs (encompassing both the need for specific pedagogical provisions and students' overall well-being), and education policy goals. There is no doubt that the impact of the developments elaborate below extends well beyond the organisation of school facilities and their educational offer, but their effect on tertiary and adult education as well as other areas of public spending is beyond the scope of this report.

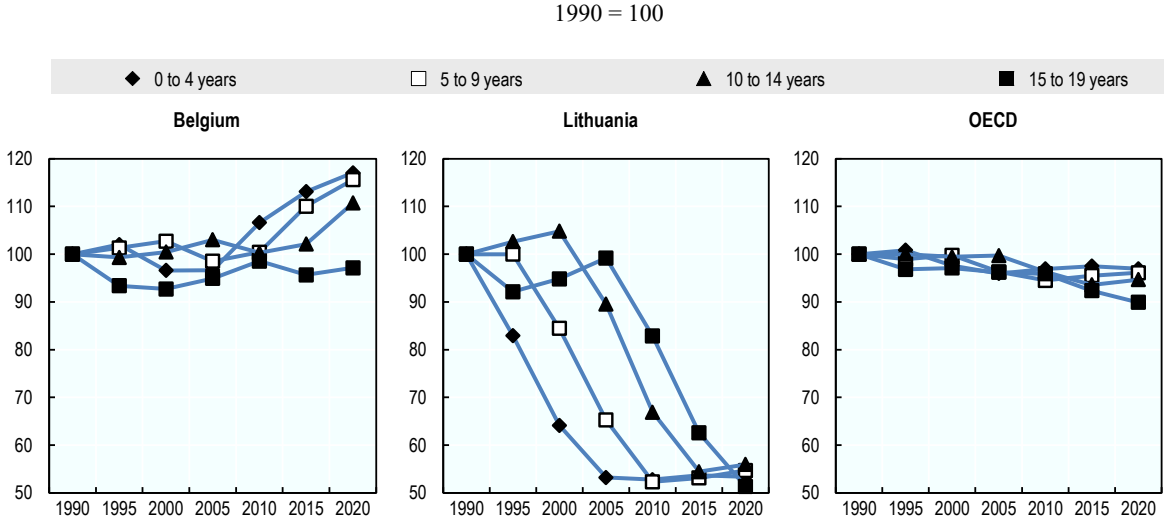
Demographic developments have placed different pressures on rural and urban school networks

Demographic developments, including regional and international migration and fluctuating birth rates, are an important factor in the change of educational needs and demand and affect how school systems can efficiently organise their educational offer. Some trends, such as declining fertility rates are widespread among advanced and emerging economies and, on average, OECD countries are projected to experience a continued population decline over the coming years, at least in their upper secondary

school-age population. Despite this general trend of shrinking student populations, there is considerable variation both between countries and their constituent regions.

While countries like Belgium have experienced a sharp rise in their primary and lower secondary student populations over the past decade (mainly due to international migration), declining birth rates and emigration have caused a drastic drop in the school-age population of some Central and Eastern European countries. In Estonia, for example, the number of students in general education dropped by 22% between 2005/06 and 2013/14 (see Figure 1.2). This trend is expected to continue in the longer term and has, despite a small rebound in recent years, left the country with a school network whose capacity greatly exceeds the number of students it serves (Santiago et al., 2016[6]).

Figure 1.2. Historical development and projection of the school-age population across OECD countries, in Belgium and Lithuania (1990-2020)



Source: OECD (2016), *Historical Population Data and Projections (1950-2050)*, https://stats.oecd.org/index.aspx?DataSetCode=POP_PROJ.

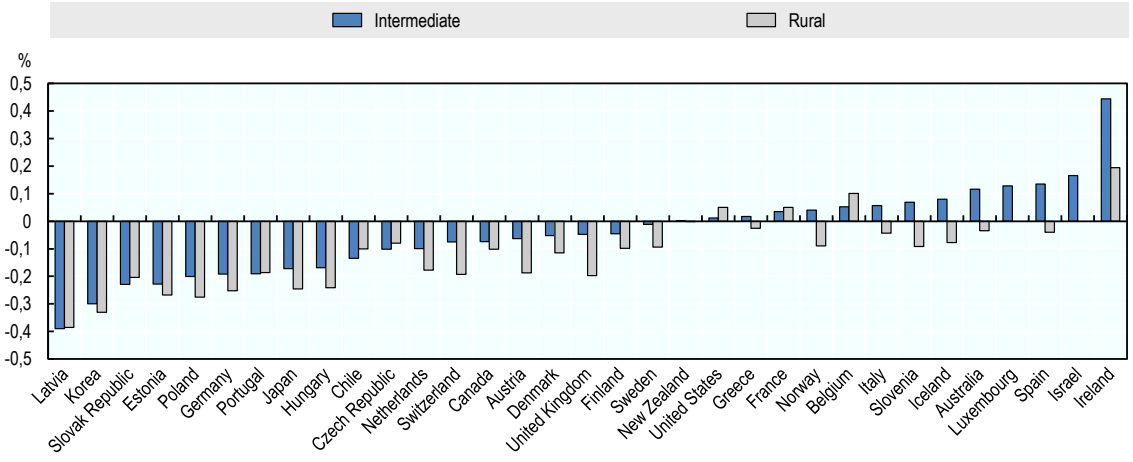
StatLink https://doi.org/10.1787/888933831089

The demand for school places is subject to significant regional heterogeneity, which has forced many OECD countries to respond to opposite developments across different parts of their school networks. In the Czech Republic, for example, internal migration and decreasing birth rates have caused considerable growth in the school-age population of Prague and the Central Bohemian region (3% and 14% between 2001 and 2012 respectively), while other parts of the country have grappled with a decline of up to 18% (Shewbridge et al., 2016, p. 61[7]). The rapid expansion of urban centres has often called for the construction or extension of educational infrastructure to provide sufficient school places and accommodate services like all-day schooling. By contrast, declining enrolment and the associated increase in the number of small schools has made the efficient provision of education increasingly difficult in many rural areas.

Rural-to-urban migration has been a universal trend among OECD countries and the rest of the world for over 50 years and cities continue to attract people hoping for better economic prospects, easier access to public services and a richer cultural offer. Between

1960 and 2013, the proportion of the population living in cities has increased across the world, reaching rates of up to 90% in OECD countries like Belgium (OECD, 2016, p. 64[8]). At the same time, rural areas in many OECD countries have been losing attractiveness, particularly among the young, resulting in a reduced population density and declining school-age population (OECD, 2016, p. 46[9]). Between 2001 and 2015, the absolute youth population below the age of 14 living in predominantly rural regions declined in almost all OECD countries, with the exceptions of Belgium, France, Ireland and the United States. By contrast, intermediate regions with mixed urban and rural populations have more frequently avoided this fate and even grown in some OECD countries over the past decades (see Figure 1.3).

Figure 1.3. Change in the absolute youth population (0-14) living in predominantly rural and intermediate areas between 2001 and 2015



Note 1: For Chile, change refers to the period 2002-15; For Netherlands: 2003-15; For Spain: 2002-15.
Note 2: Predominantly rural areas are those in which more than 50% of the population live in rural units; Intermediate areas are those in which 15% to 50% of the population live in rural local units.
Source: OECD (2017), Regional Demography, https://stats.oecd.org/index.aspx?DataSetCode=REGION_DEMOGR

StatLink https://doi.org/10.1787/888933831108

Increasing awareness of their educational benefits has led to rising demand for ECEC and all-day schooling

In a majority of OECD countries, the steady increase in women's labour market participation over the past decades has been paralleled by the expansion of early childhood education and care (ECEC) (OECD, 2016[8]). Increased parental demand and evolving family values have prompted many European governments, in particular, to expand ECEC services to allow parents to better reconcile work and family responsibilities (OECD, 2016[10]). High-quality ECEC is also increasingly recognised as effective in fostering the development of cognitive and non-cognitive skills that persist throughout a student's educational trajectory, particularly for children from less privileged socio-economic backgrounds (OECD, 2018[11]).

The importance of high-quality ECEC has been underlined by the United Nations' adoption of the Sustainable Development Goals in 2015 and the OECD's commitment to supporting Members and the international community in their achievement (OECD, 2016[12]). As part of Goal 4 (to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all"), countries have set themselves the target to ensure "that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education" by 2030 (United Nations, 2015[13]).

For similar reasons, many OECD systems in which it is not yet the norm, including Germany and Austria, have made the expansion of the school day in primary or secondary education a policy priority (OECD, 2018[14]). Like the expansion of ECEC, it is likely to support the labour market participation of parents, and mothers in particular. Providing students with a high-quality, integrated educational offer in the afternoon is also seen as a strategy to increase academic achievement, particularly among disadvantaged students. While all students would benefit from more learning time, extracurricular activities and guidance with their homework, advocates of all-day schooling argue that its benefits are particularly pronounced for children of families that are less capable of supporting them in this regard (Nusche et al., 2016[15]). Although few rigorous evaluations are available, some research has indicated a positive impact of extended days in kindergarten (Gibbs, 2014[16]) and sustained participation in high-quality afternoon activities at the primary and secondary level (Fischer and Klieme, 2013[17]). Yet, providing the infrastructure for all-day schooling and extracurricular activities can constitute a significant challenge and may require considerable adjustments to the organisation of instruction and the adaptation or expansion of educational facilities.

A greater recognition of special educational needs and increased emphasis on inclusion requires the adaptation of education services

School systems are increasingly emphasising the importance of recognising and providing inclusive learning environments for students with diverse educational needs. This commitment has been underlined by the goal to "ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations" by 2030, which was adopted as part of the United Nations' Sustainable Development Goals (United Nations, 2015[13]). Empirical evidence has added to the ethical arguments, demonstrating that educating students with disabilities in the least restrictive environments while providing additional supports improves their academic and life outcomes (Hanushek, Kain and Rivkin, 2002[18]). Due to the improved diagnosis of SEN and an increasing attention to students' right to participate in mainstream education, both the percentage of students identified with SEN and the proportion of them that are taught in inclusive settings has risen.

In light of these developments, education systems face the challenge to consistently and accurately identify students' educational needs and enable schools to meet them effectively. The misidentification of students' needs can have serious negative consequences for the students concerned and prevent systems from accurately targeting their resources to those who need them the most. At the same time, regulations increasingly aim to improve the accessibility of public facilities, which can require schools to make significant infrastructural adjustments (Leemans and von Ahlefeld, 2013, p. 15[19]). To ensure that these investments improve the opportunities of SEN students not only in terms of access but also educational quality, school systems also need to ensure the provision of adequate learning materials and well-prepared teachers and support staff.

Some school systems have recognised the potential of fostering the collaboration and moving towards a greater integration of mainstream and special needs providers. In some cases, this has taken structural forms, such as physically locating special needs provision in the same building as mainstream schools to provide opportunities for SEN students to take more classes in mainstream education settings. It can also involve efforts to build professional connections between mainstream and special education providers, and to encourage teachers with special education expertise to coach their colleagues.

Schools are expected to respond to new and evolving needs, in part due to international migration and increasing student heterogeneity

The academic and socio-emotional needs of students across the OECD have increased substantially over the past decade. Between the 2006 and 2015 PISA cycles, the percentage of students with an immigrant background in OECD countries increased from 9.4% to 12.6%, in line with the share of students who speak a foreign language at home (OECD, 2016, p. 421 ff.[20]). Increasingly diverse student populations, especially in urban areas, require many schools to provide specialised services and individualised support to meet their students' needs, reduce dropouts, year repetition, and poor labour market outcomes.

At the same time, the proportion of students who felt socially isolated in their school grew by nearly 10 percentage points between 2003 and 2015 – one of several OECD indicators pointing to students' growing socio-emotional needs (OECD, 2017, p. 345 ff.[21]). As the level of students' needs has increased, so too have ambitions to hold schools accountable for the measurable performance of all students. Thus, more than ever, schools must be enabled to continue their progress in helping a diverse range of students overcome the obstacles imposed by socio-economic and cultural disadvantage and to prepare them for responsible citizenship and success in the labour market.

Complex and highly differentiated school systems require efforts to ease students' vertical and horizontal transitions

As education systems grow increasingly complex (Burns and Köster, 2016[22]), their success relies on the capacity to ensure students' smooth progression through the system and access to appropriate support along the way. The failure to guide students along pathways that correspond to their educational interests and needs imposes significant individual and social costs as it increases inequities, the likelihood of school failure and skills mismatches in later life. Educational transitions are of particular significance in this regard as they constitute critical junctures in students' trajectories. Frictions and inefficiencies can arise from students' vertical transitions across years and levels of education (e.g. from pre-primary to primary school and from lower to upper secondary school), as well as their horizontal transitions between different school sectors (e.g. general and vocational education or mainstream and special needs education).

Chapter 4 addresses in detail how school systems can articulate the relationship between levels of education and different sectors within the school network to ease these transitions. Common barriers to students' vertical transitions include learning gaps and grade repetition, early school leaving and poor transitions into post-secondary education or the labour market. Common concerns in the horizontal co-ordination of the educational offer include early tracking into academically weak pathways, especially for disadvantaged students; an insufficient permeability between different educational

pathways; and inadequate arrangements for SEN students that provide them with limited learning opportunities.

Changing labour market needs create pressures for the vocational education and training sector to adapt its provision

Upper secondary vocational education and training (VET) programmes play a significant role in OECD education systems, educating nearly half of all upper secondary students across the OECD and over two thirds in some countries. As many jobs of the future are expected to require technical and interpersonal skills, but not necessarily at the tertiary level, policy makers have come to regard vocational education as central to their countries' economic and social success (Hoffman and Schwartz, 2017[23]; CEDEFOP and European Center for the Development of Vocational Training, 2017[24]; Richards, 2015[25]). The efficient provision of high-quality VET programmes requires the sector's careful co-ordination with both general education pathways and the world of work. Likewise, a lack of horizontal co-ordination is prone to lead to costly duplications in the VET offer.

For vocational programmes to be successful for both students and employers, it is increasingly recognised that VET must be a high-status pathway that develops flexible skill sets. Continuous changes in the skills profile sought by companies means that a wider and more flexible range of abilities is required from workers (Autor, Levy and Murnane, 2003[26]; Goldin and Katz, 2008[27]). Since firms rarely have a short-term incentive to unilaterally invest in the development of long-term human capital, education systems must design adequate funding mechanisms and support vocational programmes that meet these complex and changing demands (OECD, 2016[28]).

Educational facilities need to meet greater expectations and accommodate evolving pedagogical techniques

Evolving and increasingly ambitious goals arising both from within and outside the sphere of education place complex new demands on school infrastructures and learning environments. Growing concerns surrounding the consequences of climate change, for example, have led many countries adopt new standards for the construction of sustainable buildings and energy-saving infrastructures that schools are expected to comply with (Leemans and von Ahlefeld, 2013, p. 14[19]).

School facilities also need to be flexible to adapt to new pedagogical techniques and evidence on the effective use of learning environments. For example, the desire to equip students for the information age and prepare them for a world that is increasingly shaped by computers has prompted education systems to advance the integration of information and communication technology (ICT) in school buildings. Some systems require significant investments in their digital infrastructure in order to permit schools to fulfil ICT-related objectives. Accommodating new pedagogical approaches such as competency-based education and delivering on pledges to focus on student well-being may also require adjustments to learning environments and to the configuration of facilities within the school network (Leemans and von Ahlefeld, 2013, p. 15[19]).

1.4. The context for this report

This report was prepared as part of a major OECD study on the effective use of school resources resulting in the publication series *OECD Reviews of School Resources*. This publication series encompasses thematic comparative reports that synthesise the review's major findings on school resources policies, drawing on evidence from research and the project's country-specific analyses. The first three thematic reports cover the following topics: i) the funding of school education (OECD, 2017[1]); ii) responsive school systems (the present report); and iii) the management of human resources (to be published in 2019). Box 1.1 provides more information on the main features of the OECD review.

Box 1.1. The OECD School Resources Review

The *OECD Review of Policies to Improve the Effectiveness of Resource Use in Schools* (also known as the *School Resources Review*) was launched in 2013. This review is conducted in collaboration with countries and under the guidance of the OECD Group of National Experts (GNE) on School Resources, comprising representatives from all participating countries and other OECD Members. The review is designed to respond to the strong interest in the effective use of school resources evident at national and international levels. It provides analyses and policy advice on the use of school resources to help governments achieve quality, efficiency and equity objectives in education. It focuses on primary and secondary school education, although links to other levels of education are also established where relevant.

Key issues for analysis

School systems use a broad range of resources. This review primarily considers three types of closely interlinked resources:

- **Financial resources** (e.g. monetary transfers, school funding mechanisms).
- **Human resources** (e.g. teachers, school leaders, education administrators).
- **Physical resources** (e.g. buildings and school places, networks and clusters).

The overarching policy question guiding the review is "What policies best ensure that school resources are effectively used to improve student outcomes?" In considering policies to ensure that these resources are effectively used to improve student outcomes, the review focuses on four key issues for analysis: the governance of resource use (how to govern, plan and implement resource use); resource distribution (how to distribute resources across levels, sectors and student groups); resource management (how to manage, evaluate and follow up on resource use); and resource utilisation (how to utilise resources for different programmes and priorities).

Review objectives and methodology

The School Resources Review's analyses are designed to support governments in developing effective national education policies. In particular, the project proposes policy options to ensure that school resources are effectively and equitably used to improve student outcomes. The project provides opportunities for countries to learn from one another by exchanging best practices, and to gather and disseminate evidence on effective school resource policies. Through the public dissemination of its results, the project also seeks to inform policy debates on school resources among relevant stakeholders.

The project involves a reflection about the policy implications of the currently available evidence on the use of school resources in a wide range of national settings. The evidence is draws on includes relevant academic and policy papers published in peer-reviewed journals, detailed information provided by countries on their school resource policies, as well as the experience and perspectives of a wide range of stakeholders in participating countries. The work is undertaken through a combination of desk-based analysis, country reviews and periodic meetings of the GNE on School Resources, which provides feedback on substantive documents and determines priorities for further analytical work.

The work involves three major strands:

- **An analytical strand** draws together evidence-based policy lessons from international data, research and analysis. The analytical strand uses literature reviews, country background reports (CBRs) analyses data to investigate the factors that shape resource use in school systems. The CBRs use a common framework to facilitate comparative analysis and maximise the opportunities for countries to learn from each other.
- **A country review strand** provides individual countries with policy advice on resource issues tailored to their priorities, drawing on international evidence and the insights obtained by a team of experts visiting the country. For each country review, a team of up to five reviewers (including at least two OECD Secretariat members) analyses the CBR and subsequently undertakes an intensive case study visit of about eight days in length. Each study visit aims to provide the review team with a variety of perspectives on school resource policies and includes meetings with a wide variety of stakeholders. Country review reports are published in the series *OECD Reviews of School Resources*.
- **A synthesis strand** with the preparation of a series of thematic comparative reports. These blend analytical and review evidence and provide overall policy conclusions on specific themes.

Collaborations

This report was prepared within a broader framework of collaboration and a partnership with the European Commission (EC), which was established for the OECD School Resources Review. The support of the EC has covered part of the participation costs for members of the European Union Erasmus+ programme and contributed significantly to the preparation of a series of thematic comparative reports, including this publication. The review of Kazakhstan was undertaken in co-operation with the World Bank. Other international agencies collaborating with the project include Eurydice, the Inter-American Development Bank (IDB), the Organising Bureau of European School Student Unions (OBESSU), the Standing International Conference of Inspectorates (SICI), the United Nations Educational, Scientific and Cultural Organization (UNESCO) and UNESCO's Global Education Monitoring Report. Social partners are also involved through the contribution of the Trade Union Advisory Committee to the OECD (TUAC) and the Business and Industry Advisory Committee to the OECD (BIAC), which participate in the GNE as Permanent Observers.

1.5. Country participation and sources of information

The analysis in this report is based on multiple sources of evidence, including first and foremost the analysis of countries actively participating in the review. At the time of writing this report, 19 school systems were actively engaged in the review and will be referred to as the "OECD review countries" throughout. These 19 school systems represent a wide range of economic and social contexts, and illustrate diverse approaches to the organisation of school facilities, sectors and programmes, which enables this report to take a comparative perspective on key policy issues. In addition, this report seeks to go beyond information collected from OECD review countries by drawing on data collections and case studies from across the OECD and beyond, as well as the relevant international research literature.

Most of the OECD review countries also took part in a collection of qualitative data on the main features of their school funding approaches and prepared a detailed background report, following a standard set of guidelines. By July 2018, 12 of these school systems had also conducted a country review, undertaken by a review team consisting of members of the OECD Secretariat and external experts. Country reviews provide an independent analysis by the review team of identified strengths and challenges in the use of resources in these countries. In their analyses, the review teams have drawn on information gathered through interviews with a broad range of stakeholders, including social partners, during a main country review visit.

This report draws on four main sources of information:

- Eleven country review reports completed by OECD-led review teams for Austria, Belgium (Flemish Community), Chile, Colombia the Czech Republic, Denmark, Estonia, Kazakhstan, Lithuania, the Slovak Republic and Uruguay, as well as an ongoing country review of Portugal.
- Sixteen country background reports completed by the following school systems: Austria, Belgium (Flemish Community), Belgium (French Community), Chile, the Czech Republic, Denmark, Estonia, Iceland, Kazakhstan, Lithuania, Luxembourg, the Slovak Republic, Slovenia, Spain, Sweden and Uruguay.
- Seventeen responses to a qualitative data collection on national approaches to school funding provided by the following school systems: Austria, Belgium (Flemish Community), Belgium (French Community), Chile, the Czech Republic, Denmark, Estonia, Iceland, Israel, Kazakhstan, Lithuania, Portugal, the Slovak Republic, Slovenia, Spain, Sweden and Uruguay. The responses to selected questionnaire items were drawn on for part of the analysis in Chapter 2 and Chapter 3 and are summarised in comparative tables included in the respective chapters.
- A range of literature reviews bringing together research findings on relevant issues from as many school systems as possible beyond the OECD review countries. These literature reviews include, among others, OECD working papers on school size policies; the regulation of publicly funded private schools and student learning time.

1.6. The structure of this report

The report has four chapters. Following Chapter 1, which provides the context for the subsequent analysis and explains the importance of physical resources in education and the organisation of school sectors and programmes, Chapters 2-4 are concerned with the key substantive issues involved in the organisation of school facilities, sectors and programmes: *Governing the school network* (Chapter 2); *Adapting the school network to changing needs in urban, rural and remote areas* (Chapter 3); and *Co-ordinating educational levels and sectors to improve student trajectories* (Chapter 4). The chapters provide a description of different countries' approaches to organising school networks and education services; analyse strengths and weaknesses of different strategies; and provide recommendations for improving the organisation of school facilities, sectors and programmes.

Notes

[1] The management of human resources will be the subject of the School Resources Review's forthcoming third thematic report.

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Chapter 2. Governing the school network

This chapter describes the different actors involved in governing the school network, the roles and responsibilities they assume in different OECD and partner countries, and how their relationships affect the school network's capacity to meet demand for high-quality education. The chapter maps out steering and co-ordination mechanisms that can facilitate the strategic planning of school networks at the central as well as the regional and local levels. It also analyses challenges in aligning the development of the school network with infrastructural funding mechanisms. The chapter concludes by exploring a range of policy options to enhance the effective governance of school networks across levels of government.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

While the notion of the "school network" has in some contexts been used to denote specific school sectors and informal or formal associations of schools, this report uses the term to describe the entirety of school facilities through which education is provided in a given system (unless otherwise noted). In this context, governance therefore primarily concerns who makes, implements and monitors the decisions that affect the organisation of the school network and the basis upon which these decisions are made. This chapter describes the different actors involved in governing the school network, the roles and responsibilities they assume in different OECD and partner countries, and how their relationships affect the school network's capacity to meet demand for a high-quality education. In particular, the chapter considers i) the distribution of responsibilities in the governance of the school network, ii) how the strategic planning of school networks can be facilitated through central-level steering, iii) strategies to improve it through regional and local co-ordination and iv) how the strategic governance of the school network can be aligned with infrastructural funding mechanisms. Annex Table 2.A.1 includes relevant data on the distribution of capital expenditure from the OECD review's qualitative survey.

2.1. Distribution of responsibilities for the governance of school networks

Over the last decades, OECD school systems have grown in administrative complexity and are increasingly characterised by governance arrangements involving multi-level decision-making processes in which the links between actors operating at different levels are fluid and open to negotiation (Burns and Köster, 2016[1]). In addition, many OECD countries have undergone a process of decentralisation, increased school autonomy, and placed greater emphasis on market mechanisms and incentive schemes. These trends provide the context in which modern education systems have sought to distribute decision-making responsibilities and define relationships between different actors in the school system so as to render the governance of the school network more efficient and effective.

The developments mentioned above have taken place to varying extent across OECD countries. This is partly due to their different points of departure since some of them have a long-standing culture of devolution while others have historically been characterised by a high degree of centralisation. Federal countries such as Australia, Austria, Canada, Germany and the United States, have a long history of decision-making powers being shared between central and state levels. In others, such as Belgium and the Netherlands, the organisation of the school network is shaped by a strong tradition of school choice and the public funding of private education. A historically high degree of devolution in Finland and the United Kingdom also means that the local level has played an important role in schooling decisions for a long time (Burns and Köster, 2016[1]; OECD, 2017[2]). It is important to bear in mind these different institutional traditions to understand both the present organisation of school networks and the context in which the future development of their governance arrangements are likely to take place (OECD, 2017[2]).

Even where measures to adapt the school network are widely supported among stakeholders, complex governance arrangements can make it difficult to enhance its resource efficiency. Two of the key political and administrative challenges in addressing this issue are to reflect on the adequate distribution of network governance responsibilities between central, regional and local authorities as well as the division of responsibilities for different parts of the school network. The appropriate distribution of

these responsibilities depends on the wider governance context and, as will be further discussed below, there are many ways in which responsibilities can be effectively shared between actors at different administrative levels. Improving the arrangements for school network governance promises a more efficient use of school infrastructure. It also plays a role in reinforcing trust and promoting functioning relationships across levels and actors, in aligning curriculum and pedagogical approaches and in setting clear goals that guide students through their educational pathways, which is particularly important where student mobility is an issue.

Central, regional and local responsibilities for the governance of the school network and distribution of programmes

While there has been a general trend towards greater decentralisation in school systems over the past decades, the degree of local autonomy varies considerably across countries and domains of decision making. Compared with the organisation of instruction, for example, responsibilities for the governance of the school network and distribution of programmes across school sites tend to rest with more centralised tiers of government. Between 2003 and 2011, the proportion of decisions related to these matters that were taken at the central and state level has actually slightly increased while the proportion taken at the local and school level has dropped (OECD, 2012, p. 510; Table D6.6c[3]).

Some of the most consequential decisions affecting the organisation of the school network concern the creation of new schools and the closure of existing ones. As can be seen in Table 2.1, in 2011, the authority over the creation and closure of public lower secondary schools lay with central or state authorities in 14 OECD school systems. In half of these, the decisions were taken in full autonomy while the others let central authorities take their decisions after consulting with school, local or regional actors. Of the remaining countries, 16 assigned responsibility for the opening and closure of schools to local authorities. However, in only six systems did local authorities take these decisions autonomously, while the majority of them operated within frameworks set by higher level authorities (usually the state or central level) (OECD, 2012, pp. 505, Table D6.9.[3]).

Table 2.1. Responsibility for the opening and closure of public lower secondary schools, 2011

Country	Level taking the decision	Decision mode
Greece	Central	After consultation with regional level
Ireland	Central	After consultation with school level
Israel	Central	After consultation with local level
Luxembourg	Central	In full autonomy
Netherlands	Central	In full autonomy
Portugal (1)	Central	After consultation with local level
Slovak Republic	Central	After consultation with local level
Australia	State	After consultation with state and local level
Austria	State	After consultation with state and local level
Belgium (Fr.)	State	In full autonomy
Canada	State	In full autonomy
Mexico	State	In full autonomy
Spain	State	In full autonomy
Switzerland	State	After consultation with local level
Italy	Regional	Within framework set by central level
Korea	Regional	In full autonomy
Turkey	Regional	Within framework set by central level
France	Sub-regional	Other
Chile	Local	Within framework set by central level
Czech Republic	Local	Within framework set by regional level
Denmark	Local	Within framework set by central level
England	Local	In full autonomy
Estonia	Local	Within framework set by central level
Finland	Local	In full autonomy
Germany	Local	After consultation with state level
Hungary	Local	After consultation with sub-regional level
Iceland	Local	In full autonomy
Japan	Local	In full autonomy
Norway	Local	In full autonomy
Poland	Local	Within framework set by central level
Scotland	Local	Within framework set by central level
Slovenia	Local	Within framework set by central level
Sweden	Local	In full autonomy
United States	Local	Within framework set by state level
Belgium (Fl.)	School	Within framework set by state level

1: Information updated, 2018.
Source: OECD (2012), *Education at a Glance 2012: OECD Indicators*, OECD Publishing, Paris, http://dx.doi.org/10.1787/eag-2012-en, Table D6.9.

As the authorities responsible for the organisation of the school network vary, so do the ownership models that govern educational infrastructure. While some OECD review countries rely on the local ownership and management of school buildings, others have sought to increase administrative efficiency by centralising the ownership, administration and maintenance of their educational infrastructure. In Austria, for example, ownership of the majority of federal school buildings has been transferred to a federal agency – the Federal Real Estate Company (*Bundesimmobiliengesellschaft*, BIG). With only few federal schools remaining in the ownership of other proprietors such as municipalities, the ministry rents most of its schools from the BIG, which reinvests this revenue into the buildings' centrally co-ordinated maintenance, improvement and the network's expansion. Occasionally, the BIG receives additional investments in the form of increased

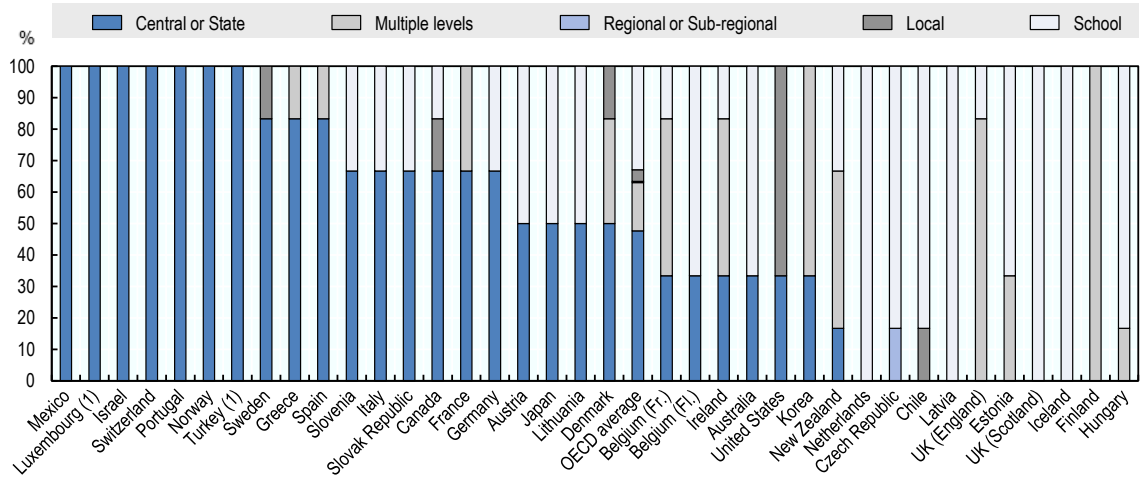
rental payments to implement major infrastructural projects adjustments such as the transformation of schools into all-day schools (Bruneforth et al., 2016[4]).

In countries where schools, school boards or local authorities are endowed with the responsibility to initiate and lead school construction projects, central governments often assume a facilitating role in relation to local actors. One example of this arrangement can be seen in the Flemish Community of Belgium where school boards have far reaching autonomy in school construction. To support school boards in the creation of effective learning spaces, the Flemish Ministry of Education has tasked the Flemish Agency for Infrastructure in Education (AGIOn) with subsidising the purchase, construction and renovation of public and private school buildings; advising schools on the planning and design of buildings through a knowledge centre, publications and websites; and providing guidance and monitoring for construction projects operated under public-private partnerships as part of the DBFM-project (Design-Built-Finance-Maintain), which established a company with a private partner (Fortis Bank-Fortis Real Estate) to head a large-scale investment to reduce the backlog in school construction works (Leemans and von Ahlefeld, 2013[5]).

It should be noted that the opening and closure of schools may occur for a variety of reasons and that different actors may be responsible for authorising and implementing the opening or closure of schools under these different scenarios. For example, systems may distribute responsibilities differently depending on whether schools are closed due to poor performance or under-enrolment and whether new schools are constructed in response to local initiatives or based on central-level enrolment projections. Likewise, some countries have devised specific arrangements that differ from the ordinary school network governance to advance specific network restructuring projects. Some urgent or large-scale infrastructural developments have thus been carried out by specialised government agencies endowed with a high degree of independence that allowed them to bypass traditional ministries and avoid certain regulations and bureaucratic procedures. As specialist centres with a highly focused mandate and consolidated expertise, these independent agencies can be more proactive, innovative and agile in their response to unanticipated situations (Blyth et al., 2012, p. 46[6]). One of the challenges governments face when delegating responsibilities to independent agencies is to ensure that their activities are effectively evaluated and coherent with those of other government bodies and programmes.

Systems differ not only in the way they assign responsibilities for the development of the school networks' physical infrastructure, but also for the distribution of educational programmes and subjects to be taught at these sites. Figure 2.1 presents the share of such decisions concerning planning and structures taken at each level of government across OECD countries in 2017. This comprises decisions on the design of programmes of study and their content as well as the selection of programmes and subjects taught in a particular school (OECD, 2018[7]). Other than decisions concerning the organisation of instruction, which mostly are taken at the school level (50%), those concerned with planning and structures are most likely to be made at the central or state level (48%). On average across OECD countries, local authorities take 4% of key decisions concerning the design and distribution of programmes and courses in lower secondary schools, while schools themselves take another 33% of these decisions and 15% of them involve multiple levels of government (OECD, 2018, p. Table D6.2[7]).

Figure 2.1. Percentage of decisions on planning and structures taken at each level of government in public lower secondary education, 2017



Note: Countries are ranked in descending order of the percentage of decisions taken at the central or state level. Decisions at a specific level of government may be made in full autonomy, or after consulting with other bodies, or within a framework set by a higher level of authority.
1: Year of reference 2011.
Source: OECD (2018), *Education at a Glance 2018: OECD Indicators*, OECD Publishing, https://doi.org/10.1787/19991487, Table D6.2.

StatLink https://doi.org/10.1787/888933831127

In 2017, in 14 of the 35 OECD countries and economies with available data, decisions on the selection of programmes to be taught in each school were taken at the state or central level, although this process may involve the consultation of lower-level authorities or schools, for example in Portugal. While 10 of the 35 systems allowed schools to decide on their selection of study programmes, all of them operated within frameworks set by a central or state authority (OECD, 2018, p. Table D6.7[7]). Even in countries with a greater overall degree of decentralisation and school autonomy, such as the Flemish Community of Belgium and the Netherlands, the central and state levels can therefore play an important role in shaping the distribution of study programmes across school sites.

Division of responsibilities for different parts of the school network

The facilities comprising a school network are often governed by multiple authorities. In OECD countries, primary education facilities, for example, are more frequently owned and governed by local administrations (Beynon, 1997, p. 7[8]), while upper secondary and special needs infrastructures are often governed by regional or central authorities. Similar divisions of sectorial responsibilities may occur between the ministries governing early childhood education and care (ECEC), compulsory and post-secondary education facilities. Where parts of the school network are subject to different administrative authorities, a low degree of integration can be aggravated by a lack of institutional co-ordination mechanisms and communication channels between providers. This can impede strategic infrastructure planning and lead to duplications in the educational offer or administrative services. Similar inefficiencies can arise where multiple public providers engage in undesired competition within a given region and level of education or

where funding models discourage municipalities from integrating different services and sharing resources between them.

Fragmented governance arrangements in the school network can result in administrative duplications, a misalignment of infrastructural investment strategies and other inefficient spending patterns. In the Flemish Community of Belgium, for example, the decentralised school system with three independent network providers has been identified as an obstacle for the efficient distribution of resources and the pursuit of central objectives concerning the quantity and quality of educational facilities. Likewise, each of the three educational networks has a central organisation employing administrative staff and operates its own pedagogical advisory services (PBDs) and student guidance centres (CLBs) funded by the Flemish government. This duplication of administrative positions and services risks generating inefficiencies and fragmented responsibility (Nusche et al., 2015, p. 115[9]; Rouw et al., 2016[10]).

In some cases, the decision for parts of the school network to be governed by different authorities is driven by instrumental considerations. The responsibility for specialised schools, for example, might be situated at the central level to pool the required resources and expertise at a scale that enables their efficient management. Special needs education and specific forms of Vocational Education and Training (VET) are therefore sometimes administered at more central levels than mainstream and general education respectively. It is important, however, to recognise that this arrangement can weaken the connections between sectors and that the advancement of inclusion or a greater integration of vocational and general education may require additional co-ordination efforts under these circumstances.

In the absence of strong co-ordination mechanisms, divided responsibilities within the school network can also negatively affect the pedagogical integration across levels of education, the alignment of their goals and implementation strategies. Particularly in education systems with high dropout and repetition rates, the failure to ensure successful student transitions from one level of schooling to the next comes at a high individual and social cost (see Chapter 4). There are some concerns linked to the integrated provision of ECEC services and its impact on children and the ECEC teacher profession, notably the risk of "schoolification" (i.e. introducing school pedagogical practices to ECEC settings, including longer days, more teacher-directed pedagogies, greater attention to academic content or less playtime) (OECD, 2017[11]; OECD, 2015[12]). Yet, particularly in contexts where transitions from ECEC to primary education are subject to frictions, integrating both services in the same administrative structures and facilities can ease students' entry into primary school. Demographic shifts and changing student enrolment patterns can provide an opportunity to efficiently repurpose school structures and advance this integration. In the Slovak Republic, for example, declining upper secondary enrolment has freed up capacities in compulsory education facilities that could be used to integrate ECEC services in the same structures as primary education (Santiago et al., 2016, p. 95[13]).

The case of Estonia is a good example of a country seeking to clarify the division of responsibilities for different levels of education to facilitate the efficient governance of the school network. In a system characterised by many small providers, Estonia's complex division of responsibilities across education levels and between providers had given rise to co-ordination problems. Municipal and state-owned schools competed with each other in general education, in special needs education and – to a lesser extent – in VET. This generated unnecessary duplication in the educational provision, reduced the

capacity for co-ordination and made planning the school network more difficult. In light of this complicated governance context and the risk of fragmentation, the efficiency of the school network – particularly at the lower secondary level – hinges on strong mechanisms for inter-municipal co-operation and resource sharing between institutions (Santiago et al., 2016, p. 83[14]).

Recent reforms in Estonia aim to improve the division of labour between its municipalities and the state, leaving the provision of pre-primary, primary and lower secondary education to the former and the responsibility for upper secondary education (both general and VET) and special education schools to the latter. The reform is expected to reduce unnecessary duplication and ambiguous responsibilities, provide the conditions for better co-ordination within education levels and assist with school network planning. For example, the new governance structure is expected to facilitate bringing VET and general upper secondary education closer together and allow all of upper secondary education to be effectively managed as a unified sub-system (Santiago et al., 2016, p. 94[14]).

The Czech Republic has grappled with similar challenges. The Czech system divides responsibilities for the school network between municipalities, which take care of primary education and the majority of lower secondary level, and regions, which provide upper secondary education. Despite this relatively clear division of responsibilities, some specialised regional schools (*gymnasia* with eight-year and six-year programmes) also compete with municipal schools for enrolment at the lower secondary level, generating some duplication of services that has been argued to exacerbate inefficiencies in the school network caused by demographic pressures (Shewbridge et al., 2016, p. 74[15]).

2.2. Central-level steering and co-ordination for effective network planning

Despite the trend towards decentralisation in the governance of OECD education systems, central authorities remain a critical actor in the planning and co-ordination of the school network. Depending on the precise distribution of responsibilities, central-level authorities have different tools at their disposal to steer the development of the school network in line with policy priorities and improve the efficiency of its organisation. These range from direct interventions into the organisation of the school network to efforts to ensure that local network reforms maintain traction by monitoring progress and, where appropriate, challenging local or regional authorities. Furthermore, central authorities in many OECD countries dispose of more indirect means to advance efficiency in the school network, including the provision of central information systems to support the regional planning of school infrastructure; facilitating local co-ordination; setting financial incentives and providing guidelines for infrastructural development projects; regulating school and class sizes; and regulating the creation of new schools, school choice or catchment areas. The full extent of central-level steering capacity in decentralised systems where the design and planning of school networks lies at the local level was illustrated during Lithuania's network restructuring process (Box 2.1). The following sections will explore some of these tools in more detail, providing the context for Chapter 3 and the analysis of concrete strategies to adapt the school network in response to changing levels of demand.

Box 2.1. Central-level strategic steering of local school network reform in Lithuania

Over the past decades, the Lithuanian school network has been subject to a significant reorganisation, with the number of general education schools dropping from 1 499 in 2004/05 to 1 022 in 2015/16. Although municipalities are responsible for planning their school network, the central government has actively steered the restructuring process in order to maintain its momentum and ensure that the provision of high-quality education remains the central goal of the reform. In particular, the Ministry of Education and Science has played a key role in initiating the reorganisation process, providing its strategic direction and devising rules to guide it. In 2011, the ministry determined that the structure of general education should be reformed by replacing previous "secondary schools" and transforming them into either *gymnasia* (offering the second part of lower secondary and upper secondary education), basic schools (offering the first and second part of lower secondary education and in some cases primary education) or into the newly-introduced pre-gymnasia (offering the first part of lower secondary and in some cases primary education). Since 2004/05, 451 secondary schools were transformed into gymnasia, basic schools or pre-gymnasia (of which 112 were operating by 2015/16). At the same time there has been a significant reorganisation of primary and basic schools: 219 basic schools were re-organised into pre-gymnasia, gymnasia or a basic or primary education unit within a secondary school; 179 primary schools were closed or transformed into gymnasia, basic schools or a primary units within pre-gymnasia.

The reorganisation process at the local level was guided by central rules and parameters, based on which municipalities were expected to advance the reform of their school networks. To deal with the particular challenges experienced in rural areas, the government set out priority measures to address the preservation of small primary schools in rural areas and concerns about safe transportation to school. These priorities aimed to ensure that the provision of high-quality services would be the central objective in advancing the school network reform and would not be compromised by purely economic considerations. As part of the phasing out of "secondary schools", an accreditation process has been put in place to determine whether existing secondary schools that wish to convert into gymnasia can meet the more rigorous requirements of the curriculum at Years 11 and 12. Conditions for their transformation include a sufficient number of students studying in secondary education programmes and a given number of classes at Years 11 and 12. Thresholds vary, however, depending on the population that a school serves (for example rural or urban; border area; language of instruction).

In order to support school consolidation initiatives the central administration provided a rich array of data, analyses, models and the ministry's "Recommendations for Establishing a Network of Schools", which includes national guidelines for municipalities. Another important document supporting the school network reform was the "Workbook for Municipalities", which the ministry piloted with six municipalities. The ministry also prepared sample plans for school network reform that municipalities could use as a basis for their planning and collected data on student achievement at the municipal and school level. These data-rich publications were a key resource in negotiations with different municipalities, to inform public consultations and to communicate the key principles of the school network reform.

Source: Shewbridge et al. (2016). *OECD Reviews of School Resources: Lithuania 2016*, OECD Publishing, Paris, http://doi.org/http://dx.doi.org/10.1787/9789264252547-en (pp. 55 ff., 61).

Guidelines for infrastructural development and school construction projects

Some countries have issued central guidelines for the construction of school facilities in order to reduce the cost of planning procedures for infrastructural development and ensure the fulfilment of quality standards and policy objectives related to issues such as environmental performance or inclusive educational settings (see Box 2.2 for an example of such guidelines in England). Centrally set and monitored norms for educational facilities can be particularly useful where the planning of school networks and individual facilities is the responsibility of local authorities with insufficient capacity to effectively engage in the planning of infrastructural developments. This tends to be more frequently the case at the level of primary education (Beynon, 1997, p. 7[8]).

School networks can make significant long-term efficiency gains by sharing and employing best practices for the construction of high-quality and flexible school facilities. Providing architects with guidelines and objectives for the creation of learning spaces that support a variety of pedagogical practices and offer enough flexibility to respond to changing student needs can reduce the initial cost of construction, but also expenditures on maintenance and remodelling works in the long term (Beynon, 1997, p. 60 f.[8]). Several large-scale infrastructural development projects have taken this approach, including Portugal's Secondary School Building Modernisation Programme (SMP), which comprised the rebuilding, extension, adaptation and re-equipment of 173 schools. As part of the modernisation project, *Parque Escolar* (a special-purpose state-owned company charged with overseeing its planning and delivery) assembled a design manual providing architects a range of guidelines ranging from requirements for classroom layouts to technical guidance on acoustics and lighting, drawing on the findings of consultations with various experts and stakeholders (Blyth et al., 2012[6]).

Box 2.2. Central guidelines for efficient school construction in England

In England (United Kingdom), there were three major allocations of public funding for capital expenditures (delivered as a capital grant) in 2013/15: basic needs funding allocated to local authorities to provide additional school places where needed in their area (based on projections of need and enabling authorities to plan provision over the coming two years); maintenance funding (allocated to local authorities or direct to schools, depending on the management of the school); and devolved formula funding allocated direct to schools. Additional targeted funding (targeted basic need programme) was announced to provide additional support to local authorities with the greatest demographic pressures to expand the provision of school places.

A "Priority School Building Programme" was also established to target the renovations or rebuilding of schools in the worst condition across the country (a total of 537 schools). The Education Funding Agency (which was merged with the Skills Funding Agency in April 2017 to form the Education and Skills Funding Agency) designed the programme to make more efficient use of public funding. First, schools are grouped into "batches" to improve efficiency in procurement time and costs. Second, the programme promotes a more standardised design to support construction efficiency and principles for future sustainability. It specifies standard designs, services and performance requirements for each school.

The facilities' output specification comprises: a generic design brief with requirements for all schools; a school-specific design brief (e.g. reflecting special needs provisions); schedules of accommodation comprising a list of rooms and spaces required in each school; and area data sheets which identify the requirements for each room and space listed in the schedule of

accommodation (comprising services, environmental performance requirements, fittings, furniture and equipment and Information and Communication Technology [ICT] provision). Key design principles guiding the project relate to functionality, health and safety, a standardised approach, sustainability and future-proofing (i.e. the flexibility to adapt school facilities to changing enrolment patterns, curricular provision and teaching methods). These principles are illustrated in a set of baseline designs for schools which can be consulted at www.gov.uk/government/collections/school-building-design-and-maintenance.

Source: OECD (2017), *The Funding of School Education: Connecting Resources and Learning*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264276147-en.

Central funding mechanisms and incentives for local network efficiency

In school systems that use central formulas to distribute financial resources to lower-level authorities or schools, the choice of the formula's parameters can set incentives for greater network efficiency and steer the development of the school network in line with policy objectives. Increasing the weights for students attending specific types of schools, for example, can encourage their expansion where they are in short supply or encourage specific forms of educational provision, such as teaching in integrated classrooms for special educational needs (SEN) students. Given that per-student fixed costs are higher in small schools, strict per-capita funding places larger providers at an advantage and thereby indirectly encourages school consolidation. Alongside direct interventions into the school network, such as one-off payments to support municipal school consolidation projects, the design of funding allocation mechanisms therefore provides a particularly important instrument for systems with significant excess capacity to encourage the rationalisation of their networks. Reducing the funding for schools that remain below a given class sizes threshold for multiple years or the amount of additional allocations to small schools are common ways to exert indirect pressure towards school consolidation in these contexts.

Reconciling incentives for a rational organisation of the school network with the recognition that small schools face an additional burden and should be compensated accordingly – particularly where consolidation is not an option – poses a challenge for many school systems. Some of the strategies governments have explored to resolve this tension include i) limiting incentives for school network consolidation to higher levels of education for which the proximity of provision to students' homes is considered less of a priority, ii) granting protected status and guaranteed additional funding to remote schools whose maintenance is critical to the school network, iii) offering financial incentives for network consolidation in the form of direct grants provided outside the main funding formula (see more in Chapter 3). The funding system in Estonia provides examples of some of these techniques (see Box 2.3).

Countries that place a premium on school choice and curricular diversity, rather than economies of scale and the efficiency of the school network, often design funding mechanisms with a view to safeguarding the provision of a wide range of courses and maintaining small classes. In the Flemish Community of Belgium, for example, the funding formula for secondary education assigns a greater weight to students enrolled in small courses, thus encouraging teaching in smaller classes and maintaining access to course options which could not otherwise be offered. In addition, funding is based on regressive scales, calibrating student coefficients to rise in value as course enrolments fall. While this approach ensures a wide range of diversified course options, it risks to

exacerbate inefficiencies arising from the operation of a fragmented school network, particularly in conjunction with a relatively fragmented curriculum and a large number of small schools. Authorities should be aware that this funding model penalises schools that seek to achieve economies of scale by consolidating their programme offer or establishing co-operations between schools (Nusche et al., 2015, p. 113 f.[9]).

Box 2.3. Reconciling incentives for network efficiency with funding for small schools in Estonia

In recognition of the higher resource needs of small schools, Estonia's school funding formula contains coefficients that are designed to give additional resources to municipalities that operate small schools while at the same time providing them with incentives to engage in school consolidation. Since the Estonian government is committed to providing primary education close to the place where students live, the formula used to allocate education salary grants to local governments is primarily designed to encourage consolidation at the lower secondary level (Years 7-9).

Municipalities that close lower secondary schools continue to receive funding for these students for multiple years, while the municipality that takes them on immediately also receives whichever level of funding was assigned to them prior to the consolidation. This was particularly relevant prior to 2017, when an Administrative Reform Act reduced the number of Estonian municipalities from 213 to 79. Until then, half of them had only operated a single school.

At the upper secondary level, support for consolidation is further supported through direct investment grants. Local governments that reduce their number of upper secondary schools are eligible for special investment grants and the national government fully covers the cost of transportation for students who decide to commute to one of the newly constructed state-run gymnasiums. In addition, to provide local governments with greater long-term financial security when planning the reorganisation of their school networks, the coefficients used to allocate both salary and equalisation grants were fixed in 2015 and are no longer subject to annual changes.

Source: Santiago, P. et al. (2016), *OECD Reviews of School Resources: Estonia 2016*, OECD Publishing, Paris, http://doi.org/10.1787/9789264251731-en.

For any such funding formula-based incentives to enhance the school network's efficiency, its objectives and the factors that drive the distribution of funding need to be transparent to schools and local authorities (OECD, 2017[2]). A clear public communication strategy and coherent messaging can help to dispel ambiguities and provide school leaders or local authorities with a good understanding of the trade-offs they face and their financial implications. For example, as has been suggested in the case of Estonia, authorities could adjust the funding formula such that it covers teacher salaries only for classes exceeding a given minimum threshold and ensure that municipalities understand that maintaining smaller classes would require them to contribute additional resources (Santiago et al., 2016, p. 98 f.[14]). However, it should be born in mind that some small municipalities and schools have limited capacity and manoeuvring space to adequately adjust their resource use in response to financial incentives (Blanchenay, Burns and Köster, 2014[16]).

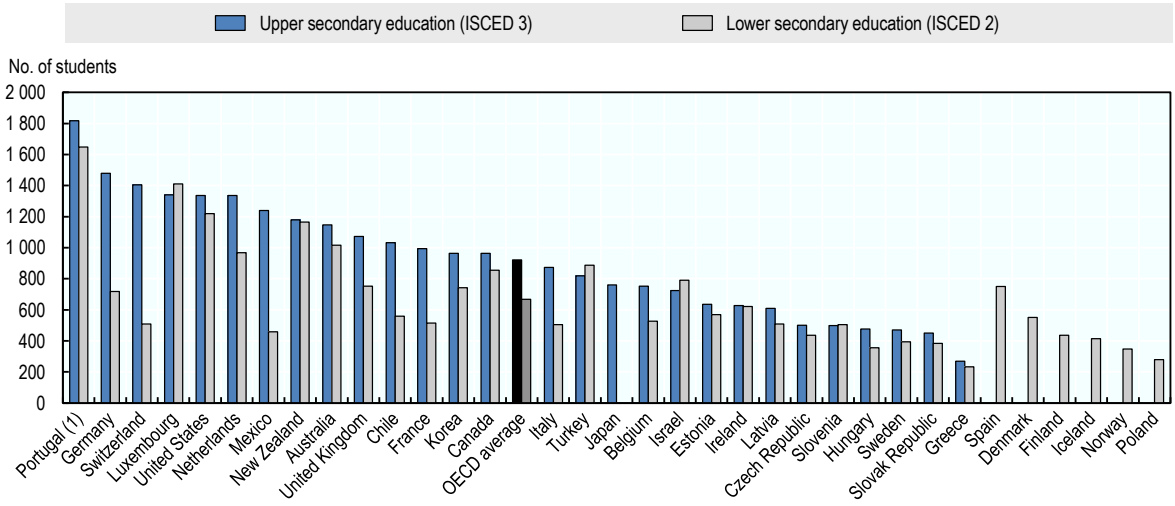
The distribution of spending responsibilities and the mechanisms used to distribute funding across levels of government also plays a critical role in shaping the incentive structure for the efficient organisation of the school network. Complex governance arrangements in Austria, for example, provide municipalities with little incentives to engage in the strategic planning of their school networks since they bear few of the financial consequences generated by its inefficiencies. Under a system sometimes described as "distributional federalism", the federal government provides provinces with annual funding for teacher salaries based on previously agreed staff plans. However, provinces are free to hire more teachers than foreseen in these annual plans and the federal level covers part of the additional expenditure generated as a result. This arrangement has encouraged overspending and caused the number of excess teaching positions at general compulsory schools to almost double from 1 039 to 2 063, between 2006 and 2010. In addition, Austrian municipalities face financial incentives to resist school closures, since consolidating municipalities are required to compensate the constituency which absorbs their students to cover part of its increased infrastructure and non-teaching staff expenditures (Nusche et al., 2016, p. 26[17]).

By contrast, aligning financial responsibilities with the degree of local autonomy for the planning of the school network can generate strong incentives in the opposite direction, prompting strategic reflections at the local level on ways to increase the efficiency of the school network. For example, both Norway (1986) and Sweden (1993) decentralised their school funding systems by providing local authorities with block grants from the central level. Although the amount of per-pupil funding remained unchanged, reforming the mechanism through which it was distributed and decentralising spending responsibilities incentivised local authorities to generate savings by reorganising their rural school networks (Sigsworth and Solstad, 2005[18]). Likewise, in Denmark, municipalities can devise their own school funding formulas and adapt them to local conditions and the concerns of the local community (Nusche et al., 2016, p. 82[19]).

Regulations concerning school and class sizes

The regulation of school and class sizes is an important steering tool in the governance of the school network. It can serve as a means to improve the efficient use of public funds, steer rationalisation processes and provide incentives for co-operation among schools. As can be seen in Figure 2.2, the average size of secondary schools varies considerably across OECD countries around an average of 668 students at the lower secondary level and 921 at the upper secondary level. In systems at the extreme ends of the spectrum, more than 1 400 students attend average upper secondary schools and more than 1 200 attend average lower secondary schools, while upper and lower secondary schools in Greece are the smallest with an average enrolment of 269 and 233 students respectively. In general, primary schools tend to be significantly smaller than those at the secondary level and lower secondary schools are on average smaller than upper secondary schools in all OECD countries with available data, apart from Luxembourg, Turkey and Israel.

Figure 2.2. Mean school size at the upper and lower secondary levels, 2015

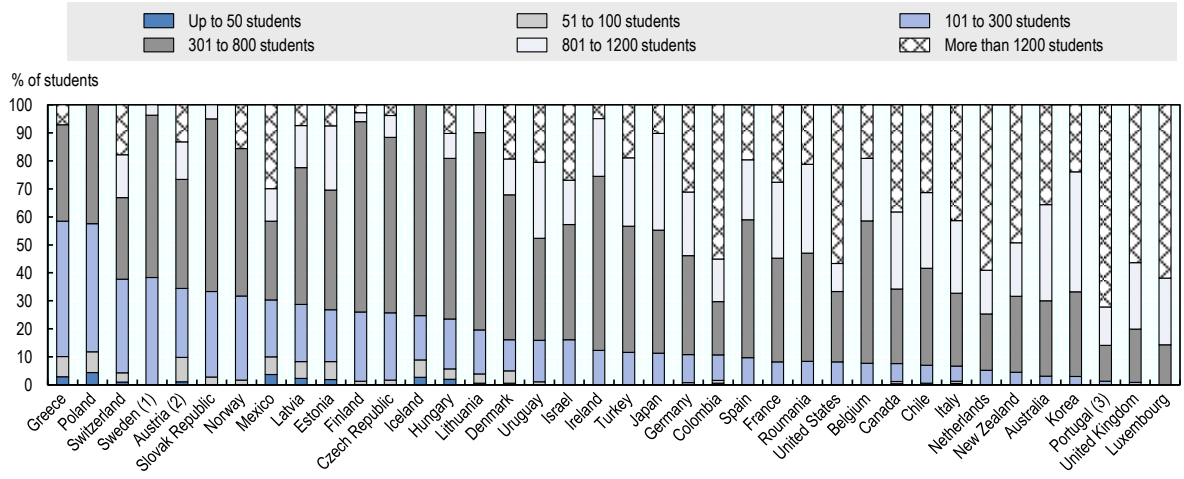


Note: Countries and economies are ranked in descending order of students per school at the upper secondary level (based on school principals' reports). Missing bars due to insufficient number of observations to ensure comparability (i.e. there are fewer than 30 students or fewer than 5 schools with valid data).
1: Number of students refers to school clusters (see *PISA 2015 Technical Report*, Table 4.3).
Source: OECD (2016), *PISA 2015 Results (Volume II): Policies and Practices for Successful Schools*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264267510-en, Table II.6.7.

StatLink https://doi.org/10.1787/888933831146

One of the biggest challenges for the efficient organisation of the school network, particularly in rural areas, is a low population density. In multiple OECD review countries, this has been aggravated by declining birth rates and rural-urban migration (see Chapter 3). As a result, many of the affected countries have seen a significant reduction in the average school size for parts of their network. As can be seen in Figure 2.3, the proportion of 15-year-olds attending small secondary schools with fewer than 300 students is lower than 15% in the majority of OECD countries. Nevertheless, they account for at least one third of students in six countries and more than half in Greece and Poland. The structural variation in school networks is even more apparent for the prevalence of very small secondary schools with fewer than 100 or 50 students. While their proportion is negligible in the majority of OECD member states and review countries, more than 5% of 15-year-olds in the PISA sample attend such schools in Austria, Estonia, Greece, Hungary, Iceland, Latvia, Mexico and Poland.

Figure 2.3. Size of schools attended by 15-year-old students, 2015



Note: Countries and economies are ranked in descending order of the proportion of students in schools with fewer than 300 students (based on school principals' reports). School size categories with fewer than 30 students or fewer than 5 schools are displayed as 0.
1: PISA 2012 data
2: PISA 2009 data
3: Number of students refers to school clusters (see PISA 2015 Technical Report, Table 4.3).
Source: Authors' analysis based on PISA 2015 data.

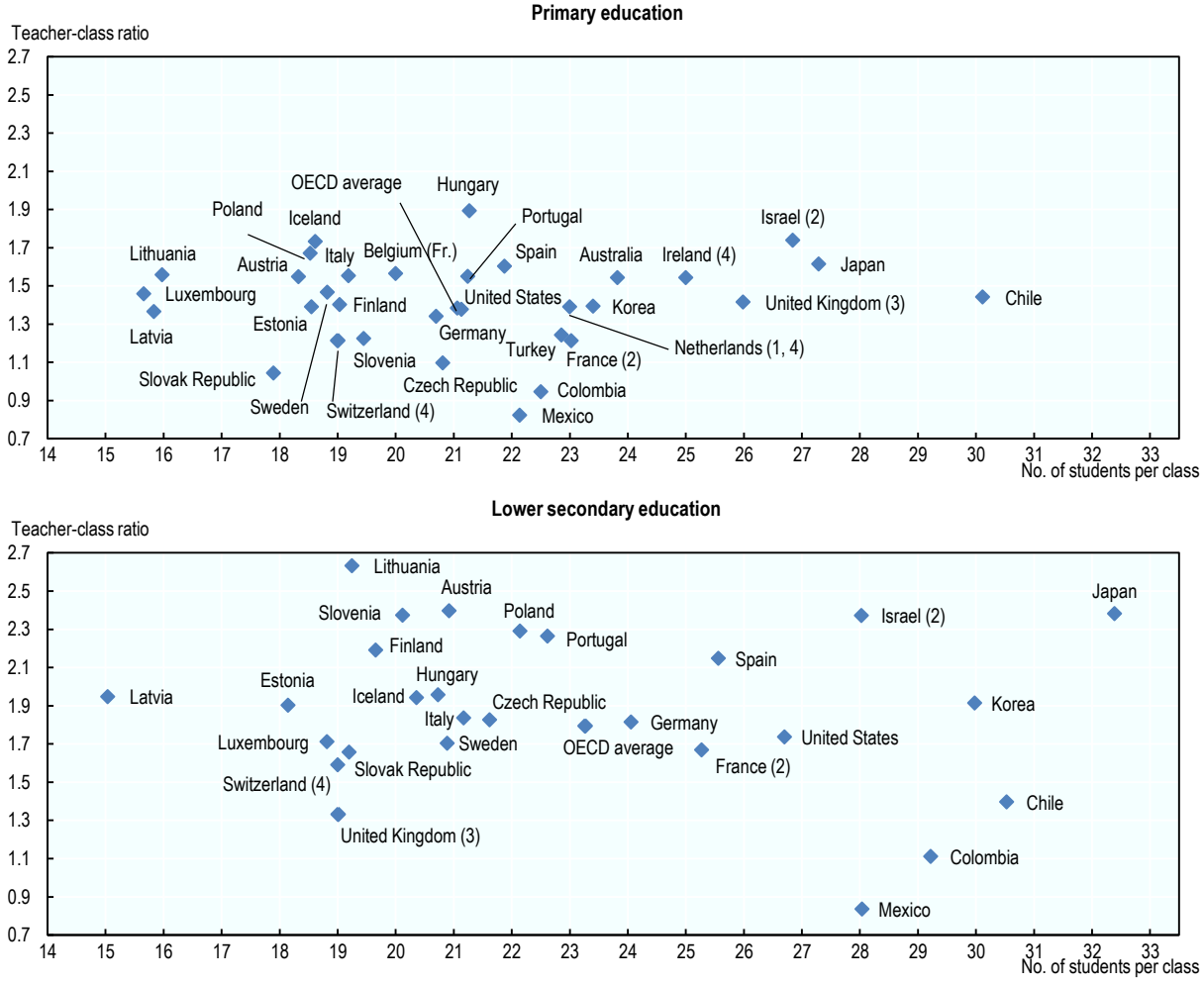
StatLink https://doi.org/10.1787/888933831165

Subject to school network reforms and demographic shifts, the size of schools has undergone significant changes in some OECD school systems. Between the 2009 and 2015 waves of the OECD Programme for International Student Assessment (PISA) survey, the proportion of 15-year-olds in schools with fewer than 300 students has increased by more than 10 percentage points in Sweden and the Slovak Republic, while dropping by close to the same magnitude in Italy and Slovenia. In Greece, Romania and Poland, enrolment in very small secondary schools with fewer than 100 students has risen by more than 3 percentage points over the same period of time while it has dropped significantly in Latvia, Sweden and Turkey. At the other end of the spectrum, multiple OECD countries have significantly raised the proportion of 15-year-olds enrolled in large schools with more than 1 200 students between 2009 and 2015, increasing it by more than 10 percentage points in Belgium, Denmark, Germany, Italy, the Netherlands and the United Kingdom (based on the authors' analysis of PISA 2009 and 2015 data).

The proliferation of very small schools has important fiscal implications, given that expenditure per student tends to be highest in small schools (Falch, Rønning and Strøm, 2008[20]; Østergaard Larsen, Houlberg and Schindler Rangvid, 2013[21]). At the same time, research from multiple countries suggests that providers can generate economies of scale by increasing school size up to a certain enrolment level (although marginal returns to scale tend to diminish and diseconomies of scale may emerge in very large schools) (Ares Abalde, 2014[22]). One of the main reasons why larger schools are able to reduce per-student costs is their ability to fill classes up to the maximum number of students (Knoth Humlum and Smith, 2015[23]). Conversely, very small schools are more prone to suffer from underutilisation (i.e. large spaces and high staff numbers for few students), which can put considerable pressure on public resources.

Even though, within a given school system, schools with small classes tend to face higher per-student staff costs, the link between average class size and student-teacher ratios is surprisingly weak across countries. As illustrated in Figure 2.4, countries with similar class sizes can have very different teacher-class ratios depending on the number of classes for which a teacher is responsible, the amount of instruction time compared to the length of teachers' working days, how students are grouped within classes and the use of team teaching. For example, while the average class size in Luxemburg primary schools is the lowest of any OECD country, the number of primary teachers per class is only slightly above the OECD average (1.46 in Luxembourg, compared to 1.39 in the OECD on average), which results in a student-teacher ratio comparable to that of some countries with above average class sizes. The number of teachers per class also tends to increase with the level of education, reflecting increased annual instruction time for students and fewer instruction hours per teachers as their specialisation and the number of different courses on offer increases. Correspondingly, the number of students per class is higher in lower secondary than in primary education in most OECD countries (Figure 2.4).

Figure 2.4. Class size and teacher-class ratio in primary and lower secondary education, 2015



1: Primary includes pre-primary education.
2: Public and government-dependent private institutions only.
3: Lower secondary education comprises secondary schools for age 11-16.
4: Public institutions only.
Source: OECD (2017), *Education at a Glance 2017: OECD Indicators*, OECD Publishing, Paris, http://dx.doi.org/10.1787/eag-2017-en, Tables D2.1 and D2.2; Lithuania: Eurostat.

StatLink https://doi.org/10.1787/888933831184

Given that, all else being equal, smaller classes are associated with higher staff costs and may require greater administrative and organisational effort (Hanushek, 2011[24]; Rivkin, Hanushek and Kain, 2005[25]), the regulation of class sizes has featured prominently in discussions surrounding the efficient organisation of the school network. The strongest objections to the increase of class sizes are based on the perception that smaller classes are conducive to educational quality since they permit teachers to devote more attention to individual students and employ a wider range of pedagogical approaches (see Box 2.4). The empirical evidence on the effects of class size on student outcomes are contested (Krueger, 2003[26]; Hanushek, 1997[27]). The best-identified studies from large-scale experiments such as the Tennessee's Student Teacher Achievement Ratio (STAR) study suggest that reducing class sizes from kindergarten through third grade to around 15 students had a positive effect on achievement and some longer-term outcomes, particularly for students from disadvantaged backgrounds (Chetty et al., 2011[28]; Dynarski, Hyman and Schanzenbach, 2013[29]).

The effect of class size appears to be smaller for older students and varies considerably across countries (Wößmann and West, 2006[30]). Relatively small or absent effects in many schools systems have been taken to suggest that student learning can be more effectively supported through other means than class size reductions (Hattie, 2009[31]). Proposals for such alternative investments include the increase of teacher salaries, investments in their professional development or the hiring of extra assistant teachers and other para-professionals. Although long-term effects of class size reductions on students' future earnings have not been conclusively demonstrated in the United States (Chetty et al., 2011[28]), evidence from Sweden points to long-term wage increases that could offset some of the cost associated with smaller classes (Fredriksson, Öckert and Oosterbeek, 2013[32]). Nevertheless, few studies have directly compared the cost and benefit of class size reductions with those of alternative interventions (Chingos, 2013[33]).

Box 2.4. Trade-offs in decisions concerning the use of teacher resources

Holding other factors constant, organising students in smaller classes is more expensive since it requires more staff resources per student. While smaller classes are often assumed to improve educational quality by allowing teachers to focus more on the needs of individual students, the effectiveness of class size reductions needs to considered in comparison with competing strategies to improve student outcomes.

Some studies indicate that smaller classes can improve non-cognitive skills (Dee and West, 2011[34]) and others have found these effects to be more pronounced among students from disadvantaged socio-economic backgrounds (Piketty, 2004[35]; Dynarski, Hyman and Schanzenbach, 2013[29]). Most studies that rigorously identify effects of class size reduction, however, have focused on the earlier years of education (Chetty et al., 2011[28]) and cross-national evidence from OECD countries has generally found a weak association between smaller classes and the performance on standardised tests, attainment or degree completion (OECD, 2013[36]). Some of these inconsistencies may arise from the assignment of less qualified or experienced teachers to smaller classes. Another reason may be that marginal reductions in class size only translate into better outcomes once they enable teachers to employ different pedagogical practices (Santiago et al., 2016, p. 27[13]).

Given the trade-off between investments in lower class-size and other priorities, some high-performing systems, such as Shanghai and Singapore, have chosen to reduce teacher workloads instead to enable them to spend more time on professional development (Jensen et al., 2012[37]). Others have proposed increasing class sizes to invest in higher salaries for teachers, teaching technology, or more widespread use of assistant teachers (OECD, 2014). Recent findings from the 2013 OECD Teaching and Learning International Survey (TALIS) show that the proportion of a teacher's students with behavioural problems remains a strong predictor of low job satisfaction, while the size of their classes is insignificant in most participating countries (OECD, 2014, pp. 445, Box D2.1[38]). This underlines the importance of ensuring that teachers are well-equipped to teach diverse and challenging classrooms regardless of their size.

Sources: OECD (2014), *Education at a Glance 2014: OECD Indicators*, http://dx.doi.org/10.1787/eag-2012-18-en; Jensen et al. (2012), *Catching Up: Learning from the Best School Systems in East Asia*, Grattan Institute, Melbourne, Victoria.

Maximum class size regulations

Based on concerns for educational quality and the well-being of students and teachers, many OECD countries specify an upper bound or recommend a maximum size for school classes. This threshold may vary across different types of provision, educational levels or according to the size of schools. In Estonia, for example, new state-run upper secondary general schools are expected to proscribe a maximum class size of 28 students for small schools (planned for 252 students), 30 students for medium-sized schools (planned for 360 students), and 36 students for schools located in larger towns (planned for 540 or 750 students). In addition, the maximum class size for students with SEN is considerably smaller, depending on the severity of their learning difficulties (Santiago et al., 2016, pp. 166, Table 4.5[14]).

Hard upper bounds to maximum class sizes may pose challenges for a number of reasons. Since both educators and parents tend to have a preference for smaller classes, school leaders might seek to artificially increase enrolment by flexibly applying age-at-entry rules or moving students between grades if they are close to the cut-off. For example, data from Israeli primary schools, which need to split classes once they exceed 40 students, provides clear evidence of this practice (Angrist et al., 2017[39]). At the same time, particularly in constituencies with limited funding capacity, maximum class size rules can put schools under financial pressure and cause teacher shortages in case they have to unexpectedly split classes. Evidence from California's class-size-reduction programme indicates that the need to split classes has compelled many disadvantaged schools to hire inexperienced and less qualified teachers, which offset some of the benefits associated with smaller classes (Jepsen and Rivkin, 2009[40]). In order to ease the financial burden resulting from an unexpected increase in the number of required classes, small schools are sometimes provided with additional financial support or permitted to exceed the maximum number of students. Such exceptions may be grated after obtaining permission from a relevant authority (Santiago et al., 2016, p. 27[13]) or for a limited period of time (e.g. one academic year in a specific class) and may be conditional on certain provisions (e.g. ensuring that all health and safety requirements are met), as is the case in Estonia (Ministry of Education and Research, 2015, p. 45[41]).

Minimum class size regulations

While the specification of maximum class sizes is common practice, there are many cases in which schools remain well below this threshold, to the extent that their operation raises concerns for the efficiency of the school network. Particularly in systems where the responsibility for the operation of schools is relatively decentralised, the authority to set minimum class and school sizes has therefore come to constitute a powerful steering tool with which central authorities influence the organisation of the school network (Shewbridge et al., 2016, p. 66[15]). The potential effects of minimum class size rules need to be carefully considered as they are likely to vary across contexts and the level of education to which they are applied. Particularly in sparsely populated areas, they may exert pressure leading to the closure of schools or reduction of their course offer. All else being equal, minimum class sizes are also likely to have a greater effect on schools with a more diversified course offer, as is commonly the case at higher levels of education.

Once defined, minimum class size rules may be used for different purposes. Some countries use them as thresholds for recommending or requiring schools to initiate the merger of multiple small classes or provide them with additional support if the size of their classes requires specific pedagogical arrangements such as multi-grade teaching. Minimum class sizes may also be used to impose sanctions such as a reduction in funding if a school remains below the threshold for multiple years, or to define the maximum number of teachers required for a given number of students. To the same effect, some Danish municipalities use national guidelines on *maximum* class sizes to fund schools according to the minimum number of theoretically required classes (Nusche et al., 2016, p. 71[19]).

School and class size regulations that are not attuned to student needs and regional context can undermine quality and efficiency objectives

While the regulation of school and class sizes can play an important role in the governance of school networks, it is important to bear in mind that there is no "one size fits all" solution. Regulations concerning minimum class or school sizes should allow for variation across levels of education and locations. Even though providing incentives for municipalities to create larger schools and classes may improve school quality and efficiency in some contexts, enforcing a lower bound to school sizes may be unfeasible in geographically isolated areas (Andrews, Duncombe and Yinger, 2002[42]), just as increasing the size of classes may not be an option for small schools admitting only a single class per year.

Under per capita funding regimes, small classes tend to place a financial burden on schools anyway and further sanctioning their operation may be counterproductive and detrimental to their ability to provide high-quality education (Santiago et al., 2016, p. 183[14]). To account for this challenge, authorities may specify a threshold or average school class size below which students would not be funded, while offering schools an option to be exempted from this rule subject to their identification as meriting a protected status. This serves to ensure that students in remote areas are not placed at a further disadvantage and that school owners and local authorities can deliberate whether to engage in consolidation processes or contribute funding out of their own budgets to keep schools open at their current level of enrolment.

In the absence of a clear consensus on optimal school or class sizes, local authorities with sufficient authority and capacity play an important role in developing context-specific strategies to improve the efficiency of their school networks. As discussed in more detail

in Chapter 3, a range of different strategies have proven effective in offsetting the disadvantages of small remote schools without further tightening their budgets or removing them from their communities. Especially in systems with a tradition of local autonomy, involving local communities in the restructuring of the school network can be more effective than driving the process through national-level regulations as it allows for contextual characteristics to be taken into account. Nevertheless, central-level actors should ensure that the adjustment of school network structures remains high on local political agendas and that it is guided by school quality at least as much as it is by concerns for economic efficiency (Nusche et al., 2016, p. 91[19]).

School licensing and the role of private providers

A central issue for the governance of the school network are the rules and procedures for setting up new schools. The criteria employed in the licensing and funding of new schools are not only critical to ensure a high quality of educational provision, they can also serve as steering tools supporting the rational organisation of the school network. Low barriers to entry and incentives for the establishment of new (public and private) providers can be a way to expand the capacity of the school network and broaden parental choice. Inducing greater dynamism in the school network is often expected to yield innovation and facilitate the replacement of ineffective providers by competitors of higher quality or productivity. Yet, the unplanned school closures characterising many high-turnover systems are disruptive events for students that can negatively impact their social and educational outcomes (Grau, Hojman and Mizala, 2018[43]). To compensate for these adverse effects, newly opened schools would need to be of significantly higher quality than those leaving the network, which need not be the case in practice. Licensing procedures that regulate the entry into of new providers therefore play an important role in supporting equity, educational quality and efficiency in dynamic school networks.

The licensing process often requires prospective school owners to submit a range of information to the license-granting authority and any standing or ad hoc expert committees involved in the process. These dossiers may include the school statutes, its proposed curriculum, the qualifications of school management and teachers, information about facilities, development plans etc. In some cases, the licensing process involves binding agreements between school founders (e.g. self-governing regions, municipalities, regional state authorities), which may impose additional criteria for the provision of school services and define quality standards, minimum class and school sizes or maximum commuting distances for students.

The ultimate responsibility for the creation of public schools may be shared between multiple authorities and vary by school type. The process of registering new schools, revoking their license or recommending their consolidation may also draw on the assessment or recommendation of other public bodies, for example the school inspectorate in the Slovak Republic (Santiago et al., 2016, p. 41[13]). For specific school types, such as vocational schools in Estonia, employers other social partners can play a role in the process too (Santiago et al., 2016, p. 73[14]). Given that decisions to open a school are frequently made by local authorities, many systems face challenges when trying to ensure that the process is transparent and that decisions are based on an assessment of quality and need, as the review team observed, for example, in the Slovak Republic (Santiago et al., 2016, p. 22[13]).

Differential standards for admission and tuition practices can generate an uneven playing field between public and private providers

School systems vary in their approach to licensing independent private schools and government-dependent private schools (i.e. those receiving a majority of their funding from public agencies). Encouraging the entry of private providers, for example through public subsidies, is usually intended to stimulate competition between schools and provide parents with a greater diversity of educational approaches to choose from. Distinct licensing criteria for private schools may therefore give them greater freedom to teach innovative curricula or a flexible programme to encourage this pedagogical diversity. However, when it comes to factors like the ability to select students, applying different standards to public and private schools can raise significant equity concerns related to the segregation of students and the allocation of public resources (Boeskens, 2016[44]; Waslander, Pater and van der Weide, 2010[45]).

Chile provides a good example of a country that has experienced and recently addressed this challenge. Until the 2015 Inclusion Law (*Ley de Inclusion*) put an end to the practice, government-dependent private schools were eligible for the same amount of funding as public schools while retaining the right to charge parental fees and engage in selective admission practices (Santiago et al., 2017[46]). This has contributed to the country's high level of socio-economic segregation as middle class students increasingly left the public school system to enter subsidised private schools whose tuition and admission policies had put them at a financial advantage while effectively excluding many disadvantaged students (OECD, 2017, p. 85 f.[2]). Most countries acknowledge this risk of "cream skimming" or competition based on selectivity rather than educational quality and therefore apply the same admissions regulations for public and government-dependent private providers and ensure that tuition fees do not exclude disadvantaged students from attending publicly funded schools.

The process of licensing new schools can facilitate or undermine the rational organisation of the school network

Independent of concerns related to equity and segregation, licensing and funding arrangements that strongly encourage the entry of private providers can come at the expense of efficiency in the school network. Even though, on average across the OECD, private schools are larger than public schools and there is no significant difference in their class size, an influx of private providers encouraged by low barriers to entry or preferential funding conditions can contribute to the fragmentation of the school network and lead to smaller average school and class sizes, thus thwarting efforts to provide education services at a greater scale. Systems in which funding follows students across sectors therefore need to carefully define the conditions under which different services and providers should be eligible for public funding, in order to guarantee a high quality of provision and to protect students' interests while avoiding a fragmentation of the school network.

Estonia, for example, has seen a significant increase in the number of government-dependent private schools, which are entitled to the same amount of funding as public schools, provided that they do not charge tuition fees exceeding 25% of the monthly minimum wage. These schools have significantly smaller classes than public schools, counting 15 and 12 students in primary and lower secondary education respectively, compared to the system-wide averages of 17 and 16 students per class (Santiago et al., 2016, p. 76[14]). While the opening and closure of municipal schools is

the responsibility of local governments acting within a central regulatory framework, private schools in Estonia are not subject to the same control. As in many OECD countries, the expansion of the private sector therefore not only comes with the prospect of greater competition, but also that of diminished public control over the planning of the school network. Given the country's ongoing challenge to adapt the school network to shrinking cohort sizes, the funding and regulation of private schools has raised significant efficiency concerns (Santiago et al., 2016, p. 94[14]).

The misalignment between a system's policy priorities for the school network and its process for the creation of new schools can also significantly diminish the scope for strategic network planning and thwart efforts to reorganise the school offer. Between 2007 and 2013, for example, Danish municipalities have responded to shrinking cohort sizes by closing down smaller schools and reorganising the management of schools by joining several schools under the same leadership. As a result, they reduced the total number of municipal schools by more than a fifth and increased the average size of a *Folkeskole* (public primary and lower secondary schools) from 362 to 442 students. However, the potential for private schools to emerge and replace the recently closed public schools has raised concerns that the low barriers to entry for private providers might undermine their efforts to rationalise the school offer. Even though it is difficult to establish the extent of this phenomenon, municipal leaders repeatedly reported to the OECD review team that the closure of public schools has led parents to set up a private school in the same location, particularly in rural areas with strong parental engagement (Nusche et al., 2016, pp. 55, 90[19]). The fact that private schools are funded by the state rather than the municipalities has aggravated this problem, since it gave local authorities little incentives to apply stricter standards for the creation of new schools. A similar phenomenon has been reported in Norway, where parents in multiple rural communities decided to shift to Montessori pedagogy when faced with the prospect of municipal school consolidation, which made them eligible for state-funding under the country's Private Schools Act (Lauglo, 2010[47]).

The Flemish Community of Belgium – another system that places great emphasis on school choice and autonomy – has responded to similar efficiency concerns by financing school associations to encourage collaboration between schools with management and administrative support. Such initiatives can offset some of the cost associated with diseconomies in fragmented school networks and foster co-operation in a competitive choice-based system that provides few incentives for collaboration. However, the cost of supporting school associations and similar platforms to remediate diseconomies in fragmented school networks needs to be weighed against the potential efficiency gains afforded by a broader public ownership of school facilities or increased control at the point their creation (Nusche et al., 2015, p. 115 f.[9]).

In order to align procedures for the creation of new schools with the pursuit of greater efficiency in the school network, some systems have tied the licensing and funding of education services to an assessment of both quality and needs. In regions without a clear case for unmet demand, schools might for example be required to serve a sufficient number of classes above a given threshold before qualifying for inclusion into the network of publicly funded providers. Historical examples of the introduction of such need-based licensing procedures include the Czech Republic, where a reform of the Education Act in 1995 aimed to tighten up access to public funding and the entry into the School Registry of Schools and School Facilities (see Box 2.7). The revision imposed a stricter set of criteria to be fulfilled for the public funding of school providers as well as specifying under which conditions a school would be removed from the school registry.

This significantly reduced the number of private schools (MŠMT, 2016[48]). As described in Box 2.5, Colombia provides another example for the needs-based licensing and funding of private schools, which ensures that they complement the public offer and are strategically drawn on to address capacity shortages in the school network (Sánchez, 2018[49]; Radinger et al., 2018[50]).

Box 2.5. Contracting private providers to address acute capacity shortages in Colombia

When faced with capacity shortages or other limitations, Colombia's Secretaries of Education (sub-national authorities at the departmental or municipal level that have been certified to provide education and are referred to as certified territorial entities) can provide education through different forms of partnerships with private providers (*matrícula oficial contratada*). Regulated by Decree 1851 of 2015, these partnerships most commonly take the form of publicly funding privately operated schools under the supervision of the Secretaries of Education. Overall, around 6% of students from pre-primary to upper secondary education were enrolled in publicly funded private schools and 19% in independent private schools in 2017 (Sánchez, 2018). Based on PISA 2015 data, the share of 15-year-old students attending government-dependent or independent private schools in Colombia stood at 24.1% compared to the OECD average of 19.1% (OECD, 2016[51]).

The contracting of private providers can take different forms and is conditional on the local authorities' proven inability to supply sufficient school places to meet educational demand. Most commonly, local authorities hire the owners of private schools from a regulated database of recognised suppliers on the basis of single-year contracts that encompass both personnel and facilities. Private school providers can also be contracted through a selective process via tender to take over the management of existing public school facilities for a period of 2-12 years. Furthermore, churches and other religious entities can be engaged to provide educational services on single-year contracts and certified municipalities with more than 300 000 inhabitants can provide vouchers for low-income students to attend independent private schools.

The limited-term contracts on which most publicly funded private provision is based has allowed authorities to quickly scale back their reliance on private schools when enrolment started to drop or to assume the responsibility themselves where demand for facilities and staff was expected to remain high. A drawback of the flexibility afforded by these short-term contracts is the insecurity it entails for private partners, which makes it difficult for them to establish high-quality educational projects over a longer period of time (Radinger et al., 2018).

These public-private partnerships were important for Colombia's ability to respond to rising enrolment in urban areas driven by rural-urban migration and students displaced from conflict zones. They also helped to guarantee the provision of specialised education to indigenous students and mandatory services for students with SEN where local authorities did not have the capacity to adequately provide them on their own. At the same time, the quality of education provided by private entities is highly variable and not all local authorities have adequate capacity to monitor their quality. In recent years, the government has promoted the reduction of the use of private providers (Radinger et al., 2018).

Sources: Sánchez, J. L., (2018), *OECD Review of Policies to Improve the Effectiveness of Resource Use in Schools: Country Background Report for Colombia*, Ministerio de Educación Nacional [National Ministry of Education], Bogotá, D.C; Radinger, T., A. Echazarra, A., G. Guerrero & J. P. Valenzuela (2018), *OECD Reviews of School Resources: Colombia 2018*, OECD Publishing, Paris.

Examples of needs-based criteria for the creation of new schools can also be found in the vocational education sector. In Estonia, for example, vocational school owners are required to submit a justification for their choice of programmes as part of their schools' licensing process (Santiago et al., 2016, p. 73[14]). This includes submitting the written views of social partners on the programmes proposed and – since the abolition of county Governors with the administrative reform in 2017 – a written statement from the union of local municipalities. Yet, whether in general or vocational education, the implementation of needs-based licensing systems involves several challenges, including the specification of adequate and transparent criteria, their reliable measurement and the development of capacity among school authorisers to carry out the associated assessments.

School choice and residence-based assignment mechanisms

The mechanisms by which students are assigned to or given the opportunity to choose their school affect how the demand for school places is distributed across the network. The choice of assignment procedures is an important factor in determining the extent to which the school network should be governed by market-based mechanisms and may involve trade-offs between competing policy goals. While residence-based student assignment mechanisms are a straightforward and predictable way to ensure that students can attend a school close to where they live, they have been criticised for reproducing residential segregation and compelling students from disadvantaged neighbourhoods to attend under-resourced or low-performing local schools. Systems involving parental choice, by contrast, promise to break the link between students' education and their place of residence but are often charged with reproducing inequities by virtue of the different ways in which families across the socio-economic spectrum can exercise their right to school choice.

Particularly for younger students, the majority of OECD school systems combine some form of initial geographic assignment process with varying degrees of parental choice (Musset, 2012[52]). In 2009, primary and lower secondary students are initially assigned to a proximate neighbourhood school in 27 of 33 OECD countries with available data, compared to just half of OECD countries at the upper secondary level (OECD, 2011, pp. 440, Table D5.12 [web][53]). This initial assignment is often based on catchment areas that determine the residents who are eligible or encouraged to attend a specific school. In most cases, parents then have the possibility to submit a request for their child to attend a different public school following this initial assignment, which may be granted subject to the availability of places, the schools' proximity, the presence of siblings, specific educational reasons and various other criteria. Particularly in decentralised education systems, the modalities of this assignment process can vary from one local authority to the next. Some systems also dispense with the initial assignment process altogether and prompt all parents to apply to a primary or lower secondary school of their choice or to submit a list of preferences from the very start.

In Austria, for example, some cities and regions have responded to demands from families by loosening their system of strict geographic assignment. When enrolling their child in an academic upper secondary school (*Allgemein bildende höhere Schule*), families can now freely choose from all schools of their province. Where demand exceeds supply, students can be assigned to another academic secondary school based on their distance to the school, siblings enrolled, their ability, or – depending on provincial regulations – the parents' second or third preference. In general compulsory education, students are traditionally assigned to their local school based on catchment areas and, if they comprise multiple schools, based on additional criteria depending on the province's

regulations, such as their distance from the school or the presence of previously enrolled siblings. While the city of Linz has now entirely abolished the initial assignment based on catchment areas, Vienna has expanded them to include not only the school's municipality, but also its neighbouring districts. Parents are free to select any school within their catchment area and request permission from the concerned authorities to enrol their children in a different district or municipality since such transfers require local municipalities to send compensation payments to the receiving authority. Schools offering specialised curricula, such as music or sports, are exempt from the catchment area principle. While the expansion of parental choice and school autonomy in Austria since the 1990s has motivated some schools to sharpen their profiles and develop pedagogical priorities to attract high-achieving students, authorities have sought to prevent student segregation dynamics by withholding disaggregated school assessment results or other forms of rankings (Nusche et al., 2016, p. 123[17]).

Even in systems that do not conduct an initial residence-based assignment, students' choice of schools can be constrained by the commuting distance they are willing to accept. In addition, many oversubscribed schools prioritise students who live nearby or whose siblings are already enrolled (Musset, 2012[52]). These criteria are sensible means to ensure that students can attend schools close to their home and parents with multiple children can easily drop them off or pick them up. Nevertheless, concerns have been raised that residence-based priority lists can reproduce residential segregation in the school system, effectively excluding disadvantaged students from popular schools in more affluent neighbourhoods. For this reason, a 2000 reform in Stockholm abolished residential proximity as an admissions criterion for oversubscribed secondary schools and instead assigned all places strictly based on students' grades. Yet, the case of Stockholm demonstrates that replacing residency with other selection criteria or expanding parental choice (discussed in detail below) is not guaranteed to reduce segregation on its own. As expected, the reform led to a marked increase in between-school segregation by ability (Bygren, 2016[54]) and earlier evaluations also found a significant increase in socio-economic and ethnic segregation, beyond what would have been expected based on students' grades alone (Söderström and Uusitalo, 2010[55]).

School choice schemes can exacerbate inequities if not carefully designed

Proponents argue that parental choice in the student assignment process incentivises schools to compete for students with an attractive pedagogical offer and yields a distribution of students that more closely reflects their educational preferences. Parental choice, at least in theory, also provides disadvantaged students with an opportunity to attend high-quality schools that would have otherwise been restricted to those who can afford living in or moving to attractive school districts. Even though school choice schemes in the majority of OECD countries only apply to the public sector, some have used extended parental choice to include the attendance of selected private providers based on similar arguments. These reforms are frequently implemented through voucher schemes that permit students to carry their funding from the public into the private sector (Musset, 2012[52]).

In practice, many countries' school choice systems have exacerbated socio-economic segregation across schools, rather than widening access to high-quality schools and there is little evidence that increased competition benefits those who fail to take advantage of school choice (Musset, 2012[52]). In contrast to systems with a strictly geographical assignment, those with a high degree of school choice are affected by socio-economic differences in parents' behaviour, related to both their likelihood to make use of school

choice and the criteria upon which they base their decisions. School choice arrangements that fail to take these social and behavioural variations into account and effectively address them are therefore at risk of reproducing or exacerbating the inequities they were designed to redress.

When selecting a school, most families have a preference for high academic standards, alongside other factors, such as a school's distance or socio-economic composition. There have been concerns, however, that the weight parents place on different criteria when engaging in school choice might vary across socio-economic groups, leading to some families systematically choosing better performing schools than others. Although some of this variation arises from differences in the quality of accessible schools rather than parents' actual preferences, advantaged parents do appear to value academic performance more than others (Burgess et al., 2015[56]; Hastings, Kane and Staiger, 2005[57]). This variation in parental preferences is a concern, not only because it means that school choice may systematically lead disadvantaged students towards lower-achieving schools, but also because it implies that schools have fewer incentives to compete on the basis of educational quality than proponents of parental choice might expect.

Evidence from school choice systems in multiple countries also shows that the disadvantaged families for whom many school choice schemes were originally introduced are the least likely to take advantage of them. Wherever the exercise of school choice is optional, rather than the default, i.e. where students are initially assigned to a local school, the group most consistently found to exercise choice are those with comparatively high social, cultural and economic resources. Native parents have also been shown to more frequently opt out of local schools with a high concentration of migrant students, causing dynamics of "native flight" that reinforce ethnic segregation (Rangvid, 2010[58]). Even choice schemes that are narrowly targeted at disadvantaged families tend to benefit those among them with the greatest academic ambitions and the most resources at their disposal (Musset, 2012[52]). This can be due to greater efforts among advantaged families to pull out of disadvantaged schools or due to the difficulties that low-income and minority families face in navigating the school choice process (Ladd and Fiske, 2001[59]). Giving individual providers discretion over their application and registration procedures can lead to indirect "cream skimming" practices and exacerbate differential participation rates, for example if disadvantaged families fail to submit their choices for the most popular schools early on (Musset, 2012[52]). Some of these barriers can be reduced by making deadlines, admissions and enrolment procedures homogenous across schools, by raising awareness of school choice options and by supporting disadvantaged families in navigating the process effectively (Nusche, 2009[60]; OECD, 2012[61]).

Even where disadvantaged families engage in the school choice process, they often lack the strategic sophistication and the relevant, contextualised information on school quality that they need to make the most of their choice (Schneider, Teske and Marschall, 2000[62]). Disadvantaged families may lack the resources, time and social capital to acquire sufficient information when exercising school choice and language barriers or a lack of familiarity with the school system can be an additional obstacle for migrant parents (Nusche, 2009[60]). For school choice to be effective, public institutions must address these barriers by expanding access to information and minimising the cost of its acquisition (OECD, 2012[61]), which also involves making it available in selected foreign languages and accessible to parents with limited literacy (OECD, 2010[63]). Whether countries decide to publish school-level performance indicators or withhold this information to avoid further segregation, it is important to recognise that raw performance

data is difficult to interpret and that contextualised value-added measures should be strictly preferred (Musset, 2012[52]).

Furthermore, most choice-based assignment procedures are susceptible to strategic manipulation, in the sense that they incentivise families to misreport their true school preferences, for example by avoiding submitting a preference for oversubscribed schools. Evidence from a common, ranking-based school choice system in the United States suggests that students engaging in strategic manipulation were more likely to be assigned to one of their preferred schools. This form of manipulability not only lowers the overall match-quality of school assignments, but may also implicitly discriminate against students and families who lack the knowledge, time or resources to appropriately respond to the complex incentives for strategic manipulation (Dur, Hammond and Morrill, 2018[64]). School systems have taken different complementary measures to ameliorate this problem. These include expanding the availability and accessibility of information on the quality of schools and the school choice process itself to enable parents to pick whatever school would serve their children best without requiring extensive research and upfront-investments. A parallel strategy has been to ensure school choice systems do not reward strategic manipulation, for example with the implementation of strategy-proof Deferred Acceptance Algorithms in New York in 2004, and Boston in 2006 (Roth, 2008[65]).

Policy makers have also turned to various types of "controlled choice" systems that combine some degree of parental choice with mechanisms to ensure that the advantages of school choice accrue to families across the socio-economic spectrum (Brunello and De Paola, 2017[66]; Nusche, 2009[60]). This commonly involves parents reporting several school preferences to a central enrolment point, which public authorities then try to respect as much as possible while maintaining a balanced distribution of students. This can be based on schools adopting quotas pertaining to characteristics such as SES, parental income and educational background, geographic area and other household characteristics. Controlled choice systems may also restrict which admissions criteria oversubscribed schools are permitted to take into account when selecting their incoming cohort of students or require them to assign places randomly among applicants using a lottery system to prevent the exclusion of disadvantaged students (Karsten, 2010[67]).

The Flemish and French Communities of Belgium provide two recent examples of school systems with a strong tradition of parental choice that have reformed their enrolment policies and introduced different elements of controlled choice (see Box 2.6). In both systems, free and largely uncontrolled parental choice at the primary and secondary levels, had contributed to a high level of social and ethnic school segregation which they have sought to address over the course of the past decade (OECD, 2015, p. 73[68]). An important feature of the Flemish Community's reform was its scope for flexibility at the local level, based on the extensive use of consultations, which significantly reduced resistance to its implementation. Given the complexity of controlled choice systems, their successful introduction may also require a certain degree of centralisation to minimise administrative costs and prevent problems like multiple registrations from generating inefficiencies (Musset, 2012[52]). The implementation of controlled choice systems also requires sufficient juridical and administrative capacity for the responsible authority to collect and manage the data needed to allocate students to schools (Karsten, 2010[67]).

Box 2.6. Controlled choice reforms in the Belgian Communities

Since passing the 2002 Decree on Equal Educational Opportunities, the **Flemish Community of Belgium** has implemented a series of reforms to its school choice system. Following a two-year period between 2008 and 2010, which permitted local experimentation to test out different enrolment systems, a 2011 Decree took stock of the lessons learned and introduced a number of reforms to the controlled choice system. First applied in 2012-13 (and subsequently adjusted) to admissions in all pre-primary, primary and secondary schools, the reform required oversubscribed schools to assign places to disadvantaged and non-disadvantaged students in proportion to the socioeconomic composition of each school's neighbourhood. The reform also defined the criteria that schools could draw on to choose among students within each group when demand for places exceeded supply. Pre-primary and primary schools were allowed to consider the distance between the parents' home or workplace and the school, the position of the school in the student's rank order list, or the results of a lottery. Secondary schools were required to operate on a first-come-first-served basis or to make decisions based on the position of the school in the student's rank order list. Many elements of the reforms' implementation were decentralised and assigned to local negotiating platforms (*locale overlegplatformen*, LOPs). LOPs decided on matters such as the definition of neighbourhoods and the quotas for disadvantaged students, which helped to reduce local resistance to the new rules. By 2013, there were 72 LOPs covering most of the territory of the Flemish Community, each of which ensured the co-operation between schools, stakeholders and a defined local authority or region, bringing together representatives of the main educational stakeholder groups in that area.

The **French Community of Belgium** reformed its parental choice system starting in 2007 and enrolment in the first year of secondary education has been subject to a 20% quota for disadvantaged students in every school since 2010-11. Enrolment at the pre-primary and primary levels remains largely unregulated. Other than in the Flemish Community, the reform did not provide scope for adjustments at the local level and adaptations to a school's neighbourhood characteristics, which may help to explain the relatively strong resistance by schools and other stakeholders. The identification of disadvantaged students was also rather imprecise and based on the average SES of their primary school, which in turn was defined on the basis of the schools' residence area.

Sources: Nusche et al. (2015), *OECD Reviews of School Resources: Flemish Community of Belgium 2015*, OECD Publishing, Paris, http://doi.org/10.1787/9789264247598-en; OECD (2015); *OECD Economic Surveys: Belgium 2015*, OECD Publishing, Paris, http://doi.org/10.1787/eco_surveys-bel-2015-en.

The definition of catchment areas is an important steering tool in the governance of student assignment

The definition of school catchment areas is an important tool in the governance of the school network and student assignment. Whether the residence-based assignment to a school is mandatory or merely the first step in a process of parental choice, the size and boundaries of catchment areas can have a significant effect on the distribution of students.

Catchment areas are often defined along administrative boundaries but can vary significantly in size, ranging from those containing a single neighbourhood school to those encompassing an entire city's school network. In countries that restrict students' enrolment to schools within their local catchment area, expanding their size can be an indirect way to increase parental choice. In the Austrian capital Vienna, for example, a school's catchment area includes both its own and the neighbouring district (Nusche et al., 2016, p. 123[17]). Furthermore, drawing catchment areas that integrate advantaged and disadvantaged neighbourhoods can be a means to increase diversity in socially segregated schools networks (Karsten, 2010[67]).

In some countries, such as Austria, catchment areas also define the funding obligations of local authorities, which are required to compensate adjacent municipalities for students attending schools outside their jurisdiction. Particularly where the efficient organisation of the school network requires a rationalisation of school facilities, such funding arrangements can create disincentives for small municipalities to engage in school consolidation or share facilities. In this context, the expansion of rural catchment areas beyond municipal boundaries can be an important step to initiate a reorganisation of the school network since multi-municipality catchment areas could permit authorities to rationally decide which schools should be kept open without the threat of immediate budgetary consequences for individual municipalities (Nusche et al., 2016, p. 140[17]).

School catchment areas are regularly adjusted, for example in response to new school openings and closures, to account for housing developments or population declines, to increase their socio-demographic diversity, to implement new school choice programmes, or to adjust to new grade configuration models. In most cases, catchment areas are defined by local authorities and given the significant impact that re-zoning processes can have on local communities, giving them a voice in the final decision is important to find suitable solutions and ease the implementation process. National or regional authorities can, however, play a critical role in supporting local actors in their definition of catchment areas, for example by providing them with technical tools and data on student enrolment patterns, school performance or estimates of the cost and benefits associated with different boundaries (OECD, 2011[69]).

Some authorities have taken advantage of geographic information systems (GIS) when re-drawing catchment areas to conduct spatial analyses of factors such as students' travel times under different scenarios. Since GIS applications require significant expertise and resources, they often rely on a division of labour between central and local authorities, which can create tensions between a commitment to decentralised control over catchment areas and the centralised capacity for their implementation (Hite, 2011, p. 215[70]). Well-designed GIS tools can draw on the technical capacity of central-level staff for the collection and manipulation of data or the production of easy-to-use maps and analyses, while drawing on the contextualised knowledge of local administrators, teachers, and community members to adjusting the products to their needs (Hite, 2011, p. 224 f.[70]).

Monitoring the school network and forecasting educational demand

Monitoring and forecasting mechanisms play a vital role in creating the conditions for school networks to effectively respond to changing student needs and educational demand. Collecting and disseminating information on the current supply of school places, the quality of facilities and expected demand is crucial to steer the actions of authorities at all levels of the school system and enable them to contribute to the sustainable governance of the school network.

Monitoring the supply of school places

Effectively aligning supply and demand for school places and planning the network accordingly requires a thorough understanding of both the current stock of educational facilities and the changing demand for school places. The strategic planning of school infrastructure developments therefore relies on effective monitoring and forecasting mechanisms that support a system-wide approach with high-quality data. They can inform decisions about specific investments and priorities and help policy makers in assessing the scope and feasibility of efficiency-enhancing interventions, inter-school collaboration, consolidation or the expansion and construction of new facilities.

High-quality inventories providing centralised information on educational facilities, their characteristics and capacity can provide invaluable information to support planning activities at the local and central levels. Aggregating micro-level data on the capacity of individual facilities in geographically oriented databases and combining it with corresponding enrolment forecasts can help authorities to detect priority areas in need of additional school places and those with excess capacity. Collecting and managing this data can also provide a basis to explore opportunities for synergies such as the sharing of facilities or the creation of school clusters and to simulate the expected effects of reforms such as grade reconfigurations on enrolment patterns across multiple sites (Beynon, 1997, p. 62[8]). The Czech Republic's school registry provides an example of an administrative tool that comprises a comprehensive listing of capacities across different educational fields, which could be used to perform the aforementioned operations (see Box 2.7).

During the OECD review visit in 2015, representatives from the Flemish Community school network reported to developing capacity to map out the school provision and infrastructure based on strategic plans for each of the Flemish Community's school groups (school boards, responsible for multiple schools), as well as monitoring and projecting relevant indicators related to demographic trends and local infrastructure. The intention is to encourage school leaders and school group directors to make strategic choices, plan ahead for future needs and set priorities that take the entire area into account. This also involves investing in an information system that includes data on all facilities and their associated infrastructure (Nusche et al., 2015, p. 125[9]). The French Community of Belgium has adopted a similar strategy to detect and address capacity shortages in its metropolitan areas. As described in Chapter 3 (Box 3.11), the four-stage process includes consulting the surface area and student numbers of each school, as documented in an inventory. Next, it involves on-site visits and the deployment of working groups to institutions with significant over- or under-capacity to analyse whether a reorganisation of their premises could yield a more efficient use of space (Smoos, 2017[71]). However, particularly in systems where the provision of school places is governed by different and overlapping networks and diverse independent providers, gathering system-wide data to identify discrepancies between the demand and supply of school places constitutes a significant challenge (Nusche et al., 2015, pp. 115, 124 f.[9]).

Box 2.7. Monitoring the school network in the Czech Republic

In the Czech Republic, any school seeking public funding and official recognition as a certificate-granting institution is required to be included in the country's School Registry of Schools and School Facilities (hereinafter "school registry"). The Ministry of Education, Youth and Sports (*Ministerstvo školství, mládeže a tělovýchovy*, MŠMT) is in charge of the school registry, although regional authorities share some responsibility for the entry and maintenance of data and the approval of schools entering or being removed from the school registry (MŠMT, 2016, p. 16[48]). In addition to confirming its schools' recognition, the registry serves as an administrative tool to monitor the school network. Subject to systematic evaluation from the education inspectorate, the school registry contains a comprehensive list of all facilities managed by the three major school providers and their respective capacities: public schools established by the ministry or regional governments, church schools and private schools. This use of a single registry gives the central authority a relatively high degree of oversight in an otherwise very decentralised school system (Shewbridge et al., 2016, pp. 66, 83).

Despite the school registry's potential to support the strategic organisation of the school network, its use as a planning and steering tool is currently limited. Combined with regionally disaggregated data and forecasts of future demographic developments, the school registry could be used to systematically identify discrepancies between projected network capacities and educational demand at different levels of the school system. This could also guide the development of principles for the reorganisation of the school network, including rules for the opening of new schools or new educational programmes. Yet, even in areas with identified excess capacity, the legislative framework limits the Ministry of Education's ability to decline a school's bid to join the registry, for example if an application enjoys the support of regional authorities. This, alongside the challenge of maintaining data once it has been entered into the registry, has thus far limited its use as a tool to steer the organisation of the school network.

Sources: MŠMT (2016), *OECD Review of Policies to Improve the Effectiveness of Resource Use in Schools: Country Background Report for the Czech Republic*, Czech Ministry of Education, Youth and Sports, Prague; Shewbridge, C., et al. (2016), *OECD Reviews of School Resources: Czech Republic 2016*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264262379-en.

Monitoring and evaluating the quality of school facilities and infrastructural investment needs in the school network

Efforts to monitor the school network and generate inventories of an education system's infrastructure stock can extend beyond the quantity of buildings and learning spaces to include their qualitative characteristics and condition. This information can provide the basis for identifying investment priorities and forecasting construction or maintenance needs. In some countries, this data is generated on an ad hoc basis, while others collect it in regular intervals or as part of post-occupancy evaluations following the completion of construction projects. As discussed in Chapter 1, adequate school facilities are an important part of students' learning environment and investing in the school network's infrastructure can have a positive impact on teachers, learners and the wider community (Cellini, Ferreira and Rothstein, 2010[72]; Conlin and Thompson, 2017[73]). Meta-analyses have found particularly young students to be susceptible to the quality of their school

buildings (Gunter and Shao, 2016[74]). In addition to maintaining school buildings in an adequate physical condition, identifying and responding to infrastructural investment needs also plays an important role in enhancing educational practices by creating the conditions for the introduction of new and improved pedagogical techniques.

Ad hoc comprehensive reviews

Comprehensive reviews of school facilities, their quality and investment needs are usually conducted leading up to major reforms or infrastructure projects. During the initial phase of its large-scale Secondary School Building Modernisation Programme (SMP), for example, Portugal launched a comprehensive survey of its secondary schools to determine which schools should benefit from infrastructural investments, taking into account the schools' age, condition and other characteristics. A detailed technical analysis provided further insight into the types of school buildings whose life could be considerably extended through renovation works and those that would benefit more from replacement than refurbishment (in practice, this tended to be the case for newer schools built with lower-quality materials). This comprehensive review and analysis of school facilities provided the basis for the effective prioritisation of funds and – in co-operation with regional authorities – the selection of schools for the different phases of the project (Blyth et al., 2012, p. 20[6]).

Regular comprehensive reviews

In contrast to ad hoc review, the regular evaluation of the school network and its building stock can allow policy makers and stakeholders to track progress over time, fostering both transparency and accountability. The AGIOn's monitoring survey in the Flemish Community of Belgium provides an example of such regular monitoring instruments. Since 2008, the Flemish school building monitor has been carried out at the end of every government term (the second was conducted in 2013), collecting statistical data on all schools via an online survey asking school principals to assess their facilities based on a wide range of quality indicators (Flemish Ministry of Education and Training, 2015, p. 57[75]). The 2008 survey of the Flemish school network, for example, brought to light that school buildings at 32% of all sites were considered too small to accommodate necessary facilities, especially in the capital region (Leemans and von Ahlefeld, 2013[5]). Similar reviews are regularly conducted in Austria as part of its federal school investment and infrastructure planning process (Nusche et al., 2016, p. 129[17]).

Post-occupancy evaluation techniques

Post-occupancy evaluation (POE) techniques constitute an important complement to large-scale reviews of the school network, assessing the adequacy of school facilities once a construction project is completed and its facilities are in use. In addition to ensuring the technical adequacy of infrastructural works and fulfilment of contractual obligations, POE techniques generate important information on the facilities' ability to meet teachers' and students' needs in practice and thereby provide a basis to identify problems, initiate necessary adjustments and inform the planning of future construction projects elsewhere. Although they are usually carried out locally, central governments can facilitate the process and help schools to develop the instruments they need to evaluate facilities upon completion (Leemans and von Ahlefeld, 2013[5]).

Monitoring and forecasting developments in educational demand

Amid growing concerns surrounding the efficiency of their school networks, many countries are increasing their efforts to identify discrepancies between educational supply and demand. Developing indicators of underutilisation or infrastructural shortages based on student enrolment and school capacity data can be an effective means to detect mismatches in the current supply and demand for school places. Some countries also use capacity data and indicators such as average class size and occupancy rates when selecting priority areas for investigation or initiating automatic review procedures, as described in Box 2.8. While these techniques are primarily geared to detect shortcomings in the present stock of schools and school places, other techniques aim to identify these challenges before they arise.

Accurate forecasts of educational demand are critical for countries to anticipate infrastructural needs, determine the appropriate size for newly constructed or renovated schools, guide the distribution of capital funding and ensure that the school network can accommodate educational demand for the foreseeable future. While aggregate projections of educational needs can support the system-wide planning of school facilities and expenditure frameworks at the national level, more fine-grained and disaggregated forecasts can support school network planning activities at the regional level and even contribute to micro-planning and school network management at the local level. Depending on the distribution of responsibilities, these disaggregated projections may be integrated into the central-level forecasting activities or carried out by regional offices and sub-central authorities.

Box 2.8. Examples of automatic network review processes in the United Kingdom

In **Scotland**, the Scottish Borders Council developed a set of criteria that initiate automatic reviews of schools. These include: a reduction in the school's number of required teachers; cohorts that are forecast to fall below 13 students over the next three years; operating cost exceeding three times the local authority's average; occupancy levels below 45%; a significant decline in student performance; urgent investment needs that are considered disproportionate (Commission on the Delivery of Rural Education (CDRE), 2013[76]). The ensuing review process does not necessarily result in the closure or consolidation of small schools, but it may create pressure and incentives leading to consolidation later on. For example, repeated reviews have been reported to dissuade parents from sending their children to a school, which has sometimes caused a further decline in enrolment rates, thereby triggering a vicious circle.

In **Wales**, a third of primary schools have fewer than 90 students, and 15% of them have fewer than 50 students. During recent years, the Welsh Assembly Government has therefore put increasing pressure on Local Education Authorities to address the issue of excess capacity (Rural Development Sub-Committee, 2008[77]). Local authorities have been ordered to monitor their school networks and pay particular attention to: primary schools with fewer than four teachers, year groups regularly containing less than eight to ten students, head teachers with substantial teaching loads, mixed age classes containing more than two year groups, or schools with more than 25% surplus places [Evans, 2005, in (Sigsworth and Solstad, 2005[18])].

Source: Ares Abalde, M. (2014), "School Size Policies: A Literature Review", *OECD Education Working Papers*, No. 106, OECD Publishing, Paris, http://dx.doi.org/10.1787/5jxt472ddkjl-en.

In addition to baseline data on student populations, current capacity, equipment or staff, forecasts of educational demand depend on a range of predictive assumptions concerning student enrolment and flow rates, student-teacher ratios, class sizes, utilisation rates of facilities etc. Based on a series of such variables, simulation models can serve to project expected student numbers, classes or classrooms, personnel and facility needs at different levels of aggregation (UNESCO, 2012[78]). Depending on the granularity of the desired estimates and the model's sophistication, forecasting exercises may rely on existing administrative data or require the collection and processing of additional information from various sources.

Since policy changes such as an increase in the school leaving age have a significant impact on the size of future student cohorts, reliably projecting educational demand and the associated infrastructural needs relies not only on accurate demographic projections but also on the evaluation of ongoing developments in educational policy. Likewise, curricular developments such as a move towards the use of ICT or personalised and laboratory-based teaching methods often require the expansion or adjustment of educational facilities. Capacity forecasts and simulations can inform policy dialogues around such reforms, facilitate negotiations and promote consensus among stakeholders. As administrative working tools, they can also foster transparency in resource management decisions and support the implementation of costed sector plans (UNESCO, 2012[78]) or complement pilots to simulate the impact of policy options under multiple scenarios.

Especially in countries that do not have an established culture of using projections to support educational planning, generic simulation models have played an important role in advancing national forecasting capacities. The EPSSim (Education Policy and Strategy Simulation Model) (developed by UNESCO in 2001 and updated since) is one example designed to support national administrations in formulating education development plans. It helps them in identifying resources and actions required under different scenarios and testing the viability of different strategic responses. Building on core components that are applicable across school systems, such as a basic student flow simulation, the model integrates a number of optional elements that allow administrations to approximate features of their local and national contexts and adapt the tool to their specific needs (UNESCO, 2012[78]). Although basic generalised simulation models are easily accessible to national education planners, adapting and using them to develop reliable medium to long-term plans requires resources and technical expertise. Fostering a successful "culture of projecting" might therefore require capacity building for the use of existing simulation models, their modification and the analysis of projection results (Bray and Varghese, 2011[79]).

2.3. Network planning at the regional and local levels

In many OECD school systems, decentralisation and the increased autonomy of local authorities, school boards and schools have changed the context in which the organisation of the school network takes place. At the same time, parents, students and communities have become more diverse, educated and empowered to demand schools to cater to students' individual needs (Burns and Köster, 2016[80]). While decentralisation is typically expected to increase responsiveness to the demands of local communities, raise the potential for innovation and adapt the use of resources to local conditions, it can also raise challenges for the equitable and efficient management of resources (OECD, 2017[2]). For example, small municipalities may lack the capacity to effectively plan their school

networks and manage their facilities so as to ensure high-quality learning environments for their students. Systems with fragmented governance structures in which many local authorities are responsible for a single school may also face difficulties to attain size efficiency, particularly in a context of falling student enrolment. Enabling locally governed school networks to provide a high-quality educational offer that responds to all students' needs is a significant challenge that requires all levels of government to work together.

It is clear that highly centralised systems are not necessarily better placed when it comes to the challenge of adjusting school networks to changing demand or student needs. Countries such as Serbia, that did not undergo a process of decentralisation and in which the national government remains responsible for both the school network and teacher employment have had an even harder time adjusting to demographic shifts than countries like Estonia, which devolved network planning competencies to the local level (Santiago et al., 2016, p. 152[14]). Likewise, there are many examples of systems that successfully carried out efficiency-enhancing reforms without strong central-level involvement. This was the case in Denmark, where municipalities independently advanced the consolidation of their school networks in order to generate economies of scale, reduce expenditures at the lower secondary level through larger school sizes and increase student achievement by improving the learning environment in the process (Nusche et al., 2016, p. 81[19]).

The Czech Republic provides another example of a decentralised system that proved capable of adjusting their school network in the face of demographic pressures. Particularly in the early years of declining student enrolment, the number of teaching staff has largely kept pace with this trend in both the municipal and the regional school networks. Some conditions which facilitated this responsiveness included a clear distribution of responsibilities, with municipalities operating most pre-primary, primary and lower secondary schools and the regions mostly operating upper secondary schools. Furthermore, the central per capita funding system provides some incentives for school consolidation. Finally, the possibility to operate different kinds of schools and facilities as a single legal entity has encouraged modular approaches to school consolidation based on the reallocation of services across facilities (Shewbridge et al., 2016, p. 68[15]). Beyond contextual particularities, the success of local planning initiatives and school network governance appears to be contingent on a number of conditions, including adequate local capacity, responsible authorities of sufficient size and effective co-ordination mechanisms between them.

Capacity for strategic planning at the sub-central level

Depending on a school system's degree of decentralisation and local autonomy, schools and municipalities may assume significant responsibilities for planning the local school network and managing or maintaining school facilities. In order to perform these tasks successfully, the responsible sub-central actors require not only adequate capacity, but also clear leadership and a focus on educational quality (Shewbridge et al., 2016, p. 62[81]). As described before, successfully anticipating discrepancies between the supply and demand of school places and planning the school network accordingly involves a diverse range of activities, many of which require technical skills, such as the collection, management and analysis of relevant data (OECD, 2017, p. 137[2]). Small municipalities often have few dedicated staff members working on matters concerning education, and local authorities in recently decentralised systems may lack the experience to engage in strategic thinking and effective network planning.

The case of Estonia illustrates the importance of building local capacity for the success of school network governance in decentralised systems. While local governments in Estonia had been assigned responsibility for key decisions concerning school reorganisations, closures and mergers, most of the information and administrative capacity was retained by the central government, making it difficult, particularly for smaller municipalities, to effectively exercise their new role (Santiago et al., 2016, p. 93[14]). As highlighted by the OECD review team, the professionalisation of local management depends not only on the capacity of local actors themselves, but also on the institutional settings in which they operate. This includes their access to information and professional support, as well as mechanisms to monitor and provide feedback on the work of municipalities and their services (Santiago et al., 2016, p. 103[14]).

Different forms of horizontal capacity building and structures based on distributed leadership can complement these approaches to improve the organisation of school networks in decentralised education systems. Multiple case studies conducted as part of the OECD's Governing Complex Education Systems project, for example, demonstrated that collaboration and the exchange of good practices can have a very positive impact on the capacity of municipalities, schools and professionals (Burns, Köster and Fuster, 2016[82]). Another strategy to co-ordinate the actions of local authorities in decentralised systems and enable them to engage in long-term strategic thinking is to build "guiding coalitions" of leaders at different levels of the system (Rouw et al., 2016, p. 57[10]). Such coalitions have the potential to develop a shared agenda for the whole-system implementation of school network reforms and harmonise the actions of stakeholders in the absence of formally centralised control.

Horizontal co-ordination for effective network planning

Even at times when the importance of adapting the school network is widely recognised among stakeholders, a lack of incentives or structures for collaboration can render its reorganisation difficult in decentralised systems. Particularly in those with a fragmented governance structure and a high number of small municipalities operating only a few or a single school (as is the case in countries like Austria and the Slovak Republic), local administrators can feel pressured to keep small schools open despite their high costs and potentially inadequate educational provision. In the absence of effective co-ordination among nearby municipalities, they often fail to seize opportunities for collaboration or the joint provision of services despite their potential to reduce costs and improve the learning experience of students.

This section describes two ways in which school systems have sought to address this problem: through governance structures that foster horizontal co-ordination at the local level, and through arrangements between the central and the local level that seek to bring a system-wide dimension to the decentralised governance of the school network. While many countries with a long tradition of decentralised governance have overcome co-ordination challenges and managed to facilitate the rational organisation of the school network across administrative boundaries using one or both of these approaches, others have yet to adapt to the challenges posed by a new governance context (Santiago et al., 2016, p. 83[14]).

Local co-operation, co-decision mechanisms and the pooling of administrative capacities

Successful local co-operation on matters like the co-management of schools, the shared use of facilities, transportation services, school maintenance or joint purchasing depends on governance structures that facilitate horizontal collaboration and decision making. In the absence of institutionalised mechanisms, strong central level support or financial incentives, these forms of co-operation often depend on historical ties and informal relations between decision makers in different municipalities (OECD, 2011, p. 248 f.[69]).

While local capacity building should be a priority in decentralised systems, collaboration across municipalities or schools and the pooling of administrative resources can complement these efforts and improve schools' ability to effectively plan their school networks. This can involve informal forms of exchange to identify and spread good practices or more formal collaboration. For example, groups of municipalities could share management resources by jointly employing and drawing on the services of specialised staff, share relevant data or engage in the collective planning of their school networks. In systems where the challenges of local authorities are too profound to be addressed through traditional capacity building or sharing administrative resources alone, some countries have engaged in the de facto consolidation of municipal authorities to generate administrative economies of scale and improve the efficient delivery of the entire array of local public services. Box 2.9 provides examples of two such approaches to enhancing local capacity through collaboration in Norway and administrative consolidation in Denmark.

Central-level authorities can promote horizontal co-operation and co-decision mechanisms at the sub-central level in a number of ways, ranging from the provision of guidance and incentives to the enforcement of rules that require collaboration under specific circumstances (OECD, 2011[69]). In the Netherlands, for example, the Law on Mutual Agreements regulates the co-operation between municipalities, provinces and other sub-central public bodies. While their co-operation is voluntary in principle, the national government can force sub-central authorities to collaborate on a well-defined project of particular importance under certain conditions (Charbit and Michalun, 2009[83]). Some central-level authorities have also prompted municipal co-operation by expanding catchment areas and putting a single provider (for example a larger municipality or an association of municipalities) in charge of administering the enlarged school network. Depending on their role within a given governance context, school principals can also be key actors driving local-level collaboration in the organisation of the school network. Platforms that foster a regular and constructive exchange between school leaders can promote peer learning while simultaneously strengthening the basis for inter-school collaborations (Santiago et al., 2016, p. 210[84]).

Box 2.9. Addressing a lack of administrative capacity through collaboration and consolidation

Peer-learning networks in Norway

In Norway, municipal quality networks provided a platform for local authorities to engage in peer-learning and pool administrative capacity as a means to fulfil their responsibility for the school network in a highly decentralised system with a strong sense of respect for local ownership. In this context, a range of networks, partnerships and local collaboration initiatives have been established to take collective responsibility for quality evaluation and improvement. For example, in 2002, the Association of Local and Regional Authorities (*Kommunesektorens interesse- og arbeidsgiverorganisasjon*, KS), the Ministry of Labour and Government Administration, and the Ministry of Local Government and Regional Development set up "municipal networks for efficiency and improvement" that offer quality monitoring tools for municipal use and provide a platform for municipalities to share their experience, compare data and evaluate different ways of delivering services across a range of sectors. For the education sector, an agreement was established between KS and the Directorate for Education and Training to allow the networks to use results from the user surveys that are part of the national quality assessment system (Nusche et al., 2011[85]).

Administrative consolidation in Denmark

As part of a Local Government Reform in 2007, Denmark reduced the number of its municipalities from 271 to 98 and replaced 14 counties with five regions. Many of the municipalities that existed prior to 2007 were considered too small to provide effective local services, in particular in the health sector. The reform sought to address these challenges by improving the municipalities' capacity to deliver high-quality services and do so more efficiently by creating economies of scale. Most of the newly established municipalities have a minimum size of 20 000 inhabitants. The reform also sought to clarify responsibilities for different levels and sectors of education, transferring the responsibility for general upper secondary education from the counties to the central-level administration, thus making it responsible for all upper secondary education. In addition, municipalities were given full responsibility for both mainstream and special needs compulsory education to facilitate a more effective use of resources (Houlberg et al., 2016, p. 100[86]).

Sources: Nusche, D., et al. (2011), *OECD Reviews of Evaluation and Assessment in Education: Norway 2011*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264117006-en; Nusche, D., et al. (2016), *OECD Reviews of School Resources: Denmark 2016*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264262430-en.

Regional co-ordination and planning platforms

Regional co-ordination in the organisation of school networks commonly serves two objectives: i) increasing efficiency in the school network by rationalising its provision across administrative boundaries and ii) making the planning of local networks responsive to the wider community's needs by integrating it into regional development strategies.

Regional level planning processes can provide a platform for local actors to communicate and can encourage horizontal co-operation between them. They can remove barriers for

co-ordination in governance arrangements that provide few incentives for collaboration or where the small size of municipalities limits their capacity to do so. Potential areas for such collaboration include the provision of school services (e.g. the co-management of schools across municipalities), improving transportation services, the common use of school facilities, joint purchasing, school maintenance or improving teachers' access to professional services.

Existing structures for regional planning or administration can be built on and expanded to assume a stronger role in the planning of the school network. For example, local or regional offices of the central government can act in a co-ordinating capacity to support the collaboration of local authorities in planning their educational provision. This involvement of central authorities in co-ordinating the local organisation of the school network, however, is not always welcome. In Estonia, for example, the OECD review team found that the county-level education departments struggled to effectively assume a co-ordinating role since many municipalities did not perceive them as legitimate partners in the governance of the school network (Santiago et al., 2016, p. 83[14]).

In the absence of existing structures or traditions of regional co-ordination and planning, some systems have considered establishing new regional planning platforms. These can cover all levels of school education, involve relevant stakeholders (e.g. municipalities, self-governing regions, regional industry representatives, as well as representatives of state or national authorities) and provide formal or informal ties to the authorities responsible for regional development processes. In the case of the Slovak Republic, the OECD review team recommended developing and launching such platforms on a pilot basis in one or two self-governing regions (Santiago et al., 2016, p. 101[13]).

Portugal, which does not have a formal regional tier of administration, recently made it possible for municipalities to organize themselves as inter-municipal communities (*Comunidades Intermunicipais*, CIMs) to develop strategic plans for regional development and strengthen their horizontal co-ordination. Since 2013, 23 such inter-municipal entities have been formed, two of which correspond to the metropolitan areas of the largest cities – Lisbon and Porto. CIMs play a role in the regional governance of education by providing a platform to share experiences across municipal boundaries and by developing integrated education plans at the regional level, based on their constituent municipalities' local education plans (*cartas educativas*). CIMs can also play an important role in helping central authorities to steer and regulating their VET offer as part of the recently created Qualification Needs Anticipation System (*Sistema de Antecipação de Necessidades de Qualificação*, SANQ). As part of this process, regions can co-ordinate contributions from local VET providers and employers to develop rankings of the regional qualification priorities, which in turn inform the central authorities' targets for the number of VET classes to be created in each CIM. Initially, few CIMs had the technical capacity or initiative to effectively take advantage of this widened scope for horizontal co-ordination and regional planning. Since the policy's introduction, however, a growing number of CIMs have adapted centrally defined priorities for the regional VET offer based on their own stakeholder consultations and assessment of needs (Liebowitz et al., 2018[88]).

Strengthening the regional dimension in the organisation of the school network is particularly important in systems that exhibit major regional demographic and economic disparities. Effective school network planning procedures need to be sensitive to these conditions while taking into account the role that school networks play for local and regional development objectives. As will be discussed further in Chapter 3, making the

governance of school networks responsive to local and regional contexts and connecting it to the wider institutional framework of regional development is an important challenge for school systems (Santiago et al., 2016, p. 95[13]).

In Estonia, for example, where the challenges confronting the school network vary considerably between different parts of the country, authorities have been looking for ways to strengthen the county or inter-municipal dimension in their strategic reflections. This "regionalisation" can be promoted through the development of institutional mechanisms for school network co-ordination and planning. An OECD Public Governance Review therefore recommended that national, county and municipal governments should consider creating regional "cluster districts" (also sometimes referred to as "collaboratives" or "federations") to encourage more effective and efficient educational management (OECD, 2011, p. 328[69]).

Local administrations' support for central network planning

Even in systems where the ultimate responsibility for the design and planning of the school network is vested at the central level, local and regional authorities can make a significant contribution to the process. The local administrators' knowledge of the school community they serve makes them valuable partners for the development and implementation of strategies to increase the efficiency of local school networks and assess the long-term infrastructure needs in light of the prospective demand and regional development objectives. Central authorities might thus consult local administrations on matters such as the identification of emerging needs for educational services within a region, the expected demand for school places (potential enrolment, preferences of students etc.), their supply (capacity constraints, quality etc.) and developments or trends affecting the region's social and economic needs (Santiago et al., 2016, p. 102[13]). They can also systematically report inefficiencies within their jurisdiction and instances of high unit costs or low quality provision. In some cases, this also involves leveraging local capacity for the systematic collection of data and its supply to national administrators. Furthermore, local administrators can be a key partner in the implementation of network reforms, acting as a broker managing stakeholder engagement processes or communicating proposals to the local community (see below).

Rationalising the distribution of responsibilities across levels of administration

While some countries have responded to challenges related to the size and capacity of local authorities by consolidating administrative structures or strengthening co-ordination mechanisms, others have considered reversing the process of devolution and recentralising responsibilities for those parts of the school network that local authorities may lack the capacity to govern effectively. This can take the form of moving responsibilities to higher levels of administration or creating new bodies to administer a larger number of schools. An example of large-scale recentralisation efforts in Estonia is described in Box 2.10.

Systems that are recentralising parts of their school network governance may do so across the board or selectively, and some countries have opted for a flexible implementation that recognises differences in the capacity and performance of local providers. This could involve the option for municipalities to seek certification and continue to operate their local school system within a strengthened accountability framework (OECD, 2017[2]). In the case of Estonia, for example, the review team suggested that its recentralisation strategy for upper secondary education should involve "both a dialogue with

municipalities (to determine which ones could maintain the operation of their gymnasiums under a state-defined regulatory framework) and co-ordination at the county or regional level to define where the operation of state-run gymnasiums is pertinent" (Santiago et al., 2016, p. 98[14]). Likewise, in Denmark, municipalities that lack the capacity to organise the provision of special needs education themselves can rely on services provided through the regions (Nusche et al., 2016, pp. 36, 55, 82[19]).

Box 2.10. Recentralisation of upper secondary education in Estonia

The Estonian school network, particularly in rural areas, is characterised by inefficiencies stemming from a large number of small municipalities providing upper secondary education to a decreasing number of students due to a rapid population decline and urbanisation. As a means to rationalise its school network, the Estonian government pursued an indirect recentralisation strategy that consisted of two components: First, basic and general upper secondary education were separated by preventing local governments from opening new full-cycle schools for Years 1-12 or schools which combine upper secondary education with other levels. (This restriction has since been lifted, but new school openings remain largely confined to private basic schools, not full-cycle schools). Second, the state sought to consolidate the general upper secondary network by constructing a new gymnasium in each state, hoping that the smallest municipalities would cease to offer this level of education and send their students to the state-run schools instead. Even though the state has no power to close upper secondary schools under local control, the reform provides municipalities with financial incentives to rationalise their upper secondary and basic education school networks, given that the newly constructed gymnasiums are fully funded by the state (Santiago et al., 2016, pp. 137, 75[14]). In addition, municipalities can apply for investment grants to improve their basic school provision under the condition that they take steps to improve the efficiency of their school network, e.g. by closing or merging their upper secondary schools.

The 2016 OECD review pointed to a number of concerns regarding the reform's implementation. One challenge could arise in counties whose constituent municipalities are able to continue providing upper secondary education at an efficient scale, which would then compete for students with the newly opened state-run gymnasiums, thus exacerbating the fragmentation of the school network. A second concern is that the recentralisation of upper secondary education might weaken its link to regional development strategies. The OECD review therefore suggested taking a selective approach to recentralisation and delegate the provision of upper secondary education in some larger municipalities conditional on their proven experience and capacity. A second recommendation was to ensure that regional development objectives remain a relevant dimension in defining the organisation of schools and supply of courses. Regular consultations of relevant stakeholders could help to retain the school offer's responsiveness to diverse regional and local expectations despite its recentralisation (Santiago et al., 2016, p. 94 f.[14]).

Source: Santiago et al. (2016), *OECD Reviews of School Resources: Estonia 2016*, OECD Publishing, Paris, http://doi.org/10.1787/9789264251731-en.

Recentralising education services and school network governance entails the risk of weakening the links between education and local development planning. Yet, centralisation does not necessarily preclude a simultaneous emphasis on regionalisation and attention to local needs. Some recentralisation initiatives have been accompanied by mechanisms to ensure that local development objectives are considered when defining

approaches to the school network, for example by ensuring the consultation of relevant local stakeholders (see below) (Santiago et al., 2016, p. 98[14]).

Stakeholder involvement in network planning and infrastructural developments

Involving relevant stakeholders in school renovations and infrastructural investment programmes is important to ensure that the process is aligned with their needs and practices and to manage the expectations of those affected by the changes. This includes helping teachers and students to navigate the inevitable disruptions in their daily routine during the construction works and to recognise the longer-term benefits of the renovated facilities (Blyth et al., 2012[6]). Engaging stakeholders upfront can also improve project outcomes and ensure that school buildings are better used and cared for upon the project's completion (Fisher, 2000[88]).

Stakeholders' views may be consulted at the point of commissioning, during the selection of project proposals or their final execution. In practice, the extent to which stakeholders are involved in renovation projects at all, the stage at which they are consulted, the formality of the process and the range of actors that are addressed varies considerably, often from one project to the next. Establishing a dialogue in which all actors feel that their voices are heard is challenging. The Flemish Community of Belgium, which has a long-standing tradition of and commitment to participatory governance, illustrates some of the challenges and opportunities of stakeholder involvement. In a case study on the development of attainment targets, Rouw et al. (2016[10]) found that opening governance structures and processes to wide participation could generate a virtuous cycle that enhances knowledge mobilisation and allows for the tailoring of policy design and implementation in response to stakeholder needs. Not just encouraging, but expecting stakeholders to express their views and expertise was seen as an effective way to strengthen a common understanding and ownership of policies. Nevertheless, involving stakeholders beyond the education sector and ensuring that professional expertise is valued amidst the growing number and diversity of stakeholders remains difficult (Rouw et al., 2016[10]).

In the case of Portugal's Secondary School Building Modernisation Programme (SMP), which was launched in 2007 and involved the renovation and expansion of 173 secondary schools, the independent state-owned company *Parque Escolar* (PE) was responsible for overseeing all stages from the planning and funding to the maintenance of completed buildings, including a relatively standardised but intensive process of community involvement (Veloso, Marques and Duarte, 2014[90]). At the local level, this engagement took the form of information sessions and consultation meetings before and during the construction process, which brought together parents, teachers, students, school boards and non-teaching staff with engineers and architects. An OECD review of the SMP programme confirmed that these meetings gave local stakeholders the sense that they had an impact by responding to and providing input into the planning process, although the exchange of information with national-level stakeholders (e.g. national teachers unions and parents' organisations) was rather limited (Blyth et al., 2012[6]). Moreover, the SMP played an important role in supporting the simultaneous consolidation of Portugal's school network (see Chapter 3, Box 3.6). When planning capital investments, the programme could take into account that some school buildings would need to be expanded or adapted to accommodate students of recently closed schools, which helped to mitigate the negative effects of school closures (Liebowitz et al., 2018[88]).

Even more so than school renovations, the closure of facilities can have a strong impact on local communities. Consolidation plans have frequently been met with strong and organised opposition from students, parents, teachers and staff (Ares Abalde, 2014, p. 28 f.[22]). Consultation and stakeholder engagement are therefore widely recognised as particularly important to solicit input, identify and respond to concerns among the local community and build consensus around proposed restructuring plans (for more details, see Chapter 3).

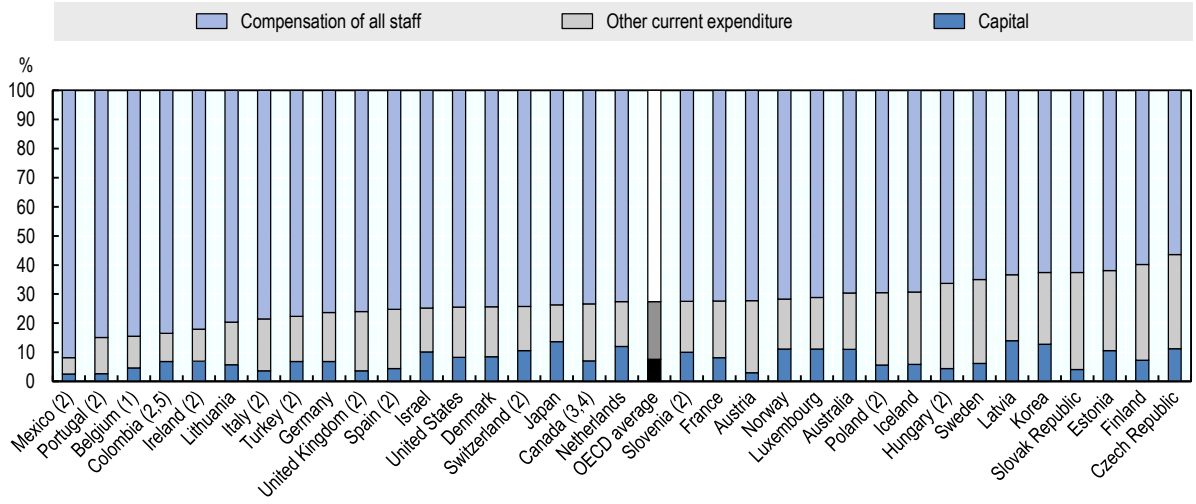
2.4. Financing the development of the school network

For the steering and planning mechanisms described above to have the desired effect and enhance the efficiency of the school network, they need to be supported by concomitant funding mechanisms to ensure that the network and its facilities can be adequately developed and maintained. As discussed in Chapter 1, access to adequate educational facilities and materials is a critical condition for students to enjoy a high-quality education and for teachers to employ their skills effectively. Ensuring that infrastructural funding is channelled to where it matters the most and that instruction is supported by an equitable distribution of educational materials is therefore an important concern for policy makers across the OECD.

The importance of this objective has been underlined by the United Nations' adoption of the Sustainable Development Goals in 2015 and the OECD's commitment to supporting its Members and the international community in their achievement (OECD, 2016[91]). As part of Goal 4 (to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all") countries have set themselves the target to "build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all" (United Nations, 2015[92]).

Even though the labour-intensive nature of education means that the largest proportion of overall expenditure in schools is devoted to the teaching work force, a considerable share of education budgets in OECD countries is spent on the construction of school buildings, their adaption and maintenance as well as teaching materials. Particularly in a context of increasing fiscal pressure, the way in which educational infrastructure is funded therefore plays an important role for a school system's ability to achieve its goals efficiently. The considerable variance in OECD countries' infrastructural expenditure (see Figure 2.5) also points to the different efficiency challenges that their school networks face, but also to their varying success in addressing them. The mechanisms by which infrastructural resources are distributed therefore play an important role in ensuring that funding reaches the facilities most in need of investment and in aligning the distribution of resources with policy priorities for the efficient organisation of the school network.

Figure 2.5. Average proportions of capital expenditure, staff compensation and other current expenditure from public and private sources in primary education, 2011-2014



Note: Countries ordered in descending order of their total non-staff expenditure.
1: Public and government-dependent private institutions only (for one or more of the years).
2: Public institutions only (for one or more of the years)
3: Includes pre-primary and lower-secondary programmes
4: Period of reference 2010-2014
5: Period of reference 2011-2015
Source: OECD (2017), *Education at a Glance 2017: OECD Indicators*, OECD Publishing, Paris, http://dx.doi.org/10.1787/eag-2017-en, Tables B6.1 and B6.2; OECD (2016), *Education at a Glance 2016: OECD Indicators,* OECD Publishing, Paris, http://dx.doi.org/10.1787/eag-2016-en, Tables B6.1 and B6.2; OECD (2015), *Education at a Glance 2015: OECD Indicators*, OECD Publishing, Paris, http://dx.doi.org/10.1787/eag-2015-en, Table B6.1; OECD (2014), *Education at a Glance 2014: OECD Indicators*, OECD Publishing, Paris, http://dx.doi.org/10.1787/eag-2014-en, Table B6.1; Latvia prior to 2013 and Lithuania: Eurostat; Colombia: UNESCO Institute for Statistics.

StatLink https://doi.org/10.1787/888933831203

Expenditure on educational infrastructure and materials varies significantly across countries

The OECD defines capital expenditure by educational institutions as spending on assets that last longer than one year. This includes, for instance, the construction, renovation and major repair of school buildings. Current expenditure, by contrast, refers to spending on resources that are required each year for the operation of schools (OECD, 2017[93]). Figure 2.5 shows the proportions of total expenditure in primary education spent on capital resources, the compensation of staff and other current expenditure. The latter includes expenditure on teaching materials, energy and communal services, as well as the maintenance of school buildings or rental of facilities.

The proportion of total expenditure devoted to capital spending varied widely around the OECD average of 8% between 2011 and 2014, ranging from less than 4% in Austria, Italy, Mexico, Portugal and the United Kingdom to 12% or more in Japan, Korea, Latvia and the Netherlands. Although the data does not allow a precise estimation of all expenditure on educational infrastructure since some of it is classified as capital and some as current expenditure, there appears to be a wide range of spending in this area. Non-staff related current expenditure combined with capital expenditure accounts for 20% or

less of the education budget in Belgium, Colombia, Ireland, Lithuania, Mexico and Portugal but more than 35% in the Czech Republic, Estonia, Finland, Korea, Latvia and the Slovak Republic, around an OECD average of 27% between 2011 and 2014 (Figure 2.5).

While a range of factors may contribute to these differences, inefficient spending is arguably one of them. Particularly where schools enjoy a high degree of financial autonomy, different levels of capacity and experience mean that some schools require additional guidance and support to procure goods and services efficiently. Countries such as England (United Kingdom) have therefore sought to improve their spending on non-staff goods and services with initiatives described in Box 2.11 (Department for Education, 2017[94]).

Box 2.11. Initiatives to increase the efficiency of non-staff spending in English schools

England (United Kingdom) has launched multiple initiatives to increase the efficiency of school's non-staff spending in a period when many of them are facing budgetary pressures. The **Schools' Buying Strategy**, published by the Department for Education, aims to help schools save a significant proportion of their non-staff-expenditure and points them to various tools and advice for school leaders and financial administrators (typically "School Business Managers"). As part of a wider effort to advance the professionalisation of schools' financial staff, the ministry brings together best-practice guidance and practical support such as templates for each step of an effective procurement procedure. The tools provided by the ministry also include an online benchmarking system that allows schools to compare their overall spending patterns and specific expenditure lines with those of similar schools to identify inefficiencies and cost-saving potentials.

A central element of England's effort to reduce schools' non-staff spending are the so-called "**National Deals**" – framework agreements that are centrally procured and publicised by the Department for Education in conjunction with partnering organisations. Since many schools have difficulties procuring a wide range of goods and services in a complex market environment, the ministry offers them the opportunity to take advantage of nationally agreed rates and benefit from economies of scale. These national deals give schools an opportunity to save on their existing contracts for, among others, water and electricity; software licenses; and ICT supplies. According to the ministry, as of 2017, over 3 300 schools had taken advantage of the national deals for multi-functional devices, saving up to 40% on printers and photocopiers. The National Deals programme also offers interest-free loans to fund energy-saving improvements and the popular Risk Protection Arrangement, which provides schools with a cheaper alternative to commercial insurance providers.

Sources: Department for Education (2017), *Schools' Buying Strategy*, London.

Interdependencies and trade-offs between current and capital expenditure

To ensure that the school network's development is adequately and sustainably financed, responsible authorities need to apply strategic foresight and consider the interdependence between different types of expenditure. This includes prioritising between long-term and short-term investments, between capital investments and maintenance funding, and

between core and ancillary educational goods and services. Capital investments, for example, can have a significant long-term impact on the funding required for the new infrastructures' maintenance, just as putting off regular repair works can result in the need for major overhauls and capital investments further down the line. Budgeting maintenance expenditures for capital investments is not trivial and may require rigorous analyses by qualified professionals. While an annual maintenance expenditure amounting to 1% of a new building's construction cost was once considered a reasonable budgeting basis, techniques have since become significantly more refined (Beynon, 1997, p. 52[8]).

Local authorities or school leaders that lack the capacity to account for these interactions between capital investments and current maintenance funding are likely to engage in inefficient spending. This challenge is often compounded where the responsibilities for allocating capital and current expenditure are divided between different authorities or where the two funding streams are provided through independent mechanisms following different timelines or with different degrees of predictability. Under these conditions, additional co-ordination efforts between the responsible authorities and schools may be necessary to avoid inefficient or unsustainable spending patterns.

Whenever school providers find themselves confronted with trade-offs between capital and current expenditure, there is a risk that their incentives are systematically aligned in ways that crowd out the benefits of long-term investments. This is often the case where schools operate on tight budgets without earmarked funding for maintenance or capital spending and leaders struggle to mobilise sufficient resources for the maintenance and improvement of their school buildings. In Colombia, for example, current expenditure tends to consume such a large share of schools' budgets that no funding remains for important repair works and the improvement of facilities (Radinger et al., 2018[50]).

Capital funding

The mechanisms that OECD review countries use to allocate capital funding to schools or local authorities vary across school sectors, levels of education and types of expenditure. In the majority of the 17 education systems participating in the review's qualitative survey, capital funding reaches schools through more than one mechanism and is sometimes provided to them by multiple authorities (see **Error! Reference source not found.**). While funding for current expenditure is usually allocated using earmarked grants or restricted block grants, the distribution of capital funding tends to rely on ad hoc grants and resources channelled through investment programmes. In 12 of the 17 review countries, part of the resources for capital expenditure are allocated to schools using ad hoc grants and 11 systems distribute resources for construction projects, maintenance or renovation through infrastructure investment programmes (see Box 2.12). Somewhat less frequently, school systems use discretionary funding (8), a negotiated process (4), annual grants (4) or earmarked grants (4).

In some cases, these allocation mechanisms are used alongside targeted funding in support of specific policy initiatives or contributions from international agencies such as the European Commission's Structural Funds (OECD, 2017, pp. 253, Annex A[2]). Many systems use different allocation mechanisms to distribute funding for the construction of new schools, the expansion of established schools, or the renovation of existing facilities. Of the five OECD review countries that used vertical transfers to distribute capital funding between levels of administration, three did so through infrastructure investment programmes, and two used earmarked grants and discretionary funding respectively.

Box 2.12. Examples of targeted infrastructure investment programmes

Australia's Building the Education Revolution (BER) programme

Following the 2007 global financial crisis, the Australian government launched a federal investment programme, Building the Education Revolution (BER), which provided AUD 16.2 billion in earmarked grants to fund infrastructure projects and the construction of primary and some secondary schools. The programme was intended to provide an economic stimulus to local communities and generated 23 675 construction projects delivered by 22 government and non-government education authorities (Commonwealth of Australia, 2011[95]).

Austria's school development programme (Schulentwicklungsplan)

The Austrian federal government adopted a long-term school development programme (*Schulentwicklungsplan,* SCHEP-NEU) aiming to invest EUR 1.66 billion to fund the extension, refurbishment or reconstruction of one third of all federal schools between 2008 and 2018. The programme focuses on the modernisation of existing infrastructure to provide students and teachers with adequate classrooms and workplaces although investments are also made to allow for the expansion of all-day schools and school-based day care (Bruneforth et al., 2016[4]). The investments are transferred to the owners of school buildings, mostly the Federal Real Estate Company and municipalities, via increased rental payments. The spending allocated through the programme is based on careful planning with medium-term and long-term prognoses for infrastructure needs developed with bottom-up input.

Sources: Commonwealth of Australia (2011), *Building the Education Revolution Implementation Taskforce: Final Report*, Commonwealth of Australia, Canberra; Bruneforth M. et al. (2016), *OECD Review of Policies to Improve the Effectiveness of Resource Use in Schools: Country Background Report for Austria*, Bundesministerium für Bildung und Frauen, Vienna.

While funding for current expenditure is usually allocated on a recurrent annual basis, capital expenditure grants in the majority of OECD review countries are allocated less regularly. Notable exceptions to this are schools in the Czech Republic, Denmark and upper secondary vocational schools in Chile, which receive at least part of their capital funding in the form of annual grants (OECD, 2017, p. 140[2]).

The responsibility for allocating capital funding to schools or school providers may lie with either central, regional or local authorities, dedicated agencies or a combination of these actors. Compared to current expenditure, the responsibility for managing capital expenditure funding tends to be less decentralised. In Spain, for example, public schools directly administer the funding dedicated to cover their operating costs, while the cost of major repair and maintenance works are charged directly to the corresponding education authority and schools are not authorised to sign major contracts for construction works and infrastructural developments (INEE, 2016, p. 96[96]).

This is reflected in countries' responses to the review's qualitative survey: In 12 of the 17 OECD review countries, the central level is responsible for allocating at least part of the capital funding for education. In 13 of 17 countries, local authorities also bear some responsibility for the allocation of capital funds, sometimes complementing central funding through supplementary earmarked grants or only allocating capital funding for

schools of a specific provider or at a particular level of education. Regional authorities and dedicated agencies feature less frequently and bear responsibility in only six and three of the OECD review countries respectively. In all but one country, responsibilities for the funding of capital investments were shared between at least two and often three actors, most commonly involving both central and local authorities (OECD, 2017, pp. 253, Annex A[2]).

Capital funding is often driven by the availability of resources, rather than strategic long-term planning and the holistic assessments of infrastructural needs

The use of multiple allocation mechanisms for capital funding across sectors and a fragmentation of responsibilities across multiple levels of government can make it difficult to co-ordinate infrastructural development projects and foster a coherent regional organisation of the school network. In Australia, for example, a 2011 review of capital funding mechanisms noted that school capital and infrastructure investments often lacked a co-ordinated approach to cross-sectoral planning, which complicated the balanced and efficient development of the school network in new suburbs and towns. As a remedy, the review recommended reducing the complexity of capital funding mechanisms by establishing two main funding streams to support new constructions and investment in existing infrastructure. Although the plans were ultimately not implemented, the review also proposed establishing School Planning Authorities in all states and territories to co-ordinate the development of the school network and strengthen cross-sectoral planning at the regional level (Gonski et al., 2011[97]).

In contrast to current expenditure, the level of capital expenditure grants is rarely determined using a funding formula. One reason for this is the nature of capital resources, whose value fluctuates over time as they deteriorate and age or benefit from maintenance works and renovation. As a consequence, there are significant differences in the state and value of fixed assets and the associated need for capital funding across sectors and individual schools, which must to be taken into account when allocating funding for capital expenditure (European Commission/Eurydice, 2000[98]). Data that would account for this complexity is limited and capital funding needs often emerge unexpectedly. This renders the estimation of annual capital requirements difficult at the school level and for the most part prevents the use of formula funding. There have also been concerns that distributing capital funding through a formula might create perverse incentives that could undermine the efficiency of the school network by encouraging the establishment of new schools in areas with sufficient capacity or by discouraging the merger of school facilities even where there is a strong case for consolidation (Gonski et al., 2011[97]).

Instead, OECD countries commonly determine the level of capital funding based on an assessment of needs or administrative discretion – both of which are used in 11 of the 17 OECD review countries (OECD, 2017, p. 140[2]). These allocation methods commonly involve efforts to target funding to schools with the greatest need for renovations, remodelling works or emergency repairs. In countries with decentralised governance structure, the standards used to assess a school's need for capital expenditure grants may vary even from one municipality to the next, as is the case in Sweden. As with the mechanisms used to allocate funds, eight of the review countries reported using at least two different methods to determine the amount of capital funding for different kinds of providers, for different levels of education or for different purposes. Furthermore, three of the 17 systems reported allocating capital funding on a competitive basis and many local authorities ask schools to provide an application dossier based on which their requests for financial support are assessed.

Given the supply-driven nature of many countries' capital funding mechanisms, the development of school infrastructure risks to be led primarily by the current level of available resources, rather than by strategic long-term planning and holistic assessments of infrastructural needs. This can generate inefficiencies due to the misallocation of excess funding on the one hand, and the under-investment in pressing construction needs due to temporary shortages on the other hand. Notable exceptions include capital development projects that are based on the programmatic reorganisation of the school network, such as the construction of state-run gymnasiums in Estonia or the investment in multi-function centres in Lithuania, which were supported by EU structural funds with the strategic goal to consolidate the network of rural pre-primary and primary schools. Some countries have sought to lay the basis for a more permanent needs-driven approach to capital funding. Regular surveys assessing the condition of school buildings over time can support authorities in identifying the magnitude of overall and school-level needs and in evaluating the effectiveness of its interventions. Improved data on site conditions can inform the allocation of funding on a case-by-case basis or as a variable in funding formula, and strengthen the education ministry's evidence base in inter-ministerial budget negotiations.

International funding plays an important role for capital investments in multiple OECD review countries

Several OECD review countries have significantly benefited from international funding to support investments in educational infrastructure (see (OECD, 2017[2]), Box 2.2 for an extensive discussion). The European Union (EU)'s two structural funds – the European Regional Development Fund (ERDF) and the European Social Fund (ESF) – are designed to promote economic and social development and address specific needs of disadvantaged regions across the European Union. EU funds are allocated subject to the European Commission's approval of the recipient states' operational programme, in which they outline the funding's strategic objectives and propose an auditing framework. The managing authorities at the national level are then responsible for administering the funds and allocating them to projects and sub-central beneficiaries. Member states are also required to co-finance their operational programmes to varying extent.

All Czech regions, for example, qualify to benefit from European funding, which has proven to be instrumental in developing the school network. EU Structural Funds have primarily been used to support the consolidation of upper secondary provision (in line with regional action plans supported by European Structural and Investment Funds) and to increase capacity for pre-school and basic education in certain regions with strong demographic growth in these age groups (Shewbridge et al., 2016, p. 76[15]). Likewise, Estonia has benefited from EU funding through its Operational Programme for Cohesion Policy Funds 2014-2020 the funding has assisted Estonia's school consolidation process by developing a network of state-run upper secondary general schools and supporting municipalities in strengthening their basic education schools (Santiago et al., 2016, p. 99[14]).

In Latin America, international agencies such as the Inter-American Development Bank (IDB) and the World Bank have played a major role in financing educational projects, often focussing on capital expenditure and the improvement of infrastructure to support the expansion of educational services. In Uruguay, for example, loans from the World Bank were used to finance the Support Programme for Public Primary Education (*Programa de Apoyo a la Enseñanza Primaria Pública*, PAEPU), which invests in the infrastructure and equipment of full-time schools. Uruguay also co-operates with the IDB,

whose loans have funded the country's Support Programme for Secondary Education and Training in Education (*Programa de Apoyo a la Educación Media y Formación en Educación*, PAEMFE), which strategically invests in the infrastructure and equipment of secondary education and teacher training institutions (INEEd, 2015[99]; Santiago et al., 2016[84]).

A lack of capacity can impede the equitable distribution and use of capital funding

Given that many countries require schools and local authorities to apply for capital funding, a lack of capacity or experience in writing grant applications can compromise their access to investment. Particularly small and disadvantaged schools may lack the resources, time or trained personnel to launch successful bids for capital funding. Discrepancies in local capacity can thereby undermine the efficient distribution of capital funding to the areas and schools that exhibit the greatest need and exacerbate inequities in the school network.

An evaluation of Australia's Building the Education Revolution investment programme and its implementation echoed some of these concerns, pointing to a number of challenges that are frequently encountered in the course of large infrastructural investment projects. In particular, the report suggested that some states lacked the technical capacity to deliver the programme successfully and ensure that external organisations tasked with the management of the programme delivered on their contract obligations (Commonwealth of Australia, 2011[95]). This underlines the importance of building adequate capacity and skills among sub-central administrations and schools, allowing them to provide effective oversight and management for outsourced projects.

Capital investments for public and private providers

In many education systems, public and private providers are subject to different rules governing the funding of capital expenditures. Of the 17 education systems participating in the review's qualitative survey, seven reported that privately managed schools are not eligible for any public capital funding, while systems like the Czech Republic leave the capital funding of private schools to the discretion of local authorities. In another seven education systems, government-dependent private schools are eligible for some, but excluded from other sources of capital funding (see Annex Table 2.A.1). This is the case in the French Community of Belgium, where private schools are not eligible for ad hoc grants provided at the discretion of the state authority, even though their current expenditure is funded in the same way as that of public schools. Countries like Sweden, where government-dependent private schools are treated similarly to public schools when it comes to capital funding are the exception. In the Flemish Community of Belgium, public schools belonging to the Flemish Community Education Network (GO!) are entitled to grants covering 100% of their expenditure on school buildings. Grant-aided public schools and private providers, on the other hand, have to co-finance part of their capital investments with the option of using state-guaranteed loans or applying for an ad hoc grant covering up to 70 % of the expenses (see Box 2.13).

Restrictions on the public funding of private schools' capital investments is partly explained by concerns that their infrastructure might not permanently serve the public good and could eventually be sold off or repurposed by the private operators. Some school systems, including the Flemish Community of Belgium, seek to prevent this practice by requiring private providers to use their publicly subsidised facilities for educational activities over a period of at least thirty years. Nevertheless, once this time

has expired, they can sell the building without returning the equity to the government or reinvesting it in educational services. Even though a high level of educational demand in Belgium makes it unlikely that private providers will sell school buildings at a large scale and cause unanticipated drops in the provision of school places, it limits the public authorities' leverage to ensure that the facilities they invest in serve societal needs and the public good in the long term. As the OECD review noted, retaining ownership of these facilities could also increase the public authorities' scope to steer the use of facilities, for example by facilitating the sharing of buildings with community groups or between schools (Nusche et al., 2015, p. 125 f.[9]).

Spain provides an interesting example of an allocation system in which private institutions' access to capital funding depends on the general planning of the educational offer. Access to public capital funding is conditional on factors such as to the need for free pre-primary places in the school area, the number of additional school units needed and the presence of students with socio-economic disadvantages.

Box 2.13. Capital funding for private providers in the Flemish and French Communities of Belgium

Capital expenditure in the Flemish Community (ISCED 0-3)

In the Flemish Community, access to capital funding is organised by two public agencies. A dedicated public body, GO! Education of the Flemish Community, finances the construction and improvement of buildings in the Flemish Community school network as public assets. The Agency for Educational Infrastructure (*Agentschap voor Infrastructuur in het Onderwijs*, AGIOn) finances building works in schools of other public school providers (municipal and provincial) as well as publicly subsidised private schools. AGIOn meets 70% of their capital funding needs in primary education and 60% in secondary education. The unsubsidised balance can be covered by a state- guaranteed loan. The buildings of publicly subsidised private schools remain in private ownership. For public school organising bodies, buildings are owned by the regional and local authorities (municipalities and provinces). Public-private partnerships are another source of capital funding (see Box 3.11).

Capital expenditure in the French Community (ISCED 0-3)

In the French Community, public schools receive capital funding through a school building fund. Publicly subsidised private schools do not benefit from this fund, but they are granted a capital repayment guarantee for construction, renovation, modernisation and expansion projects (Decree 05/02/1990). A priority programme of works (*Programme prioritaire de travaux*, PPT) makes it possible to remedy essential needs by allocating funds for emergency works to all school providers. The French Community covers 70% of capital funding needs at the primary level and 60% at the secondary level, while the school providers cover the remaining balance (Decree 16/11/2007).

Source: OECD (2017), *The Funding of School Education: Connecting Resources and Learning*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264276147-en.

Maintenance funding

Besides the initial capital investment required for their construction or expansion, school buildings generate ongoing maintenance cost. Keeping educational facilities in an adequate condition and extending their lifetime requires ongoing preventative and compliance servicing, expenditures on utilities, and capital replacements including the repair and remodelling on the building, its furniture and equipment (Beynon, 1997, p. 51[8]). Based on the review's qualitative survey, countries used a variety of different mechanisms to allocate funding for infrastructure maintenance. Most frequently they used ad hoc grants and discretionary spending by local authorities, but in some cases also infrastructure investment programmes and earmarked grants (OECD, 2017, pp. 253, Annex A[2]). Although many school systems use separate mechanisms to allocate capital and maintenance funding, distinguishing between the two is not always straightforward and can be a source of ambiguities both at the national level and in comparative work.

According to the OECD definition, funding intended for maintenance and small repair works is considered part of schools' current expenditure since – unlike capital spending – its main value added is not expected to exceed beyond the allocation year. However, not all OECD review countries adhere to this clear-cut distinction and in many systems, some types of maintenance activities are counted as part of current expenditure while others fall under the allocation mechanisms for capital funding (OECD, 2017, pp. 253, Annex A[2]). In the Flemish and French Communities of Belgium, for example, part of the schools' maintenance funding is distributed to school providers as part of a block grant based on a formula similar to that for other forms of current expenditure, while the maintenance of school buildings in Israel is – unlike their construction and current expenditure – the direct responsibility of municipalities. Providing clear national guidance on which maintenance and repair works should be covered by funding for current expenditures can help to shed light on this grey area and reduce ambiguities (Gonski et al., 2011[97]).

Particularly where the responsibilities for capital and maintenance funding are split between different authorities, a good level of co-ordination is needed to ensure that the future maintenance cost of facilities and equipment is fully funded and accounted for when engaging in major capital investments. Ad hoc programmes that finance school construction using central budget funds, for example, can burden local authorities with unsustainable recurring costs for years to come. Ensuring that the responsible authorities have the means to maintain newly built schools, procured equipment and older facilities, should be an integral part of the annual budgeting process (OECD/The World Bank, 2015[100]).

The means by which maintenance funding is distributed can also provide incentives to raise efficiency by keeping school buildings in good condition and prevent more costly interventions in the future. Where capital funding is targeted to schools most urgently in need for repairs, school leaders may have few incentives to maintain their buildings efficiently, particularly if they have to meet the cost of routine maintenance from their own budgets. As noted in a report by the UK National Audit Office, one way to address this problem is to strengthen the accountability system for school maintenance and provide schools with sufficient funding to cover routine maintenance out of their budgets (British Department for Education, 2017[101]). Establishing guidelines or best practices for the maintenance of buildings and grounds alongside the regular collection of data on the conditions of facilities can provide a basis for holding local authorities or school providers to account.

Funding for educational materials

Besides an adequately maintained physical infrastructure, teachers rely on materials such as ICT, textbooks and lab equipment to provide their students with high-quality instruction. What matters most for student achievement is not so much the aggregate spending devoted to educational materials, but their equitable distribution, their quality and how effectively they are used in the classroom. Providing science classes with access to well-maintained laboratory material, for example, is not enough if teachers are not supported in designing and conducting well-structured laboratory activities that allow students to establish the links between the hands-on activities, key scientific concepts and real-life problems (OECD, 2016, pp. 187, 229[51]).

Nevertheless, a lack of adequate instructional materials can make it difficult for students and teachers to work effectively. According to data from the 2013 TALIS survey, between 26% and 38% of teachers across participating countries work in schools whose principals report a shortage of or inadequate instructional materials, computers or software, internet access and library materials. In some countries, these shortages are particularly pronounced. In Romania and the Slovak Republic, around 80% of teachers work in schools that lack adequate instructional materials like textbooks and more than half of the teachers in Mexico and Romania work in schools where library materials are a hindrance to quality instruction, according to their principals (OECD, 2014, pp. 47, Table 2.19[102]).

Schools in some OECD review countries have reported difficulties in providing their students with a sufficient amount of high-quality learning materials, including up-to-date textbooks. Where central authorities are responsible for distributing learning materials, these shortages may stem from an insufficient coverage or frequency of central supplies. Even though students in Kazakhstan, for example, are provided with free textbooks from the ministry, some rural regions fell short of universal coverage and the supply of textbooks did not always keep up with the rising student population in urban schools. In individual schools, reported delivery cycles of up to five years with no annual replacements for unintentional losses or damage posed similar problems, even though official regulations suggest that 20% of textbooks are to be replaced every two years to make up for wear and tear (OECD/The World Bank, 2015[100]).

An insufficient supply of high-quality textbooks and other learning supplies can also be a symptom of budget constraints and under-investment in schools. In the Slovak Republic, for example, many schools reported to lack the resources to supply their students with supplementary learning materials, while the textbooks supplied by the ministry were often insufficient or outdated. Besides ensuring that schools have sufficient funds for textbooks, allowing them to choose their own textbooks from a list of accredited publishers or titles can set incentives for external providers to fill this gap and bolster the market for learning materials. This approach is likely to work best in systems like the Slovak Republic, whose external assessments already provide a high degree of outcome-control over learning objectives and competencies. In subject areas where the market for potential textbooks is too small to be financially viable and for which the ministry lacks funds to commission experts, encouraging teachers to share self-created materials or providing them with downloadable online materials can alleviate pressing shortages (Santiago et al., 2016, p. 152[13]).

While most schools pay for instructional materials out of their general funding for current expenditure, some countries like Estonia use earmarked grants specifically dedicated to the purchase of textbooks (Santiago et al., 2016, p. 125[14]). Earmarked funding makes it

easy for the national government to ensure that funding is spent in accordance with its specified purposes. Strong public awareness of legal entitlements to textbooks, however, can often perform a similar function and exert indirect horizontal control over the adequacy of schools' expenditure on learning materials.

Textbooks are often free for students at the point of provision and can be borrowed for the duration of the school year. This practice contributes to an equitable access to learning opportunities and avoids the stigmatisation of disadvantaged students. In some countries, the free provision of textbooks is restricted to core subjects, to materials specified in a central curriculum or to specific student groups, as is the case in the Czech Republic, where free books in post-compulsory education are reserved for disadvantaged students (Shewbridge et al., 2016[15]). Although central authorities may play a role in commissioning and approving textbooks or regulating their preparation, review and publication, in most review countries, school leaders and teachers exercise considerable discretion over their choice of learning materials. According to principals' reports in the 2015 PISA survey, 82% of students across the OECD attend schools whose teachers have considerable responsibility for the selection of textbooks and 32% attend schools where the principal plays a significant role in their selection (OECD, 2016[51]).

Learning materials and infrastructures can be strategically deployed to support educational goals. Some countries have therefore introduced national standards and scaled up the adoption of specific provisions as a means to improve learning in line with pedagogical and curricular reforms. In Chile, for example, schools are required to have a library and the ministry has supported upper secondary schools since 1995 and primary schools since 2004 in setting up Learning Resource Centres (*Centros de Recursos para el Aprendizaje*, CRA) to this end. CRAs were part of a wider strategy to reform teaching practices and promote the use of printed and audiovisual materials to support the learning process. Schools participating in the CRA programme dedicate the space, furniture and staff for a school library and, in return, receive a collection of media resources and subscriptions as well as extensive training for library staff. By 2014, 10 781 CRA libraries had been created, 8 456 in basic education and 2 325 in upper secondary education, both in municipal and subsidised private schools (Santiago et al., 2017[46]).

2.5. Policy options

Build planning capacity at relevant levels of government and support school network planning by collecting and maintaining high-quality data

Developing planning capacity at the relevant levels of government is a cornerstone of advancing the efficient organisation of the school network. For authorities to leverage their capacity and engage in strategic planning, they also need to be supported by high-quality data on the capacity of school facilities and reliable forecasts of future demand. Administrative tools that integrate monitoring and forecasting mechanisms can help countries in recognising and responding to capacity shortages early on. Ideally, data collections and inventories should cover facilities across all relevant providers and sectors of education and be subject to regular updates. By combining enrolment forecasts with data on the current supply of educational services, authorities should leverage the potential of this data to identify discrepancies between the supply and demand for school places and develop appropriate responses, for example by developing capacity indicators to inform guidelines, recommendations or direct interventions into the organisation of the school network.

Data on school capacity and educational demand should also be used to inform stakeholders and public discussions on proposed initiatives and can help policy makers in assessing the likely consequences and feasibility of competing strategies to enhance the efficiency of the school network. As such, it allows policy makers to identify potential synergies arising from the sharing of facilities or the creation of school clusters and to simulate the expected effects of reforms on enrolment patterns across multiple sites.

Strengthen horizontal co-ordination mechanisms and invest planning authority at the appropriate level to enhance the management of the school network

Decentralisation processes have led to the emergence of increasingly autonomous and powerful local actors in many OECD education systems. In multi-level and multi-actor governance contexts, inefficiencies in the planning and organisation of school networks are often rooted in weak co-ordination mechanisms across disconnected subsystems and communities. It is therefore important for decentralisation to be accompanied by efforts to build capacity at the local level and develop effective mechanisms for horizontal and vertical co-ordination.

Consider promoting platforms for regional network planning

Effective mechanisms to support network planning activities need to reflect a school system's governance structure, the roles it assigns to local, regional and system-level entities, as well as their respective capacity to carry out these responsibilities effectively. Particularly in systems where small, local authorities with little capacity are responsible for the governance of the school network, establishing platforms that allow them to better co-ordinate their provision across administrative boundaries can enhance the network's efficiency.

Regionalised planning should include the analysis of potential mismatches in an area's prospective demand and supply for different education services. It should also encompass the identification of inefficiencies in the region's current education provision, including high unit costs or duplications in their programme offer. On the basis of this analysis, regional level platforms can facilitate bilateral or multilateral agreements between schools or local authorities to engage in school mergers, create clusters, share resources or jointly provide certain educational services, either by facilitating negotiations or by providing direct incentives for collaboration. Given the reciprocal nature of a region's educational provision and its general development, planning platforms should also take into account the region's economic and social development and the associated needs and opportunities for the infrastructural development of the school network.

Planning platforms can also facilitate the transmission of information across levels of government by providing a strong voice for regional interests and concerns at the national level while at the same time communicating system-wide developments and concerns to local actors. Particularly in countries with pronounced regional disparities, ensuring a strong regional dimension in the development of the school network can ensure that local specificities are taken into account in the formulation of national policies and goals and, conversely, that local developments are consistent with national priorities.

To advance the regional planning of the school network, authorities should seek to build on existing regional structures and co-ordination mechanisms where possible or institutionalise previously informal modes of co-operation. This can involve expanding the responsibilities and capacity of existing regional actors such as the education departments of regional government offices. In the absence of prior regional structures,

governments should consider establishing new platforms to strengthen regional level co-ordination and planning. Ideally, these should span multiple levels of education and involve relevant stakeholders from all levels of government. The implementation of regional planning platforms can be piloted in a number of selected areas, and should be accompanied by their continuous monitoring and evaluation.

Depending on the degree of formal authority vested with regional level actors, they could play a merely consultative role for local or central actors or assume substantial co-ordination and decision-making responsibilities. In the latter case, the regional platforms' potential to bring about greater efficiency can only be realised if they are adequately supported and equipped with sufficient capacity to assume their new responsibilities.

Establish a clear division of responsibilities for different parts of the school network

Maintaining a clear division of responsibilities for different parts of the school network can facilitate its efficient planning and oversight, reduce undesired competition between different public providers and increase the potential for co-operation among schools operating at the same education level. Ambiguities surrounding the responsibilities of public authorities can also make it difficult to assign political leadership for the governance of network reforms. A clear division of labour, by contrast, can strengthen the basis for school network planning by creating closer linkages and facilitating the alignment of strategic objectives, school-level management and accountability.

The same holds for the distribution of resources for infrastructural adjustments in the school network. Countries should ensure that the coherent planning of the school network is not undermined by fragmented responsibilities or mechanisms for the allocation of capital funding. Streamlining the distribution of capital funding and engaging representatives from different sectors in the assessment of needs can improve cross-sectoral and regional coherence in the development of the school network.

In the absence of sufficient local capacity, consider flexible approaches to recentralising the governance of the school network

In some circumstances, where local authorities are too small or lack the capacity to engage in effective network planning, it can make sense to re-recentralise responsibilities for parts of the educational offer. In this case, governments should take appropriate steps to ensure that the recentralisation process does not compromise the network's responsiveness to local and regional needs. This could be achieved through a flexible approach to centralisation that is sensitive to differences in the capacity and performance of local providers and gives them the option to retain their autonomy, provided that they can demonstrate their ability to do so effectively within a strengthened accountability framework. Regardless of whether the school network's development is planned and co-ordinated at the central, regional or local level, it should be recognised that its success in meeting local needs depends on a meaningful process of social consultation and deliberation. This should actively involve stakeholders, rather than being a purely technical or administrative process.

Balance central regulations on class and school sizes with the need to maintain high-quality provision in small schools and remote areas

While the regulation of school and class sizes can play an important role in the governance of school networks, it is important to bear in mind that there is no "one size fits all" solution and that maintaining high-quality provision in small schools and remote areas should be a priority. Even though incentives for municipalities to create larger schools may improve educational quality and efficiency in some contexts, enforcing a lower bound to school sizes may be unfeasible in geographically isolated areas. Authorities should therefore consider exempting certain schools from class size requirements if they are identified as meriting protected status to avoid placing student in remote areas at a disadvantage. In addition, thresholds should reflect the pedagogical requirements of students in different age groups and take into account the special attention required, for example, by disadvantaged students or those with SEN.

Given that students' grade level, social background and educational needs can mediate the effects of school and class size, policy makers need to carefully consider which student populations will benefit or suffer from the respective reforms. Changes in size policies should be conducted through an open and transparent process that permits the participation of the affected communities, and that clearly presents the arguments for the proposed changes. Especially in systems with a tradition of local autonomy, communities should assume an active role in restructuring the school network and developing context-specific strategies to improve the efficiency of their local provision. Central authorities can therefore play a vital role not only through the use of regulatory steering mechanisms, but also by encouraging local reflections on ways to improve both economic efficiency and school quality through school network planning.

Devise student assignment mechanisms that respect parental preferences without compromising equity

Student assignment mechanisms play an important role in determining how the demand for school places is distributed across the network. While many OECD review countries, particularly for younger students, continue to use some form of initial assignment method based on students' residence, parental choice plays an increasingly important role. Although strict geographic assignment based on catchment areas risks to reproduce residential segregation patterns in schools, the introduction or expansion of school choice is not guaranteed to benefit the most disadvantaged students. Instead, poorly-designed choice schemes have often exacerbated the inequities they were designed to redress and led to increased socio-economic segregation across schools.

Disadvantaged families are less likely to make use of school choice, and where they do, often engage in the process less effectively because they lack the time, resources or information to identify and select the highest quality schools. Reducing the complexity of school choice schemes by ensuring that deadlines, admissions and enrolment procedures are homogenous across schools and by expanding the availability and accessibility of contextualised information on the quality of schools and the school choice process itself can reduce some of the barriers experienced by disadvantaged families.

To ensure that the advantages of school choice accrue to families across the socio-economic spectrum, the criteria used by oversubscribed schools to select their incoming cohort should be monitored and regulated to prevent "cream skimming" practices. This includes regulating admission procedures to ensure that subsidised private

providers adhere to the same standards of selection as public providers and do not charge add-on tuition fees that might exclude disadvantaged students from attending publicly funded schools. Standards for admission and tuition practices should be designed to create an even playing field between public and subsidised private schools to reduce the risk of socio-economic segregation and incentivise schools to compete on the basis of quality rather than selectivity.

Different forms of "controlled choice" have also shown to be effective in reducing high levels of student segregation, for example by reserving a given number or share of places in oversubscribed schools to students of different socio-demographic backgrounds to maintain a balanced distribution of students. Engaging school communities in the definition of these criteria and allowing for local variation can ensure that they are sensitive to local context and can significantly ease their implementation. Given their complexity, controlled choice systems may require a certain degree of centralisation to minimise administrative costs and prevent problems like multiple registrations. They also depend on sufficient administrative capacity to collect and manage the data needed to allocate students to schools.

Since geographic assignment remains an important aspect of many review countries' student allocation system, the design of catchment areas is an important steering tool that can be used to advance both equity and the efficient organisation of the school network. Given its sensitive nature, the definition and reform of catchment areas should involve local actors wherever possible and central authorities should provide them with the tools they need to competently evaluate the merits of different scenarios. Efforts should be undertaken to consider the equitable distribution of students and avoid segregation, e.g. by combining districts with different socio-demographic characteristics within a catchment area. At the same time, where rationalisation is a pressing issue and financial disincentives prevent small municipalities from consolidating or sharing facilities, expanding the size of catchment areas beyond municipal boundaries can be an effective means to initiate reflections on the efficient organisation of the school network.

Ensure that the entry of both public and private providers into the school network is based on assessed quality and need

Regulating the creation and funding of new schools serves not only to ensure a high quality of educational provision, but also constitutes a powerful steering tool to support the rational organisation of the school network. Licensing procedures that are misaligned with policy priorities for the school network can diminish its efficiency and reduce the scope for strategic planning. Particularly an insufficiently regulated licensing process for government-dependent private providers can contribute to increasing per-student costs, add to the fragmentation of school networks, and in some cases undermine public efforts to rationalise them.

To address efficiency concerns raised by the entry of new providers, the decision whether or not to fund them should be transparent and take into account an assessment of both quality and needs. Only services of proven quality should be allowed to operate and - particularly in areas with excess capacity – only those that respond to an identifiable need should benefit from public funding. Authorities could, for example, require schools to demonstrate a sufficient number of classes above a certain size before they are included in the network of publicly funded schools. When assessing the need for specific types of provision, decision makers should strive to take into account the views of relevant stakeholders. The licensing process for new vocational schools or accreditation

of new programmes, for example, might involve the consultation of social partners to assess the need for the proposed offerings in light of both labour market demands and the existing provision. Any such needs- and quality-based procedures for the creation of new schools need to live up to high standards of transparency and must be supported by the development of relevant standards and effective tools to analyse quality as well as current and future needs. Reforming licensing procedures along these lines may also require capacity building for the school authorisers expected to implement them.

Ensure equitable access to capital funds and support the efficient management of investment projects at the local level

In many education systems, the allocation mechanisms for capital funding demand both technical capacity and experience on the part of local authorities and schools. Particularly small and disadvantaged schools often lack the resources and trained personnel to successfully bid for capital funding, which threatens to undermine the balanced distribution of infrastructural investment and risks exacerbating inequities in the school network. Some regional and local authorities also lack the capacity to successfully deliver infrastructural programmes and ensure that contractors or external organisations tasked with the management of projects deliver on their contract obligations.

Particularly in systems without a long-lasting culture of local autonomy, the actors involved in overseeing or managing capital investments should benefit from strong support mechanisms and relevant professional development programmes emphasising the skills needed to ensure value for money in construction works. Competency frameworks used to guide recruitment processes for local leaders and administrators should also reflect these responsibilities (OECD, 2017, p. 90[2]). Efforts to improve local capacity can leverage the wider institutional settings in which local authorities are embedded. This might involve building on existing co-ordination structures or collaborative ties among local authorities to facilitate peer-learning or support-networks and provide training and capacity building to larger groups of administrators. This could extend to sharing administrative resources, for example by jointly employing staff specialised in monitoring and planning the school network and overseeing infrastructural investment projects.

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Annex 2.A. Mechanisms for capital funding

Annex Table 2.A.1. Mechanisms for the distribution of capital expenditure

Country	Level of education	Governance		Allocation mechanism						Basis for allocation				
		Funding authority	Level of recipient	Ad hoc grant	Infrastructure investment programme	Annual grant	Earmarked grant	Negotiated process	Discretionary funding	Admin. discretion	Negotiated Process	Assessment of needs	Competitive basis	Other or not specified
Austria (1)	ISCED 0 and ISCED 1-3 (state schools)	State and local	School	✓	✓					✓		✓		
		Central	State				✓				✓			
	Secondary (federal schools)	Central	School		✓							✓		
Belgium (Fl.)	All levels	Dedicated agency	School provider	✓						✓				
		Dedicated agency	School provider		✓					✓				
Belgium (Fr.)	All levels	State	School	✓						✓				
		State	School provider			✓								✓

Country	Level of education	Governance		Allocation mechanism						Basis for allocation				
		Funding authority	Level of recipient	Ad hoc grant	Infrastructure investment programme	Annual grant	Earmarked grant	Negotiated process	Discretionary funding	Admin. discretion	Negotiated Process	Assessment of needs	Competitive basis	Other or not specified
Chile	Early childhood	Central	Regional						✓				✓	
	All levels except ISCED 01	Central	School		✓								✓	
	Secondary (VET)	Central	School			✓							✓	
Czech Republic	All levels	Central	School		✓							✓		
		Regional and local	School	✓		✓				✓		✓		
Denmark	All levels except upper secondary	Local	School						✓	✓				
	Upper secondary	Central	School			✓		✓						✓

Country	Level of education	Governance		Allocation mechanism						Basis for allocation				
		Funding authority	Level of recipient	Ad hoc grant	Infrastructure investment programme	Annual grant	Earmarked grant	Negotiated process	Discretionary funding	Admin. discretion	Negotiated Process	Assessment of needs	Competitive basis	Other or not specified
Estonia	Early childhood	Dedicated agency	School provider		✓							✓		
	All levels	Local	School	✓								✓		
		Central	School provider		✓								✓	
Iceland	Early childhood	Local	School						✓			✓		
	Primary and lower secondary	Local	School					✓				✓		
	Upper secondary	Central and local	School						✓	✓				
Israel	All levels	Central	School	✓								✓		
		Local	School	✓								✓		
Kazakhstan	All levels	Central	School				✓			✓		✓		
		All levels	School	✓				✓	✓	✓		✓		

Country	Level of education	Governance		Allocation mechanism						Basis for allocation				
		Funding authority	Level of recipient	Ad hoc grant	Infrastructure investment programme	Annual grant	Earmarked grant	Negotiated process	Discretionary funding	Admin. discretion	Negotiated Process	Assessment of needs	Competitive basis	Other or not specified
Lithuania	All levels	Central	Local		✓									✓
		Local	School	✓								✓		
		Local	School						✓	✓				
Portugal (2)	Early childhood and primary	Local	School provider		✓							✓		
	Primary and lower secondary	Central	School provider	✓								✓		
	Upper secondary	Dedicated agency	School provider		✓							✓		
	Upper secondary	Dedicated agency	School provider	✓								✓		
	All levels except early childhood	Central	School provider	✓								✓		
Slovak Republic	All levels except ISCED 01	Central	Regional and local		✓					✓		✓		
	All levels except early childhood	Central	Regional and local				✓			✓		✓		
		Regional and local	School providers						✓	✓				

Country	Level of education	Governance		Allocation mechanism						Basis for allocation				
		Funding authority	Level of recipient	Ad hoc grant	Infrastructure investment programme	Annual grant	Earmarked grant	Negotiated process	Discretionary funding	Admin. discretion	Negotiated Process	Assessment of needs	Competitive basis	Other or not specified
Slovenia	All levels except upper secondary	Central	Local						✓	✓				
	All levels	Local	School						✓	✓				
	Upper secondary	Central	School						✓				✓	
Spain	Early childhood and primary	Local	School				✓					✓		
	All levels	Regional	School	✓			✓			✓		✓		
		Regional	School		✓							✓		
Sweden	All levels	Local	School		✓									✓
		Local	School	✓								✓		

Country	Level of education	Governance		Allocation mechanism						Basis for allocation				
		Funding authority	Level of recipient	Ad hoc grant	Infrastructure investment programme	Annual grant	Earmarked grant	Negotiated process	Discretionary funding	Admin. discretion	Negotiated Process	Assessment of needs	Competitive basis	Other or not specified
Uruguay	All levels	Central	Councils					✓						✓
		Central	School		✓					✓		✓		
	Early childhood and primary	Central	School						✓			✓		
		Central and regional	School					✓				✓		
	Primary	Central	School		✓									✓
	Primary and secondary	Dedicated agency	School						✓	✓				
	Lower and upper secondary	Central	School						✓	✓				
		Central	School		✓									✓
		Central	School	✓						✓		✓		

Notes: Funding for capital expenditures intend to cover spending on assets that last longer than a year. It includes funds for construction, renovation or major repairs to buildings (immovable) as well as on new or replacement equipment (e.g. furniture, laboratory equipment, computers, etc.), except where noted otherwise. Depending on national conventions, funding for maintenance works may be partially or completely allocated through current expenditure mechanisms.
The review team made every effort to ensure, in collaboration with countries, that the information collected through the qualitative survey on school funding is valid and reliable and reflects specific country contexts while being comparable across countries. However, given the qualitative nature of the survey, information should be interpreted with care.
For definitions of levels of education, levels of administration and funding allocation mechanisms, see Annex A. For country-specific notes to this table, see the end of this annex.
1: Transfers from the central to the state level in Austria refer to funding for federal policy priorities, in particular the expansion of all-day schooling. The funding is part of a one-off programme based on temporary agreements between the central authorities and the states. These transfers are therefore not considered part of Austria's regular capital funding mechanisms.
2: Information on funding mechanisms in Portugal refers to the continental territory. The autonomous regions of Madeira and Azores autonomously legislate on matters related to their respective education systems.
Source: The information in this table was compiled based on information provided by the review countries through the Review's qualitative questionnaire on school funding.

Country notes

Austria

***Capital expenditure (ISCED 0-3)*:** The responsibility for capital expenditure in early childhood education and care (ISCED 0) lies with the state or private providers (e.g. associations or churches). For school education (ISCED 1-3), the main responsibility for capital expenditure lies with the owner of the school. For state schools, most tasks associated with the provision and maintenance of schools have in practice been devolved to the municipal level, including the provision of school buildings, infrastructure and non-teaching staff, such as janitors. States typically support municipalities in carrying out these duties by administering allocated funds and have retained their responsibility for vocational, agriculture and forestry schools at the upper secondary level (ISCED 3). In the case of federal schools, as a general rule, the Federal Ministry of Education, Science and Research is responsible for providing and maintaining the school infrastructure. A large share of school buildings at this level (around 320) have been outsourced and are administered and maintained by the Federal Real Estate Company (*Bundesimmobiliengesellschaft*), owned by the Federal Republic of Austria. Buildings are rented by the ministry. Some school buildings of federal schools are owned by other proprietors, mainly municipalities and social partners. Regular funding for current expenditures at all levels of the education system also includes some funds for maintenance and small investments.

Ad hoc grants and infrastructure investment programmes from state and local authorities (ISCED 0, ISCED 1-3 state schools): The state governments operate investment programmes to support municipalities in the construction and renovation of state schools. The adequacy of school infrastructure is subject to state legislation and comprises detailed guidelines concerning the construction and equipment for specific types of schools. The suitability of planned infrastructure is assessed by expert commissions.

Infrastructure investment programme from the central authority (ISCED 2-3 federal schools): The federal government has adopted a long-term school development programme (*Schulentwicklungsplan*) for the decade 2008-18. The programme focuses on the modernisation of existing infrastructure and school buildings to provide students and teachers with adequate classrooms and workplaces. Investments are transferred to the owners of the school buildings (i.e. the Federal Real Estate Company or others, primarily municipalities) in the form of increased rental payments.

Belgium (Fl.)

Access to capital funding is organised through two public agencies. A dedicated public body, GO! Education of the Flemish Community, funds the creation or improvement of buildings in the Flemish Community school network as public assets. The Agency for Educational Infrastructure (*Agentschap voor Infrastructuur in het Onderwijs*, AGIOn) finances building works in grant-aided public schools (municipal and provincial) as well as publicly subsidised private schools, covering 70% of their capital requirements at the primary level and 60% at the secondary level. The unsubsidised balance can be covered with the help of state-guaranteed loans and the assets remain privately owned for publicly-subsidised private schools and owned by the local authorities in the case of grant-aided public schools). By contrast, Community schools receive funding to cover

100% of their capital costs. In addition, there is the possibility of public-private partnerships.

Belgium (Fr.)

Public schools receive capital funding through a school building fund. Publicly-subsidised private schools do not receive resources from this fund, but they are granted a capital repayment guarantee for expenditures related to the construction, renovation, modernisation and expansion of schools (Decree 05/02/1990). A priority programme of works (*Programme prioritaire de travaux*, PPT) makes it possible to remedy essential needs by allocating funds for emergency works to all school providers. The French Community covers 70% of capital funding needs at the primary level and 60% at the secondary level, while the school providers cover the remaining balance (Decree 16/11/2007).

Chile

School providers are responsible for managing their infrastructure's maintenance and capital investments. Funding for maintenance activities is distributed through the school grant system whose Grant for Maintenance Support (*Subvención de Apoyo al Mantenimiento*) aims to support the conservation of subsidised schools, including their equipment and furniture. This includes an annual allocation of funds calculated on the basis of the Basic Grant.

***Infrastructure investment programme from the central authority (ISCED 02-3)*:** In the public sector, the main source of infrastructure investment remains the central government. The National Regional Development Fund (*Fondo Nacional de Desarrollo Regional*, FNDR) is an important element of the government's investment strategy and distributes additional resources detailed in each year's Budget Law. The funds are transferred to the regions to promote investment in priority areas defined at the national level, including education with the Fund for Educational Infrastructure (*Fondo de Infraestructura Educacional*, FIE).

Denmark

For early childhood education and public primary and lower secondary institutions, the allocation of capital funding is at the administrative discretion of municipalities. Private schools at ISCED 1-3 receive an activity-based "building/capital" grant from the central authorities. Public upper secondary schools also receive an activity-based "building/capital" grant and own their own buildings, allowing them to finance capital expenditures through commercial loans. If the school board makes capital dispositions for more than DKK 60 million, they have to be approved by the Ministry of Education.

Estonia

Infrastructure investment programmes run by dedicated central-level agencies support local authorities in the creation of new pre-school places. Key agencies are Enterprise Estonia (*Ettevõtluse Arendamise Sihtasutus*, EAS), which is responsible for promoting business and regional development and co-ordinates the implementation of EU structural funds and the Innove Foundation, which is responsible for implementing relevant projects in the area of lifelong learning and for mediating EU structural funds.

Iceland

Schools can use a portion of their general block grant to cover capital expenditures. In pre-primary and compulsory education (ISCED 0-2), local authorities are entirely responsible for capital expenditures. For upper secondary schools (ISCED 3), construction costs and initial capital investments for equipment are generally divided between the central government and the relevant municipalities based on a negotiated settlement between central and local authorities. The central government and the relevant municipalities pay 60% and 40% respectively. There are no formal provisions for funding the capital expenditure of private schools at any level.

Israel

Multi-year plans for the construction of schools and classrooms are based on forecasts of student numbers and any identified infrastructure shortages. The Ministry of Education participates in planning the budget using the number of classes and corresponding price charts as criteria. Local authorities are responsible for the execution of the budget.

Kazakhstan

Funding for capital expenditures in schools is mainly guaranteed by ad hoc decisions and discretionary funding, giving priority to schools with the greatest identified need based on defined priorities. According to the State Programme for Education and Science Development for 2016-19, the top priorities are to decrease the number of schools that provide triple-shift education, to reduce the shortage of school places and to decrease the number of schools that are classified as being in state of emergency.

Lithuania

Most of the funding for investments in school infrastructure comes from dedicated central government grants and the EU Structural Fund, supplemented by local government funding. These funds are mainly allocated to the development of vocational training centres, the establishment of multi-functional centres in rural locations, investments in pre-school education and the upgrading of technology, natural sciences and art facilities in general education.

Slovak Republic

***Infrastructure investment programme from the central authority (ISCED 02-3)*:** The central infrastructure programme focuses on the expansion of school capacity through new constructions or the extension of existing infrastructure, particularly in areas where schools have introduced double shifts in response to demographic pressures. Between its launch in 2013 and 2016, the programme created additional capacity for more than 6 000 students. A similar infrastructure programme has been started to extend the capacity of kindergartens by 5 000 places.

Slovenia

At ISCED levels 0-2, and in exceptional cases also at ISCED level 3, local authorities are responsible for funding infrastructure construction, renovation and maintenance, non-instructional and instructional materials. In schools of the Italian and Hungarian national communities, the central level covers 100% of the capital investment.

Uruguay

Schools' regular funding for current expenditure includes funds for maintenance and small investments. In addition, the central authority manages several infrastructure investment programmes for schools from the primary to upper secondary level: The Support Programme for Public Primary Education (*Programa de Apoyo a la Escuela Pública Uruguaya*, PAEPU), funded by the World Bank, supports full-time schools with infrastructure and equipment. The Support Programme for Secondary Education and Training in Education (*Programa de Apoyo a la Educación Media y Técnica y a la Formación en Educación*, PAEMFE), funded by the Inter-American Development Bank, supports infrastructure and equipment in secondary education and teacher training institutions. Both PAEMFE and PAEPU are administered by the National Public Education Administration (*Administración Nacional de Educación Pública*, ANEP).

Chapter 3. Adapting the school network to changing needs in urban, rural and remote areas

This chapter analyses strategies to enhance the efficiency of school networks by adapting or restructuring them in response to changing patterns of educational demand. It provides an overview of contextual trends affecting the organisation of school networks as well as the regional heterogeneities in their structure, the populations they serve, and their socio-economic context. Since rural and urban school networks tend to face different challenges and opportunities related to demographic and social trends, the chapter takes a territorial perspective and describes strategies that countries have used in both contexts in turn. First, it discusses challenges and policy options for schools in rural and remote areas, many of which are confronted with declining student populations. Then, it turns to challenges and policy options for urban school networks, which are often faced with rising student numbers and increasing student diversity.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

This chapter is concerned with the organisation of the school network and its capacity to support a high-quality educational provision. Challenges and opportunities for the efficient organisation of school facilities often vary considerably within countries due to regional heterogeneities in the school network's structure, the populations they serve, and their socio-economic context. The chapter therefore places particular emphasis on strategies to restructure or adapt the school network in light of changing and often diverging patterns of educational demand across geographic regions and different sectors of the school system. After describing the main geographic variations in OECD school systems, the chapter discusses in turn i) challenges and policy options for schools in rural and remote areas, many of which have experienced a declining population in recent decades, and ii) challenges and policy options for schools in urban areas, which are often confronted with rising student numbers, segregation and increasing student diversity. Annex 3.A includes relevant data on school transport from the OECD review's qualitative survey as well as supplementary analyses on human and material resources in urban and rural schools.

3.1. Contextual factors affecting the organisation of school networks in rural and urban areas

The challenges that authorities face in promoting an efficient organisation of their school networks are highly context dependent. Effective governance can go a long way to provide the general conditions for local and central actors to work together in rationally organising the school network (see Chapter 2). Yet, the concrete steps that authorities take to adapt the school network need to reflect regional variations and the different kinds of challenges that confront rural and urban areas in many OECD review countries. While rural school networks are, for example, frequently characterised by excess capacity, many urban schools struggle to provide enough school places to meet rising demand. As will be discussed in the following, the different kinds of mismatches between supply and demand in rural and urban school networks are only one of a range of persistent regional variations. The experience of OECD review countries as well as international assessments highlight that rural schools differ significantly in their structure, student composition and socio-economic context. Remaining sensitive to this heterogeneity when organising the school network (i.e. the location, size and offer of educational facilities) to make the most efficient use of available resources, is critical to ensure that students benefit from high-quality education regardless of their school's location.

The concepts of rurality and urbanity are complex and highly sensitive to the context in which they are employed. As in the project's country reviews, we therefore draw on national definitions when referring to country-specific examples, and on international definitions when drawing on comparative data, for example from the OECD Programme for International Student Assessment (PISA) (see Box 3.1 for a discussion).

Box 3.1. Definitions of "urban" and "rural" schools used in this report

The OECD Programme for International Student Assessment (PISA) defines the status of a school's location based on the principals' characterisation of the community in which it is located. The same definition is applied across all participating countries and includes five categories: villages, hamlets or rural areas (fewer than 3 000 people), small towns (3 000 to about 15 000 people), towns (15 000 to about 100 000 people), cities (100 000 to about 1 000 000 people) and large cities (with over 1 000 000 people), as well as a further distinction between villages and hamlets or rural areas (fewer than 1 000 people) in the OECD Teaching and Learning International Survey (TALIS). In line with OECD conventions, this report identifies "rural schools" in the PISA data as those in communities with fewer than 3 000 people and "urban schools" as those located in any city with more than 100 000 people, unless otherwise noted.

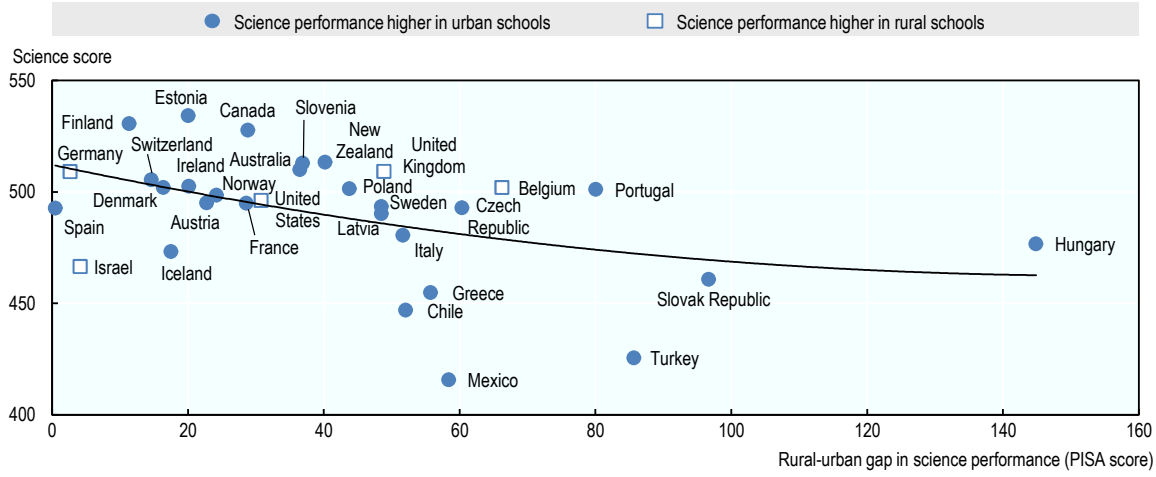
National administrations and researchers have used a variety of different definitions to capture the complex and multi-faceted concepts of rurality and urbanity, often operationalising them in terms of a community's population size, density and/or contiguity. The National Center for Education Statistics in the United States, for example, defines rural communities as open and small settlements of less than 2 500 people that are not in the vicinity of densely populated suburban areas. Yet, the requisite data to classify schools based on these criteria are not necessarily available to all national administrations. Using a standardised definition, such as that employed by PISA, can facilitate the international comparison of results and has proven useful to evaluate student outcomes, school policies and practices in an international context. Drawing on principals' accounts also allows the concept's measurement at the school-level, rather than classifying entire regions based on their population density (an approach which can be useful in other contexts and has been employed, for example, in the *OECD Regions at a Glance* series).

As with any parsimonious, internationally comparative definition, the categories employed in PISA reduce a certain amount of meaningful variation and, in some cases, may risk the misidentification of individual schools. The fact that its notion of "villages, hamlets or rural areas with fewer than 3 000 people" combines two criteria (the community's status and its population size) can, for example, lead to ambiguities where metropolitan areas contain small, administratively autonomous communities. Defining school locations based on the number of their communities' inhabitants also makes it difficult to distinguish different types of urban locations (for example, suburban and inner-city schools) and between isolated towns and those that are part of large metropolitan areas. Neither does the definition take into account topographic features such as mountains, rivers or oceans that may impinge on a schools' accessibility or consider a rural community's distance to neighbouring villages, its access to public transport or the road network. As far as possible, the remainder of this chapter seeks to take these nuances into account by relying on national definitions of regional characteristics where possible and internationally comparative measurements where necessary.

Source: OECD (2017), *PISA 2015 Results (Volume III): Students' Well-Being*. OECD Publishing, Paris, http://doi.org/10.1787/9789264273856-en; OECD (2016), *OECD Regions at a Glance 2016*, OECD Publishing, Paris, http://doi.org/10.1787/reg_glance-2016-en.

The PISA survey casts light on the geographic heterogeneity in students' achievement across OECD education systems. Results from 2015, for example, indicate that many of the systems that are successful in reducing geographic disparities in achievement are also the ones who manage to provide the highest quality and most equitable education overall. As indicated by the trend line in Figure 3.1, systems with a narrow rural-urban gap in science performance tend to show better academic performance across the entire system. This is congruent with studies showing that countries which close the rural-urban gap in other domains, such as infrastructure quality, are more economically successful (OECD, 2016[1]).

Figure 3.1. The rural-urban gap and average science performance, 2015



Note: Rural schools are those located in rural areas or villages with fewer than 3 000 inhabitants, urban schools are located in cities with 100 000 inhabitants or more.
Source: OECD (2015), *PISA 2015 Database,* www.oecd.org/pisa/data/2015database/.

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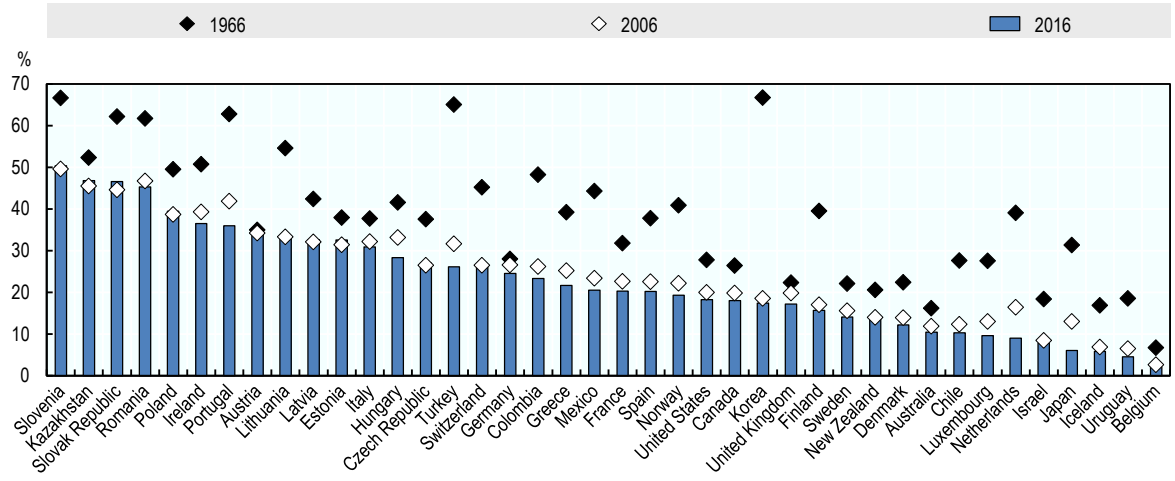
While many OECD countries have grappled with a relative decline in their overall school-age population over recent decades, this trend has had distinct and often diverging manifestations at the sub-national level. Due to heterogeneous fertility rates as well as international migration and within-country mobility, many countries are simultaneously confronted with a rising urban and a dwindling rural population. This has caused unforeseen challenges for regional development in general and the provision of public services, including education, in particular.

Fuelled by productivity gains in agriculture, economies of agglomeration, lower fertility rates and increased rural-to-urban migration, populations in predominantly rural regions have been on the decline over the past 15 years in the vast majority of OECD countries (OECD, 2016[2]). On average, about 22% of the OECD population lived in rural areas in 2016, compared to 37% fifty years earlier. While the rural population decline has slowed down in some countries over the last decade, urbanisation has continued in most of them and rapidly so in Hungary, Japan, the Netherlands, Poland and Turkey (see Figure 3.2). Much of the recent population growth in metropolitan areas has been driven by sub-urbanisation and the expansion of large cities' commuting zones, which have expanded at a faster rate than their city centres (OECD, 2016, p. 52[2]).

Figure 3.2. Trends in the rural population share



Note: Rural population refers to people living in rural areas as defined by national statistical offices.
Source: World Bank based on the United Nations Population Division's World Urbanization Prospects (see https://data.worldbank.org and https://esa.un.org/unpd/wpp/).

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The rural population decline is particularly pronounced among younger generations. In a majority of OECD countries, only 20% or less of the children up to the age of 14 live in rural areas – a share which is even lower in the 15-29 age group as many of them migrate to urban areas in pursuit of further studies or better employment opportunities. These diverging demographic trends have important consequences for the organisation of the school network since many countries are simultaneously confronted unsustainable excess capacities in rural areas and the need to expand the provision of school places in large cities.

Participation in early childhood education and care (ECEC)

In many OECD countries, there are pronounced regional variations in pre-primary attendance. On average, students in rural areas attended almost 2.5 months less of pre-primary education than those in cities. In Estonia, Finland, and the Slovak Republic, this difference is more than six months and it rises up to one year in Poland. By contrast, in Iceland and France, rural children attend pre-primary education for longer periods than their urban counterparts. Students in schools located in towns or cities are also more likely to attend pre-primary school for any period of time than students in schools located in rural areas (OECD, 2013[3]).

Rural-urban disparities in ECEC attendance can be due to a number of reasons: a higher rate of (maternal) employment in urban areas; rural occupational patterns and family structures that are more conducive to childcare at home; lower incomes that make it difficult for families to afford pre-schools; and limited accessibility in rural areas due to long distances. Ensuring that demand is met with adequate supply may require an expansion of provision and investments in infrastructure (Santiago et al., 2016, p. 19[4]). Furthermore, high-quality pre-primary education depends on clear education goals, curriculum and quality standards, investment in human capital, family and community

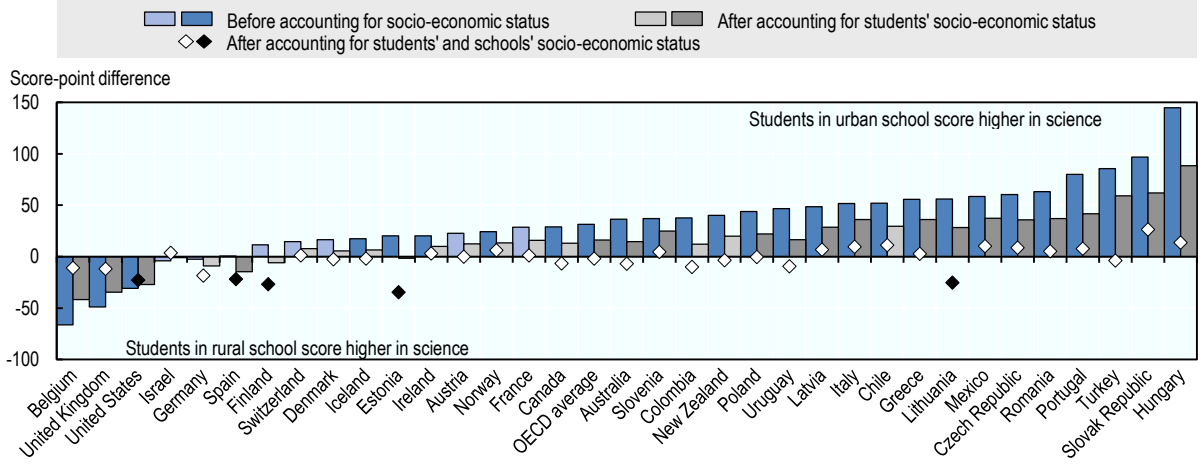
involvement as well as a commitment to continuous improvement informed by data, research and monitoring (OECD, 2011[5]).

The importance of providing children with access to high-quality early education regardless of their place of residence is a policy priority in many OECD countries. Its importance has also been underlined by the United Nations' adoption of the Sustainable Development Goals in 2015 and the OECD's commitment to supporting its Members and the international community in their achievement (OECD, 2016[6]). As part of Goal 4 (to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all") countries have set themselves the target to ensure by 2030, "that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education" (United Nations, 2015[7]).

Attainment, performance and socio-economic conditions

The rural regions of most OECD countries lag behind their urban counterparts when it comes to educational achievement and attainment. PISA 2015 data indicate that, on average across OECD countries, 15-year-old students in rural areas across the OECD are almost twice as likely to have repeated a grade as students in urban schools. In addition, before accounting for socio-economic background, students in urban lower secondary schools score on average 31 points higher in science than students in rural lower secondary schools – a performance gap which is roughly equivalent to one academic year (Figure 3.3). In Chile, the Czech Republic, Hungary, Italy, Greece, Mexico, Portugal, the Slovak Republic and Turkey the gap is wider than 50 score points. However, in Belgium, the United Kingdom and the United States students in rural schools outperform those in urban schools, and there is no significant difference in several countries, including Germany, Israel and Spain.

Figure 3.3. Urban-rural differences in science performance, 2015



Note: Rural schools are those located in rural areas or villages with fewer than 3 000 inhabitants, urban schools are located in cities with 100 000 inhabitants or more. Statistically significant differences are marked in a darker tone. Countries are ranked in order of the score-point difference before accounting for socio-economic status.
Source: OECD (2015), PISA 2015 Database, www.oecd.org/pisa/data/2015database/.

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Much of this gap in academic performance can be explained by the fact that rural students tend to have a lower socio-economic profile than their urban peers in the great majority of OECD countries (Belgium and the United Kingdom being the only counter-examples) (Byun, Meece and Irvin, 2012[8]). As shown in Figure 3.3, the gap between rural and urban students' performance decreases substantially after accounting for their economic, social and cultural status (ESCS), and disappears in most countries after accounting for both students' and schools' ESCS. This may be due to a number of factors, including the presence of significant peer effects in urban schools with higher ESCS, as well as their ability to benefit from the parents' and communities' higher level of resources.

Another, even more concerning, difference between rural schools and their urban counterparts is their students' aspiration (McDonough, Gildersleeve and Jarsky, 2010[9]). On average across OECD countries, only 30% of students in rural schools expect to complete at least a university degree (ISCED 1997 levels 5A or 6), compared to nearly half of the students in urban schools (OECD, 2017, p. 330 Table III.6.3[10]). Even in countries like the United Kingdom and the United States, where rural students outperform their urban peers academically, they are no more likely to expect completing a university degree and several US studies confirm an urban-rural gap in the enrolment and completion of post-secondary education (Byun, Meece and Irvin, 2012[8]; United States Department of Agriculture, 2017[11]).

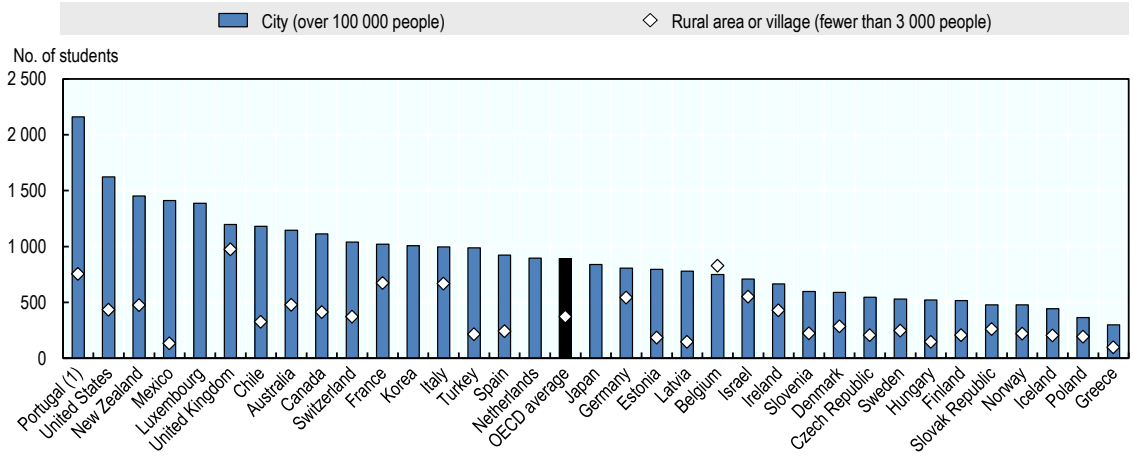
While differences in ECSC explain part of the gap in students' expectations, significant differences remain in many countries even after controlling for rural schools' lower socio-economic profile. The wider economic context, including the lack of highly-skilled jobs in many rural areas, the scarcity of specialised teachers and equipment and a narrower course offer may play a role in explaining this difference, as can the lower levels of parental educational attainment in many rural areas (Bertolini, Montanari and Peragine, 2008[12]). As will be discussed in more depth in Chapter 4, students in rural areas also tend to face greater difficulties in their transitions to upper secondary education. Particularly in geographically isolated areas, the pursuit of further education or a specific course of study can entail long commuting distances or require rural students to migrate to larger municipalities. Of course, other aspects of children's lives in rural and urban areas, including their well-being and life satisfaction (Rees et al., 2017[13]), and other outcomes of education need to be considered too (Levin, 2012[14]).

Structure of the school network, facilities and resources

Urban and rural school networks also tend to differ considerably with regards to the size of their constituent schools, the facilities and teaching materials at their disposal as well as their ability to match capacities to reflect local demand. In all OECD countries other than Belgium, 15-year-olds in cities of over 100 000 inhabitants attended significantly larger schools than those in rural areas or villages with fewer than 3 000 inhabitants (OECD, 2016[15]). On average, rural schools had an enrolment of 369, compared to 890 in urban schools (see Figure 3.4), with particularly large differences observed in countries such as Mexico and the United States where the average urban schools enrol at least 1 000 students more than the average rural school. Differences of similar magnitude can be observed in Portugal between urban and rural organisational units (comprising both independent and clustered schools). Nevertheless, due to their demographic decline, rural areas in many OECD countries exhibit over-capacity, while cities are frequently confronted with excess demand (Nusche et al., 2016[16]; Nusche et al., 2015[17]).

Despite the smaller average size of rural providers, the school network tends to have a lower density in rural areas than in cities or suburbs and private providers tend to concentrate their offer in urban areas. In Spain, for example, only 4% of rural students attend a private school, compared to 51% of urban students (OECD, 2016, pp. 458, Tables II.4.11 and 4.12[15]). As a consequence, rural families are often faced with few options when choosing a school for their children. Many rural families only have one primary school within reasonable distance from their home and according to PISA 2015 data, only 38% of rural 15-year-olds' families reported that their school had competition from at least two other providers, compared to 71% of urban families (OECD, 2016[15]) (see Figure 3.8). While consolidation has often been proposed as a means to increase the size, improve the resources and broaden the educational offer of the remaining rural schools, it is also clear that such measures can further reduce the diversity of schools and parents' ability to choose between multiple providers or course offers (Gronberg et al., 2015[18]).

Figure 3.4. School size in rural and urban areas, 2015



Note: Countries and economies are ranked in descending order of the number of students per urban school. Missing values signify insufficient observations to provide reliable estimates (i.e. fewer than 30 students or fewer than 5 schools with valid data). Rural schools are those located in rural areas or villages with fewer than 3 000 inhabitants, urban schools are located in cities with 100 000 inhabitants or more.
1: Number of students refers to school clusters (see *PISA 2015 Technical Report*, Table 4.3).
Source: Based on OECD (2016), *PISA 2015 Results (Volume II): Policies and Practices for Successful Schools*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264267510-en, Table II.6.7

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Given that rural schools – particularly in systems that allocate funding based on enrolment – tend to have smaller operating budgets and need to spend a larger proportion of them on staff and transport costs (Showalter et al., 2017[19]), one might suspect their infrastructure and facilities to be of a lower standard than those of urban schools. Yet, in contrast to most lower- and upper-middle-income countries that participated in PISA 2015, rural principals in OECD countries were, on average, no more concerned about their equipment than those in urban schools (OECD, 2016[15]). In several cases, including the OECD review countries Denmark, Belgium, Iceland, Slovenia and Uruguay, rural principals even reported fewer concerns about the quantity or quality of

their schools' physical infrastructure and teaching materials than their urban colleagues. In Australia, Ireland, Norway, Mexico, France and the United Kingdom, by contrast, rural principals were more likely to report that the state of their schools' material resources was a hindrance to instruction (Annex Table 3.A.2).

When it comes to teaching materials required for specialised courses, such as laboratories for science classes, the principals of urban schools report to be better equipped than their rural peers in 14 OECD countries. This most likely reflects larger schools' ability to benefit from economies of scale, as well as the availability of specialised teachers and staff, such as lab assistants hired to maintain these facilities. Conversely, rural schools tend to have a higher number of computers per student, although this may reflect their smaller class size and dependence on ICT-supported instruction and distance education (Annex Table 3.A.2). They also often benefit from access to outdoor spaces and may face fewer constraints when offering their students related activities than schools in high-density urban areas.

3.2. Challenges and opportunities for the efficient and equitable provision of education in rural areas

Over the past decades, the rural education landscape has undergone a considerable transformation across OECD countries. Where one-room schools with a single teacher were once the norm, increased government spending, rural economic development, improved connectivity and higher expectations have made larger schools with multiple classrooms, teachers and grades, and a greater variety of learning opportunities the new standard (Egelund and Laustsen, 2006[20]). Nevertheless, many of the challenges that traditionally confronted rural school networks remain highly salient and new ones have emerged. Shrinking student numbers, limited access to qualified and experienced teachers and a relatively high proportion of disadvantaged students make the efficient provision of high-quality education in rural areas a difficult undertaking. On the other hand, in some countries, a high level of voluntary involvement, tight-knit communities and the intimacy of small schools and classes provide opportunities that successful rural school networks might capitalise on.

Despite the tremendous diversity in rural topographies as well as their economic, social and cultural characteristics, there are some commonalities that impact the quality and cost of delivering education and other public services in rural areas. These include first and foremost the remoteness of many rural service recipients, which increases the cost of transport, communication and training as well as a low population density, which makes it more difficult to take advantage of scale economies and network effects (OECD, 2010[21]). Of course, it is important to stress the difficulty of defining rural, suburban and urban areas. Transitions between them can be gradual and some inner-city neighbourhoods may have more in common with rural communities than with other locations in the same city (Burdick-Will and Logan, 2017[22]). Likewise, remote rural schools are likely to experience greater difficulties in providing a rich educational offer than those located at the margins of an urban centre (Greenough and Nelson, 2015[23]). Nevertheless, the challenges described above are widespread features of rural education, even though they are not exclusive to or experienced by all rural areas (Centre for Education Statistics and Evaluation, 2013[24]).

In addition, the challenges encountered by small schools in rural and remote areas are often exacerbated by the limited capacity and resources of local authorities. In many school systems, local governments assume some responsibilities related to, for example,

the hiring of teachers, overseeing the instructional quality of their schools, co-ordinating resource sharing or consolidation initiatives, ensuring access to professional services for students and teachers, organising transport services, etc. Particularly in rural areas with many small schools, municipalities may lack the capacity and resources to effectively assume these responsibilities and offer their schools adequate support (Santiago et al., 2016, p. 93[25]). In 2009, rural schools in 8 of 32 OECD countries had less autonomy in the allocation of resources than urban schools, while the opposite was true in 4 countries (OECD, 2013[26]).

A high degree of regional variation in local capacity can also be a challenge for the effective delivery of central initiatives and policies. Smaller rural municipalities, for instance, may not have the staff, time or experience to apply for central grants, which can reinforce existing regional inequities (OECD, 2017[27]). Likewise, the design of central policies often fails to account for the vastly different contexts in which schools are embedded and the different needs that arise from them. Although rigorous piloting schemes and impact evaluations are increasingly used for evidence-based policy making, schools in small rural districts tend to be markedly underrepresented if not excluded from many rigorous evaluations, even where they comprise a significant share of the students impacted by potential policy changes (Stuart et al., 2017[28]). The moderating effect of school locations on the tested interventions' impact thus risks being overlooked.

Small school size can be an obstacle for the efficient provision of rural education

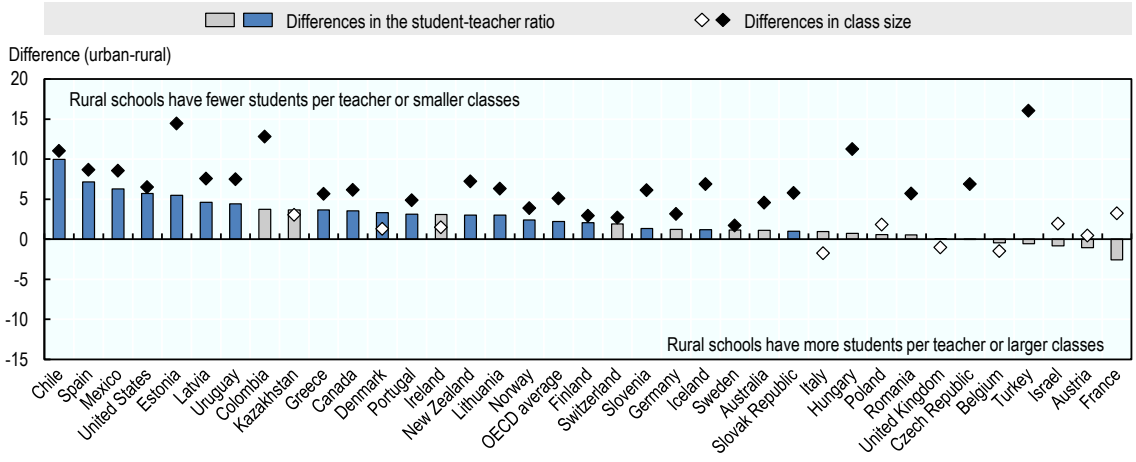
As mentioned above, one of the biggest challenges for the efficient operation of rural schools is their small size and the low population density of their surrounding areas. There is no universal agreement among policy makers or researchers on what constitutes large, medium-sized or small schools in any given context. In the research literature, definitions of large schools, for instance, range from those with 800 students or more to schools with more than 2 000 and even 3 200 students (Leithwood and Jantzi, 2009[29]). Administrative standards and conceptions of what constitutes an adequate school size also vary depending on the level of education, a school's location and its particular offer (Ares Abalde, 2014[30]).

Yet, regardless of where the precise boundary is drawn between small and large schools, research from different countries indicates that expenditure per student is highest in the smallest schools (Falch, Rønning and Strøm, 2008[31]; Østergaard Larsen, Houlberg and Schindler Rangvid, 2013[32]) and that significant economies of scale can be achieved when increasing school size up to a certain enrolment level before returns to scale diminish or diseconomies of scale may emerge (Ares Abalde, 2014[30]). One of the reasons why schools can reduce per-student cost up to a certain size is the reduction of per-student fixed costs associated with administrative work, constructing, running and maintaining school facilities.

Another reason for the cost efficiency of larger schools is their ability to fill classes up to the maximum permitted number of students (Knoth Humlum and Smith, 2015[33]). Partly due to their small size and demographic decline, rural schools tend to have smaller classes and fewer students per teacher than their urban counterparts, which can exert considerable pressure on public resources. As shown in Figure 3.5, the average secondary rural school in OECD countries has five fewer students enrolled in language-of-instruction classes and about two fewer students per teacher. In not a single education system are the class sizes or student-teacher ratios of rural schools significantly higher than those of urban schools.

Particularly in systems where central funding for schools is tied to the number of students they serve, a low student-teacher ratio may require municipalities to contribute significantly to the cost of maintaining small local schools.

Figure 3.5. Differences in rural and urban schools' student-teacher ratio and class size, 2015



Note: Statistically significant differences are marked in a darker tone. Rural schools are those located in rural areas or villages with fewer than 3 000 inhabitants, urban schools are located in cities with 100 000 inhabitants or more.
Source: OECD (2016), *PISA 2015 Results (Volume II): Policies and Practices for Successful Schools*, PISA, http://dx.doi.org/10.1787/9789264267510-en,Tables II.6.29 and Table II.6.30.

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There is some evidence of a U-shaped relationship between school size and per-student costs and that the cost of high-quality provision may increase once schools surpass a certain size, which varies depending on the level of education. Andrews, Duncombe and Yinger (2002[34]), for example, find that moderately sized elementary schools (300-500 students) and slightly larger high schools (600-900 students) are well-placed to balance economies of size with the disadvantages that may accompany very large institutions, such as increasing administrative complexity. However, studies tend to consider a narrow set of student outcomes and few if any take into account negative externalities, such as increased travel time, that may arise when school size is increased through consolidation (Ares Abalde, 2014[30]).

The size of a school can impact a wide range of student outcomes and can have both advantages and drawbacks for the experience of students and teachers. Evidence on the effects of school size on student outcomes is mixed (OECD, 2016, p. 190[15]) and its impact can be moderated by contextual factors such as pedagogical techniques, student composition, and school resources. Although relationships are therefore variable across countries, students in larger schools benefit from better equipment on average. After accounting for the socio-economic profile of students and schools, out of a total of 67 education systems, there are still more systems (30) in which the relationship between school size and science performance is positive than those (5) where it is negative (OECD, 2016, pp. 192, Figure II.6.5[15]).

In other respects, smaller schools may be at an advantage. They are often argued to allow for more interaction among school staff, parents and students, foster a greater sense of belonging and facilitate the exchange between students of different ages. Based on results from the PISA study, students in smaller schools report a better disciplinary climate in their science lessons and are less likely to skip days of school or arrive late than students in larger schools, controlling for socio-economic status, the level of education and science performance (OECD, 2016[15]).

The smaller class size found in many small and rural schools has also been associated with a number of advantages since it may allow teachers to devote more attention to individual students' needs and personalise their instruction accordingly. According to students' reports across OECD countries, teachers in smaller classes are somewhat more likely to adapt their teaching to the students' needs and abilities than teachers in schools with larger class sizes, and teachers in rural schools also more frequently give students extra help when they need it than teachers in urban schools (OECD, 2016[15]). Both of these teaching characteristics are associated with higher student performance (OECD, 2016[15]) and some studies suggest that particularly students in the early grades and those with a lower socio-economic profile benefit from smaller class and school sizes (Piketty, 2004[35]; Dynarski, Hyman and Schanzenbach, 2013[36]; Leithwood and Jantzi, 2009[29]).

Not all rural schools can provide a comprehensive educational offer with adequate depth and breadth to meet their students' needs

Many small schools, and by extension rural school networks, face difficulties in providing an educational offer with sufficient depth and breadth to match the teaching environment and learning experience of larger schools. Small schools may lack the teacher resources or student numbers to provide specialised course options and after-school activities to meet their students' interests and needs (Ballou and Podgursky, 1995[37]). Likewise, small rural schools often struggle to provide specialised educational opportunities, for example for special needs students (Berry et al., 2012[38]) and academically gifted individuals (Puryear and Kettler, 2017[39]). As a result, parents of children with special needs in rural settings more frequently decide to complement the regular school instruction with home schooling (Schafer and Khan, 2017[40]). Due to the lower volume and variety of economic activity in rural areas, vocational schools may also be limited to providing work-study programmes in specific sectors like agriculture or tourism. Even though evidence shows that not all students benefit from curricular diversity in the same way, a narrow educational offer can also lower rural schools' attractiveness for prospective teachers (Halsey, 2017[41]).

Limitations in the offer of small, rural schools extend beyond the academic curriculum and include supplementary services for struggling students and those with specific learning needs. While rural schools tend to have fewer space constraints than urban and suburban schools, they often face challenges when trying to find the specialised staff or subcontractors necessary to offer services for students with special educational needs (SEN) due to their location (Sipple and Brent, 2015[42]). In the United States, for example, federal and state authorities require some schools to provide services which small rural districts may face difficulties to offer.

Rural schools cannot benefit from the same economies of agglomeration and the proximity to urban facilities as their metropolitan counterparts (Rogers, Glesner and Meyers, 2014[43]). Taking part in attractive afternoon activities, science clubs, cultural events or sport activities may therefore require students in rural areas to travel at a

considerable logistical and financial cost. Even at the secondary level, where schools tend to be larger, students in rural areas are not exposed to the same extracurricular opportunities as their urban peers. On average across OECD countries, for instance, 29% of 15-year-old students enrolled in rural schools are offered a science club as a school activity, compared to 41% of students enrolled in urban schools (OECD, 2016[15]). Similar limitations have been observed regarding remedial classes and language support for recently arrived migrants (Centre for Education Statistics and Evaluation, 2013[24]). At the same time, some studies report that after-school activities in larger schools are often overcrowded, and that the participation in these activities can be more equitably distributed in smaller schools (Leithwood and Jantzi, 2009[29]).

Since neither textbooks, nor curricula tend to be adapted to the challenges of small schools, teachers – particularly those relying on multi-grade instruction – are often required to cover the material of multiple grade-specific programmes in a fraction of the allotted time (Mulryan-Kyne, 2007[44]). The challenge for rural schools is thus to strike an appropriate balance between different competing demands and expectations for a curriculum while maintaining a strong focus on fundamental elements like literacy and numeracy (Halsey, 2017[41]). This highlights the importance of giving rural schools sufficient support and pedagogical autonomy to adapt central curricula to their capacity while at the same time meeting their students' learning needs (Halsey, 2017[41]).

Similar concerns arise not only regarding the quantity of material prescribed by national curricula, but also their content and the question whether the educational offer is sufficiently adapted or applicable to the needs and realities of students in rural areas. Without compromising training on such basic skills as numeracy and literacy, teachers in rural schools may benefit from opportunities to design and adapting curricula based on relevant and local examples (Shin, Iyengar and Bajaj, 2013[45]). A narrow or ill-adapted educational offer and the limited availability of quality equipment and materials can significantly compromise the quality of learning environments provided in small schools and threatens to undermine the benefits that might otherwise accrue to rural schools due to their lower student-to-teacher ratios (Santiago et al., 2016, p. 97[46]).

Some rural schools face difficulties in attracting and retaining qualified personnel

The quality of teachers is a critical, if not the most important determinant of students' educational experience (Hattie, 2009[47]; Gershenson, 2016[48]; Jackson, 2012[49]). Ensuring that rural schools have access to qualified, prepared and motivated teachers is therefore essential to give rural students the same opportunity to realise their potential as their urban peers (OECD, 2005[50]). Yet, many rural schools face difficulties to recruit teachers in certain subject areas and to prepare them to teach effectively in a rural context (Monk, 2007[51]). Evidence from the United States points to a low degree of geographic mobility among teachers (Reininger, 2012[52]) and a strong impact of location preferences in their job search (Engel, Jacob and Curran, 2014[53]). This strong regional dimension of the teacher labour market can create supply shortages for schools in both rural and disadvantaged urban areas. Combined with the limited opportunities for professional development and peer-support in some isolated areas, their frequently reported retention problems, and the limited budgets of small schools, shortages of qualified teachers can aggravate the efficiency concerns of rural school networks.

Results from PISA 2015 and TALIS 2013 show that, on average across OECD countries, rural science teachers are somewhat less likely to have completed a relevant university degree than urban ones and that rural teachers are less likely to have attained a university qualification in general (OECD, 2014, pp. 276 ff., Table 2.13[54]). In contrast to some of the lower- and upper-middle-income countries that participated in PISA, however, these differences are modest and there are only four OECD countries in which rural school principals are more concerned about a lack of teaching staff than their colleagues in cities and three countries in which they are more concerned that their teachers' qualifications might be a hindrance to instruction (Annex Table 3.A.3). At the same time, on average across the OECD and particularly in countries such as the Czech Republic, Estonia and the Slovak Republic, rural teachers more frequently report having to teach subjects for which they did not receive formal training on content, pedagogy or classroom practices[1].

Many initiatives aimed at improving the quality of teaching, such as the application of education theory in classroom settings from the very start of a teacher's career, are likely to benefit rural schools as much as they do their urban counterparts. Yet, in light of their small size, limited resources and social context, effective teaching in rural schools may require teachers to employ specific pedagogical techniques to effectively address their students' needs. The small number of students and teachers in rural schools, particularly in primary education, influences how schools can organise their instruction time and group students by grades or abilities. Many rural schools therefore rely on specific pedagogical practices to make efficient use of their limited resources, including multi-grade teaching.

While recent internationally comparable data on the occurrence of multi-grade teaching is not readily available, reports from individual countries and regions suggest that it remains a common practice in rural areas and in exceptional cases also in urban schools. An evaluation from New South Wales (Australia), for example, suggests that half of all students in rural public primary schools and nearly 90% of those in very remote schools were taught in multi-grade classes in 2012 (Centre for Education Statistics and Evaluation, 2013[24]). Likewise, in Ireland, just under a quarter (24%) of all primary students were taught in multi-grade classes combining two grades and 8% were taught in classes made up of three or more grades in 2010/11, even though their proportion has declined since the early 1990s (Quail and Smyth, 2014[55]).

Early meta-analyses of empirical studies have yielded mixed and inconclusive results concerning the cognitive and non-cognitive effects of multi-grade and multi-age teaching (Veenman, 1995[56]). Some of these ambiguities may have been due to the failure to control for selection effects (Mason and Burns, 1996[57]), classroom composition and heterogeneity across student groups. More recent studies, for example, suggest that the effects of multi-grade teaching differ based on students' gender. While they found few overall differences between the outcomes of students taught in single-grade and multi-grade classes, Quail and Smyth (2014[55]) find Irish nine-year-old girls to experience a range of negative effects on their achievement and behaviour when paired with older peers. In a study of rural junior high school students in Norway, Leuven and Rønning (2016[58]) also found heterogeneous effects based on age and classroom composition. While younger students were demonstrated to benefit from the presence of older peers in multi-grade settings, sharing a classroom with younger peers was found to have a negative effect. While the two effects cancel each other out at the aggregate level, especially the negative impact on older students lasted until the time of high school graduation and college entry.

In any case, it is clear that the effects of multi-grade teaching are highly dependent on the preparation and the support teachers receive when working in these challenging circumstances. Ameliorating negative effects on students' behaviour and achievement may require developing innovative ways to engage students, manage classroom interaction and discipline, and provide constructive feedback. This, in turn depends on the availability of adequate professional training and peer-exchange, providing teachers with sufficient time and support for the preparation of classes (Mulryan-Kyne, 2007[44]) and ensuring the supply of instructional materials and textbooks that facilitate self-guided learning (McEwan, 2008[59]). Given that multi-grade teaching may not feature in the initial teachers' education, countries relying on small schools with multi-grade classes should reflect on ways to incorporate corresponding pedagogical techniques into their professional development (Santiago et al., 2016, p. 97[46]).

Giving prospective rural teachers an opportunity to gain pre-service experience in rural schools can allow them to build relationships with the providers and gain a realistic understanding of what it is like to live and teach in a rural community, which may increase their likelihood to stay later on (Halsey, 2017[41]). Effective partnerships and feedback loops between rural schools, teacher education institutions and education authorities can also help to inform the design of teacher education programmes and increase their relevance for rural contexts (Yarrow et al., 1999[60]).

Some of the challenges related to the preparation and retention of teachers in rural schools could be eased by providing appropriate opportunities for continuing professional development (Fowles et al., 2014[61]). In many OECD review countries, however, this kind of training is limited in small rural schools, partly due to the cost of delivering it in isolated areas (OECD, 2010[62]). According to PISA 2015 data, in-house professional development activities, are less frequently provided in rural schools, even though principals in urban and rural secondary schools report that a similar share of their teachers participate in some professional development activities (Annex Table 3.A.3). Being part of a small teaching staff with limited opportunities for peer-learning, collaboration and feedback can also result in rural teachers feeling isolated from their professional community (Stern, 1994[63]; Ares Abalde, 2014[30]). This threatens to affect the quality of their work, their professional satisfaction and ultimately adds to the challenge of retaining high-quality personnel in rural schools.

Countries have employed a range of strategies to address rural teachers' professional isolation and provide high-quality professional development opportunities at a reasonable cost (Halsey, 2017[41]). These include cascade teaching (training a group of teachers to coach their colleagues in a particular skill), mobile facilitators, induction and mentoring, and the use of local resource and support centres. The creation of school and teacher networks has also been used to provide educators with forums to discuss and solve problems they encounter in their daily practice, to provide them with ongoing feedback and support, and to encourage teachers to remain in rural schools (Centre for Education Statistics and Evaluation, 2013[24]). The effectiveness of such collaboration efforts hinges on their ability to guide participants in their continuous improvement, the leadership necessary to distribute roles and responsibilities, and the availability of spaces and common rules that can foster a shared identity (Jensen, 2012[64]; Alcázar and Ortiz, 2011[65]).

In the United States, some school districts with difficulties to attract qualified teachers have sought remedy in the provision of financial incentives such as loan-forgiveness programs, low-rate mortgage loans, or signing bonuses for teachers who commit to enter

the local teaching profession. Other districts have launched so-called "grow your own" initiatives that target local high school students and raise their interest in the teaching profession by providing them with opportunities to volunteer in schools or with structural support to take up post-secondary education (Reininger, 2012[52]).

3.3. Strategies to adapt rural school networks with excess capacity

The way in which a school network is organised (i.e. the location, size and structure of its physical infrastructure, the use of facilities and the distribution of educational services across school sites) can have a significant impact on a school system's efficiency. Particularly in areas that are characterised by excess capacity and falling educational demand, adapting the school network to tap into economies of scale, generate synergies and align the provision of services with local and regional needs has the potential to improve educational quality while generating significant savings.

The process of adapting rural school networks to falling demand has conventionally been associated with consolidation: many OECD countries have sought to address the declining efficiency of their rural school networks by closing and relocating the students of schools that are no longer deemed financially viable. Managing the trade-offs between maintaining smaller community schools or larger, but more distant facilities has therefore been a central challenge in adapting rural school networks. Given the administrative complexity of school closures, their strong impact on the lives of students and local communities, as well as the risk of unintended consequences for student learning and well-being, many have come to see consolidation as a last resort.

Over the past decades, the repertoire of strategies to rationalise the school network has been greatly expanded to extend beyond the construction, merger or closure of schools. Many systems now place increasing emphasis on informal and formal co-operation, resource sharing between schools as well as modular approaches that focus on expanding or reducing specific services offered in schools and reorganising grade levels or types of provision across school units (Santiago et al., 2016, p. 104[4]). These approaches, alongside conventional consolidation and rationalisation strategies, will be discussed below, focussing on their respective applicability, benefits and drawbacks in response to specific challenges.

Many OECD countries have a strong commitment to providing younger students with educational opportunities close to their homes while expecting rural students at higher levels of education to commute longer distances. This is one of the reasons why, in PISA 2015, the share of students enrolled in rural schools therefore decreases substantially between lower and upper secondary education.[2] In the Slovak Republic, for example 36% of lower secondary students are enrolled in rural schools, compared to only 1% of upper secondary students. Similarly large differences can be observed in Chile, the Czech Republic, Hungary, Mexico, Slovenia and Turkey.

There are economic, administrative and normative reasons why upper secondary education tends to be more centralised. On the one hand, there is a strong case to be made for providing primary education close to students' homes. Since young students may lack the independence to travel on their own, suffer from the strain of long commuting times or feel uncomfortable attending a school that is removed from their familiar environment. On the other hand, delivering the greater variety of courses and more specialised curricula of upper secondary education requires more teachers and students as well as facilities and

learning material that are often impossible to provide at the scale of the average rural school.

Another reason for the greater decentralisation at the primary level is that the administrative responsibility for primary schools more frequently lies with local authorities, which tend to be strongly committed to keeping primary schools open since they perceive them to be essential for the community's attractiveness to young families. Even where local authorities are committed to consolidation, administrative fragmentation can make it difficult to plan the shared use of facilities across municipal boundaries. It is therefore important to bear in mind that there are limits to the rationalisation of ECEC and primary education networks while the greater scope for consolidation or other forms of rationalisation may be greater at the upper and sometimes lower secondary levels.

Adapting how education levels are defined and distributed across school units

Taking a modular approach to the distribution of educational services across school units and adjusting their grade configuration can generate opportunities for the targeted rationalisation of the school network without requiring the closure of entire institutions (Santiago et al., 2016, p. 104[4]). Most countries follow specific conventions based on regulations or traditions when it comes to the way in which different grade levels or types of provision are combined in and distributed across school facilities. Allowing for some flexibility in the combination of different grade levels within institutions and preparing schools to teach effectively under these conditions can make it easier to adapt the school network in response to changing levels of demand. This is particularly true where contextual developments generate different kinds of pressures at different levels of education.

In the Czech Republic, for example, primary and lower secondary education are commonly combined in "basic schools", which means that even small municipalities with few students tend to provide lower secondary education. Following the introduction of a compulsory year of pre-primary education, the system was expected to experience capacity shortages at the pre-primary level, while the decreasing school-age population generated consolidation pressures at the lower secondary level. In order to respond to these challenges effectively, the OECD review team recommended pursuing a modular approach to the school network and reconsidering the combined provision of primary and lower secondary education. Removing lower secondary education from selected basic schools could allow for their consolidation while freeing up capacity to expand the provision of rural ECEC (Shewbridge et al., 2016, p. 84[66]).

Confronted with similar challenges, Estonia opted for a more decisive separation between general upper secondary education and basic education with the aim to consolidate the upper secondary school provision while leaving the network of lower secondary schools largely intact. Combined with the construction of centralised state-run upper secondary schools, the government thereby sought to initiate a reflection among municipal authorities on the levels of education that they can adequately provide at the local level (Santiago et al., 2016, p. 75 f.[25]).

Co-operation and resource sharing between independent schools

Pooling resources through horizontal co-operation can allow schools and local authorities to increase their efficiency without requiring fundamental changes to the structure of the school network, i.e. leaving the number, size and distribution of school facilities intact.

This can involve the joint provision of specialised programmes; sharing human resources, facilities and back-end infrastructure; jointly purchasing materials or services; co-ordinating student transport; or making professional development training available to teachers from multiple schools. In practice various structural, legislative and cultural barriers can impede schools from fully realising the potential of voluntary collaboration. Regulations, for example, can make it difficult for specialised teachers to offer courses to schools in small rural communities in person or via videoconferencing. Likewise, the design of funding mechanisms can create disincentives or reduce schools' flexibility to share teaching staff and other resources. Identifying and reducing these obstacles can therefore be an important first step towards greater co-operation and resources sharing.

Co-operating with other providers can allow small schools to benefit from economies of scale and scope that enhance the efficiency of their operation and give their students access to educational opportunities they might not otherwise enjoy. While economies of scale in education are conventionally pursued with a view to reduce per-student costs by increasing the scale of service provision or purchases, economies of scope promise to reduce costs and overcome weak local demand by providing a broader range of services jointly, in collaboration or in greater proximity to one another. Providing multiple services in the same physical location can increase their efficiency if it permits schools to pool overhead costs related to energy, security or administrative expenses. It can also reduce the travel cost incurred by students and parents since it allows them to save money and time by combining trips (OECD, 2010, pp. 38, 41 ff.[62]).

Different forms of formal and informal co-operation

Co-operation between schools can take various forms, varying in their degree of formality, duration, scope and the policy levers through which they are facilitated. As discussed in Chapter 2, the likelihood for schools and local authorities to engage in voluntary collaboration and resource sharing in the absence of regional or central co-ordination depends on a range of factors. These include local capacity, the absence or presence of incentives, traditions of collaboration and pre-existing structures that facilitate horizontal co-ordination. Likewise, the success of collaborative practices in addressing the challenges of rural schools is subject to a number of conditions. Long distances between schools and a low level of trust between school leaders – especially in contexts where schools are competing for students – can act as barriers to resource sharing, while clearly established goals and a focus on mutual benefits can form a basis for successful and sustained collaboration (Muijs, 2015[67]).

Existing structures of co-ordination and co-decision making can provide a basis on which to mount an effective exchange of practices, share facilities or resources, and overcome professional isolation. Evidence from initiatives in countries like the United Kingdom, Finland and Sweden shows that a culture of school-to-school partnerships can contribute to raising student performance and making schools more efficient (Pont, Nusche and Moorman, 2008[68]; Muijs, 2015[67]). However, many countries lack a history of inter-school collaboration or established platforms that bring principals together to engage in sustained inter-school collaboration (Santiago et al., 2016, p. 189[46]). In such contexts, local or regional authorities can play a facilitating role and help principals move beyond ad hoc or short-term collaboration and towards more sustained resource sharing practices.

The school associations established in the Flemish Community of Belgium provide a good example of collaborative platforms that promote cost savings across schools by allowing them to share resources and rationalise their course offer (see Box 3.2). While the formation of and participation in school communities is voluntary, the government provides incentives in the form of additional staff resources that can be shared between the schools of an association. School associations are also free to adjust the scope of their collaboration based on their respective needs, ranging from communities with low-intensity co-operation on selected issues to those that share a wide range of services and resources (Nusche et al., 2015, p. 114[17]).

Box 3.2. School associations in Belgium (Flemish Community)

In 1999, the authorities of the Flemish Community of Belgium launched a policy to encourage school collaboration through the establishment of "school associations" (*scholengemeenschappen*) among secondary and, since 2003, primary schools. School associations are collaborative partnerships between schools in the same geographical area comprising between 6 and 12 schools on average. In 2010, the vast majority of schools (96.7%) belonged to a school association, and most of those that did not were special needs schools. Particularly at the secondary level, a central goal of the initiative was to improve the efficiency of schools' resource use and their offer of programmes through increased co-operation and co-ordination. In an evaluation of school associations, the Belgian Court of Audit (2010[69]) concluded that their introduction had significantly reduced the duplication of courses offered by schools of the same association.

Membership in a school association is voluntary, and to incentivise schools' collaboration in a system that is otherwise based on school choice and competition, the Flemish Ministry of Education and Training provides additional staff and other resources whose use the association can collectively decide upon. In practice, school associations receive a number of points for management and support staff and – in the case of secondary schools – teacher hours, which they can redistribute among the associated schools based on an internally agreed repartition system (Flemish Ministry of Education and Training, 2015[70]). In elementary education, some of these points may be used to appoint a co-ordinating director of the school association, and in secondary education, the school association can retain up to 10% of the points to fund its operations.

In the most successful cases, school associations have also brought about greater effectiveness and efficiency through the use of shared management systems for staff recruitment and evaluation, easing their principals' managerial and administrative burden and allowing them to assume greater pedagogical leadership. Evaluations of secondary school associations also showed that many of them have developed common personnel policies that facilitate sharing human resources across schools and jointly providing parts of their curricula (Pont, Nusche and Moorman, 2008[68]).

Source: Nusche, D., et al. (2015), *OECD Reviews of School Resources: Flemish Community of Belgium 2015*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264247598-en.; Pont, B., Nusche, D., & Moorman, H. (2008), *Improving School Leadership, Volume 1: Policy and Practice*, OECD Publishing, Paris, http://doi.org/10.1787/9789264044715-en.

Collaborative service provision and joint purchasing

Particularly for small schools, sharing specialised teachers and expensive mobile equipment can offer a means to expand the breadth and depth of their educational offer. In rural France, schools have therefore been encouraged to organise themselves in networks since the 1970s, allowing many small schools that might have otherwise been unsustainable to remain open. Since 1998, municipalities have stepped up their involvement in this co-operation and enabled their schools to offer services like transport, internet access, and extracurricular activities together. This type of collaboration relies on the relative spatial proximity of small providers to avoid spending excessive time and resources on the transport of teachers, students and materials between schools (Giordano, 2008, p. 37[71]).

In Spain, partnerships between rural schools, called "Grouped Rural Schools" (*Colegios Rurales Agrupados*, CRA), have served as a means to overcome the resource constraints faced by small schools since the late 1980s. Participating schools from multiple municipalities share peripatetic teachers, instruction materials or extracurricular offers and combat their teachers' professional isolation through regular co-ordination meetings. In Catalonia, one of the autonomous communities in Spain, the initiative has been pursued under the name of "Rural Education Zones" (*Zona Escolar Rural*, ZER). The schools of a ZER are independent of each other but share a common educational project and curriculum. Each ZER is co-ordinated by a leadership team including one of the participating schools' principals, a chief of studies and a secretary, which dedicates 25 weekly hours to co-ordinating and directing the ZER. Each ZER has a school council composed of representatives of the school management, teachers, administrative and service staff, parents, and the municipality where the schools are located. The schools of each ZER share at least three peripatetic teachers offering instruction in a foreign language, music and physical education. Larger ZERs, comprising seven or more schools hire a fourth peripatetic teacher to provide special needs education. Usually, these teachers focus their instruction on one school each day to avoid excessive travelling between schools and they usually meet every two weeks to plan school activities and overcome the sense of professional isolation prevalent in small rural schools (Ares Abalde, 2014, p. 30[30]).

Vocational education and training (VET) is another sector in which providers can generate considerable savings from collaboration between schools (see also Chapter 4). Particularly in rural areas with relatively low student numbers, the workshops of many vocational schools are not used to capacity and providers in close proximity may offer similar types of training equipment to their students. Given the considerable cost of vocational training equipment, greater co-ordination and resource sharing between providers holds a lot of potential to enhance the efficiency of the VET network. Typical challenges impeding such collaboration include the strong sense of ownership many principals have over their training facilities and the fact that VET providers at different levels of education frequently operate under different governance structures, which can make cost sharing arrangements difficult in practice.

Joint procurement is another way for schools to benefit from economies of scale while retaining their institutional independence. Such purchasing agreements can be based on the ad hoc collaboration between individual school leaders or the co-ordination activity of local authorities, as is the case in Estonia, where most local governments have centralised the procurement of school services such as catering, building repairs, and the purchase of heating fuel and other school supplies. In order to guarantee school leaders some

discretion, for example in choosing their schools' meal plans, municipalities have developed a selective procurement model that allows state-run institutions to procure services independently unless joint procurement agreements are made by the central purchasing body. The education ministry also co-ordinates procurement activities related to the physical infrastructure of state schools and supervises major decisions concerning the repair, expansion or disposition of assets belonging to state-owned schools (Santiago et al., 2016, p. 122[25]).

Regional centres for specialised services and teacher collaboration

Another common resource sharing strategy involves the creation of regional centres that provide multiple schools in their vicinity with specialist services or equipment that could not be efficiently provided at a smaller scale. The regional counselling centres in Estonia provide a good example of this practice, providing specialised services related to the diagnosis and accommodation of SEN students to multiple schools (see Box 3.3). The initiative for the regionalised provision of services can originate at different levels of administration. In Austria, educational psychology and career guidance (*Schulpsychologie-Bildungsberatung*) is provided by 77 school psychological service units across the country, run by the Federal Ministry of Education, Science and Research. They offer psychological information, counselling, support and treatment with the focus of health promotion and personality development, and expert services according to legal provisions (Nusche et al., 2016[16]). In Denmark, by contrast, the regions are responsible for developing and operating specialised social services including special needs education for children with special needs (Nusche et al., 2016[72]).

Box 3.3. Centralised provision of specialist services through regional counselling centres in Estonia

As of 1 September 2014, regional counselling centres ("*rajaleidja centres*", also called "pathfinder centres") started operating in each Estonian county, providing free counselling services for children and young people under the age of 26. The advice covers areas as diverse as career guidance, special education, psychology, speech therapy and social pedagogy. Municipalities (particularly smaller ones) and schools have the opportunity to request services and specialist support (e.g. of special educators or psychologists) through the regional counselling centres. The counselling centres operate under the umbrella of the Innove Foundation's Agency for Lifelong Guidance, which develops and provides career guidance and counselling services, trains guidance practitioners, engages in quality assurance for lifelong guidance, and co-operates with stakeholder networks.

Each counselling centre also operates a Counselling Committee entrusted with guiding students with special educational needs and learning difficulties. They provide schools with recommendations concerning the admission of SEN students or the postponement of their school attendance, as well as the organisation of the teaching for students with special educational needs. The counselling services for SEN students further include the provision of speech therapists, special education teachers, social pedagogues and psychologists. In the future, the regional counselling centres may also assume the responsibility for diagnosing special needs.

The regional counselling centres have significant potential for improving the day-to-day operation of schools and effectiveness of the school network. To fulfil their potential, they require sustained support in developing the staff capacity, procedures and practices necessary for them to be attractive service providers for schools and local governments. They can also act as important sources of information for national policy makers about where the system needs to be adjusted to improve educational outcomes and equity. Even though the counselling centres still depend on the financial support of the European Social Fund (ESF), in the long term, they might be financed through the fees paid by schools, households, and teachers to purchase their services.

Source: Santiago, P. et al. (2016), *OECD Reviews of School Resources: Estonia 2016*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264251731-en, pp. 57, 91, 102.

Teacher resource centres (TRCs) are another example of inter-school collaboration, providing schools with opportunities that they might not otherwise enjoy due to their limited size or isolation. TRCs aim to provide teachers from multiple schools with a shared space to foster peer learning, informal exchange and collaboration for example on the development of materials and curricula. TRCs may also offer more formal in-service training, particularly where such opportunities would not otherwise be available due to the small size of the participating schools' teaching workforce (Giordano, 2008, p. 26[71]). TRCs can be integrated into an existing school cluster or run independently. In Chile, so-called *microcentros rurales* serve a similar function and have played a key role in alleviating the professional isolation of rural multi-grade teachers (see Box 3.4).

Box 3.4. Rural micro centres as platforms for teacher collaboration in Chile

In Chile, "rural micro-centres" (*microcentros rurales*) provide teachers in rural areas with a space to meet, to collaborate and to share best practices to address their common challenges. In a context in which close to half of all rural schools have fewer than four teachers, opportunities for collaborative work, peer learning and professional development are severely limited. Micro-centres thus constitute an important means to strengthen school quality, improve instruction and raise teacher morale.

Teachers of 2 400 small rural schools have the opportunity to meet once a month in one of 374 micro-centres. The objectives of these meetings, as legally specified, are to improve student learning by helping teachers to: i) assess students progress; ii) work on pedagogical innovations needed to improve student learning; iii) exchange pedagogical experiences; iv) design teaching strategies for students; v) set criteria for improvement plans; and vi) receive technical assistance from the ministry's technical-pedagogical advisory services (*Asesores Técnico-Pedagógicos*, ATP) or independent advisory services (*Asesorías Técnicas Educativas*, ATE).

Since 1992, rural schools have also received technical support through the Basic Rural Education Programme (*Programa de Educación Rural*, PER) whose objective is to improve rural students' learning through adapted pedagogical tools and teaching materials, focussing on the work of micro-centres and targeting rural schools that rely on multi-grade teaching.

Source: Santiago, P. et al. (2017), *OECD Reviews of School Resources: Chile 2017*, OECD Publishing, Paris, pp. 94, 101, http://dx.doi.org/10.1787/9789264285637-en.

School clusters under consolidated administration

In some contexts, it has been beneficial for school collaborations to extend beyond resource sharing agreements between independent providers and to include elements of centralised leadership and joint administration. Although the formation of school clusters under a single leadership has often been pursued to streamline school management and improve the quality of educational provision, it has also come to be seen as a path to greater cost effectiveness and, particularly in rural areas, as a means to rationalise the school network while avoiding the closure of small schools.

Different approaches to clustering schools

While the term school cluster has been applied to a range of structures, it is here used to denote the formal co-operation of schools under some form of consolidated administration. Creating such clusters (or federations, as they are sometimes referred to) typically involves designating one school as a lead, core or hub school and converting multiple nearby schools into satellites. In the most far-reaching cases, this effectively entails the closure of two or more schools and a change of leadership structures to create a split-site school under a single principal or governing body and a joint budget. In other cases, a cluster's central administration may assume a leadership role but allow each of the cluster's constituent institutions to operate as relatively independent units that retain a significant degree of autonomy in their day-to-day operations (Ares Abalde, 2014, p. 30 f.[30]). Depending on their degree of integration, some school clusters allow members to maintain and even refine distinct identities and educational profiles while others follow a unitary educational project, which tends to require strong pedagogical leadership.

There is great variety in the processes by which school clusters are formed, the purposes they serve and the extent to which they transform the governance of their constituent institutions. Giordano (2008, p. 88 ff.[71]) offers a typology of different models, distinguishing between bottom-up and top-down, voluntary vs. mandatory, selective vs. universal, single- vs. multi-issue approaches, and between clusters that serve primarily as tools for external control vs. those that emphasise internal development. Some clusters integrate schools with a similar educational offer while others include schools providing different levels of education. Examples of both can be observed in Lithuania (see Chapter 4, Box 4.2), which has promoted the construction of multi-function and regional training centres to bring small rural providers under a unified administrative structure.

Clustering has become one of the most popular approaches to supporting English primary schools within the United Kingdom's relatively autonomous system. In the case of Whitesheet Primary School in Wiltshire (United Kingdom), two village schools with a combined enrolment of only 64 students were turned into a single school with two sites. Shortly after, the school started attracting additional students, growing to 99 in total, which improved its ability to recruit and retain qualified teachers, increased the school's flexibility and efficiency in the allocation of staff and equipped it to withstand future fluctuations in student numbers (OECD, 2010, p. 41[62]). Since the English rural schools that organise themselves clusters are often less than a thirty minute drive apart, they can organise frequent cluster meetings and exchanges between their staff (Rule, 2005[74]).

Multi-Academy Trusts (MATs) provide another example of effective school co-operation at the secondary level in the United Kingdom. Joining a trust enables academy governors and school leaders to collaborate, share effective practices and generate economies of scale when purchasing or sharing goods and services. Although a large geographic

distance between schools can diminish the collaborative benefits of MATs and render their governance more difficult, several trusts have effectively combined large urban schools with smaller rural schools in their surroundings. In order to ensure that schools enjoy these benefits regardless of their geographic location, Regional School Commissioners (RSCs) are responsible for that preventing small schools in rural areas are isolated and excluded from joining MATs (UK Department for Education, 2016[76]).

School clusters in OECD review countries vary in size, typically comprising up to 15 schools in relative geographic proximity. The distance between schools may affect the viability of day-to day collaboration within the cluster and the extent to which, for example, pedagogical staff can be assigned to teach at multiple schools over the course of a day. Working in school clusters places high demands on the time of school leaders and teachers. Similar difficulties have been observed in Uruguay, where the majority of teachers in secondary education work in more than one school, albeit not due to the clustering of schools (Santiago et al., 2016, p. 231[46]). Based on the latest Teacher Survey carried out in 2015, 12% of Uruguay's teachers reported to work in at least three schools, with the proportion rising to 17% in both general public secondary and technical-professional schools and to 21% in private secondary schools (Instituto Nacional de Evaluación Educativa (INEEd), 2016[73]). In the French Community of Belgium, specialised teachers employed by small schools often have to travel between multiple provinces. This can imply excessive travelling times that could often be avoided if proximate schools belonging to different umbrella networks were to collaborate on the joint use of human resources.

Additional challenges when entering a formal collaboration under joint leadership concern the decision where to locate its administrative centre, the selection of a principal, and re-defining the professional profiles of principals in satellite schools. In addition to taking on administrative responsibilities, the central hub of a school cluster may also act as a resource centre for teaching materials or provide facilities like a library or a computer lab to the teachers and students from surrounding schools (Giordano, 2008, pp. 23, 82[71]). While it can be intuitive to choose the largest, most central or best-equipped school to act as the cluster hub, there is a risk that it may be perceived as superior to its satellite schools and attract a disproportionate share of students from its surrounding units. Some Dutch school federations have resolved this problem by letting the principal rotate between the participating schools (Rule, 2005[74]).

School clusters also need to engage in the complex task of organising transport arrangements and co-ordinating the schedules of teachers travelling between the central school and its satellites as well as those of students attending courses in multiple schools. Administrations also need to routinely decide on the distribution of resources like teacher working time or newly acquired equipment and whether they will be more efficiently used in the cluster's central school or its satellites. The leadership team also needs to decide which grades should be taught in which satellite schools so as to use the available resources most effectively while bearing in mind the interests of students and teachers (OECD/The World Bank, 2015, p. 122[75]). In light of these complex tasks, successful clustering initiatives involving a centralised leadership team and budget require careful attention to administrative capacity building and effective mechanisms to involve the school communities in the decision-making processes.

Economic and educational impact of school clustering

In addition to the savings that can be generated by sharing resources and tapping into economies of scale, uniting multiple schools under a single leadership team allows schools to reduce their overhead and expenditure on administrative personnel or back-end IT systems. Particularly in rural areas characterised by a large number of fragmented providers, the consolidation of administrative and pedagogical capacity within a school cluster can offer small schools educational opportunities that they would be unable to finance on their own. Where school clusters integrate more than one level of education, they can also strengthen the articulation and co-ordination of students' vertical transitions (see Chapter 4). This was one of the reasons for school clustering policies that Colombia implemented in 2002 as part of broader decentralisation reforms. By ensuring that each school cluster offered all levels of education, the reform sought to strengthen students' transition across levels of education, particularly in rural areas (Radinger et al., 2018[77]).

Joining a school cluster can also put small schools in a better position to serve the needs of dispersed student populations with similar educational needs. Clusters can, for example, enable teachers to exchange their experience and pedagogical practices or to collaboratively develop teaching materials and tests for special needs or minority-language students. In the Netherlands, for instance, school clusters were provided with additional resources for special needs education which were used to co-ordinate support for educators to develop methods for students with behavioural problems, learning disorders and physical disabilities (Jan Pijl and Van Den Bos, 2001[78]). Like other forms of collaboration, clusters can provide teachers in remote areas with opportunities for face-to-face interaction during regular cluster meetings, and thereby reduce professional isolation. Some well-established clusters in Wales have even developed specific teaching materials that take into account their schools' location and size. At the same time, different school sites under a common administration may require principals to develop new strategies to provide adequate pedagogical leadership. Building pedagogical and managerial capacity in cluster leaders could, for example, involve the creation of new teacher leadership roles to effectively observe teachers' classroom practices and provide critical feedback as needed.

School clusters can also function as a means to increase accountability and facilitate education management. They can provide both local stakeholders and central or intermediate administrations with a point of contact that facilitates the transmission of information between them and the school leadership. In some cases, the creation of school clusters has therefore been explicitly pursued as part of decentralisation reforms, assigning them a formal role in the administrative hierarchy and enabling districts to interact with groups of schools rather than individual institutions. Likewise, enhancing administrative capacity at the local level by clustering schools has thus occasionally been seen as a condition for the delegation of resource management responsibilities.

Including mechanisms for stakeholder engagement and accountability from the very beginning of clustering projects can increase their chances of economic and educational success. According to Giordano (2008, p. 118 ff.[71]), school clusters are most likely to have a positive impact on teaching and learning if they foster local ownership through parent and community involvement and make use of development plans and self-evaluations to set goals and gauge progress. The significant school consolidation that took place in Portugal after 2005 aimed to achieve all of the goals above through a combination of strong central steering, direct support for local governments, and the effective use of school clusters (see Box 3.5) (Liebowitz et al., 2018[79]).

Box 3.5. Clustering as part of school network consolidation in Portugal

In 2005, Portugal, initiated an ambitious consolidation reform to address the school network's inefficiency and drastic regional inequalities. Within a decade, Portuguese educational authorities closed 47% of the country's public schools, most of them primary schools in rural areas. Prior to the reform, rural areas were dominated by small schools with poor facilities and low performance while schools in urban areas were often overcrowded and relied on double-shift education. To address this problem, the Ministry of Education started co-operating with local governments and school executive boards to close down underperforming schools with fewer than 20 students and above average annual repetition rates in 2005/06. Even though the consolidation efforts were legally mandated, their implementation required the municipalities', school leaders' and parents' consent that the changes would improve the learning experience of affected students. At the same time, the ministry provided participating local authorities with financial support to invest in new school clusters and school transport where the changes to the school network had led to an increase in students' travel distances (Matthews et al., 2009[80]). Many small schools were also replaced by newly built facilities with a minimum of 150 students, full-day instruction and access to curricular enrichment activities.

As part of the consolidation process, nearly all public schools (98%) were re-organised into clusters comprising schools from one or more education levels under a single administration. Similar to other countries, the organisational leadership of clusters is assigned to a principal (supported by a number of deputy principals and school co-ordinators) and school governing councils composed of representatives (mainly teachers) of each school. School clusters typically group between 4 and 7 schools, but range in size from as few as 2 to as many as 28 schools.

The introduction of clusters aimed to mitigate some of the negative consequences of school closures, allowed for a more rational use of resources and eased students' vertical transitions across levels of compulsory education. Within a single cluster, students can more easily progress through school years and education levels while remaining within their extended school community, allaying concerns typically associated with a change of school environments. Furthermore, since resource planning is conducted at the cluster level, variations in demand for any given school can be more easily dealt with by shifting human and material resources across collectively managed school buildings. The reorganisation of the school network is also considered to have ameliorated the isolation of rural teachers, improved educational opportunities for disadvantaged students in isolated areas, and fostered greater collaboration between the Ministry of Education, municipalities, schools and other stakeholders.

Several features of the reform contributed to the success of the reorganisation: i) the reform was guided by a clear vision and criteria that specified which schools should close and what they would be replaced with; ii) it was recognised that parents needed to be convinced of the reforms' positive outcomes for them and their children and incentives, including free transport, were provided; iii) municipalities supported cluster leaders in assuming their new responsibilities.

Sources: Liebowitz, D., Pablo, G., Hooge, E., & Lima, G. (forthcoming), *OECD Reviews of School Resources: Portugal 2018*, OECD Publishing, Paris; Ares Abalde, M. (2014), "School Size Policies: A Literature Review", *OECD Education Working Papers*, No. 106, OECD Publishing, Paris, http://dx.doi.org/10.1787/5jxt472ddkjl-en; Matthews, P. et al. (2009), *Policy Measures Implemented in the First Cycle of Compulsory Education in Portugal: International Evaluation for the Ministry of Education*, Office for Education Statistics and Planning, Ministry of Education, Portugal.

School consolidation

The consolidation of the school network conventionally refers to the process of closing one or more schools and transferring their students to surrounding providers, thus reducing the total number of schools in the network and increasing the enrolment of those that remain. Over the past decade, the consolidation of school networks has been a common response to declining student rolls, fiscal pressure or a combination of both. According to a 2013 report by the European Commission (EC), around two thirds of countries or regions in the European Union (EU) engaged in school consolidation between 2010 and 2012. Although these measures mainly concerned primary and secondary schools, eleven European countries or regions also consolidated their stock of pre-primary facilities, including the Czech Republic, Estonia, Iceland, Lithuania and Portugal (European Commission, EACEA and Eurydice, 2013, p. 60 f.[81]). In other countries, such as the United States, the pace of consolidation has slowed down following a period of wide-spread school closures in 1930-70, which saw the number of schools drop by nearly two thirds, affecting more than 100 000 schools and leading to a five-fold increase in the average school size (Duncombe and Yinger, 2007[82]).

Fiscal pressure in the wake of financial and economic crises was a significant factor driving recent consolidation in countries such as Denmark, Iceland, Italy, Latvia, Poland, Portugal and Slovakia. In Portugal, the high cost of installing and adequately maintaining essential infrastructure such as canteens, libraries and ICT facilities added to concerns about the weak educational offer and learning conditions in some very small schools. Likewise, the reorganisation of the Danish school network was partly a response to municipal budget cuts. In other systems, consolidation was driven by reforms to the structure of the school system, e.g. in Malta, where the number of schools fell due to the phasing out of its dual secondary education system. In the majority of countries concerned, however, the main rationale for school consolidation was a desire to make infrastructural adjustments in response to demographic developments and changing patterns of demand, often associated with a decline in the rural school-age population (European Commission, EACEA and Eurydice, 2013, p. 60 f.[81]).

Even though most cities face the opposite challenge (as described further below), demographic decline and concerns about performance have motivated a number of urban school districts in the United States, including Detroit, Milwaukee, Pittsburgh and the District of Colombia, to engage in similar initiatives and significantly consolidate their school networks. As in rural areas, these reforms have sometimes prompted concerns about rising inequality in the access to education and, more specifically, about their effect on student segregation (Lee and Lubienski, 2017[83]).

Economic and educational impact of school consolidation

Arguments in favour of school consolidation often stress its economic and educational benefits, citing the school network's increased efficiency through economies of scale and expected benefits to student learning by virtue of the resources available to larger schools. Yet, although gains in economic efficiency are a central aim of consolidation projects, recent surveys of the empirical evidence point out that their effect on public expenditure is not frequently subject to rigorous evaluations (Knoth Humlum and Smith, 2015[33]). Even fewer studies take into account the costs that consolidation may generate for private households, including the time and money spent on longer commuting distances (Ares Abalde, 2014[30]).

Despite an insufficient culture of empirical evaluation, existing cost and production function studies of school district consolidation suggest that – up to a certain point – increasing the size of schools can allow for a given educational quality to be provided at a significantly lower cost per student (Andrews, Duncombe and Yinger, 2002[34]). Part of a school's operating and capital expenditure is relatively fixed and therefore higher per student in small schools. This includes the salaries of the school leadership, central administration and school board as well as the cost of buildings, heating systems or science labs. Depending on the structure of the school network, the schools' present size and distance from each other, the prospective savings of consolidations may be outweighed by increased transport costs and the diseconomies of scale that may emerge once schools reach a certain size. Based on evidence from the consolidation of rural school districts in the State of New York between 1985 and 1997, Duncombe and Yinger (2007[82]) find strong evidence for economies of scale in schools' current expenditure, particularly for instruction and administration, but not in their capital expenditure. In the long-term, they find per-student operating expenditure to decrease by 62% when two 300-student districts merge and by 49.6% when two 1500-student districts merge, which indicates diminishing returns to the consolidation of larger schools or districts.

It is also important to bear in mind that the process of consolidation itself can generate substantial transition costs in the short term. These may accrue from purchasing additional instructional material for newly arrived students; expanding the facilities of receiving institutions; merging information and communication technology (ICT) and software; revising transport schedules or setting up new transport contracts; renegotiating collective bargaining agreements with teachers; and reviewing, correcting or amending existing service contracts (Andrews, Duncombe and Yinger, 2002[34]). Evidence from district consolidations in the U.S. State of New York suggest a large upward shift in both current and capital expenditure, followed by a gradual decline in the years after the consolidation (Duncombe and Yinger, 2007[82]). The efficiency gains generated through consolidation are therefore unlikely to materialise immediately and, depending on the cost sharing arrangements, may accrue asymmetrically to the consolidating and the receiving schools.

Besides their expected impact on public expenditure, non-economic factors related to educational quality and student well-being are at the forefront of discussions on school consolidation since the closure of schools can have a significant impact on students' learning experience and daily lives. Consolidation can affect students by increasing the size of their schools and through the disruptive experience of relocating or receiving new students (especially in the short term). By reducing the number of schools in the network, consolidation can also limit students' choice and inter-school competition, although it may also reduce inequities arising from students sorting and residential segregation (Knoth Humlum and Smith, 2015, p. 16[33]). As for the economic consequences of consolidation, the educational effects arising from the disruptive process of school closures are likely to subside over time, while the changes in school size and the network's structure shape the longer-term effects of consolidation.

Beyond the effects of attending a larger school – including the greater curricular diversity, specialised teachers, but also larger class sizes – most studies find that students forced to relocate following the closure of their schools tend to, on average, experience detrimental short-term effects on performance, retention and school dropout (Beuchert et al., 2016[84]; Knoth Humlum and Smith, 2015, p. 16[33]). At the same time, there is evidence to suggest that the relocation has fewer adverse and even positive effects on students' outcomes where the closure affects low-performing schools and students are

relocated to relatively high-performing schools (Brummet, 2014[85]; Engberg et al., 2012[86]). An evaluation of school closures in Michigan also found that students suffered more from school closures if they were scattered across multiple recipient sites (Brummet, 2014[85]). This suggests that the disruption of students' peer networks may be responsible for some of the adverse effects and underlines the importance of paying close attention to ensuring both a smooth transition and successful integration of students from consolidated schools.

Secondary effects of school closures may stem from the reduced number of providers competing in a given area, a diminished scope for parental choice, and changes in students' peer composition. Where consolidation is implemented by merging local school districts, the effects of increased school size can coincide and interact with those of strengthened municipal administrative capacity (OECD, 2017[27]). Estimates from an early wave of consolidation in the United States during the middle of the 20th century, for example, show that the larger size of consolidated school districts was associated with positive long-term student outcomes while the increase in school size that tended to go along with it had a negative effect (Berry and West, 2008[87]). Empirically disentangling the various pathways through which consolidation affects students' outcomes is therefore difficult, especially in light of their potential heterogeneity across the student population and their mediation by the idiosyncratic characteristics of each project's local context and implementation (Knoth Humlum and Smith, 2015[33]).

Any reorganisation of the school network and plans for consolidation should be carefully conducted with a view to identify potential consequences for equity. A frequent concern arising in the context of consolidation, for example, is that the closure of schools could disproportionately affect disadvantaged students, partly since students with a lower socio-economic profile tend not to fare as well in larger schools and classes as their peers (Piketty, 2004[35]). Likewise, consolidation measures could have a negative impact on students requiring language training or those with special educational needs, unless the provision of relevant services and personnel can be guaranteed throughout the transitional period (Santiago et al., 2016, p. 29[4]). Whether or not disadvantaged students suffer from school closures is likely to depend on the local context. Even though Brummet (2014[85]) finds that displaced students suffer from school consolidation on average, students from relatively low-performing schools are found to benefit from consolidation if it implies their relocation to high-performing schools. This suggests that the consolidation of adjacent schools with different socio-economic and academic profiles might diminish segregation and inequality.

Specific measures that countries have taken to protect students during the restructuring processes include the active involvement and consultation of representatives of vulnerable student groups. Some services targeted at disadvantaged students or minorities, such as the work of teaching assistants, could also receive special protection when restructuring measures are implemented. Other equity-promoting measures that should accompany restructuring or consolidation measures include professional development that enables teachers to provide personalised instruction in what might be more heterogeneous consolidated schools (Santiago et al., 2016, p. 29[4]).

To ensure that plans for school consolidation and the surrounding deliberations are informed by best practice, it is prudent to collect relevant data and equip stakeholders with the capacity to interpret and effectively employ it. In many countries, evidence concerning the effects of consolidation on student learning outcomes, their well-being and the wider community remains scarce (Commission on the Delivery of Rural

Education, 2013[88]) and many systems lack a culture of evaluating policy interventions related to the reorganisation of the school network. While the experience from comparable projects in other education systems and international best practices can provide important lessons, sharing evaluation results among national stakeholders at the sub-system level remains a crucial part of promoting system-wide learning. This requires the careful monitoring of ongoing network reforms and their subsequent evaluation as well as the use of this information to make adjustments to current consolidation processes and inform future reforms elsewhere.

Regardless of the efficiency gains that might be achieved by restructuring the school network, it is important to keep in mind that school consolidation should be guided by the goal to ensure the highest quality of education for the greatest number of children. This may involve difficult trade-offs and authorities should balance the importance of efficiency with the values of both equity and quality. In light of the evidence, it is clear that there are limits to consolidation and that its feasibility and returns depend not only on the present structure of the school network, but also its geographic and social context. Diminishing returns to scale and the excessive impact that school closures in remote areas may have on students' travel time impose a natural limit to consolidation. Research from the United States, which saw a considerable rationalisation of school districts over the course of the 20th century, for example, indicates that parts of its network may have reached or exceeded the point at which further consolidation no longer promises fiscal or educational improvements (Howley, Johnson and Petrie, 2011[89]). Approaches that are not attuned to local contexts, such as a generalised minimum school size, are therefore unlikely to yield positive outcomes for the reorganisation of rural school networks. Nevertheless, there are many cases in which the consolidation of educational provision would not only generate savings, but also broaden both students' and teachers' opportunities (Santiago et al., 2016, p. 95[25]).

Policy levers to advance school consolidation

Countries, regions and municipalities have sought to advance school consolidation using a range of policy levers combining financial incentives for the closure of small schools, disincentives for their continued operation, or direct support in the consolidation process. The provision of financial incentives for school co-operation or consolidation through central funding formulas is a powerful steering tool in the governance of school networks. Tying the funding of schools or local governments to the number of enrolled students, for example, discourages the maintenance of small schools due to their relatively high per-student fixed costs. In addition, some systems have used more targeted incentives to consolidate specific parts of the school network. In line with the aim to consolidate lower secondary education, for example, Estonian municipalities that cease their educational provision in Years 7-9 continue to receive salary grants for the students they lose for multiple years while the receiving municipality receives whichever salary coefficient was applied to them prior to the consolidation (Santiago et al., 2016, p. 129 f.[25]).

Particularly in systems with decentralised funding responsibilities and a high degree of local autonomy, governments have offered direct financial aid to consolidating districts or schools in order to promote consolidation and convince local stakeholders of its benefits. Direct aid of this sort may be needed for providers to cover the significant transition costs that can arise in the course of the consolidation process, including capital investments to expand facilities, the cost of setting up transport systems and increased operating costs that tend to accrue in the years immediately following the closure of schools and reassignment of its students (Andrews, Duncombe and Yinger, 2002[34]). This direct

financial support can be provided as a one off payment or over multiple years, and take the form of a lump sum grant or earmarked transfer.

In New York State, for example, districts that consolidate their school network receive an increase in their basic operating funding of up to 40% for five years and a declining sum for another nine years. In addition, they may receive a 30% increase in their capital funding for projects initiated within 10 years of the consolidation. Likewise, the Estonian government sought to accelerate the consolidation of its school network by providing special investment grants to local authorities reducing or eliminating their upper secondary provision. At the same time, the government agreed to allocate funding for the transport of students attending one of the new state-run gymnasiums outside of their local municipality as well as offering dormitories or financial support for housing to commuting students (Santiago et al., 2016, p. 130[25]).

An important challenge related to direct aid programmes is to ensure that consolidating districts spend their additional funding efficiently and with the best interests of their students in mind. In the case of New York State, which provides generous aid to support consolidating districts, a study identified large increases in capital expenditure following school closures (Duncombe and Yinger, 2007[82]). While some infrastructural adjustments and capital investments may be justified by the need to repurpose facilities and expand receiving schools, authorities should be careful to monitor schools' expenditure and ensure that direct aid following consolidations is spent effectively to support educational quality.

In some countries, the rationalisation of the school networks has not been accelerated by a net change in the funding received by any individual school, but rather by adjusting its distribution mechanism. Notably, in Sweden, the decentralisation of school funding in the form of block grants from the central to the local level between 1986 and 1992 provided fiscally strained municipalities with an opportunity to reduce spending by adjusting their school networks. The decentralisation was therefore followed by a dramatic consolidation of rural schools without any explicit adjustments in national policies related to small schools (Ares Abalde, 2014[30]).

In systems facing particularly strong pressures to consolidate their school networks, authorities might also consider tying financial support to centrally defined benchmarks for school or class sizes. In the case of the Slovak Republic, for example, the OECD review team explored the option of defining an average minimum class size below which a school is not funded from the state budget if it remains below the threshold for a given number of years. Alternatively, authorities could reduce existing weights for the funding of schools as they drop below a certain threshold (Santiago et al., 2016, p. 14[4]). As discussed in Chapter 2, however, imposing strict rules on minimum class or school sizes ignores the importance of local context for the efficient organisation of the school network and the feasibility of consolidation.

Finding the right balance of incentives and direct aid to encourage the rational organisation of the school network while striving to improve the educational quality in rural areas wherever possible constitutes a significant challenge for policy makers. In many cases, financial incentives and other policy levers designed to encourage the closure of small schools exist side by side with instruments providing financial support for their continued operation (Duncombe and Yinger, 2007[82]). There is a risk that opposing financial incentives might cancel each other out or at least send ambiguous signals to local authorities and school leaders, which highlights the importance for policy makers to provide clear guidance and use their steering capacity effectively.

Some of the strategies to resolve this tension have been to exempt small schools for which consolidation is not an option from financial penalties or other instruments designed to exert pressures on inefficient school networks. In Scotland, for example, schools can be excluded from policies meant to encourage consolidation if the Scottish Borders Council identifies them as strategically important and meriting particular protection due to their geographic isolation (Commission on the Delivery of Rural Education, 2013[88]). These forms of conditionality require authorities to define a set of factors that justify the continued operation of small schools, to systematically and transparently measure them and apply them in their funding mechanisms.

Consultation and stakeholder engagement

Many OECD countries have adopted systematic approaches to stakeholder engagement, involving information, consultation or participation and consider them integral for the successful design and implementation of public policies across a wide range of domains (OECD/Korea Development Institute, 2017[90]). Public engagement has an intrinsic value, fostering accountability, building civic capacity and trust, and widening the scope for societal actors to make and shape decisions on public goods. In addition, engagement has instrumental value, enhancing the quality of policies by leveraging ideas and resources, aligning them more closely with the needs of the affected constituencies and facilitating their implementation by resolving potential conflicts and generating public support.

Consultation and stakeholder engagement are equally important in the field of education (Viennet and Pont, 2017[91]) and particularly so when it comes to consolidation, given the significant impact that school closures can have on local communities and the tensions they frequently generate between the actors involved. A lack of communication, engagement and trust among local authorities and stakeholders can aggravate resistance to proposed school network reforms. It is therefore instrumental to communicate a policy's objectives transparently and to engage a broad range of stakeholders, including less active and powerful voices, in the decision-making process (Burns and Köster, 2016[92]). Ensuring that consolidation procedures are responsive to local economic, ecological and social concerns can pre-empt resistance and generate the support necessary to ease their implementation. Public consultation procedures can also serve an important accountability function, since they require authorities to demonstrate that restructuring measures are driven by a clear vision of quality education, that they have considered alternative options and taken into account its effects on the local community (Ares Abalde, 2014, p. 22[30]).

In addition to the consultation of relevant authorities as part of formal co-decision procedures, the closure of schools frequently involves the consultation and engagement of local stakeholders. In systems where adjustments to the school network require the formal consent of all affected stakeholders, public consultations and engagement have traditionally played an important role, for example in US states where the consolidation of school districts requires the explicit consent of voters (Duncombe and Yinger, 2007[82]). Yet, even in systems that do not vest formal decision making power in local stakeholders, articulating a positive educational vision for network reforms can be an important condition for their success. This is particularly true where public schools are competing with private providers and parents might transfer their children to the private sector if the consolidation is not expected to go hand in hand with tangible improvements to the quality of public schools (Nusche et al., 2016, p. 96[72]).

Although well-structured and executed consultation procedures promise to yield results that are more aligned with local needs and enjoy greater support among the local community, authorities need to be aware that the engagement of stakeholders can be resource intensive, render decision-making processes more complex and require additional time to be factored in. Alemanno (2015[93]) identifies common obstacles to the effective participation and engagement of the public in decision-making processes:

- **Lack of awareness**. Many OECD governments have embraced the internet and mass communication to provide the public with relevant information regarding legislative decision making and ongoing policy initiatives. This often involves establishing a central point of access providing official information to the relevant stakeholders, sometimes supplemented with press releases, conferences and other public statements. Yet, these efforts may not be sufficient to reach all individuals that have a stake in the process and press pronouncements cannot be relied upon to provide sufficient context for policy proposals and to explain opportunities for engagement.
- **Low participation literacy**. Providing information about ongoing policy initiatives and the opportunities to get involved may not be sufficient to render the process fully inclusive. Few members of the public have a thorough understanding of the way public decision-making processes are organised – a knowledge gap referred to as "low participation literacy". Even where information about policy initiatives is widely spread, it can fail to trigger engagement if people do not recognise that policy makers are looking for their participation in an ongoing process. Other barriers related to language, resources or special needs should also be taken into account.
- **Information overload and capture**. The documents announcing public initiatives and describing their predicted impact tend to be lengthy, technically complex and difficult for non-expert audiences to understand. This reduces participation and creates the potential for "information capture" by stakeholders who can leverage the high cost of information acquisition to gain control over the decision-making process at the exclusion of others.
- **Disillusionment due to past record**. Negative experiences with consultation and engagement processes can lead to lasting disillusionment and scepticism among stakeholders. The public willingness to engage in consultations can be severely reduced if they appear to serve cosmetic purposes or merely legitimise decisions that have already been taken. Authorities should also be careful to prevent third parties from capturing engagement procedures to advance their interests and other factors that could undermine public trust, such as attempts at manipulative framing.

Public directives can significantly influence the terms on which stakeholder engagement is conducted. Consultation processes can be mandatory or merely recommended, can take place at different points during the network reform process and can be vested with varying degrees of influence over its outcomes. Some school systems, like those of Quebec or England, require any school closure to be preceded by a consultation process that brings together all major stakeholders in order to resolve conflicts before they arise and to hold authorities to account. In Scotland, the consultation process leading up to any proposed school consolidation is explicitly designed to establish a "presumption against school closure" and requires local authorities to make their case exclusively on educational grounds, as described in Box 3.6 (Ares Abalde, 2014, p. 22[30]; Commission on the Delivery of Rural Education, 2013[88]). Designing consultation procedures that set

a very high bar for consolidation places stakeholders in a strong position to defend the local provision of education. At the same time, it can exert significant financial pressure on regions in demographic decline and prevent them from adequately balancing educational, social and economic concerns (Slee and Miller, 2015[94]). Clear guidance on when and how to conduct consultations and which information stakeholders should be provided with can be an effective means to support local authorities and align expectations among all actors involved.

Box 3.6. Consultation procedure for school closures in Scotland

In 2010, the Scottish Schools Act introduced a new consultation procedure, which local councils must initiate before closing, merging, relocating or opening a school. The process was intended to bring together all stakeholders affected by the school restructuring, including students of the affected school and their parents, teachers, staff, or trade unions, parents of children who might attend the school within two years of the proposed date of closure and relevant church or denominational bodies, where appropriate. One of the aims of the consultation process was to establish a "presumption against closure" and to ensure that educational benefits would be the driving force in any proposed closure.

Local authorities were therefore required to publish an Educational Benefit Statement presenting the proposal's likely impact on students and other users of the school facilities. During the consultation process, they are asked to clarify which policy alternatives were available and why a particular option was chosen, taking into consideration both short and long-term effects. In some cases, the process was supported by studies prepared by external consultants that assessed the likely socio-economic impact of a school closure. Over the course of the consultation process, initial proposals were often altered to reflect ideas and concerns generated during public debates. In other cases, they were deferred, shelved or replaced by new proposals.

Between 2011 and 2013, the Scottish Government tasked the independent Commission on the Delivery of Rural Education with conducting a review of the consultation procedure and providing recommendations to improve its effectiveness. Recurring conflicts between local communities and councils had been a cause of concern, as had the quality of the reviews and evidence base upon which local authorities could mount their case for restructuring plans. While underlining the importance of the Education Benefits Statement, the Commission also criticised that it created the unrealistic expectation that educational considerations would be the sole criterion driving network reforms. Instead, the Commission suggested that it should be acceptable for councils to demonstrate that the children would not be detrimentally affected and to include transparent and accurate financial information to be considered alongside it. In 2014, the Children and Young People (Scotland) Act, introduced some changes to the process, including the requirement for school closure proposals to contain information on its financial implications. In addition, the often-mentioned "presumption against closure" was explicitly included and clarified in the Act to reduce disputes over the interpretation of "viable alternative to the closure proposal" that would need to be considered.

Sources: Ares Abalde, M. (2014), "School Size Policies: A Literature Review", *OECD Education Working Papers*, No. 106, OECD Publishing, Paris, http://dx.doi.org/10.1787/5jxt472ddkjl-en; Commission on the Delivery of Rural Education (CDRE) (2013), *Commission on the Delivery of Rural Education: Report*, Edinburgh; The Scottish Government (2008), *Safeguarding our rural schools and improving school consultation procedures. Proposals for changes to legislation*, Edinburgh; Slee, B., & Miller, D. (2015), *School Closures as a Driver of Rural Decline in Scotland: A Problem in Pursuit of Some Evidence?*, Scottish Geographical Journal, 131(2), 78–97, https://doi.org/10.1080/14702541.2014.988288.

Administrative process of school closure and student relocation

The consolidation of school networks involves complex administrative procedures and often rely on the co-operation of multiple levels of government, agencies and stakeholders in the time leading up to and following the closure of schools. As described in Chapter 2, the authorities involved in the process vary across systems depending on their distribution of responsibilities for the school network and on the way in which the closure was brought about, i.e. whether it was voluntary or enforced, hierarchical or horizontal.

The administrative process of school closures may be initiated by the school founders themselves or a request submitted to the responsible authority by another entity. In the Slovak Republic, for example, the central ministry has the authority to decide on the closure of schools on the basis of requests that may be submitted by the school founder, regional state authority or the state's school inspectorate and which need to provide reasons for closure, such as deficiencies in personnel, material or equipment (Educational Policy Institute, 2015, p. 53[95]). In Estonia, decisions on the closure of schools are taken by their owner, which may be a municipality, the ministry or a private entity. They take into consideration a number of aspects, including the quality of education, the cost of provision, safety and health conditions, school alternatives in the vicinity, the quality of roads around school location and the school's role in the local community and cultural life (Santiago et al., 2016, p. 73[25]).

The administrative procedures leading up to school closures can be highly complex, particularly where they involve negotiations between multiple authorities. In Austria, for example, they are often preceded by intense political dialogue between stakeholders and negotiations between the provincial government and the federal level represented by the provincial school board. In order to gain the consent of municipalities, agreements over consolidation procedures often require the provision of financial incentives and the failure to reach a consensus may lead to administrative court proceedings causing some school closures to stretch over several years (Rechnungshof, 2014[96]).

Wherever a school is closed, providing an adequate alternative for its students and minimising the disruption caused by the relocation process is the highest priority for parents and local authorities alike. Finding a proximate school with a matching educational offer to absorb students from consolidated institutions is crucial to ensure that they can continue to attend schools at a reasonable distance from their homes and continue following their educational pathways. The responsibility for choosing among potential recipient schools may lie with parents or local administrations, depending on the systems' degree of school choice. In either case, challenges may arise if the surrounding schools have limited capacity or they cannot provide the educational offer students previously received.

In the event of a school closure, authorities also need to arrange the redistribution of resources previously dedicated to the closed school and decide who should bear the transition costs associated with student transport, teachers' severance pay and infrastructural conversions. While a share of the closed schools' funding usually follows students and teachers to their new providers, systems vary in the extent to which they financially reward municipalities for consolidating their school network rather than letting them bear part of its costs. In Austria, for example, municipalities that close their schools are obliged to compensate the constituency which absorbs their students to cover part of its increased infrastructure and non-teaching staff expenditures which may discourage them from consolidating their networks (Nusche et al., 2016, p. 124[16]). In

Lithuania, by contrast, consolidating districts' maintenance funds are distributed among the remaining schools based on their needs for renovation; or used for the maintenance of whichever public institution may take the consolidated school's place (e.g. multi-functional centres providing informal child education, cultural, social or other community services) (NASE (National Agency for School Evaluation), 2015[97]).

The future use of vacated school facilities is another important aspect when planning consolidation procedures. While the continued maintenance of buildings can constitute a burden for financially strained rural communities, freeing up capacity in previously under-utilised facilities and putting them to new uses can also provide significant opportunities (Nusche et al., 2016, p. 124[16]). This can involve the buildings' continued public use for the provision of different community or social services. Where there is no demand for such facilities, leasing or selling them can be an attractive option, potentially after remodelling them for residential or commercial use. Since mismatches in demand and supply are often unevenly distributed across different levels and types of school provision, repurposing facilities for other educational services is a good example of modular approaches to the school network. In the Czech Republic, for instance, the OECD review team recommended using the capacity generated by consolidating the lower secondary network to respond to the risen demand for pre-school places (Shewbridge et al., 2016, p. 84[66]). Plans for future use of school buildings should be clearly stated and discussed at an early stage of the consolidation process to allow for input from stakeholders. Since repurposing school buildings can imply complex legal procedures, local authorities may need support to assess different options at their disposal and avoid legal costs or delays (Commission on the Delivery of Rural Education, 2013[88]).

Arrangements for school transport

Both public and private expenditure on students' transport tend to be higher in rural than in urban communities, given the longer average distances between their homes and schools or afternoon activities (Reeves, 2003[98]; Showalter et al., 2017[19]). Concerns about a further rise of private transport costs and commuting times are frequently cited as one of the most problematic aspects of school consolidation and a reason for many communities' resistance (Killeen and Sipple, 2000[99]). At the same time, the rising costs of school transport services in countries like the United States have driven many local authorities to reduce their provision. According to the National Center for Education Statistics (U.S. Department of Education, 2016[100]), the average per-student expenditure on public bus transport was USD 961 in 2011–2012; compared to only USD 531 in 1980-1981 (adjusted for inflation). Many school districts have therefore halted school transport services altogether, reduced the number of routes and bus stops or increased the minimum distance for students' eligibility (Gottfried, 2017[101]).

Particularly for the parents of young students, school transport can be critical to alleviate concerns over work schedule conflicts and the safety of students who would otherwise rely on walking, cycling, or taking public transit to school. Longer travelling times have also been suggested to negatively impact students by causing fatigue or inattentiveness in class and reducing students' time for extracurricular activities or the interaction with their families (Gottfried, 2017[101]).

The absence of convenient transport options may also increase students' risk of dropping out, especially for disadvantaged students and those expecting lower returns from education. While evidence concerning the impact of geographical constraints on upper

secondary participation and completion is limited, a study in Norway found longer travel times to have a modest negative effect on the probability of graduation, particularly for students whose prior achievement suggests that they are at the margin of dropping out (Falch, Lujala and Strøm, 2013[102]). Evidence from the United States confirms that the use of school buses is associated with reduced absenteeism among kindergarten students (Gottfried, 2017[101]). Likewise, in the United Kingdom, marginal students with middling achievement or from disadvantaged backgrounds were less likely to engage in post-compulsory academic education the longer they would have to commute to the nearest academic institution (Dickerson and McIntosh, 2013[103]).

When planning the closure of schools, education authorities therefore need to ensure that students will be provided with adequate arrangements for transport and take into account its direct cost on communities as well as the burden it may place on students, parents and staff. Nevertheless, the effects of increased travel times and the cost of transport services are often overlooked, both in the academic literature and in the assessments of consolidation plans (Ares Abalde, 2014[30]). Guaranteeing that consolidation plans are accompanied by provisions for school transport and that their costs are adequately accounted for is particularly challenging in systems where the responsibilities for public transport and the organisation of the school network are split between different authorities. Since the costs and savings of school closures may asymmetrically accrue to different levels of administration, it is important to ensure that the incentives for and against consolidation are aligned to promote aggregate resource efficiency and the best interests of students.

Several education systems are supporting school transport, either through their main funding mechanisms or through special-purpose funds targeting individual students and families. The legal frameworks specifying who is responsible for organising and financing school transport and who is eligible to benefit from it vary considerably across the countries that took part in the OECD review's qualitative survey on school funding. While many systems provide free transport services for students with specific characteristics or living in a specific area, others combine it with universal discounts on the price of public transport. In Chile, for example, all students attending Years 5 to 12 in a municipal or subsidised private school are eligible for reduced public transport fares and those attending municipal schools in remote areas benefit from free transport services by the central government from the pre-primary to the secondary level (Ministry of Education Agency for Quality Education and Education Superintendence, 2016[104]).

The success of consolidation initiatives critically depends on ensuring students' continued access to education and the use of transparent, adequate criteria to determine their eligibility for transport support. 10 of the 14 school systems with available information reported to use distance-based criteria to determine which students should benefit from school transport. In four of those cases, legal frameworks specified a distance between student's homes and their school above which such support would be provided. In Lithuania, for example, the ministry has committed to guarantee safe transport for every child living in a village that is further than 3 km from the nearest school, as well as every child with special educational needs, who has difficulties getting to school. Between 2000 and 2014, the country has therefore made significant investments to purchase a fleet of almost 700 municipal school buses. With support from EU Structural Funds, this investment has greatly eased students' transitions to new schools during the consolidation of the school network and improved young people's access to extracurricular activities (Shewbridge et al., 2016, p. 61[105]). Similarly, in Sweden, municipalities are responsible

for covering the costs of transport for upper secondary students who are enrolled in schools further than 6 km from their place of residence (see Annex Table 3.A.1).

When determining students' eligibility for public transport, countries may take into account additional factors besides their distance to the nearest school, such as their age or safety concerns. In Slovenia, municipalities are obliged to organise safe transport for students in areas where they might be subject to attacks from brown bears and other wild animals, using funding from the central government (Slovenian Ministry of Education Science and Sport, 2016, p. 78[106]). Danish municipalities cover students' transport cost on a sliding scale based on their age, acknowledging that older children can travel certain distances independently. Specifically, municipalities are obliged to cover transport costs for students living more than 2.5 km away from their *Folkeskole* in pre-school and Years 1-3. For Years 4-6 it is 6 km, for Years 7-9 it is 7 km, and for Year 10 it is a distance of more than 9 km (Nusche et al., 2016, p. 75[72]). Especially in systems with extensive school choice, the provision of free transport may also be restricted to students taking advantage of local schools or those of a certain provider. In Denmark, for example, parents who choose to enrol their children in private schools are not eligible for free transport (Nusche et al., 2016, p. 75[72]) and in Austria, transport funding for students who choose to attend schools far from their place of residence is means-tested and conditional on academic success (see Annex Table 3.A.1).

Ensuring the availability of transport options for vulnerable students and those with restricted mobility is of particular importance and seven of the fifteen OECD review countries with available information acknowledge this with dedicated arrangements for students with special educational need. In Estonia, SEN students who require assistance and need to attend schools in a different municipality have a right to adequate transport arrangements or to be compensated for private expenses by their home municipality (Ministry of Education and Research, 2015[107]). In the Flemish Community of Belgium, all children attending special needs education have the right to bus transport organised and funded by the Community (Flemish Ministry of Education and Training, 2015[70]). In Spain, the central government provides targeted funding for families, covering up to 50% of the transport costs of students with severe motor disabilities (INEE, 2016, p. 97[108]).

Even though the excessive use of targeted funding programmes based on different characteristics can create a significant administrative burden (OECD, 2017[27]), providing clear criteria for the funding of school transport is an effective means to support students in remote areas and ameliorate the negative impacts of school consolidation. The selection and operationalisation of these eligibility criteria merits careful attention to avoid perverse incentives, inequities or the misallocation of funds. In the Slovak Republic, for example, parents are only reimbursed for transport costs if their children's school is located outside their home municipality. In practice, however, schools in neighbouring municipalities can be considerably closed to students' homes than the nearest school within their own municipality (Santiago et al., 2016, p. 140[4]).

The governance of school transport and the distribution of responsibilities for its funding and management are a critical factor to ensure its seamless provision. In countries like Denmark, Iceland and Kazakhstan, local authorities are responsible for both financing and organising children's transport to schools (Annex Table 3.A.1). This decentralised approach can have several advantages, particularly where local authorities are also responsible for managing their school networks. Combining the responsibility for school closures with that for the provision of student transport enables the responsible authority

to oversee the entire process of consolidation and take its financial merits and drawbacks into account in their entirety. Assigning the funding responsibility for student transport to whichever authority is in charge of consolidation can also increase their accountability and sensitivity to the affected students' needs. Yet, the ability of local authorities to effectively provide remedial transport services depends on their capacity and the size of their school network. Particularly where local authorities are responsible for only one or very few schools, the prospect of covering transport costs for its students when they are absorbed by neighbouring municipalities may significantly reduce their incentives to engage in further consolidation, even where it is otherwise financially prudent and in the students' best educational interest. In other education systems, responsibilities for the funding and organisation of student transport are retained at the central or regional level. In the French Community of Belgium, for example, student transport is managed and funded by the regions (Wallonia and Brussels), although provincial governments can provide affected students with additional funding (International Relations Directorate of the Federation Wallonia-Brussels, 2016[109]). In education systems like Chile, the Flemish Community of Belgium or Lithuania, the central (or state) government is at least partially responsible for both funding and managing student transport in isolated and rural areas (Annex Table 3.A.1).

The absence of legal frameworks that assign clear responsibilities for the provision of school transport can make it difficult for authorities to assess the feasibility of future consolidation plans and anticipate problems that may arise from increasing distances to schools. Without transport-related legal provisions and efforts to systematically collect and analyse corresponding data, problems arising from consolidation risk to remain hidden from local and national authorities' view (Shewbridge et al., 2016, p. 113 f.[66]). Likewise, the absence of financial support for student transport places a burden on families in rural areas who lack the time or resources to drive their young children to school. In the Czech Republic, for example, regions are responsible for ensuring that transport to compulsory schools is offered for students living further than 4 km away, but families are expected to contribute to these services, even where public transport is not available. Especially in a context of shrinking student populations in rural areas and efforts to consolidate the school network, this may place an additional burden on parents affected by closures and increased commuting distances.

Setting up a system for student transport and providing targeted support can play an important role in preparing the ground for future network consolidation by incentivising rural students' voluntary transfer to urban schools or responding to parents' concerns about potential school network reforms. In an effort to consolidate its upper secondary school network, for example, the Estonian government encouraged students to attend newly constructed, state-run gymnasia by providing commuting students with financial support for transport and accommodation expenses (Santiago et al., 2016, p. 19[25]).

Given the significant cost associated with the provision of transport, requiring schools to offer bussing services to their students can create a high barrier to entry for new providers, particularly those intending to serve students in areas with long average commuting distances. Yet, absolving certain providers from the responsibility to provide school transport can have unintended consequences that need to be carefully considered before loosening regulations. In the United States, for example, court decisions in many states and school districts granted charter schools and private providers exceptions from the responsibility to provide their students with transport services. Given that many charter schools serve disadvantaged families in high-needs areas, this has raised serious

concerns about a potential rise in absenteeism, dropouts and ultimately widening social and regional disparities (Gottfried, 2017[101]).

In some countries, such as Australia, boarding facilities are used to complement rural school networks at the upper secondary level in cases where students' distance to the nearest school is too far for a daily commute (Martin et al., 2014[110]). Despite the significant variation in boarding schools' missions and students' motivations for attending them, the educational experience of boarders differs markedly from students living at home. Boarding students spend considerably more time in the school environment and among school staff, they have different opportunities for growth and development, and often follow highly regulated daily routines. While boarding may remove some students from a supportive home and family, it provides a more stable environment for others.

A large-scale study from Australia found boarding to have little discernible effects on students' motivation, engagement, and psychological well-being (Martin et al., 2014[110]). By contrast, quasi-experimental evidence from one of France's 45 "boarding schools of excellence" (*internats d'excellence*), which provided disadvantaged students with high-quality learning environments, points to disruptive effects during the first two years of boarding school attendance and suggests that mostly high-ability students benefited from the boarding environment in the long run (Behaghel, de Chaisemartin and Gurgand, 2017[111]). Empirical research on boarding schools specifically addressing the needs of rural and remote areas is scarce, but considering some students' reliance on their services to access secondary schools, it is important to establish standards and guidelines ensuring the quality of their provision, including pastoral and academic care, facilities and resources, the provision of extracurricular activities, staff training and qualifications, and boarding students' rights and responsibilities.

Concerns for local development

School closures may have short- and longer-term ramifications for the local community and neighbouring areas that need to be considered. One of the reasons why consolidation is frequently met with local resistance is the detrimental effect it is believed to have, not only on the affected students, but also on the surrounding neighbourhood and community. It has been hypothesised to accelerate the out-migration of young families and the associated loss of economically active adults, hit the local economy, lower housing values and deprive the community of a social hub that may be constitutive of its identity and civic life. The savings stemming from school consolidation could thereby be outweighed by reduced economic activity, lower tax revenue and declining property values (Lyson, 2002[112]). The likelihood for any of these negative effects to materialise depends on the characteristics of the consolidating communities and the status of the school within it.

Particularly in rural areas, the role of schools for the local community often extends beyond the field of education. In a recent review of the literature, Areas Abalde (2014) identifies three types of such positive externalities: effects on social capital, effects through the provision of community services and effects on the local economy. Rural schools often provide a space for interactions that foster social capital and cohesion if the village community is actively involved in the school's activities. Forging bonds and fostering exchange among residents can lead to increased co-operation for the mutual benefit of community members. In addition, schools may benefit their local community directly by providing additional social services in their facilities. These can be related to education (e.g. day care services or study centres for young people and adults) or address

other community needs, for example by serving as polling stations, information centres for municipal services, spaces for local cultural activities or work places for very small businesses. In addition, schools can be an important source of local employment and provide skilled labour to local businesses (Ares Abalde, 2014[30]).

In retrospective case studies of 30 Danish school closures between 1990 and 1999, Egelund and Laustsen (2006[20]) found little evidence of the negative consequences that many communities had expected. In most cases, the closure of schools with an average of 6.6 students appeared to be symptomatic of the rural communities' decline, rather than its cause. While schools undoubtedly serve important non-educational functions in many communities, the viability of providing high-quality education in depopulated rural areas needs to be considered within the wider context of regional economic development and efforts to enhance the conditions of local communities. While it may be possible to maintain the educational provision in areas with very low student numbers, it should be acknowledged that sustaining communities in the process of economic and demographic decline is neither the responsibility, nor within the power of local schools alone.

Decisions on the future of individual small, rural schools should be primarily based on what is in the best interest of their students, rather than their exogenous value for local and regional development. Authorities therefore need to think of alternative ways to sustain the social benefits that schools provide where consolidation is seen as pedagogically prudent or economically unavoidable. This can involve supporting local institutions in taking over the schools' function as a social hub, but needs to be embedded in a broader reflection on economic strategies and funding solutions to support rural development beyond the field of education.

3.4. Addressing efficiency, quality and equity challenges in remote rural schools

As discussed above, the problems associated with small school size are, in many rural and remote areas, compounded by the schools' geographic isolation and inadequate learning infrastructures. Especially in remote areas, the scope for strategies to rationalise the school network by means of fostering school co-operation, clusters or consolidation is limited due to the great distance between sites. In order to ensure that students in these areas enjoy a high-quality education nevertheless, systems can employ a range of strategies to address the challenges of remote schools while leaving the structure of the school network intact.

Since it is widely recognised that the provision of high-quality education in rural areas comes at a higher per-student cost, some countries provide dedicated funding to compensate for the greater resource needs of small, isolated schools and their difficulty to recruit high-quality teachers. In addition, targeted programmes have been used to finance teacher learning and collaboration across isolated schools and improve transport arrangements where distance constitutes a significant barrier for attendance. Denmark, for example, recently increased its financial support for small island schools in order to secure the provision of a high-quality basic school offer in remote areas. Chile also dedicates additional resources for rural and remote schools to address their challenges related to inadequate infrastructure and access, as described in Box 3.7.

Box 3.7. Technical and financial support for rural and remote schools in Chile

The school funding system of Chile includes various supplementary grants to address the needs of schools in rural and remote areas, for example through programmes that promote school enrolment and attendance. Scholarships (*Becas de integración territorial*) are offered to students finishing their basic education so they can continue into upper secondary education and housing and transport programmes support students in remote areas. Chile has also put in place some steps to improve the quality of education in rural and remote areas by improving teachers' working conditions and opportunities for collaboration. There is a monetary incentive to attract teachers and school leaders to remote areas through the "difficult conditions of work allowance" (*Asignación por desempeño en condiciones difíciles*) and teachers taking on the management of a rural school are compensated with a special allowance (*Bonificación especial de profesores encargados de escuelas rurales*). In addition, the "Rural Connections" (*Enlaces Rural*) programme was introduced in 2000 to provide rural schools with technological infrastructure including internet access as well as teaching materials adapted for multi-grade settings.

Source: Santiago, P. et al. (2017), *OECD Reviews of School Resources: Chile 2017,* OECD Publishing, Paris, pp. 94, 101, http://dx.doi.org/10.1787/9789264285637-en.

ICT can support the provision of education in rural areas

Besides long-term rural development strategies and targeted financial support, many communities have turned to ICT as an opportunity to overcome some of the disadvantages associated with their small size and geographic isolation (OECD, 2013, p. 26[113]). Distance education in the form of correspondence courses, videoconferencing, educational television and audio has a long tradition. These and other forms of ICT-supported distance learning are widely employed to promote access to instruction at all levels of education in OECD countries with significant rural populations, including the United States (Hannum et al., 2009[114]), Canada and Australia (Barbour, 2011[115]). Adapted to local needs, different levels of education as well as the availability of technological resources and qualified staff, distance learning can connect teachers and students in one-way or two-way interactions based on real-time or asynchronous communication. The use of ICT has ranged from fully-remote distance learning to web-based lessons in the presence of teachers facilitating the process.

Despite the prevalence of distance education, relatively little is known about its cost-effectiveness in general and in rural schools in particular. Meta-analyses comparing distance education with traditional classroom instruction yielded no overall differences but a high degree of variability in its effects on student attainment, attitudes and retention (Bernard et al., 2004[116]). Experts have therefore underlined the importance of the methods used for ICT-based instruction and the extent to which teachers and schools are supported in applying these techniques effectively. Since distance learning enables rural schools to expand their curriculum and course offer, a central question becomes how to select distance courses, effectively schedule them and design their delivery in a way that benefits all students.

One of the challenges commonly associated with distance learning is that its pedagogical benefits strongly depend on students' level of motivation and independence. For distance

learning to be effective for all participating students, it has therefore been recommended that students should be supported when necessary, for example through school-based facilitators that act as intermediaries between students and web-based teachers. Likewise, distance learning relies on the availability of adapted teaching materials and programmes have tended to be more effective where schools appoint a contact person to assist teachers with the use and maintenance of technology (Ares Abalde, 2014[30]). The effective introduction of distance and technology-aided learning therefore requires serious preparation, including the development and provision of appropriate learning materials and training for teachers in rural schools (OECD/The World Bank, 2015, p. 123[75]). The few empirical studies that consider the cost of distance education point to the significant initial investments required for its implementation as well as the recurring expenditure on maintaining and replacing its technological devices (Sipple and Brent, 2015[42]).

Beyond instruction in the classroom, ICT can also be used to facilitate the professional development of teachers in remote areas, improve their access to learning materials and reduce their professional isolation. According to a recent literature review by Ares Abalde (2014[30]), primary and secondary school teachers in remote Australian schools showed a greater need for professional development, and video conferencing or web-based systems were cost-effective and convenient ways to provide them with in-service education. Particularly in geographically isolated schools, where teachers lack opportunities for face-to-face interaction with their peers, ICT also provides a tool for peer learning and discussions on how to address common challenges they may face. Similar approaches could be used to establish mentoring relationships between teacher students and professionals in remote schools, since the challenges of teaching in small remote schools may not be sufficiently addressed in pre-service teacher training (Ares Abalde, 2014, p. 32[30]).

While urban areas still enjoy a better coverage of modern communication technologies than rural areas, the gap has narrowed considerable in the last few decades across OECD countries (OECD, 2010[62]). This includes access to broadband internet for bandwidth-intensive activities like videoconferencing, access to technical assistance and maintenance as well as the availability of professional development for the integration of technology (Centre for Education Statistics and Evaluation, 2013[24]; Commission on the Delivery of Rural Education, 2013[88]). In some countries, rural and remote regions still have limited access to broadband internet and the cost of infrastructural investments and qualified personnel can be an obstacle to both distance learning and remote teacher training (Ares Abalde, 2014, p. 32[30]). Yet, PISA data collected from school principals in 2012 indicates that – with the exception of Mexico – most rural schools in OECD countries have computers with internet connections that can be used for educational purposes and few countries exhibit a significant rural/urban divide in school connectivity. In partner countries such as Colombia, Indonesia and Peru, by contrast, more than one in four students in rural areas and small towns did not have access to the internet through school computers, compared to fewer than one in ten students attending urban schools (OECD, 2015, pp. 132, Table 5.9a[117]). On the other hand, PISA data also shows that several OECD partner countries, including Albania, Indonesia and Uruguay, made significant progress in closing the rural/urban connectivity gap between 2009 and 2012 (OECD, 2015, pp. 132, Table 5.9c[117]).

The "Rural Connections" (*Enlaces Rural*) programme in Chile and e-resource projects in Ontario (Canada) provide recent examples of technological innovations alleviating disadvantages associated with the limited resources of remote schools (see Box 3.8). In Italy, the National Institute for Documentation, Innovation and Educational Research

(INDIRE) has supported the creation of a national network of small rural schools (*Piccole Scuole*) that uses technology to link classes with few students across different sites, while taking the widespread practice of multi-grade teaching and the community role of small schools into account. Uruguay's Ceibal Plan is another ambitious initiative aimed at expanding the availability and use of ICT across the country (Santiago et al., 2016[46]).

Box 3.8. Using ICT to enhance students' access to learning resources in rural school networks

Uruguay: Expanding the use of digital material and ICT equipment through the Ceibal Plan

The "Ceibal Plan" is a major initiative in Uruguay that started in 2007 and aims to bring internet access and modern information technology to schools, promote digital literacy and expand the use of ICT in the learning process. Its main component has been the free distribution of laptops to students and teachers of public schools (at the primary and lower secondary levels). In addition, tablets with education content were distributed to pre-primary and Year 1 students as well as teachers as part of a pilot initiative in 2013.

The Ceibal Plan also involves a variety of programmes to support students and teachers, which includes training support teachers for the implementation of the Plan (Ceibal teachers, deployed to individual schools), internet platforms with educational content, the Ceibal library, the Ceibal English programme (videoconferencing classes for students in Years 4, 5 and 6) and the "Aprender Tod@s" programme, which promotes digital inclusion through school projects. In addition, the Ceibal Plan allows online formative assessments to be organised nationwide (in Years 3 to 6). The Ceibal initiative is administered by an autonomous organisation (the Ceibal Centre) and targeted at public schools, although private schools can participate on the basis of individual agreements (INEEd, 2015[118]).

While evaluations of the programme indicate that the use of ICT in schools and classrooms is appreciated by families and the community, they also raise concerns that ICT is typically not used in innovative and effective ways to improve learning, and that school principals and teachers need further training to integrate ICT in the teaching and learning process. Similar concerns have been raised concerning the effective use of ICT in general and technical-professional secondary education. Nevertheless, the introduction of ICT in primary education has enabled schools to participate in regional or national courses and meetings through videoconferencing and has somewhat eased the administrative tasks of school leaders (e.g. through the Unified Management of Records and Information, GURI) (INEEd, 2015[118]).

Chile: Providing digital teaching material and internet connectivity to rural schools through the "Rural Connections" programme

The "Rural Connections" (*Enlaces Rural*) programme was first introduced in 2000 to improve the quality of education in rural areas through technological infrastructure and teaching materials adapted for multi-grade settings. In 2013, the programme also provided digital teaching material internet connections to several rural schools (MINEDUC, ACE and ES, forthcoming). In 2014, a complementary program, Integrating Rurality (Integrando la Ruralidad), was implemented in 2 043 schools with limited internet access to provide them with offline digital resources.

Ontario (Canada): Blended learning and other ICT-supported strategies to widen access to teaching and care services

E-learning resources in Ontario include a virtual learning environment and a digital library of materials relevant to the Ontario curriculum. Students can use these to take courses fully online or to benefit from blended learning, which allows them to access resources during and outside school hours to supplement face-to-face lessons. In both approaches, the password-protected virtual learning environment provides a suite of tools allowing students to communicate and interact with their teacher and classmates. In rural and remote areas, better broadband connection is key to making e-learning a real option. The Ontario 2016 Budget committed to promoting equitable and affordable access to high-speed broadband services in Ontario's schools to support e-learning, but also the delivery of mental health and well-being services. An example is Ontario's Tele-Mental Health Service, which provides children and youth in rural, remote and underserved communities with access to specialized mental health consultations through videoconferencing. The Upper Canada District School Board in Eastern Ontario, one of the largest English public school boards by geographical area in the province, is making e-learning more widely available to ensure all students can access the courses they need to complete their secondary school diploma. The school board is diligently working to build capacity among e-learning teachers to ensure they understand and apply the most effective teaching techniques. This effort aligns with the school board's strategic plan and the declining enrolment that has led to discussions of closure and consolidation (Ontario Ministry of Education, 2017[119]).

Sources: Santiago, P. et al. (2016), *OECD Reviews of School Resources: Uruguay 2016*, OECD Publishing, Paris, http://doi.org/10.1787/9789264265530-en; Santiago, P. et al. (2017), *OECD Reviews of School Resources: Chile 2017*, OECD Publishing, Paris, p. 94, http://dx.doi.org/10.1787/9789264285637-en; Ontario Ministry of Education (2017), *Supporting Students and Communities: A Discussion Paper to Strengthen Education in Ontario's Rural and Remote Communities*.

Leveraging community links and support from local stakeholders

Many rural schools are embedded in tight-knit communities, which consider them central to their social life and cohesion (Kalaoja and Pietarinen, 2009[120]). This can generate a high level of parental involvement that some schools have successfully leveraged to ameliorate the challenges described above, even though these favourable conditions are not given in all rural settings. Earlier studies of rural education in the United States found that rural parents were *less* likely to be involved in school meetings or interact with teachers but attended more school events (Prater, Bermudez and Owens, 1997[121]), while more recent studies observed that rural parents more frequently volunteer and participate in school activities than their urban counterparts (Provasnik et al., 2007[122]). The latter is corroborated by evidence from the nine countries that distributed the PISA 2015 parent questionnaire. On average, across these nine countries, parents in rural schools reported to participate more in school activities, such as discussing their children's progress, volunteering, attending conferences and participating in the school government, than parents in urban schools[3]. Likewise, across the OECD countries participating in TALIS 2013, rural teachers were more likely to report a high level of co-operation between their school and the local community[4].

To ensure the continued operation of small remote schools or ease their financial burden, local authorities in some countries have encouraged voluntary parental contributions and help from other community partners to sustain school facilities. In Scotland, for example, a recent commission on educational provision in rural areas found many examples of parent groups and voluntary organisations carrying out minor classroom improvements, maintenance works and tasks like snow clearance. In some cases, parental and community involvement has even been a mandatory condition for decentralisation initiatives, since it was seen as an effective and inexpensive way to enhance schools' capacity and educational quality (Gertler, Patrinos and Rubio-Codina, 2012, p. 78[123]). While this form of community involvement usually does not cover a significant share of the schools' overall maintenance requirements, the use of local contractors or community members can strengthen the school's social ties and often comes at no cost or a lower price than conventional approaches (Commission on the Delivery of Rural Education, 2013, pp. 37, 49[88]).

Nevertheless, the extent to which local actors are willing and capable of contributing to their local schools' operation varies and there is evidence to suggest that participatory schemes are least effective in the poor communities with low human capital that may rely on this support the most (Gertler, Patrinos and Rubio-Codina, 2012, p. 78[123]). It is also important for community involvement to be carefully monitored so as to ensure that procurement, health and safety and building regulations are adhered to and the most effective use is made of public money. Yet, overly rigid regulations of volunteer or community involvement and a lack of transparency can create uncertainties and barriers that reduce the ability of rural schools to draw on local actors' support. In the Scottish case, for example, local authorities' approaches to procurement legislation, health and safety regulations varied widely, which often prevents school staff and parents from pursuing small actions to improve their schools. A commission therefore suggested adopting a more uniform and constructive approach that encourages schools to leverage their community links (Commission on the Delivery of Rural Education, 2013[88]). The Polish "Small School" (*Mała szkoła*) programme described in Box 3.9 is another example of selective deregulation enabling a greater involvement of volunteers in running schools that might otherwise be forced to close (OECD/The World Bank, 2015, p. 124 f.[75]).

Box 3.9. Enabling parental school governance in Poland

In order to facilitate the continued operation of small rural schools that might otherwise face closure due to financial pressures, the Polish government introduced the "Small School" (*Mała szkoła*) programme, which waives certain regulations and norms for parental associations taking on the governance of rural schools. The list of these lifted norms and what should replace them is clearly stipulated in education laws. Among these lifted norms are the requirements to employ cleaners or separate kitchen staff. Instead, the programme allows for these functions to be performed by parents on a voluntary basis, which significantly reduces the per-student costs. In addition, the voluntary engagement of parents has the potential to foster informal ties and improve the relationship between the school and the community.

Schools that participate in the Small School programme are entitled to receive funding from their local government. Due to the significant savings that participation in the programme generates, the maintenance costs of participating schools tends to be

substantially reduced, which gives local governments an incentive to encourage parental and community involvement. In practice, if a village community considers their school to be an important asset for their future, they can organise themselves and take over the management of the school. In doing so, they will often benefit from the direct support of their local government, for example by letting its lawyers help parents in establishing their association, adopting its statutes in conformity to the laws and finally registering it.

Source: OECD/The World Bank (2015), *OECD Reviews of School Resources: Kazakhstan 2015*, OECD Publishing, Paris, http://doi.org/10.1787/9789264245891-en.

Considering the role of rural schools in the context of regional economic developments

It is clear from the discussion above that not all of the problems experienced by small, isolated schools can be addressed without considering the wider context of regional development, the promotion of economic opportunity, local agency, and community sustainability in some rural areas. Declining student populations and the difficulty to attract qualified teachers in rural areas are at least in part a symptom and result of their more general economic decline. In addition, many rural communities grapple with the challenge to contain brain drain towards urban areas and the concern that local policies aimed at generating human capital spillovers might be undermined by students' increased mobility upon graduation (Carr and Kefalas, 2009[124]). This leads to a paradoxical condition in which a municipality's effort to foster educational success may accelerate its decline, even though this may be less of a concern if the skills promoted are specific to a local industry (Neumark and Simpson, 2015, p. 1209[126]).

Perceptions of local economic opportunities play an important role in shaping the aspirations of rural youth and their decisions to leave or come back after attaining higher levels of education (Petrin, Schafft and Meece, 2014[125]). It is therefore clear that ensuring thriving and sustainable rural communities lies beyond the power of educational policies and schools alone, but requires a broader strategy to foster rural development. At the same time, regional economic development initiatives should acknowledge that improving the quality of rural education, particularly vocational programmes, can in some cases play a role in revitalising economic activity (OECD, 2008, p. 229[127]). Schools can, for instance, integrate academic and vocational education through collaborations with local businesses, job shadowing, or school-to-work programmes. "Farm-to-school" programmes are another example of schools purposefully contributing to the development of rural communities by entering purchasing agreements between school meal operations and local producers, the cultivation of school gardens, and farm field trips (Schafft, 2016[128]). Involving local educators and schools in the formulation of rural economic development plans and acknowledging the reciprocity between high-quality education and regional development can therefore be an important step towards improving the conditions for education in rural and remote areas.

3.5. Challenges and opportunities for the efficient and equitable provision of education in urban areas

Around half of the population in the OECD area and 60% of its gross domestic product (GDP) are concentrated in cities (OECD, 2016[129]). Urban areas are therefore rightly recognised as engines of national prosperity. Yet, cities also exhibit higher levels of

inequality than rural communities, which raises the question of how to ensure that the benefits of their growth extend to all urban residents and beyond. In addition, the rapid growth of metropolitan areas and rising demand for school places exerts pressure on urban school networks to expand their provision.

Pressing demand and fluctuating enrolment create capacity challenges in some cities

Effectively meeting the rising demand for school places in high-density areas with limited space is a major challenge for the organisation of urban school networks. Many OECD review countries witness rising enrolment in urban schools due to inward migration and increased housing density. Policy changes that require additional capacity can compound the infrastructural pressures generated by demographic shifts. In Austria, for example, the expansion of all-day schooling has seen schools in cities like Vienna struggling to find sufficient space for the play areas, cooking facilities and teacher workplaces required for longer school days (Nusche et al., 2016, p. 144[16]). The pressure on urban school networks to build or upgrade facilities can also intensify competition for limited infrastructure budgets and often leads to long queues and delays in construction projects.

Rapid urban growth and housing developments go hand in hand with increased educational demand. Following large-scale residential constructions, the number of school-age children commonly rises sharply and peaks after a few years before slowly subsiding again and stabilising, which may take multiple decades. Experience shows that this subsequent drop in student numbers can represents up to a 50% decrease compared to the peak population, which makes it difficult to find efficient responses to rising student demand. If local authorities were to meet the increase in student numbers by constructing sufficient new school buildings to accommodate the peak enrolment, a subsequent drop in enrolment can render them obsolete long before their investment has paid off. To avoid this "overbuilding", some have suggested responding to temporary increases in enrolment by using existing facilities more intensively, implementing extended school years and double shifts, or complementing permanent school buildings with temporary facilities (Bray, 2008[130]).

The expansion of urban populations, changing patterns of migration and residential mobility can lead to cyclical and unexpected fluctuations in the student population both between and within school years. The difficulty of predicting cohort sizes in areas with fluctuating student populations requires schools to be highly effective in planning the organisation of their classes and associated teaching needs while educational authorities need to support them in the face of changing enrolment patterns throughout the school year. At times, the need to quickly and efficiently create school places has led providers to turn to temporary and provisional solutions, such as prefabricated classrooms. Ensuring that these approaches to capacity expansion fulfil health and safety standards, provide a high-quality learning environment, and cater to diverse educational needs is another key challenge in the organisation of urban school networks.

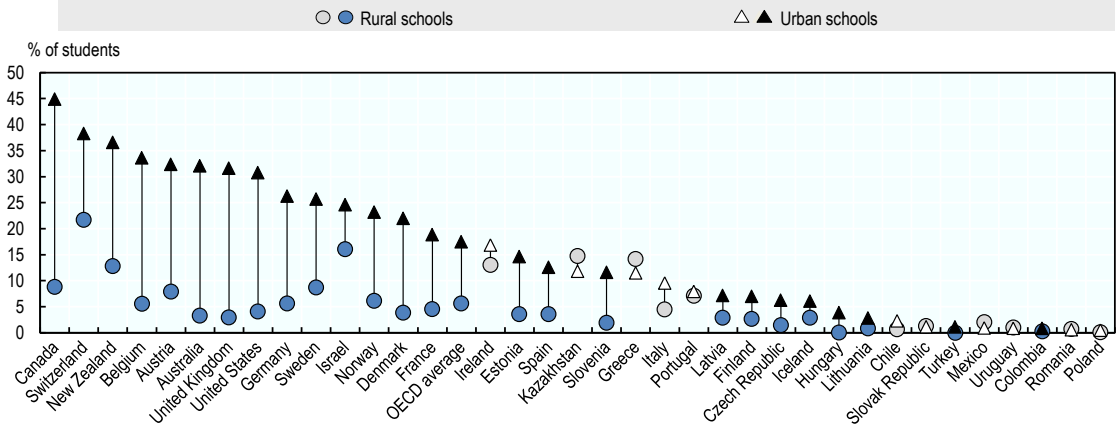
Although not limited to cities, the intensified influx of migrants and refugees in multiple European countries during the years following 2015 has aggravated the capacity shortages of some urban school networks. The Flemish Community of Belgium, for example, is committed to ensuring that every immigrant between the ages of 2.5 and 18 is integrated in a school within 60 days of their arrival and similar measures exist for higher education, language and professional training for adults. Most OECD systems strive to ensure access to all levels of compulsory education, often supported by targeted funding

channelled from the national level (OECD, 2018, p. 177[131]). Since many European countries use dispersal mechanisms to steer the distribution of asylum seekers, they tend to be more evenly distributed across urban and rural areas than other migrants (OECD, 2018[131]). Nevertheless, a significant share of them chooses to leave their initially assigned place of residence and resettle to larger cities. Urban schools may have more experience in the integration of migrant students than rural ones but also tend to have less capacity to support them. Altogether, in light of these demographic challenges, scarce facilities and a context of increasing fiscal pressure, authorities developing urban school networks need to be highly strategic, analyse short- and long-term trends in educational demand and carefully assess the viability of temporary responses to its fluctuations.

A highly diverse student population

Cities exhibit a higher cultural and ethnic diversity than rural communities, partly because recently arrived migrants seek to benefit from the job opportunities and social networks that more densely populated urban areas provide. PISA 2015 data confirms that, in almost every OECD country, the share of students with an immigrant background (i.e. those with foreign-born parents) is higher in urban schools than in rural schools, particularly so in the countries with larger shares of immigrants overall (see Figure 3.6). In Canada, for instance, about 45% of students in urban schools have an immigrant background, compared to just 9% in rural schools. Similarly pronounced rural-urban differences exceeding 20 percentage points can be observed in Australia, Austria, Belgium, Germany, New Zealand, the United Kingdom and the United States.

Figure 3.6. Share of students with an immigration background by school location, 2015



Note: Statistically significant differences are marked in a darker tone. Rural schools are those located in rural areas or villages with fewer than 3 000 inhabitants, urban schools are located in cities with 100 000 inhabitants or more.
Source: OECD (2015), PISA 2015 Database, www.oecd.org/pisa/data/2015database/.

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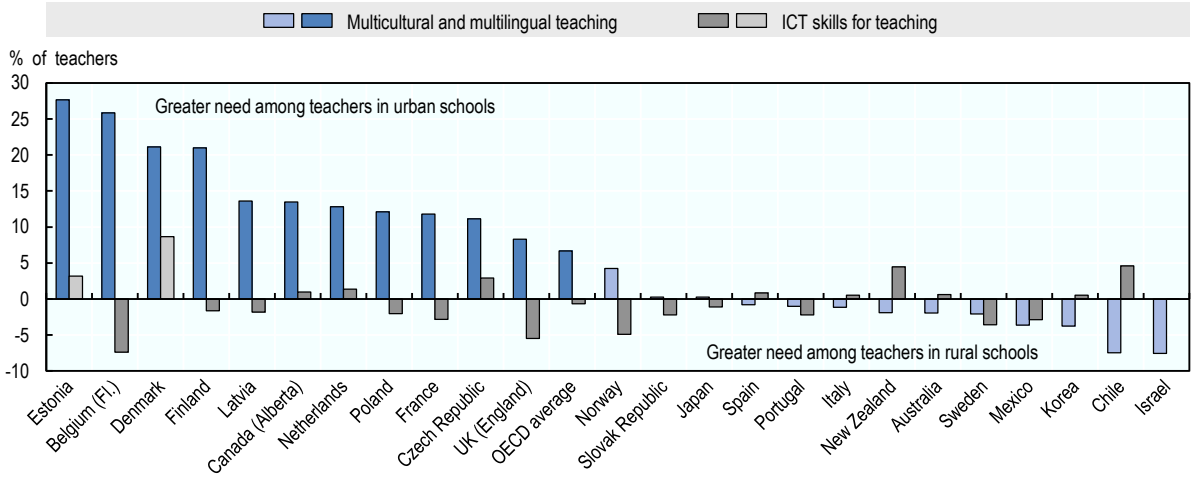
Teaching a multicultural and multilingual student body requires specific training and skills, which need to be reflected both in the initial teacher training and schools' hiring practices. In at least half of the OECD countries participating in TALIS 2013, urban teachers reported a greater need for professional development in multicultural and

multilingual teaching than their rural colleagues (Figure 3.7). Some urban schools are also called upon to co-ordinate social services provided by a range of providers to accommodate students with limited or interrupted formal education or those suffering from post-traumatic stress disorder (PTSD). In areas with high levels of residential mobility and student fluctuation. In addition, schools and teachers need to navigate uncertain cohort sizes and may have less time to establish rapport in the classroom due to a large number of students arriving and enrolling half-way through the school year. These difficulties are compounded if arriving students require specific support to overcome language barriers and socio-economic disadvantages or spent considerable time out of school.

Figure 3.7. Professional development needs of urban and rural teachers, 2013

Difference in the percentage of teachers reporting at least some need for professional development



Note: Statistically significant differences are marked in a darker tone. Rural schools are those located in rural areas or villages with fewer than 3 000 inhabitants, urban schools are located in cities with 100 000 inhabitants or more.
Source: OECD (2013), TALIS 2013 Database, http://stats.oecd.org/Index.aspx?datasetcode=talis_2013.

StatLink https://doi.org/10.1787/888933831336

Greater choice but also a high degree of social segregation and academic stratification

A high density of school providers and students can enable urban areas to provide their residents with a rich educational offer. Other than in sparsely populated rural areas, schools in cities also frequently compete with one another for enrolment, giving families a choice between multiple providers. Yet, a larger number of schools and diverse educational offer also entails the risks of stratification and segregation. Cities in many OECD review countries are not only characterised by a highly diverse population, but also by its uneven distribution. Residential segregation along socio-demographic lines combined with differential school choice behaviour often means that some students benefit less than others from the educational opportunities in urban school networks.

Students in cities benefit from a wider array of learning opportunities to match their interests and needs

The opportunity to learn and to follow their interests is a vital part of students' school experience. Particularly as they progress through secondary education, a broad offer of courses gives students the opportunity to explore and to specialise based on their interests and needs. Research suggests that taking additional courses is an important factor for students' achievement and their transition to further education (Lee et al., 1998[132]; Schneider, Swanson and Riegle-Crumb, 1998[133]; Wang and Goldschmidt, 2003[134]; Irvin et al., 2017[135]).

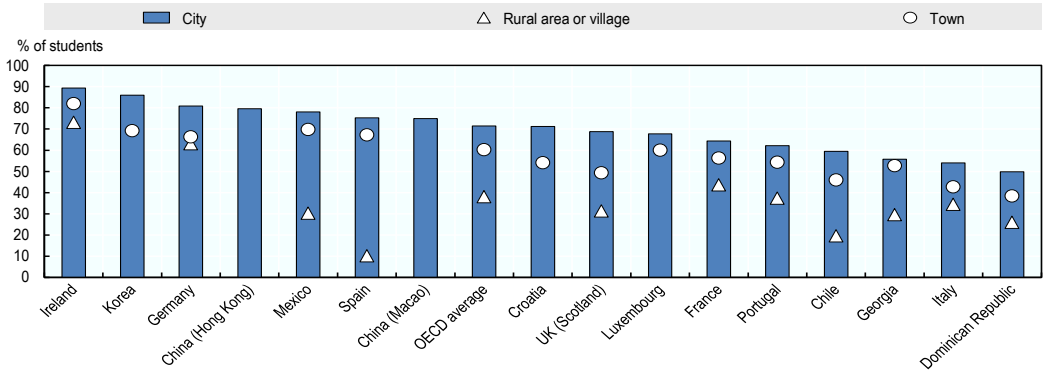
Compared to rural areas, urban school networks are usually able to offer a broader variety of course options and extracurricular activities due to the greater number of participating students and the availability of teachers with the requisite skills and expertise. However, not all students may take advantage of a larger curricular offer, the possibility to take higher level courses or participation in extracurricular activities and better performing students tend to benefit the most from them (Slate and Jones, 2005[136]; Leithwood and Jantzi, 2009[29]). This may be part of the explanation why, in most OECD countries, a large share of top performing science students in PISA 2015 is concentrated in urban schools[5]. This tendency is particularly pronounced in some of the Latin American countries taking part in PISA 2015, including Brazil, Colombia, Mexico and Uruguay while Belgium, the United Kingdom and the United States are notable exceptions.

Given the greater concentration of schools in urban areas, students and parents living in cities also stand to benefit most the choice between different providers according to their needs and preferences. While many school systems continue to assign students to their neighbourhood schools (particularly at the primary level), an increasing number of OECD countries have expanded parents' and students' rights to choose their school over the past decades (Heyneman, 2009[137]). In the United States, for example, school choice options for families have grown significantly since the 1990s. Families can choose among traditional public schools, charter schools, magnet schools, and out-of-district public schools in addition to religious and non-sectarian private schools (Butler et al., 2013[138]).

In all sixteen countries with available data that administered the PISA parent questionnaire, schools in cities are most likely to compete with one another for student enrolment (Figure 3.8). In Ireland, Korea and Germany, more than four in five parents in cities reported that their child's school competes with at least two others. On average across the OECD, students in cities are also more likely to attend a private school than their peers in towns or rural areas. In Chile, a country with a long history of school choice, and Spain, the share of students enrolled in a private school is around 50 percentage points higher in cities than in rural areas. Notable exceptions to this pattern include Slovenia, where private schools are more common in rural areas (OECD, 2016, pp. 458, Tables II.4.10 and 4.14[15]).

Figure 3.8. Degree of school competition by location, 2015

Percentage of students whose parents reported that their school is competing with two or more other schools for enrolment



Note: Rural areas or villages are defined as communities with fewer than 3 000 people, towns as those with 3 000 to 100 000 people, and cities as those with more than 100 000 people.
Source: Authors' analysis, OECD (2015), PISA 2015 Database, http://www.oecd.org/pisa/data/2015database.

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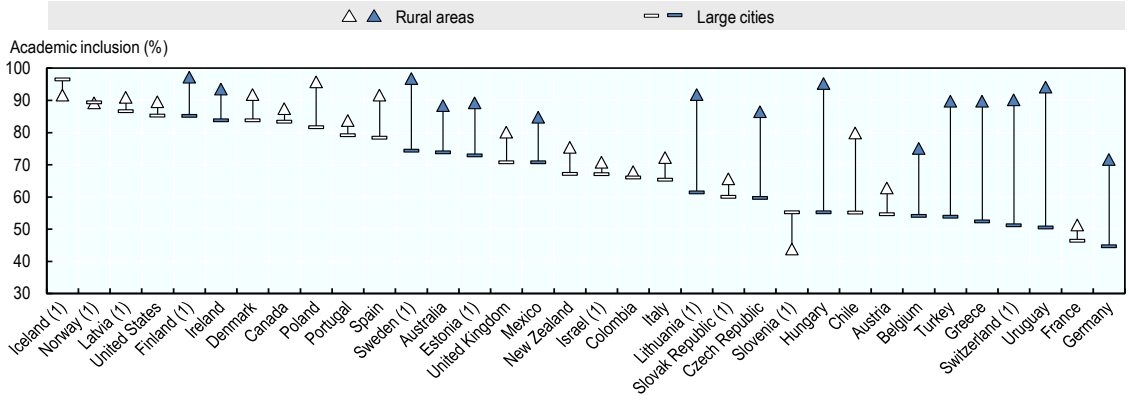
If families have adequate information and choose schools based on their educational quality, one would expect parental choice to incentivise schools to improve their performance and organise their offer in ways that better match students' interests and needs (Friedman, 1955[139]; Chubb and Moe, 1990[140]). Wößmann et al., (2007[141]), for example, find that in urban areas with more schools to choose from, students who are not restricted to attend their local school and who report that they attend their school because it is better than the available alternatives have higher achievement. However, various studies have questioned the validity of the assumptions underlying school choice, including parents' access to information about school quality (Schneider et al., 1998[142]; Berends and Zottola, 2009[143]; Lacireno-Paquet, 2012[144]) and there is evidence that some forms of school choice can lead to greater segregation between schools (Ladd, 2002[145]; Valenzuela, Bellei and Rios, 2014[146]).

Segregation can undermine the efficiency and equity objectives of school choice

The wider range of educational options available to students in urban areas also entails a greater risk of segregation. Data from PISA 2015 provides some insights into the extent of academic and socio-economic segregation in urban areas. Comparing schools in large cities (with over 1 000 000 people) with schools in villages, hamlets or rural areas (with fewer than 3 000 inhabitants), students in urban schools are both academically and socio-economically more segregated than those in rural schools. In 15 of the 34 OECD member states and review countries with available data, cities had significantly lower scores on the PISA index of academic inclusion than rural areas, which means that students with different academic abilities are less likely to attend the same schools (see Figure 3.9). The same is true of students from different socio-economic backgrounds in all but a few countries, as indicated by the OECD index of socio-economic inclusion. In 15 of the 35 OECD member states and review countries, students from different socio-economic backgrounds were significantly less likely to attend the same schools in urban compared to rural areas (see Figure 3.10).

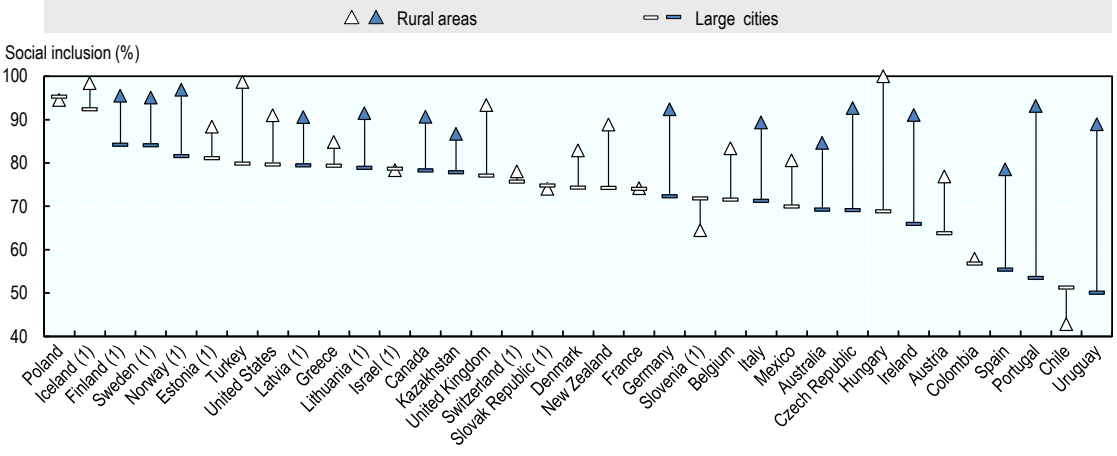
Figure 3.9. Academic inclusion across schools in science performance by location, 2015



Note: Statistically significant differences are marked in a darker tone. Academic inclusion refers to the extent to which students with different academic abilities attend the same schools. The index of academic inclusion is the ratio between the within-school variation in science performance and its overall variation at the system level (between and within schools). Rural areas are communities with fewer than 3 000 inhabitants, large cities are those with more than one million inhabitants.
1: The results are based on cities with between 100 000 and one million inhabitants.
Source: OECD (2015), PISA 2015 Database, www.oecd.org/pisa/data/2015database/.

StatLink https://doi.org/10.1787/888933831374

Figure 3.10. Social inclusion across schools by location, 2015



Note: Statistically significant differences are marked in a darker tone. Social inclusion refers to the extent to which students with different socio-economic status attend the same schools. The index of social inclusion is the ratio between the within-school variation of the PISA index of economic, social and cultural status (ESCS) and its overall variation at the system level (between and within schools). Rural areas are communities with fewer than 3 000 inhabitants, large cities are those with more than one million inhabitants.
1: The results are based on cities with between 100 000 and one million inhabitants.
Source: OECD (2015), PISA 2015 Database, www.oecd.org/pisa/data/2015database/.

StatLink https://doi.org/10.1787/888933831393

School segregation, to the extent that it results from direct or indirect exclusion, is considered an infringement of students' rights not to be discriminated against with respect to their educational opportunities (Council of Europe Commissioner for Human Rights, 2017[147]). Despite many countries' firm public stand and legislation against discrimination, the marginalisation of disadvantaged and vulnerable populations within school systems remains a concern, not least in light of the increased arrival of migrants and refugees across Europe. Despite positive examples of successful integration initiatives, many countries have yet to develop effective mechanisms to secure refugee children's right to benefit from mainstream education and enable schools to address the needs of recently arrived migrant students (OECD, 2018[131]). At the same time, marginalised communities and ethnic groups like Roma and traveller children continue to be seriously affected by segregation in some education systems where they are disproportionately confined to special needs classes or schools with an exceedingly high proportion of Roma students (Council of Europe Commissioner for Human Rights, 2017, p. 9[147]).

Besides the ethical case against marginalisation and exclusion, evidence suggests that a reduction in school segregation has the potential to benefit minority students and improve educational achievement in the aggregate (Hanushek, Kain and Rivkin, 2009[148]). While the confinement of disadvantaged students to low-quality schools from an early age has been shown to have severe long-term consequences for their educational achievement and life trajectory, segregation also deprives advantaged children of the opportunity to acquire important social and life skills through the interaction with children from different social, ethnic and cultural backgrounds or abilities (Council of Europe Commissioner for Human Rights, 2017, p. 13[147]). Across the systems participating in PISA, those with the highest index of social inclusion are also the ones that performed best in the mathematics test in the PISA 2012 survey (OECD, 2013[3]) – an effect that may reflect peer effects and the disproportionate benefits that accrue to disadvantaged students from interacting with high-achieving peers.

Although rising social heterogeneity at times has been argued to pose a threat to social cohesion (Putnam, 2007[149]), recent evidence points to segregation and the absence of positive inter-group contact as a key factor that mediates the relationship between diversity and generalised social trust, which is of ever greater importance in the face of increased migration flows and growing inequality (Uslaner, 2012[150]; Borgonovi and Pokropek, 2017[151]). From this perspective, living and learning in integrated, heterogeneous communities can give students the opportunity and confidence to interact with peers from different backgrounds and develop the global competences they need in an increasingly diverse and interdependent global economy (Asia Society/OECD, 2018[152]).

Segregation in public school systems can take many forms and arise due to different mechanisms. Some of them are based on decentralised household decisions, while others are based on deliberate educational policies, such as the tracking of students into separate schools. Most commonly, school sorting based on income and other student characteristics emerges from residential segregation or parents' decision to opt out of traditional public schools (Nechyba, 2006[153]). The dynamics that underlie social segregation are complex, hard to predict, and often self-perpetuating or subject to positive feedback (Schelling, 1971[154]). In public school systems, the effects of peer composition, household resources and other non-financial inputs can contribute to sorting and differences in school quality even where local school funding is equalised across jurisdictions. The subsequent effects of school quality on house prices can directly or

indirectly constrain disadvantaged families' choice of public schools, and cause persistent sorting patterns in equilibrium (Nechyba, 2006[153]). At the same time, families may avoid or seek to withdraw their children from schools with a rising proportion of disadvantaged and minority students. Since schools catering to a large number of disadvantaged and vulnerable students require more human and financial resources and strong leadership to maintain their quality, the onset of segregation can further diminish their ability to attract students and thereby exacerbate between-school polarisation.

While residential segregation can place significant constrains on the equitable access to high-quality education, policies moderate the extent to which segregation across neighbourhoods translates into segregated schooling. The concentration of socio-economically disadvantaged students in highly urbanised countries with free school choice, such as Belgium, often exceeds what might be expected based on their degree of residential segregation alone (OECD, 2015[155]). The definition of catchment areas plays an important role in this relationship since school districts that coincide with homogenous neighbourhoods are more likely to perpetuate concentrated disadvantage than those that encompass populations with diverse social and economic characteristics. Assignment mechanisms can also serve to de-couple enrolment from students' place of residence to some extent. Even in open-enrolment systems, however, the cost of transport can diminish the accessibility of desirable schools for families living at a greater distance.

Additional factors that contribute to school segregation, besides residential patterns, include parental choice and schools' admission policies (Karsten, 2010[156]). Subject to its regulatory framework, parental choice shapes the extent to which families of higher socio-economic status can withdraw their children from disadvantaged or ethnically diverse local schools as well as the extent to which high-performing schools are accessible to disadvantaged students from elsewhere (see Chapter 2). These mechanisms are particularly well-documented in school systems that financially encourage parental choice and competition between public and private providers, but can equally occur within networks of predominantly public schools with heterogeneous quality and student-composition (Boeskens, 2016[157]).

Parents tend to display behavioural biases toward the demographic characteristics of their children's peers. Surveys of Dutch parents, for example, show that ethnic composition is an important factor when choosing a school, particularly among native parents (Karsten et al., 2003[158]). Permitting parents to choose their children's school can therefore lead to so-called "native flight" in disadvantaged areas (Rangvid, 2010[159]). Inadequate regulations of school admissions procedures, including the permission to select students based on economic or academic ability can further exacerbate segregation, as does the failure to ensure that all parents possess the information necessary to take advantage of school choice provisions (OECD, 2017[160]; Musset, 2012[161]).

The procedure for enrolling students after the regular start of the school year deserves particular attention when addressing the concentration of disadvantaged and vulnerable student populations. In some systems, the integration of late-arriving students is particularly resource intensive, not least due to the high proportion of migrant and refugee children among this population. Unless authorities ensure their even distribution, late-arriving students may be concentrated in schools that are already stretched for resources. Assigning students to schools with sufficient capacity while avoiding to place an additional burden on schools whose lack of demand reflects existing quality concerns is an important challenge to be addressed (Council of Europe Commissioner for Human Rights, 2017, p. 25[147]).

School segregation is tightly connected to students residency patterns and mobility

Students' place of residence can have a direct impact on their educational trajectory. Empirical evidence consistently shows that growing up in disadvantaged neighbourhoods with low-quality schools has a detrimental effect on children's academic pathways and development of cognitive skills (Sharkey, 2016[162]). Evaluations of the Moving to Opportunities programme in the United States show that children's place of residence has a significant long-term impact on their educational and employment trajectory (Chetty, Hendren and Katz, 2016[166]) and studies of European cities confirm that living in socially and economically disadvantaged areas exerts a penalty on people's employment prospects (Dujardin, Selod and Thomas, 2008[167]).

Even though assignment mechanisms and enrolment policies can attenuate the effect of residential segregation on diversity in schools, improving the co-ordination between housing or transport policies and the planning of urban school networks is vital to reduce the concentration of disadvantaged students in poorly resourced schools. Residential segregation can exacerbate stratification with respect to a wide range of life outcomes, diminish mobility and restrict access to vital services, including but not limited to education. Highly segregated cities risk to aggravate spatial mismatch, preventing segments of the population from accessing the opportunities and services that would enable them to realise their potential and fully participate in the economic process (OECD, 2016[129]). Conversely, a high degree of school segregation can reinforce housing segregation if socio-economically advantaged or ethnic majority households decide to leave diverse neighbourhoods because they prefer majority-dominated schools (Karsten, 2010[156]).

Comparing levels of segregation across jurisdictions presents methodological challenges (OECD, 2016[129]) but there is a general consensus that spatial segregation by income has increased in US metropolitan areas since the 1970s (Reardon and Bischoff, 2011[165]; Rothwell and Massey, 2010[166]) and has been on the rise in most European capital cities since at least the turn of the century (Musterd et al., 2017[167]). The causes for residential segregation are complex and can be both a product and a driver of economic inequalities. While high-income households tend to isolate themselves by opting to reside in residential enclaves, poverty in cities tends to concentrate in disadvantaged neighbourhoods with affordable housing. At the same time, areas that are less spatially segregated and unequal have been shown to exhibit higher intergenerational income mobility (Chetty et al., 2014[168]). This reciprocal relationship between social inequality and spatial segregation is moderated by a range of factors including past and present housing and planning regimes, welfare systems, and public transport (Musterd et al., 2017[167]). In the United States, for example, restrictive zoning, lot size restrictions and density regulations forestalling the construction of affordable housing in suburbs have contributed to the increase in spatial segregation (Rothwell and Massey, 2010[166]).

In fiscally decentralised systems, locally raised school funding constitutes one mechanism by which residential segregation can translate into variations in educational quality across neighbourhoods. The funding of many American schools, for example, is linked to locally raised taxes and property values, providing schools in wealthy areas with more resources. These locally financed investments can, in turn, lead to rising house prices and property taxes, displacing lower-income residents and further increasing the desirability advantaged districts (Bayer, Ferreira and McMillan, 2004[169]). A study of Californian districts that narrowly passed referenda for infrastructural investments found home prices

to increase significantly following the passage of a bond. Even though there was little evidence that investments changed the affected neighbourhoods' residential composition, rising home prices may set in motion self-perpetuating segregation dynamics in the longer-term (Cellini, Ferreira and Rothstein, 2010[170]). More generally, differences between the quality of public goods provided across jurisdictions have been shown to encourage sorting based on residents' preferences and ability to pay for these provisions. This might be one reason why administrative fragmentation and the local variation in the provision of public services that comes with it, is positively associated with income segregation (Boulant, Brezzi and Veneri, 2016[171]).

Even in systems with national funding formula and a homogenous allocation of resources across neighbourhoods, residential sorting can reduce disadvantaged students' access to attractive schools with a desirable peer composition. Gingrich and Ansell (2014[172]) show that public schools in English districts with high housing prices do not only perform better on average, but also exhibit greater academic dispersion. Consistent with residential sorting, the benefits of this variance in school quality mostly accrue to high-income families that can afford to live in a district's most desirable neighbourhoods. Even in school networks with little between-school variance in student achievement, for example in Helsinki, parents' perceptions of school quality can be reflected in housing prices and reinforce residential segregation, especially in high density areas with an inelastic supply of land. Since measures of school quality are not publicly available in Finland, this effect appears to be primarily driven by parents' perceptions of a school's socio-demographic student composition (Harjunen, Kortelainen and Saarimaa, 2018[173]).

Since proximity and convenient transport options are important criteria in families' school choice, improving connections between different neighbourhoods or peripheral areas and urban centres can expand students' access to attractive schools (Chingos and Blagg, 2017[174]). However, as discussed in Chapter 2, not all students may benefit equally from these opportunities. In Mexico City, where school enrolment is based on a competitive admissions process, high achieving students from advantaged socio-economic backgrounds appear to have benefited the most from an expansion of the public transit network to choose distant high-performing schools (Dustan and Ngo, 2018[175]). Although income-dependent transport subsidies can increase accessibility for disadvantaged students, policy makers need to carefully consider how they interact with school admissions criteria, in order to avoid incentivising parents to trade in school quality for lower transport costs (Masi, 2018[176]).

3.6. Strategies to adapt urban school networks

Despite considerable territorial variation across and within countries, school networks in urban areas face distinct challenges that require responses tailored to their specific conditions. In contrast to most rural areas in OECD review countries, cities continue to experience growing student populations and pressures to expand their school network's capacity. In 2016, for example, cities in the French Community of Belgium expected a shortage of 20 000 school places by 2022, despite ongoing efforts to expand its capacity. The government's strategy proposed a great variety of policy measures to meet this challenge: encouraging schools with excess capacities to modify their educational offer, re-directing students towards schools with vacant places, expanding existing capacities through an efficient use of space, extending facilities and school places in existing schools, acquiring new infrastructure and finally, the construction of new school buildings (International Relations Directorate of the Federation Wallonia-Brussels,

2016[109]). Responding appropriately to capacity shortages in the school network relies on the accurate identification of their causes, scope and expected duration, which in turn requires reliable monitoring mechanisms (see Chapter 2).

Besides mismatches in the aggregate supply and demand of capacities, many urban schools also require support in dealing with significant enrolment fluctuations over the course of the year and serving a student population whose complex needs may require them to co-ordinate social services and targeted support. While the number and density of school providers in cities could provide students with a rich educational offer close to their homes, the distribution of students across the network is often highly segregated, which raises the question of how to ensure that all students benefit from this potential. The following section offers a discussion of strategies to adapt urban school networks in response to these challenges.

Expanding the capacity of existing schools

Expanding the capacity of the school network in response to increased demand may not need to involve the construction of new, permanent school facilities. Particularly when increases in student enrolment are expected to be temporary or when they occur too rapidly and unexpectedly for new constructions to offer sufficient relief, modifications to the school network's existing infrastructure can be a promising strategy. While some of these adjustments can yield a lasting increase in the school network's capacity, others are temporary solutions designed to alleviate exceptional capacity shortages. Contingency plans that provide guidelines and strategies for infrastructural responses to unexpected increases in student enrolment can help schools and local authorities in their decision of how to expand the capacity of their schools in the short term. Depending on the causes of rising student enrolment and its expected duration, the merits of these strategies need to be weighed against those of longer-term expansions and the construction of new facilities, as discussed further below.

Identifying excess capacity or increasing student intake through the effective use of space

Perhaps the quickest and least invasive way for a school network under pressure to accommodate additional students is to identify and effectively put to use spare capacities. Part of the French Community of Belgium's strategy to address its significant shortage of school places is to identify schools with excess capacity and directing students towards them or encouraging them to offer courses that are in higher demand. At the same time, selected schools were encouraged to create additional school places by more efficiently using their space (International Relations Directorate of the Federation Wallonia-Brussels, 2016, p. 23[109]). As described in Box 3.10, the French Community of Belgium has implemented a four-stage process to support schools in optimising their capacity (Smoos, 2017[177]).

Box 3.10. Optimisation of surface area use in the French Community of Belgium

To improve the occupancy rate of school buildings, the French Community of Belgium follows a four-stage process. First, an inventory of schools' overall surface area and enrolment is used to identify facilities with potential over- and under-capacities. For selected schools, the overall surface area and space for specific purposes such as physical education or recreation are then compared to national norms. If significant over- or under-capacities are confirmed, authorities initiate an on-site investigation. In case the initial assessment is validated, a working group of the Ministry of Education (*Administration générale de l'Enseignement*, AGE) and the Ministry of Infrastructure (*Direction générale de l'Infrastructure*, DGI) is deployed to further analyse whether a reorganisation of the premises might yield a more efficient use of space.

Source: Smoos, M. (2017) *Pour un usage plus efficace de nos ressources scolaires* (presentation).

Even in times of exceeding demand, maximum class size rules and a limited number of teachers may restrict how many students a school can accommodate. In some OECD review countries, however, class size regulations are applied with some flexibility, allowing school providers to exceed the legal threshold under exceptional circumstances or for a limited period of time. In Estonia, for example, school providers are permitted to surpass maximum student numbers in a specific class for one academic year, provided that all health and safety requirements are met and the school principal's proposal is approved by the board of trustees (Ministry of Education and Research, 2015[107]). Schools can also repurpose facilities to serve as additional classrooms and accommodate so-called "bulge classes" to cope with temporary increases in student enrolment. While increasing the student intake beyond a school's originally envisaged capacity may offer an expedient and low-cost response to excess demand, the negative impact it can have on the learning environment and teaching personnel usually makes it unsuitable as a long-term solution.

School facility extensions

Extensions of existing school facilities can take multiple forms and serve either as temporary or permanent solutions to capacity shortages. In some systems, prefabricated and portable infrastructures are increasingly deployed to cope with excess demand. Such temporary classrooms must not only meet minimum health and safety requirements but also provide a high-quality learning environment (OECD, 2011[178]). Most commonly, they are used to deal with fluctuating enrolment, with immediate capacity needs in the absence of sufficient time or capital funding for permanent constructions, or during renovation works. Portable facilities are intended to be quickly deployed or dismantled and tend to be relatively cheap compared to the construction of permanent infrastructure, not least because providers may recuperate some of their cost when reusing, reselling or renting them out after their initial deployment. Even though portable classrooms are designed to serve as temporary facilities, their number has grown continuously in the United States over the past decades and they often remain in use at a given site for years.

The funding responsibilities for temporary classrooms vary across systems. During the 1990s, the US state of California strongly incentivised schools to invest in temporary classrooms, requiring all new state-funded school constructions to consist of at least 30 % portable facilities in order to increase the school network's flexibility. In many

US states, however, the acquisition of temporary facilities is not supported by state capital funding but rather by school districts' reserve funds and locally raised taxes. Expanding school districts thus need to carefully consider whether it is worth investing in new or re-used temporary facilities and if so, for how long they can efficiently use them, taking into account their depreciating re-sale value, comparatively quick deterioration and increasing maintenance cost. Where the rise in student enrolment is predicted to last, permanent school expansions might be the more cost efficient solution.

Experimental evidence points to the significant impact that the built classroom environment and factors such as light, noise and temperature can have on students' performance (Marchand et al., 2014[179]). Given that portable classrooms are primarily constructed to minimise costs and maximise flexibility, concerns regarding their suitability as learning environments therefore need to be taken seriously. Some portable classrooms suffer from poor insulation and ventilation, the lack of amenities including running water, compromised safety and low energy efficiency (Chan, 2009[180]). Nevertheless, significant progress has been made over the past decades to innovate and improve their quality. Evidence from qualitative case studies and descriptive survey analyses suggested that portable classrooms need not have a negative impact on student behaviour and achievement or teacher satisfaction (Chan, 2009[180]) and more robust fixed-effects models suggest that the effect of mobile classrooms on student achievement is net positive when they are used to ease acute overcrowding (McMullen and Rouse, 2012[181]).

Rescheduling the use of school buildings

In some OECD review countries, the capacity of existing school facilities has been expanded by reorganising the time at which students use school buildings. Although less frequently used in developed economies, multi-shift schooling has had a particular appeal in urban areas where potential for new constructions is limited and the population density is sufficient to find enough students to operate multiple shifts in the same school. Double- or multi-shift systems thus permit major savings in land, buildings, equipment, and other facilities and provide a means to reduce class size or alleviate overcrowding without purchasing new permanent or temporary facilities (Bray, 2008[130]).

In Uruguay, urban secondary schools typically operate in two shifts (*turnos*), providing students with four hours of instruction either in the morning or in the afternoon. In some cases, they also provide an evening shift (*turno nocturno*) for older students who may need to combine their studies with work commitments. By contrast, full-time and extended-time schools in Uruguay teach seven or seven and a half hours respectively, while most schools in rural areas provide five hours of instruction per day (Santiago et al., 2016, pp. 79, 180[46]). In 1996, Chile moved away from its double-shift system towards a full school day, increasing students' time for instruction and extracurricular activities (Santiago et al., 2017, p. 53[182]). The reform required a considerable investment in school infrastructure and resources for hiring additional teachers, but evidence suggests that it had a positive effect on student achievement in both language and mathematics (Bellei, 2009[183]). Kazakhstan has also invested in additional school places to reduce its reliance on multi-shift education in urban schools. Following the construction of 106 new schools, the country halved the number of students in triple-shift schools between 2007 and 2011, although the use of double-shift classes remains the norm (OECD/The World Bank, 2015, p. 96[75]).

While multi-shift schedules allow for a highly efficient use of school facilities, it is important to bear in mind its effects on the quality and time of instruction. Implementing multi-shift systems can result in reduced teaching hours, a more stressful learning environment due to shorter breaks, and more limited opportunities for remedial or enrichment classes. Evidence from Eastern Europe also shows that students attending afternoon shifts received slightly lower results, possibly due to students' and teachers' fatigue or the limited time left for after-school study (Lusher and Yasenov, 2016[184]). Some systems have therefore experimented with rotating schedules to avoid inequities arising from some students sorting into more desirable shifts (Bray, 2008[130]). Some schools have sought to compensate for the reduced teaching time in double-shift systems with a greater reliance on homework assignments, extended school terms or Saturday schooling. Schools can also set aside extra rooms for teachers to organise remedial tuition and for students to do their homework (Bray, 2008[130]).

Although the economic benefits of double-shift schooling may be considered to outweigh educational concerns in specific contexts, they have added to the negative public perception of shift schooling. Proposals to introduce or prolong are therefore frequently met with parental opposition (Linden, 2001[185]). If double-shift arrangements are conceived of as a temporary expedient, Linden (2001, p. 8[185]) argues, they are unlikely to attract support and the resources they need to operate effectively. In contexts where the universal attendance of single-shift schools is not conceivable in the near future, authorities should therefore acknowledge this and invest in making double-shift arrangements as effective as possible.

Year-round calendars and extended school terms are another way of rescheduling the use of school buildings to expand their capacity. Rather than using facilities at different times during the day, year-round calendars make use of school buildings for the entire calendar year, separating students into one of multiple tracks, at least one of which is on holidays at any given point. This allows schools to accommodate more students in the same space by reducing the time at which they remain unused for instruction (Gromada and Shewbridge, 2015[186]). In Wake County, North Carolina (United States), where around 20% of students attend year-round schools and modified calendars have been in use since the early 1990s. The introduction of year-round school calendars increased infrastructural capacity by 20-33% and empirical analyses suggest that it had a small negative impact on achievement, all else equal, but a positive effect in crowded schools (McMullen and Rouse, 2012[181]).

Constructing sustainable school buildings in line with increased long-term demand

Ensuring that the school network responds effectively to increased student enrolment requires strategic foresight and the capacity to distinguish long-term trends from short-term fluctuations. Responding effectively to cyclical and unexpected changes in student enrolment is a significant challenge in urban school networks trying to avoid costly "overbuilding" and prematurely relinquishing capacities that may be required to cope with future spikes in enrolment. Particularly in dense, built-up environments, the high cost of land acquisition and regulations such as minimum site size rules can render the construction of new school buildings difficult. In addition, some funding mechanisms for school constructions are primarily geared towards particular forms of urban growth, such as suburban expansion, rather than population increases in central areas (Vincent, 2006[187]). Strategies for the sustainable expansion of school infrastructure therefore need to ensure that the number of high-quality school places keeps up with longer-term

increases in educational demand and is responsive to the needs of different urban environments.

Strategically opening schools in locations under high demographic pressure is a common approach to alleviate overcrowding. As described in Chapter 2, school mapping tools supported by Geographic Information Systems (GIS) can facilitate this process and ensure that additional capacity is created where it is most needed. Some large urban school districts in the United States, including Los Angeles, New York and Chicago, have seized the opportunity to integrate the construction of new facilities within a wider school improvement strategy and combined adjustments in the number of schools with their qualitative enhancement. Previously, between 1997 and 2008, five bond issues worth a total of USD 20 billion had enabled the Los Angeles Unified School District (LAUSD) to fund the construction of 131 new schools, which helped to alleviate crowding and reduced bussing expenditures, but failed to improve students' performance. Between 2010 and 2013, the construction of 74 additional schools was accompanied by a concomitant educational reform – the Public School Choice initiative. It gave school leaders greater autonomy and allowed public and private organisations to apply for the operation of low-performing district schools and newly opened relief schools based on evidence-based improvement plans. Evaluations of the initiative suggest that, net of the effect of reduced overcrowding, newly opened school facilities had a positive longer-term impact on achievement after an initial two-year decrease in students' performance following their relocation to a new school (Hashim, Strunk and Marsh, 2018, p. 254[188]).

In some OECD review countries, private developers and public-private partnerships play an important role, complementing public investments into educational infrastructure. In light of imminent capacity shortages, the Flemish Community of Belgium launched an extensive public-private partnership based on the Design-Build-Finance-Maintain (DBFM) principle to construct more than 200 new schools, which is described in more detail in Box 3.11 (Leemans and von Ahlefeld, 2013[189]). In the French Community of Belgium, an urgent action plan (*Modules et Rénovation-Création*) was launched in 2013 to create 15 186 new primary and secondary school places, investing 25 EUR million to construct new permanent and mobile schooling units (International Relations Directorate of the Federation Wallonia-Brussels, 2016, p. 76[109]). In 2017, these investments were supplemented with more than EUR 100 million in private funding leveraged through DBFM schemes (Smoos, 2017[177]). If well-managed, such public-private partnerships can attract private capital while ensuring that buildings remain under public control in the long run and private partners are committed to maintaining and improving school facilities. Similar approaches involving private commitments to the construction and long-term maintenance of school buildings have been used in Australia as part of the New Schools Project in New South Wales, in parts of Canada, and the United Kingdom (Patrinos, Barrera-Osorio and Guaqueta, 2009, p. 81 f.[190]). In England, the Building Schools for the Future project was launched in 2003 with the aim to rebuild or refurbish all secondary schools by 2020. Following long delays, caused in part by an overly complex contracting process, a lack of clarity of goals and unclear accountabilities, the programme was discontinued in 2010 (James, 2011[191]).

Box 3.11. Public-Private Partnerships (PPP) for school infrastructure investments in the Flemish Community of Belgium

In the face of demographic pressures and the need to expand its school network, the Flemish Community of Belgium has attracted private investment through Design-Build-Finance-Maintain (DBFM) schemes. With a total investment volume of EUR 1.5 billion, the public-private parnerships involve the construction of 200 new low-energy facilities, increasing the number of schools by more than 5%. Venture partners that invest in school buildings through the DBFM scheme agree to maintain them to an agreed standard for 30 years, while school boards pay them a leasing fee, partly subsidised by the public Agency for Educational Infrastructure (AGIOn).

At the end of the 30-year leasing period, ownership is transferred to the school boards without any additional costs. Following a public tender, Fortis Bank Belgium's Fortis Real Estate was selected to be AGIOn's private partner for all venture projects, which allowed constructions to benefit from economies of scale. The project's scope and its effectiveness in supplementing public resources with private equity to create sustainable facilities have rendered DBFM schemes a success, although capacity shortages continue to be a pressing issue in Belgium's metropolitan areas.

Source: Nusche, D., et al. (2015), OECD Reviews of School Resources: Flemish Community of Belgium 2015, OECD Publishing, Paris, http://doi.org/10.1787/9789264247598-en; International Relations Directorate of the Federation Wallonia-Brussels (2016), OECD Review of Policies to Improve the Effectiveness of Resource Use in Schools: Country Background Report for the French Community of Belgium.

Since large-scale housing constructions generate increased demand for schooling, many countries expect developers to cover some of the associated capital costs. Leveraging contributions from housing developers can thereby help to ensure that the number of school places rises in line with student populations in expanding neighbourhoods. In England and Wales, for example, local authorities can charge developer contributions through Section 106 funding and the more recently introduced Community Infrastructure Levy (CIL) to meet infrastructural investment needs arising from new developments in their area (Local Government Association, 2014[192]). With few exceptions, CIL contributions are levied on all new developments in the form of a non-negotiable fixed-rate tax and can be used to fund any type of public infrastructure, such as roads, parks, hospitals or schools.

Depending on their design, development fees – as are common in many US states – may be better suited to serving expanding suburban areas than high-density neighbourhoods with little new housing construction, even though they may experience a similar shortage in school places (Vincent, 2006[187]). Particularly where developer contributions are subject to site-by-site negotiations, rather than mandatory and transparently calculated parameters, local authorities may also lack long-term planning certainty and the capacity or power to enter mutually satisfactory agreements. Some communities in the United Kingdom, for example, have reported difficulties when trying to negotiate developer fees in times of economic downturns and raised concerns that they might inhibit investment in affordable housing (Local Government Association, 2014[192]). The newly introduced CIL aimed to mitigate some of these problems with a tariff based approach that allowed the tax to be levied more efficiently and fairly on all new developments, rather than just a few larger-scale schemes, and gave both local authorities and developers more planning certainty. In addition, local authorities did not need to invest contributions where they were collected, which gave them greater flexibility to

channel resources to the places that needed them the most. To encourage the construction of affordable housing, they were excluded from obligatory contributions.

Integrated multi-sector responses to student segregation

Educational segregation is the product of a complex interplay between residential segregating and different selection dynamics involving both parents and schools. While there may not be a silver bullet to avoid school segregation, a set of co-ordinated interventions spanning multiple policy sectors can attenuate the concentration of educational disadvantage and foster diversity in schools. Some of these strategies seek to reduce housing segregation as one of the main drivers of school segregation. Within the education sector, three sets of strategies have been distinguished: First, direct interventions into the distribution of students and school places. Second, "controlled choice" schemes that regulate the parameters of parental choice. Third, school improvement strategies that seek to promote a more balanced distribution of students by targeting support at the most disadvantaged schools and thereby raise their attractiveness (Karsten, 2010[156]).

Direct interventions into the distribution of students

In countries operating mandatory student assignment systems, several strategies can be used to increase diversity in schools and counteract the impact of segregated housing. Direct interventions into the distribution of students have been relatively rare among OECD countries. The most prominent examples are known from the United States, where court orders in many school districts advanced the desegregation process by mandating "non-white" children from the poorest neighbourhoods to be "bussed" to predominantly "white" schools in more prosperous districts (Karsten, 2010[156]). Yet, there are other examples of assignment policies aimed at creating a more balanced distribution of students across the school network. These include the adjustment of catchment areas, e.g. integrating affluent and disadvantaged neighbourhoods into one district; the strategic planning of new schools to serve mixed student populations; magnet schools that recruit students and families to attend specialised schools in diverse neighbourhoods; and different forms of student transfer policies (Karsten, 2010[156]) (see Chapter 2 for a more detailed discussion).

The Danish capital city Copenhagen has sought to tackle the consequences of residential segregation and "native flight" with an ambitious initiative incorporating some of these elements starting in 2006. As part of its "Copenhagen Model for Integration", the city implemented a series of measures including an extensive bussing scheme to more evenly distribute immigrant and native students across the city's public schools (see Box 3.12) (OECD, 2009[193]; Nusche, 2009[194]; Open Society Foundations, 2011[195]; Houlberg et al., 2016[196]).

Box 3.12. Reducing segregation through student transfers and transport in Copenhagen

Following a pilot phase in 2006, the City of Copenhagen rolled out a series of initiatives as part of its "Improved Learning for All" (*Faglighed for alle*) programme. Its aim was to reduce the high degree of ethnic segregation among the city's public schools by providing incentives for ethnic minority students to choose mostly native schools, and *vice versa*. The initiative addressed both immigrant students, who tended to be highly concentrated in some neighbourhoods, and native students, many of whom exercised school choice to withdraw from public schools with a high proportion of immigrants.

To increase diversity in predominantly native neighbourhoods, schools reserved a certain number of places for bilingual students from catchment areas with a high concentration of immigrants, who were supported with free municipal bus transport in case they chose to enrol in a school outside their neighbourhood. Participating schools also trained their teachers in educating bilingual students and employed integration workers or translators of ethnic minority background to advance the integration of newly arrived immigrants.

At the same time, the programme involved multiple schools with large numbers of immigrant students in publicity campaigns to raise their attractiveness and deter "native flight". This included mother tongue instruction, anti-discrimination initiatives and efforts to collaborate with local pre-schools to inform parents of the advantages of choosing their local public school over a private alternative or a school elsewhere.

According to an evaluation carried out by the city in 2010, the programme appears to have had a small but positive impact, resulting in a more balanced distribution of bilingual students across Copenhagen's public schools, an improved perception of local public schools and a reduced achievement gap between immigrant and native students. Other cities, such as Aarhus, have adopted similar policies to encourage voluntary transfers among immigrant students.

Source: OECD (2009), *OECD Territorial Reviews: Copenhagen, Denmark 2009*, OECD Publishing, Paris. http://dx.doi.org/10.1787/9789264060036-en; Nusche, D. (2009), "What Works in Migrant Education?: A Review of Evidence and Policy Options", OECD Education Working Papers, No. 22, OECD Publishing, Paris. http://dx.doi.org/10.1787/227131784531; Open Society Foundations (2011), *At Home in Europe: Muslims in Denmark*, Open Society Foundation: Budapest.

Other strategies aim to re-balance the distribution of students in segregated school systems by providing socio-economically advantaged or ethnic majority students with incentives to attend schools with diverse student populations. In the United States, some "magnet schools" have been explicitly designed as desegregation tools since the 1970s. Located in relatively disadvantaged areas, they sought to attract students from other neighbourhoods with specialised math, science or art curricula and a high-quality education in an integrated learning environment. Students attending such magnet schools outside their catchment areas are usually provided with free school transport (Nusche, 2009[194]).

Regulating school choice and selection to reduce student segregation

As discussed in Chapter 2, the process by which students are allocated to schools has a significant impact on the degree of school segregation. The modalities of parental choice and residence-based assignment matter particularly in dense school networks where most students have multiple schools within their reach. Although they are frequently intended to reduce the impact of residential segregation on educational opportunities, school choice schemes that lack carefully designed checks and balances have sometimes reproduced, if not exacerbated segregation in the school network due to differential parental preferences and decision-making behaviour (see Chapter 2 for a more detailed discussion).

Public and school transport systems are another factor moderating the link between residential segregation and diversity in schools. Weakly developed or prohibitively costly transport networks can limit the extent to which lower-income families benefit from school choice while effective school transport arrangements can ensure that all students are sufficiently mobile to benefit from the expansion of parental choice. Pioneered in the United States to overcome the legacy of racial segregation in the 1950s, bussing schemes have since been used in multiple countries with the explicit aim to achieve a more socially balanced distribution of students across the school network and reduce the impact of residential segregation (Brunello and De Paola, 2017[197]).

Using integrated improvement strategies for schools across the performance spectrum

One of the most troubling consequences of segregation in urban areas is the concentration of high-needs students, which places a disproportionate burden on some schools in the network if they fail to receive adequate support. Given that demographic trends and entrenched segregation in many inner-city districts limit policy makers' ability to raise schools' socio-economic and ethnic diversity, some cities have shifted their attention towards making schools with a high concentration of disadvantaged students as effective as possible (Karsten, 2010[156]). Alongside approaches such as weighted funding formulas and teacher mobility schemes (OECD, 2017[27]), integrated school improvement strategies seek to address the complex needs of schools with widely diverging levels of performance and capacity.

One example of integrated improvement plans that co-ordinate targeted support for schools across the performance spectrum is the London Challenge, which was implemented in the United Kingdom's capital between 2003 and 2008 and subsequently expanded to other regions as the City Challenge until 2011 (see Box 3.13) (Nusche et al., 2016, p. 167[72]). Other initiatives seeking to raise the quality of schools with high proportions of migrant students include Switzerland's Quality in Multi-Ethnic Schools (QUIMS) programme. In a context where growing numbers of native middle class families left inner-city districts with ethnically diverse populations, Swiss authorities responded with an area-wide model of quality assurance to improve educational provisions for students from migrant backgrounds and reverse the trend of segregation by increasing the attractiveness of multi-ethnic schools. To achieve these goals, the programme provided additional resources and professional support to schools with 40% or more students from migrant backgrounds (Nusche, 2009[194]).

Box 3.13. The London Challenge and City Challenge

In England (United Kingdom), the Department for Education and Skills launched the London Challenge to improve education in the capital. While the programme initially focused on supporting secondary schools in London between 2003 and 2008, it was expanded as the "City Challenge" to include primary schools in to two additional areas – Greater Manchester and the Black Country – between 2008 and 2011.

Building on the experience of its predecessor, the City Challenge pursued three objectives: to reduce the number of underperforming schools; to increase the number of good and outstanding schools; and to improve educational outcomes for disadvantaged children. The programme included a number of elements aimed at schools across the performance spectrum: identifying the underperforming schools that would require the most support ("Keys to Success"); supporting satisfactory schools in becoming outstanding through targeted interventions; support schools in narrowing attainment gaps between disadvantaged students and their peers; providing schools with data about their intake; grouping schools into so-called "Families of Schools" and encouraging them to work together; building the capacity of local authorities; implementing leadership development strategies led by the National College for School Leadership; in addition to various local interventions. The programme did not promote a single view of what schools needed to do to improve. Instead, all interventions were based on local decisions involving key stakeholders, including school principals and local authority officials.

An evaluation of the City Challenge positively highlighted that the proposed strategies for school improvement included different forms of support, depending on the schools' performance and reinforced the notion that all schools should strive to improve their provision (Hutchings et al., 2012[198]). Inadequate and underperforming schools benefited from experts' support. Satisfactory schools worked with two or three other schools with similar intakes, led by the principal of a school that was further along its school improvement process. Good and outstanding schools benefited from a wide range of opportunities to share their practices and learn from the experience of other successful schools, while also supporting weaker schools.

Source: Baars, S. et al. (2014), *Lessons from London Schools: Investigating the Success*, http://centreforlondon.org/publication/lessons-london-schools; Kidson, M. and E. Norris (2014), Implementing the London Challenge, *https://www.instituteforgovernment.org.uk/sites/default/files/publications/Implementing%20the%20London%20Challenge%20-%20final_0.pdf*; Hutchings, M. et al. (2012), *Evaluation of the City Challenge Programme*, *www.gov.uk/government/publications/evaluation-of-the-city-challenge-programme*.

Supporting students' access to high-quality schools through concomitant housing policies

Although school improvement, the regulation of school choice systems, and incentives for schools to enrol more diverse cohorts are important levers to reduce student segregation and address its consequences, residential segregation exerts a pervasive influence on the distribution of students across the school network. Ensuring that cities' rich educational offer benefits all of their residents therefore requires a broader strategy that includes concomitant approaches across multiple policy sectors including housing and public transport. Policies designed to increase the availability of affordable housing

in high-quality school districts or expand the residential mobility of minority and low-income families can expand access to neighbourhoods that meet both their residential and educational expectations (Rhodes and Warkentien, 2017[199]).

Authorities at the national and the local level can have a critical influence on the supply and demand for affordable housing. Policies such as inclusionary zoning and housing allowances, which aim to make quality housing available to all segments of the population, are not only an important step towards more mixed neighbourhoods and lower school segregation – they are also considered a primary lever for inclusive economic growth in cities (OECD, 2016, p. 121[129]). Income-dependent housing allowances, usually centrally provided in the form of cash subsidies or vouchers, can help to promote mixed-income urban neighbourhoods and encourage residential mobility. Recent evidence also suggests that well-implemented allowances yield significant benefits for young children's long-term educational trajectories. For example, evaluations of the Moving to Opportunities (MTO) experiment, conducted by the US Department of Housing and Urban Development, show that children who benefited from the programme under the age of 13 were more likely to attend college and went on to have higher earnings as adults (Chetty, Hendren and Katz, 2016[166]).

At the city-level, inclusionary zoning policies can be an effective supply-side instrument to reduce segregation and increase the availability of affordable housing, for example by requiring new developments to contain a specified share of affordable housing units, sometimes in exchange for financial or regulatory concessions. This can encourage the inclusion of low-income households in otherwise market-rate residential areas and avoid the spatially concentrated supply of low-income housing that sometimes resulted from traditional social housing schemes. Originating primarily in the United States, inclusionary zoning practices have since been adopted in a number of other countries (OECD, 2016, p. 125[129]).

If housing policies at the national and local levels are misaligned, they can cancel each other out, resulting in a sub-optimal use of resources and the erosion of their social and economic impact. Common examples of such conflicting approaches include the imposition of demand-side constraints on the housing supply at the local level (e.g. through land-use regulations, development controls and zoning requirements), and simultaneous efforts to stimulate supply at the national level (e.g. through spending on new housing construction or facilitated access to home ownership through regulatory tools and tax incentives). To prevent housing policies at different levels of government from undercutting one another, it is important to address the causes of co-ordination weaknesses and ensure that policies across levels are aligned (OECD, 2016, p. 121[129]).

Social rental housing provided at sub-market prices and allocated according to specific criteria, is commonly used to increase access to affordable housing for low-income individuals. In systems with decentralised responsibilities for the provision of social housing, municipalities with a high share of low-income households may not have the financial and organisational capacity to maintain an adequate supply of social housing. In addition, the construction of large social housing estates, disconnected from existing street networks, has occasionally aggravated segregation and exclusion by concentrating disadvantaged households in neighbourhoods with low-quality public services and limited access to job opportunities. Creating inclusive cities therefore requires a holistic urban planning approach that addresses issues related to education, employment, culture, safety, urban services and social cohesion while carefully considering the indirect consequences of policy decisions over the long term (OECD, 2016[129]).

3.7. Policy options

Consider a range of strategies to enhance the efficiency of school networks with excess capacities in the light of contextual constraints and students' educational needs

Demographic shifts, regional economic developments and changing student needs have exposed many school systems to costly mismatches between educational demand and supply in both rural and urban areas. Adjusting the school network in response to these challenges and realising its potential for synergies has therefore become a central aim for school systems seeking to enhance their efficiency and free up resources to improve student outcomes. In order to do so, policy makers should consider the full spectrum of strategies to rationalise the organisation of the school network, which includes re-thinking how educational services are defined and distributed across school sites, fostering co-operation and resource sharing between providers, creating school clusters and engaging in consolidation.

Adopt a modular approach, allowing for flexibility in the way grade levels are distributed across school sites

Encouraging a "modular" approach to the school network and educational offer can expand the repertoire of flexible strategies to advance their efficient organisation. This entails shifting the focus away from schools as entire institutions towards the individual services they offer and re-evaluating whether there is room for improving the way they are distributed across school sites. Allowing for some flexibility in the combination of different grade levels within the same institutions can make it easier to adapt the school network in response to changing levels of demand, particularly if contextual developments generate different pressures across levels of education. Promoting these modular approaches should also involve a reflection on which levels of education can be adequately offered at the local level and which ones should rather be provided at a larger scale.

Promote resource sharing and school clusters to address efficiency concerns in fragmented networks

In many cases, encouraging small schools to co-ordinate their educational offer, share resources or consolidate their administrations can allow school networks to significantly enhance their efficiency without fundamentally intervening in the number, size or location of its schools. Besides the economic savings generated through economies of scale, resource sharing and collaboration can also improve small schools' capacity to provide a broad curriculum and high-quality instruction. This can be achieved, for example, by sharing teaching equipment or entering joint purchasing agreements, by jointly offering courses or easing the recruitment and retention of high-quality teachers by providing them with better development opportunities and a larger professional community.

Co-operation between schools can take different forms with varying degrees of formality, duration and scope. School clusters and federations, for example, which consolidate the administration of multiple school sites, should be considered as an effective means to counteract some of the disadvantages of small schools without requiring their removal from the local community. In light of its complexity, the successful introduction of a centralised leadership team and budget for multi-site schools requires careful attention to

building the capacity for pedagogical and administrative leadership, and possibly the development of middle and distributed leadership structures.

To leverage innovative approaches to the design and delivery of services in rural communities, authorities should also identify and reduce barriers or disincentives that impede schools from engaging in voluntary collaboration and resource sharing. Depending on an assessment of the obstacles to co-operation, promoting efficient collaboration can also involve strengthening local capacity, regional planning platforms and steering the process through regulatory instruments or incentives.

Advance school consolidation by carefully combining incentives and direct support if there is a strong economic and pedagogical case

Despite the great potential of resource sharing and inter-school collaboration, systems with a fragmented school network that exhibits significant inefficiencies should complement these approaches with incentives for the consolidation of small schools. This practice involving the closure of some schools and the transfer of its students to a proximate site can yield long-term cost savings by increasing the average size of schools and lower per-student fixed costs. When considering the consolidation of school networks, authorities should take great care to weigh its economic benefits against the substantial transition costs generated during the process, the public and private expenditure arising from longer commuting distances, and the social and economic impact on surrounding communities.

As reiterated below, any consolidation project must also, first and foremost, yield tangible pedagogical benefits for the students it concerns. Larger, better resourced schools may offer their students greater curricular diversity, specialised teachers and support services, better equipment, facilities and activities as well as the ability to organise all instruction in single-grade settings. Yet, the increased distance from students' homes and the short-term disruptive experience of relocating to a new school can negatively impact students' well-being and learning outcomes. To attenuate these effects, authorities need to ensure that the transition process is as smooth as possible and students are well-integrated in their new environments. Policy makers should also acknowledge that some constraints, such as the geographic isolation of some rural communities, may render consolidation impossible and that, particularly for younger children, maintaining access to schools at a reasonable distance from home should remain a priority.

Authorities that decide to pursue consolidation should consider a combination of policy levers, including financial incentives and direct support in the school closure process. Incentives for consolidation, for example in the form of per capita funding through a central formula, can constitute a powerful steering tool that discourages the maintenance of small schools due to their relatively high per-student fixed costs. These measures should be carefully targeted at the educational levels and sectors in which consolidation is expected to yield the greatest benefit, and include safeguards for schools that can or should not be subject to closure. Direct aid can help consolidating districts in stemming the associated transition cost. As discussed in Chapter 2, consolidation can also be encouraged through policy levers aimed at the adjustment of governance arrangements, for example by increasing the size of catchment areas and financially autonomous administrative districts. Imposing universal rules concerning, for example, minimum class and school sizes that leave local actors with little room for manoeuvre risks to overlook the importance of local context for the efficient organisation of the school network and the feasibility of consolidation. In general, authorities should be careful to

provide clear incentives, avoid sending contradictory signals and select steering tools that reinforce, rather than undermine or offset each other.

Address concerns for local development and develop strategies to use facilities effectively beyond the point of consolidation

School closures may have short- and longer-term ramifications for the local community and neighbouring areas, which need to be taken into consideration when planning to restructure the school network. Particularly the closure of schools frequently raises concerns that it may accelerate the demographic and economic decline, particularly in rural communities. Even though the consolidation of schools is more frequently a symptom than a cause of a community's decline, fears that any efficiency gains stemming from consolidation could be offset by reduced economic activity, lower tax revenue and declining property values need to be taken seriously. While decisions on the future of small, rural schools should be based on what is in the best interest of their students rather than their value for local and regional development, authorities should think of alternative ways to sustain the social benefits that schools provide where consolidation is seen as economically unavoidable or pedagogically prudent.

This should involve supporting local institutions in taking over any essential functions that the school may have provided in addition to its educational services, as well as a broader reflection on economic strategies and funding solutions to support rural development beyond the field of education. Developing plans for the future use of consolidated school facilities in close collaboration with local stakeholders is another important part of the post-consolidation process. Doing so is not only central to materialising the prospective efficiency gains of consolidation, but also to pre-empt local stakeholders' concerns and offset some of the negative side-effects the consolidating community may experience.

Compensate for efficiency, quality and equity challenges experienced by remote schools

In areas where network consolidation or increased co-operation between schools is unfeasible due to their geographic isolation or other reasons, a range of compensatory policies including targeted funding and the use of ICT can put them in a better position to provide their students with the high-quality education they deserve. Various forms of ICT-supported education, ranging from distance learning to students' participation in teacher-facilitated web-based lessons can ameliorate the limitations imposed by the narrow curriculum and personnel of small rural schools. Given the wide distribution of student outcomes in ICT-supported education, their successful introduction requires careful preparation, including the development and provision of appropriate electronic content, training teachers in rural schools, and ensuring sufficient network connectivity.

To compensate for efficiency challenges in parts of the school network, authorities should also ensure that the regulatory environment is transparent and flexible enough for schools to leverage the support of their community. Given that small schools, particularly in rural areas, are often embedded in tight-knit communities and considered to serve an important role in their social life, many of them have sought to leverage the support of parents, small businesses and other local actors to ameliorate their condition. Voluntary contributions and favourable collaborations, for example on maintenance works or the organisation of social events, can ease the financial burden of small schools and help to ensure their continued operation. To encourage community involvement, local authorities

should therefore create a constructive and permissible regulatory environment while at the same time monitoring community involvement to ensure that health and safety regulations are adhered to and public resources are spent effectively.

Where consolidation and other means to improve the efficient operation of the school network are not an option, authorities should consider providing struggling remote schools with targeted financial support. Since it is widely recognised that the provision of high-quality education in rural areas comes at a higher per-student cost, some countries provide dedicated funding to compensate for the greater resource needs of small, isolated schools and their difficulty to recruit high-quality teachers. In addition, targeted programmes have been used to finance teacher professional development and collaboration across isolated schools and transport arrangements where distance constitutes a significant barrier for teachers' mobility. Given the significant geographic heterogeneity in the supply of high-quality teachers, support for an adequate provision of initial teacher education and effective "grow your own" programmes can help to alleviate concerns about teacher shortages in rural settings.

Respond to capacity shortages in school networks strategically

Effectively meeting the rising demand for school places in high-density urban areas and networks with rising student numbers can be a major challenge. Increases in enrolment, whether caused by residential development, increased birth rates or changing patterns of migration, may be long-lasting or short-lived and appear with varying degrees of predictability. Initiating new constructions in response to momentary spikes in enrolment can render buildings obsolete long the investment has paid off. Conversely, short-term solutions such as the intensified use of existing buildings or temporary facilities are unlikely to be efficient and beneficial for student learning in the long run if the level of enrolment remains high. Countries should therefore cultivate strategic foresight and the capacity to distinguish long-term enrolment trends from short-term fluctuations to ensure that the school network's capacity grows in line with increased long-term demand. This may include providing the responsible authorities with the analytical tools and capacity to identify areas of heightened demographic pressure and the sites where new school constructions would most effectively alleviate overcrowding or cater to expected population growth.

Modifying the school networks' existing infrastructure can enhance their efficiency and generate additional capacity where increases in student enrolment are expected to be temporary or occur too rapidly for new constructions to offer sufficient relief. Contingency plans and guidance materials should be used to help schools and local authorities in weighing the pros and cons of different ways to adjust their facilities in these scenarios. As an immediate and minimally invasive remedy, remaining capacities in oversubscribed school networks should be identified and put to use by re-directing students or advising schools how to use their space more efficiently. In exceptional circumstances, relaxing maximum class size rules for a limited period of time can also be an effective way to accommodate temporary spikes in demand.

The use of prefabricated mobile classrooms can be another effective short to medium-term response to capacity shortages where insufficient time or capital funding rules out the construction of new facilities or student demand is expected to subside again. Temporary classrooms can add flexibility to the school network and attenuate the negative impact of acute overcrowding but high standards should ensure that they not only guarantee the students' health and safety but also provide them with a high-quality

learning environment. Since mobile classrooms are unlikely to be as economically efficient or conducive to student learning as permanent facilities in the long run, their period of use should remain limited.

In contexts where the demand for school places is expected to rise and remain high, whether due to demographic shifts or policy changes, authorities need to ensure that the school network expands its provision of high-quality facilities in line with educational demand. Where new demand is generated by housing development, instruments like developer fees that link capital funding to residential construction projects, can be an effective way to share the burden for infrastructural investments. However, authorities should avoid an overreliance on locally restricted developer contributions and acknowledge that high-density areas with little new construction activity may also experience rising demand for school places. Likewise, countries in which developer contributions are subject to site-by-site negotiations rather than calculations based on uniform criteria, local authorities should be given sufficient long-term planning certainty and the capacity to reach satisfactory agreements without having to compromise on the construction of affordable housing, particularly in times of economic downturn.

Take a multi-sector approach to reduce segregation and ensure that all students benefit from the rich offer of urban school networks

A high density of schools and students can enable cities to provide a rich educational offer and extensive choice. However, due to residential patterns and differential school choice behaviour, not all students benefit from these opportunities to the same extent. The schools of many cities are academically stratified and segregated along the lines of students' economic and socio-demographic characteristics. These patterns have a tendency to become entrenched and risk depriving students of the chance to live up to their full potential. Since the factors that contribute to segregation dynamics are context dependent, authorities should investigate them carefully before rigorously piloting and rolling out an appropriate combination of measures across policy domains, including education, transport and housing.

The position of new schools can exacerbate or attenuate the effect of residential segregation on students' educational opportunities. Newly opened schools should be encouraged to serve areas with diverse student populations, accompanied by information campaigns or specialised offers to encourage their attendance, particularly where parents are at risk of transferring their children to the private sector. Policies related to student assignment mechanisms and parental choice also mediate the educational consequences of residential segregation. Although they are often intended to widen access to high-quality education, school choice schemes risk to limit rather than expand opportunities for disadvantaged students due to differential parental preferences and behaviour. To avoid this, all parents should be supported in taking full advantage of their educational opportunities and carefully designed checks and balances need to ensure that the submission of school preferences and admissions criteria support a diverse student intake (see Chapter 2). In systems that rely on the geographic assignment of students to local schools, authorities should seek to define catchment areas that integrate affluent and disadvantaged neighbourhoods where possible, while keeping students' distance from their school reasonably short.

Sustainable efforts to prevent the marginalisation of disadvantaged students in highly segregated school systems need to be aligned with concomitant housing and public transport policies. To reduce residential segregation, authorities should consider both

supply-side instruments, such as inclusionary zoning, and demand-side tools like income-dependent housing allowances to promote residential mobility, increase the availability of affordable housing and foster mixed-income urban neighbourhoods. Housing policies at the national and local levels should be co-ordinated to prevent them from undercutting one another, which could result in a sub-optimal allocation of resources and the erosion of their social and economic objectives. Likewise, authorities should carefully monitor the effects of restrictive zoning, lot size regulations and other policies known to encourage the spatial concentration of social housing and take preventative measures where segregation is a concern.

Finally, the mutual reinforcement of residential and school segregation should be acknowledged and addressed to prevent the displacement of disadvantaged families from areas with high-quality schooling. Local funding mechanisms, including the relative importance of locally raised taxes for school investments, play an important role in mediating this relationship and should be scrutinised with a view to reduce geographic inequities. Likewise, initiatives aimed at narrowing the gap between high-performing and low-performing schools can be effective in raising the quality of the most disadvantaged schools while preventing the exodus of advantaged families from underperforming school districts. Among the promising avenues in this regard are integrated school improvement plans that provide tailored support for schools across the performance spectrum and encourage them to learn from one another.

Make educational quality, equity and student well-being the guiding principles for network reforms

Regardless of whether increased efficiency of the school network is pursued through school collaboration, consolidation or the expansion of capacity, advancing educational quality, equity and student well-being should be the guiding principle for any network reforms. To put this ambition into practice, responsible authorities can consider a set of policy options aimed at rendering network reforms more effective and sensitive to students' needs. The basis for any of these efforts is taking a systematic approach to monitoring ongoing network reforms and evaluating their effect on students and families. While authorities should also draw on international best practices for network reforms and the experience of comparable projects elsewhere, generating and sharing evaluation results among national stakeholders at the sub-system level is an equally crucial step towards system-wide learning and generating reliable insights into its effects on students.

Ensure stakeholders are consulted and engaged in the process

As with any major reform project, the reorganisation of school networks should be preceded by the systematic consultation and engagement of stakeholders. Structured consultation procedures bringing together all major stakeholders, including less powerful and active voices, can be an effective means to resolve conflicts before they arise, to hold authorities to account and find implementation strategies suitable to the local community's needs. The consultation and engagement leading up to reforms is crucial to ensure that stakeholders have adequate knowledge of educational policy goals, the ownership and willingness to effect change, and the tools to implement a reform as planned. Authorities should contribute to this process by maintaining a high level of transparency, articulating a clear vision for the school network reform, demonstrating that potential alternatives and their likely effects on students and the local community have been considered and providing a strong case that the plan will bring about tangible improvements in educational quality. Central guidance on when and how to conduct

consultation procedures can be an effective means to support local authorities and align expectations among all actors involved.

Identify and address equity concerns

For school network reforms to benefit students of all backgrounds and needs, it is essential for authorities to identify their potential impact on equity and the well-being of specific student groups well in advance and take the necessary steps to address them. Just as current inefficiencies in the school networks can place some students at a systematic disadvantage based on their location, resources or educational needs, restructuring the network can have a harmful impact on specific student groups and exacerbate existing inequities. Equity concerns should therefore receive particular attention in the institutional frameworks for effective network design and planning. As well as raising awareness among the responsible authorities, countries should take active steps to guarantee that these concerns are addressed, for example by ensuring that representatives of vulnerable groups are involved at key stages of the proposed reforms' design and implementation.

Ensure effective arrangements for school transport

Effective arrangements for students' transport to and from school or afternoon activities are central to guarantee their access to high-quality education. They are particularly crucial for the successful relocation of students affected by consolidation and to alleviate uncertainties among families and other stakeholders leading up to the closure of schools. Authorities should therefore provide clear and transparent frameworks that specify the conditions under which students have a right to school transport. The criteria used to determine students' eligibility for transport should be responsive to students' and families' needs. Besides the distance from the nearest school, these criteria could include the students' age or level of education, the availability of public transport options and the reliance on arrangements for special needs students.

Authorities should also align the responsibilities for setting up, operating and funding transport systems in case of school closures with their policy priorities for the organisation of the school network. Assigning responsibilities for the funding of student transport to the authorities responsible for managing the school network, for example, can ensure that the economic benefits and drawback of school closures are accounted for in their entirety before enacting consolidation plans, provided that the authorities manage a sufficiently large school network.

In denser school networks with some degree of parental choice, the means-tested provision of transport options also plays an important role in promoting equity and overcoming spatial segregation by enabling disadvantaged students to consider a wider range of schools beyond their immediate community. Weakly developed or prohibitively costly transport networks in urban areas may limit the extent to which lower-income families can benefit from educational opportunities that suit their children's needs. Authorities should therefore facilitate students' mobility between neighbourhoods as well as peripheral and central areas and monitor whether current transport provisions are effective in enhancing the mobility of disadvantaged families.

Notes

[1] Authors' analysis based on TALIS 2013 data.

[2] Authors' analysis based on PISA 2015 data. The analysis is limited to OECD countries with at least 100 sampled students in both levels of education. Differences may be partially explained by the fact that 15-year-old students in rural schools are more likely to have repeated a grade, and therefore to be in lower secondary education.

[3] Authors' analysis based on PISA 2015 data.

[4] Authors' analysis based on TALIS 2013 data.

[5] Authors' analysis based on PISA 2015 data.

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Annex 3.A. Supplementary material

Annex Table 3.A.1. Public support for school transport, ISCED 1-3, 2016

	Authority responsible for school transport		Parental contributions (if eligible)	Eligibility criteria for school transport provision					Regular public transport discounts (3)
	Funding	Organisation		Distance (km)	Distance (other) (1)	Means-based	SEN	Other (2)	
Austria	Central	Central	Yes	✓				Lack of public transport	✓
Belgium (Fl.)	State	State	Yes	✓	✓		✓		✓
Belgium (Fr.)	State	State	Yes		✓		✓		✓
Chile	Central	Central	No			✓	✓	School's rurality index	✓
Czech Republic	Regional	Regional	Yes	✓					✓
Denmark	Local	Local	Depends	✓		✓		Age, school type, immigrant background	
Estonia	Central	Local and school	Depends			✓	✓	School type	✓
Iceland	Central and local	Local	No	✓					
Kazakhstan	Local	Local	No		✓				
Lithuania	Central	Central and local	No	✓		✓	✓		✓
Slovak Republic	Central	Regional	No		✓		✓		
Slovenia	Central	Local	..	✓ (ISCED 1/2)		✓ (ISCED 3)	✓	Wildlife threats	✓
Spain	Central and regional	Regional	..		✓	✓	✓	Academic scholarships	
Sweden	Local	Central and Local	No	✓	✓		✓		
Uruguay	Central	x	No						✓

Note: The review team made every effort to ensure, in collaboration with countries, that the information collected through the qualitative survey on school funding is valid and reliable and reflects specific country contexts while being comparable across countries. However, given the qualitative nature of the survey, information should be interpreted with care.
For definitions of levels of education and levels of administration, see Annex A. For country-specific notes to this table, see the end of this annex.
x:. not applicable
.. : missing information
1: Other distance-related criteria include travel times or the attendance of schools outside the municipality of residence.
2: Other criteria include the specific education level, age, or other municipality specific criteria rather than the ones already presented in the table.
3: Transport discounts include reduced prices for public transport and need not imply transport arrangements for students in specific schools.
Source: The information in this table was compiled based on information provided by the review countries through the Review's qualitative questionnaire on school funding and Country Background Reports (accessible at www.oecd.org/education/schoolresourcesreview.htm).

Country notes

Austria: School transport is free of charge for students using public transport, except for a small parental contribution (€ 19.60 per school year). Where no adequate public transport is available, municipalities and school providers can apply for special transport arrangements to be set up that are provided free of charge to students. In cases where more than two kilometres of a student's commute to school are covered by neither of the provisions above, students can receive additional support according to the length of their commute. The funds for school transport are administered by the Federal Minister within the Federal Chancellery for Women, Families and Youth (*Familienlastenausgleichsfonds*). Austrian authorities also provide accommodation and transport grants for students who can prove school success and attend a school outside their place of residence.

Belgium (Fl.): School children are offered discounts for the use of public transport. If primary school students cannot find a public or subsidised private school within a 4 km radius from their home, the Community is obliged to either contribute to the cost of transporting students to the nearest publicly funded school or expand its subsidies to include whichever non-funded school the students end up attending. Children with special educational needs can make use of free bus transport services provided by schools and funded by the government.

Belgium (Fr.): School children in the regions of Wallonia and Brussels are offered discounts for the use of public transport. The regions are mandated to extend the same transport support to all students attending public or subsidised private schools. In rural or remote areas, the responsible authorities can organise student pick-up systems to enable students to bridge the distance between their homes and the nearest schools. Children with special educational needs can make use of free bus transport services provided by schools and funded by the government.

Chile: The central government provides transport for students living in remote areas but close enough to attend a school using transport services. The Programme to Support the Rural School Transport System provides schools with a rurality index above 25% additional funding to pay for student transport, and rural schools offering boarding services receive an extra subsidy to pay for the students' accommodation and meals. In addition, the National Student Card allows students to use public transport at a lower price, for all students attending 5th to 12th grade in subsidised municipal and private schools, technical centres, professional institutes and universities.

Czech Republic: The regions are responsible for ensuring that transport is provided to and from students' catchment school if their permanent residence is located further than 4 km away. While families bear the cost of dedicated school transport services themselves, students benefit from discounts on public transport during school days. These discounts are financed through earmarked funding which the government has provided for public transport providers since 2004. As of 2018, students under the age of 26 receive a 75% discount.

Denmark: Municipalities have the legal obligation to subsidise transport costs for students living further than 2.5 km from their local Folkeskole. The extent to which transport costs are covered varies based on the students' age, the type of school they are enrolled in and its distance from their home. In order to advance equity objectives, some municipalities operate bussing schemes for students with an immigrant background from

districts and schools with a large number of immigrants (or students from a disadvantaged socio-economic background) to those with more students of non-immigrant background.

Estonia: The municipalities in which students reside are responsible for organising their school transport. In many cases, this involves free school bus rides or reimbursements and subsidies for public transport tickets. The national government also covers some of the cost of transport for students who commute from another municipality to attend one of the new state-run gymnasiums or public schools for children with special needs.

Iceland: School transport is fully funded by local communities, which receive funding from the central government based on the number of students and the distances between their homes and schools.

Kazakhstan: Where no school is available in the students' home village/rayon, transport to the nearest school is funded by the local budget. Funding does not cover transport to afternoon-courses or extracurricular activities.

Lithuania: Students in the country are entitled to subsidised public transport tickets, according to the Law on Reduced Transport Charges. Students in pre-school and general education residing in villages and towns farther than 3 km from the nearest school are entitled to transport to and from school organised by the municipality. The Lithuanian government is also implementing the "Yellow Bus programme" to improve transport conditions for students living in rural areas or students with special educational needs, and to ensure the safe transport of students who formerly attended consolidated schools or whose schools are re-organised to another school nearby.

Slovak Republic: Transport support is provided by the central budget and includes the payment of transport costs for students of basic schools and special basic schools completing their compulsory school attendance outside the place of their permanent residence within a defined school district. Regional authorities organise the students' transport to and from school, while the Ministry of Education reimburses parents for the cost incurred via the municipalities.

Slovenia: Public transport to school is funded for primary and lower secondary students living farther than 4 km from the nearest school. For upper secondary students the eligibility criterion is their household's level of income. The central government provides additional funds to support transport arrangements in municipalities that are the habitat of brown bears, where students might risk being attacked by bears and other wild animals. The transport of students with special educational needs is also funded if it is not guaranteed by the school.

Spain: Transport support is provided for students enrolled in compulsory education depending on their place of residence and their household's level of income. Families of children with special educational needs can receive additional social assistance and schooling benefits including transport support from the central government. The transport support for students with severe motor disabilities is up to 50% higher. This support depends on both household income and capital thresholds set by the administration.

Sweden: Each municipality is responsible for covering the cost of school transport for upper secondary students living farther than six kilometres from their school. This responsibility applies regardless of the schools' location and type of provision. However, the municipality's responsibility does not extend to organising the transport. The right to school transport means that the municipality is obliged to arrange free transport to school if necessary with regard to the length of the journey, traffic conditions, each student's

limitation or any other special circumstance. The right applies to students in compulsory education and students with special needs (including in upper secondary education), provided that the students attend the school to which the municipality has assigned them.

Uruguay: The central government funds free public transport for children attending primary school (public or private), free bus tickets for public secondary school students and student ticket subsidies for private secondary school students. For students in public lower secondary schools between 12 and 18 years of age and those of public upper secondary up to 20 years old, the government fully funds the cost of 50 monthly bus tickets. Transport is also provided for rural schools and a 2015 pilot project explored the use of transport services as a means to facilitate school consolidation in very low density areas, but the approach has not been pursued further due to resistance from parents and the local community (INEEd, 2015, p. 91[118]).

Annex Table 3.A.2. Material resources in rural and urban schools

Results based on principals' and teachers' reports

Urban schools better staffed than rural schools
Too few observations
Rural schools better staffed than urban schools
No statistically significant difference

	Principals' concern about:				Science-specific resources	Computers per student	Proportion of computers connected to the internet
	Quantity of educational material	Quality of educational material	Quantity of physical infrastructure				
Mexico							
Australia							
Ireland							
Norway							
France							
United Kingdom							
Colombia							
Italy							
Lithuania							
OECD average							
Portugal							
Switzerland							
Turkey							
Austria							
Chile							
Czech Republic							
Finland							
Israel							
Slovak Republic							
Spain							
Sweden							
Estonia							
Germany							
Greece							
New Zealand							
Poland							
Slovenia							
United States							
Uruguay							
Canada							
Denmark							
Hungary							
Belgium							
Latvia							
Iceland							

Note: Systems are ranked in descending order of the number of variables according to which urban schools are statistically significantly better equipped than rural schools.
Sources: OECD (2015), PISA 2015 Database, www.oecd.org/pisa/data/2015database/; OECD (2016), PISA 2015 Results (Volume II): *Policies and Practices for Successful Schools*, http://dx.doi.org/10.1787/9789264267510-en, Table II.2.6, Table II.6.5 and Table II.6.6.

Annex Table 3.A.3. Teaching in rural and urban schools

Urban schools better staffed than rural schools | Rural schools better staffed than urban schools | No statistically significant difference

	Principals' concern about:		Share of qualified science teachers (1)	Share of teachers participating in professional development	In-service training conducted by specialists
	Quantity of teaching staff	Quality of teaching staff			
Chile					
Estonia					
Iceland					
Norway					
Turkey					
Australia					
Canada					
Colombia					
Latvia					
Lithuania					
Mexico					
OECD average					
Slovak Republic					
Austria					
Belgium					
Czech Republic					
Denmark					
Finland					
Greece					
Ireland					
Israel					
New Zealand					
Poland					
Portugal					
Slovenia					
Spain					
Sweden					
Switzerland					
United States					
Uruguay					
France					
Germany					
Hungary					
Italy					
United Kingdom					

Note: Systems are ranked in descending order of the number of variables according to which urban schools are statistically significantly better staffed than rural schools.
1: Science teachers with a university degree and a major in science.
Sources: Authors' analysis, OECD (2015), PISA 2015 Database, www.oecd.org/pisa/data/2015database/; OECD (2016), *PISA 2015 Results (Volume II): Policies and Practices for Successful Schools,* http://dx.doi.org/10.1787/9789264267510-en, Table II.2.10, Table II.6.18 and Table II.6.22.

Chapter 4. Co-ordinating educational levels and sectors to improve student trajectories

This chapter analyses how the vertical and horizontal co-ordination of the educational offer can improve students' trajectories and contribute to greater efficiency. First, it discusses the co-ordination of years and levels of education and the challenges that arise from barriers to students' vertical progression. These include year repetition, early school leaving and unsuccessful transitions beyond secondary education. The chapter then analyses the horizontal co-ordination of parallel sectors and programmes. It focuses on inequities and inefficiencies that arise from the duplication or fragmentation of services and from the insufficient co-ordination of general and vocational, mainstream and special needs pathways. The chapter concludes with a set of policy options to address these challenges.

Providing all students - regardless of their social background, educational need, or unique interests - with a high-quality education is a central priority of education systems across the OECD. Strengthening the capacity of school systems to address this challenge critically depends on the efficient organisation of the many components of the educational offer. School systems must be organised to facilitate regular progress from pre-primary through post-secondary education and the labour market. They must successfully guide students to access the appropriate supports for their particular educational profiles. At the core, this challenge relates to providing families and children with options and pathways that simultaneously promote the student's future opportunities and societal goals of excellence and equity. Accomplishing this requires careful co-ordination between the different levels and sectors of the school system.

In OECD countries, students choose between (or are selected into) a great variety of educational pathways: general or vocational tracks; separate or integrated education of students with special educational needs (SEN); public or private provision (addressed in Chapter 2); different programmes within schools, and so on. Offering students and families a variety of educational pathways and parallel programmes promises a diverse educational provision that matches each student's interests and potential. At the same time, it may lead to increased segregation, mismatches in students' pathway choices and a fragmentation of the educational offer. The co-ordination of education services across levels, sectors and programmes is therefore critical to reap the benefits of a diversified offer, to ensure students' smooth progression throughout compulsory and upper secondary education and to employ educational resources efficiently. This chapter analyses this co-ordination along two dimensions: First, the co-ordination of school years and levels of education to improve students' vertical transitions. Second, the co-ordination of parallel sectors and programmes and students' horizontal transitions between them.The way in which school systems organise different levels, sectors and programmes of education affects how children and families engage with and transition through the schooling process. Vertical transitions play an important role in all students' educational experiences, often right from the beginning of their time in school. Students enrol in early education and care services, accumulate years of educational attainment, and leverage these educational milestones to seek success in the labour market. Horizontal transitions, on the other hand, occur for some, but not all students, often at key inflection points in a child's educational pathway. They include shifting from a general curricular programme to a vocational pathway or from a general classroom into a separate special education class. Both contextual conditions and institutional factors can create barriers for students' smooth progression through the education system. The design of vertical and horizontal transitions is crucial to overcome these challenges while ensuring that school resources are efficiently and equitably allocated across education sectors and programmes.

4.1. Characteristics of vertical and horizontal educational pathways in OECD review countries

Students' experience as they progress across levels of education differs markedly across OECD countries. At the starting point of their educational trajectory, the proportion of three-year-old children enrolled in early childhood education widely ranges from 56% in Chile to over 95% in Belgium and Denmark (see Table 4.1). Analogously, at the end of their school education, in some countries nearly every student (92% in Denmark and Lithuania) graduates from an upper secondary school. By contrast, in the Czech Republic nearly a quarter fail to receive their degree. While more than 90% of Israelis and Koreans

below the age of 25 graduate from upper secondary education, less than 70% of Mexicans, Spanish or Turks are able to complete their degrees by this age (OECD, 2017, p. 62 Table A2.2[1]). Such differences often reflect variations in policy and practice. Notably, year repetition is one of the factors that has the strongest impact on students' vertical progression. An average of 11.3% of 15-year-old students across the OECD report having repeated a year. Across the countries visited by the OECD School Resources Review, this figure ranges from 2.5% in Lithuania to 42.6% in Colombia (OECD, 2016, p. Table II.5.9[2]).

In the horizontal dimension, there are also major differences in the proportions of students enrolled in various educational pathways. In Denmark and Belgium, nearly 5% of students are placed in separate special education classes or schools, whereas in Portugal and Lithuania, this is true for only about 1% of students. In Denmark and Estonia, 15-year-old students are typically enrolled in a common pathway, and are not placed into a general or vocational programme until they are 16 years old. However, in some of the OECD review countries, secondary education is organised in four, five, six, or even eight potential pathways in which 15-year-old students might be enrolled, usually stemming from the distinction between general and vocational programmes. Students in these countries may have initiated enrolment in general or vocational tracks as young as 10 or 11 or as old as 16 years of age. Unsurprisingly, there are also wide ranges in the enrolment rates of students in general and vocational pathways, with as many as 41% of 15-19 year-olds enrolled in general upper secondary programmes in Chile, compared to 18% in Austria (see Table 4.1).

Successful completion of alternative pathways also differs within and across countries. As with overall graduation rates, the variation in graduation between general and vocational programmes varies substantially. As few as 14% of Lithuanian young people who enter the Vocational Education and Training (VET) system graduate on time, but as many as 80% of Austrian VET students earn a diploma. These percentages reflect differences in effectiveness, orientation, rigour and purpose. Therefore these comparisons are not intended to rank the performance of each system, but rather to highlight differences in structure at the country level.

While the sample of education systems participating in the OECD Review of School Resources is not representative or exhaustive of the OECD and partner countries, it includes a rich diversity of conditions, practices and outcomes that permits a valuable series of comparative problems for practice and policy solutions to emerge.

Table 4.1. School pathways in OECD School Resources Review countries

							Enrolment rate, 15-19 year olds			Upper secondary graduation rates		
	Enrolment rates in ISCED 01/02, age 3	SEN (%)	SEN in separate schools (%)	Repeat (%)	Number of school types available to 15-year-olds	Age of 1st tracking	General upper secondary (%)	Upper secondary VET (%)	Of which, in combined school/ work programmes	First-time grad rates, all	Grad rate, general	Grad rate, VET
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Austria	75	..	..	15.2	5 (5)	10	18	44	21	90	20	80
Belgium (Fl.)	98 (b,2)	5.7	4.4	34.0 (b)	4 (b)	12 (b)	29 (b)	39 (b)	2 (b)	35	38 (b)	60 (b)
Chile	56	5.0	2 (3)	24.6	3 (1)	16 (1)	41	19	1	90	61	29
Colombia	60	2.2	..	42.6	2	15	18	7	x	72	..	..
Czech Republic	77	..	..	4.8	6	11	21	52	5	76	24	57
Denmark	97	..	4.8 (4)	3.4	1	16	40	12	12	92	69	44
Estonia	87	4.2	3.9	4.0	1	16	39	18	0	..	60	26
Lithuania	77	11.0	1.0	2.5	5	16	32	10	x	92	79	14
Portugal	..	5.8	1.2	31.2	3	15	37	23	x	89	45	44
Slovak Republic	60	7.0	3.5	6.5	5	11	21	44	4	80	27	54
Uruguay	..	3.0 (3)	2.9 (3)	35.3	2	15	..	..	..	..	..	..

Note: Kazakhstan not included due to lack of internationally comparable data. See EAG 2017, Annex 3, for notes http://www.oecd.org/edu/skills-beyond-school/EAG2017-Annex-3.pdf.
x: Data not applicable because category does not apply.
b: data refers to all of Belgium.
..: Data are not available in the specified sources.
1: In Chile, 15-year-olds can be enrolled in three types of school according to the study programme they offer: only general studies, only vocational studies, or both. At the modal year for 15-year-olds (Year 10), a common curriculum or education programme is offered in these three types of school. Vocational studies begin only at Year 11.
2: Includes only ISCED 02 enrolled students, ISCED 01 data not available.
3: ISCED 1 only (in Uruguay, there is no provision of special education services at secondary level); year of reference: 2016; data compiled from MEC Statistical Yearbooks and Bulletins of public and private education of the Educational Statistics Department of CEIP
4: Municipal schools only.
5: Year of reference 2018.
Sources: Column 1: OECD (2017), *Education at a Glance 2017: OECD Indicators*, OECD Publishing, Paris, http://dx.doi.org/10.1787/eag-2017-en, Table C2.1; Columns 2-3: Country background reports, unless otherwise noted (see www.oecd.org/education/schoolresourcesreview.htm); Columns 4-6: OECD (2016), *PISA 2015 Results (Volume II): Policies and Practices for Successful Schools*, OECD Publishing, Paris., http://dx.doi.org/10.1787/9789264267510-en, Figure II.5.3 and Table II.5.27; Columns 7-9: OECD (2016), *Education at a Glance 2016: OECD Indicators*, OECD Publishing, Paris, https://doi.org/10.1787/eag-2016-en; Table C1.3a; Columns 10-12: OECD (2017), *Education at a Glance 2017: OECD Indicators*, OECD Publishing, Paris, http://dx.doi.org/10.1787/eag-2017-en, Table A2.2.

The academic and socio-emotional needs of students across the OECD have increased substantially over the past decade. Between the 2006 and 2015 OECD Programme for International Student Assessment (PISA) cycles, the percentage of students with an immigrant background in OECD countries increased from 9.4% to 12.6%, in line with the share of students who speak a foreign language at home (OECD, 2016, pp. 421-423[3]). Growing percentages of students are identified as having special educational needs and are integrated within inclusive environments in mainstream schools. Despite increases in the level of students' needs in schools, the impact of students' socio-economic status on their science performance remained statistically identical between 2006 and 2015 (OECD, 2016, pp. 418-420[3]).

The challenges for addressing students' needs within schools are also evolving. The proportion of students who felt socially isolated in their school grew by nearly 10 percentage points between 2003 and 2015 – one of several OECD indicators pointing to students' growing socio-emotional needs (OECD, 2017, pp. 345-346[4]). As the level of students' needs has increased, so too have ambitions to hold schools accountable for the measurable performance of all students. Thus, more than ever, schools must be enabled to continue their progress in helping a diverse range of students overcome the obstacles imposed by socio-economic and cultural disadvantage and to prepare them for responsible citizenship and success in the labour market. When all actors in school systems are aligned, schools may more easily continue their progress from the 2015 PISA in overcoming obstacles imposed by socio-economic and cultural disadvantage.

There is widespread evidence of fragmentation in the offer of school services by educational levels, sectors and educational programming[1]. Unfortunately, the challenges systems face in supporting students to successfully transition through school levels, sectors and services carry significant individual and societal costs. Poor transitions between school years risk students falling behind in their academic curriculum, repeating years or leaving school early.

Thus, it is critical that policymakers and practitioners prepare schools to support students' success. The remainder of this chapter first describes barriers to student progress in primary and secondary schooling and mechanisms to improve these vertical transitions. It then maps the diversity of educational sectors, pathways and programmes and some of the challenges associated with students' horizontal transitions between them. Throughout, the chapter articulates strategies to ensure that resource expenditure maximises student interest and labour market demands without sacrificing equity. The chapter concludes with a series of policy options to promote co-ordination of smooth and successful vertical and horizontal transitions.

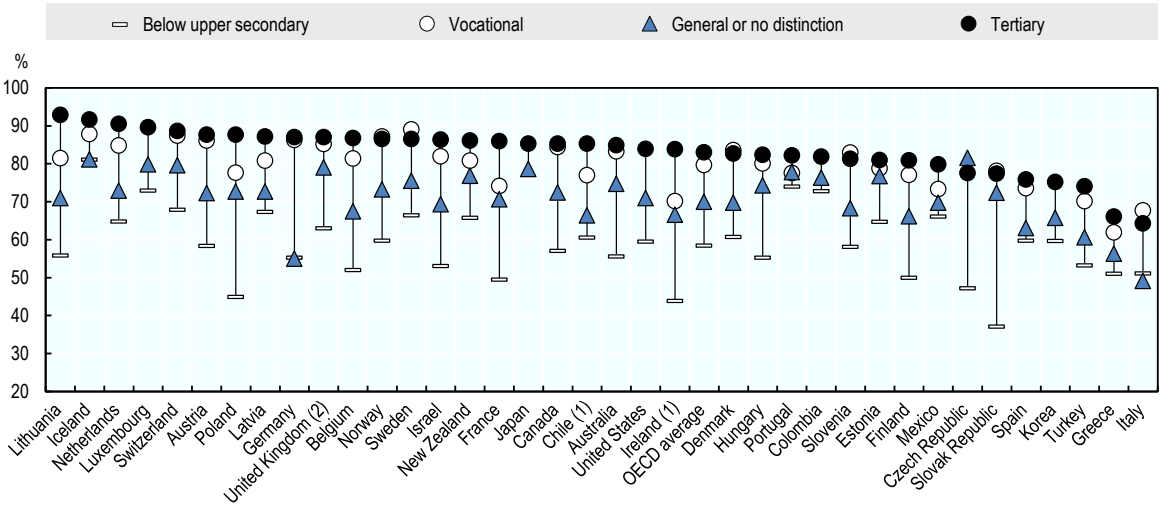
4.2. Vertical co-ordination and students' transitions across levels of education

Formal education is a cumulative – if not linear – process. When student progression through school is compromised by knowledge gaps or inappropriate year repetition, students risk leaving school early, failing to progress to tertiary education and having lower prospects in the labour market. Academic skill gaps result in meaningfully worse later-life outcomes. Young adults who struggle with literacy skills experience a nearly 21 percentage point higher rate of being neither employed nor in education or training (NEET) relatively to those who otherwise demonstrate higher proficiency on OECD's Survey of Adult Skills (OECD, 2016, p. 360 Table C5.3 (L)[5]). The benefits of literacy are not only limited to better employment prospects. Adults who show the highest levels of literacy skills report

being in good health at rates nearly 30 percentage points higher than low skilled individuals (OECD, 2016, p. 163 Table A8.1 (L)[5]).

Alongside literacy and numeracy skills, higher educational attainment continues to be relevant to improved returns in the labour market. Those who achieved tertiary education diplomas experienced 25 percentage points higher levels of employment in 2016 relative to those below an upper secondary education (Figure 4.1). This pattern is, on average, true across all levels of educational progression.

Figure 4.1. Employment rates of 25-34 year-olds, by educational attainment and programme orientation, 2016



Note: Countries are ranked in descending order of the employment rate of tertiary-educated 25-34 year-olds. The label 'general or no distinction' refers to upper secondary or post-secondary non-tertiary general education for countries with a vocational track and to all upper secondary or post-secondary non-tertiary education otherwise.
1: Year of reference differs from 2016.
2: Data for upper secondary attainment include completion of a sufficient volume and standard of programmes that would be classified individually as completion of intermediate upper secondary programmes (16% of the adults aged 25-64 are in this group).
Source: OECD (2017), *Education at a Glance 2017: OECD Indicators*, OECD Publishing, Paris, http://dx.doi.org/10.1787/eag-2017-en, Table A5.1.

StatLink https://doi.org/10.1787/888933831412

Greater educational attainment is also reflected in larger financial returns. Employed workers experience a nearly 100% earnings benefit as a result of completing tertiary education compared to workers who fail to complete upper secondary education (OECD, 2017, p. 114 Table A6.1[1]). These benefits accrue not just to the individual but to society. As a result of reductions in unemployment payments, higher income tax payments, social contributions and transfers, the estimated net per capita public returns of completing upper secondary education are USD 66 000 (PPP) for men and USD 51 100 (PPP) for women (OECD, 2017, p. 128 Tables A7.5a and A7.5b[1]). The public returns are even greater for completing tertiary as compared to upper secondary education (OECD, 2017, pp. 131 f., Tables A7.2a and A7.2b[1]).

The failure to provide students with a smooth progression through the education system and guide them to programmes that correspond to their interests and potential can increase the likelihood of educational failure and skills mismatches later on. This section highlights challenges and opportunities to support students in progressing sequentially upwards through their educational journey.

Year repetition, early school leaving, and unsuccessful transitions beyond secondary education are common across the OECD and within the countries participating in the School Resources Review. Failing to design pathways conducive to a smooth vertical progression of students throughout the system leads to both an inefficient and inequitable use of school resources. Poor year-over-year progress risks students falling behind in their academic curriculum, repeating years or leaving school early. Interventions specific to these problems, as well as the common application of early warning data systems and external support staff can counteract the negative effects of these challenges.

Transitions between early childhood education and care (ECEC), primary and secondary education

There is widespread evidence of fragmentation in the offer of school services by educational levels. A recent OECD report on the state of ECEC finds substantial variation in practices and policies employed across ECEC and primary providers (OECD, 2017[6]). While minimal causal evidence exists on the benefits of specifically targeted transition support into primary education, correlational evidence from Finland and the United States finds that students who engaged in more transition activities from pre-primary to primary schooling experienced positive academic outcomes (Ahtola et al., 2011[7]; Schulting, Malone and Dodge, 2005[8]). In the United States, this effect was most pronounced for low-income children.

Additionally, school systems across the OECD have struggled with the best ways to address the unique learning and social needs of students transitioning from primary into lower secondary education. Psychologists find consistently worse achievement-related attitudes and beliefs among students transitioning to lower secondary schools. Some have attributed this to a mismatch between the motivational and developmental needs of early adolescents and the structure of lower secondary schools (Eccles and Midgley, 1989[9]).

The transition between lower and upper secondary levels of education is often one of the most fraught. This transition point is frequently aligned with movement into general and VET tracks (OECD, 2016, p. 167 Figure II.5.8[2]). It also happens in many countries near the age for the end of compulsory education (OECD, 2017, pp. 420 ff., Tables X1.1b and X1.3[1]). As a result, it can be an inflection point for some students leading to either early school leaving or tracking into an educational programme that prepares students for entry into either post-secondary education or the labour market.

Insufficient co-ordination between multiple governing bodies can create barriers to students' vertical transitions, particularly from ECEC to primary

Different levels of the education system are often governed by different public authorities. Although the approaches for public governance of education vary across countries, some patterns hold consistently. Notably, ECEC and primary education are relatively more locally managed than secondary education, which tends to be the responsibility of central governments (see Chapter 2). In some cases, responsibilities are not only divided between public authorities at different levels of government, but also between multiple actors at the

same level of government. This is commonly observed in centrally governed ECEC sectors whose regulatory frameworks are co-administered by multiple ministries.

Effective co-ordination across the governing bodies involved in educational provision is crucial to ensure a smooth progression across levels of education. A commonly observed challenge is at the transition from pre-primary to primary education. Some of the concerns include the unpreparedness for the increased rigours of primary school, significantly different pedagogical techniques being used at the primary level relative to ECEC, or varying levels of teacher qualification requirements, associated with differing instructional skill levels between ECEC and primary institutions (OECD, 2017[6]).

Among OECD review countries, these divisions of responsibilities have been identified as a reason for the relative isolation of ECEC and primary education subsystems. For example, in the Slovak Republic, funding of ECEC providers is under the responsibility of municipalities and comes from their own revenues, while the financing of primary education is ensured by the central budget. Therefore, the local level has few incentives and significant barriers to organise pre-primary and primary education as integrated services, allowing for smoother transitions across levels (Santiago et al., 2016[11]). The alignment of funding models across subsystems and the integration of provision holds the potential for greater efficiency.

Providing ECEC services under the same administrative leadership as primary or basic education can encourage resource sharing, common professional development, curriculum and instructional practices, as well as built-in mechanisms to support students' transitions. Nevertheless, the integration of ECEC and primary education services also entails considerable concerns. The provision of ECEC services in integrated schools presents risks associated with introducing children to formal school environments too soon. Therefore, public authorities must weigh the potential efficiency and effectiveness gains of integrated provision against the risks of a "schoolification" in pre-primary education and its impacts on the cognitive and socio-emotional development of children. Furthermore, the higher teaching qualification requirements and public employee status of primary teachers regularly result in higher salary and fringe benefits than pre-primary teachers. Thus, full integration of the two sectors can impose substantial costs. In the absence of integrated provision, enhanced collaboration between providers of ECEC and primary education can help improve transitions for children.

Adapting school year configurations to minimise transitions

Parent advocates, politicians and commentators frequently debate the appropriate school year configuration in which to organise schools. These debates can be motivated by concerns about early tracking, separating students into developmentally appropriate bands, a need to capture scale efficiencies, or worries by parents that their younger children not attend schools with more mature adolescents.

In Germany, extending primary school through Year 6 (*Grundschule)* has been presented as a way of delaying early tracking from age 10 to 12. Similarly, in Scandinavian countries that provide all of compulsory education (Year 1 to 9) together in one "basic school", the arguments in favour of this arrangement have generally centred on the equity enhancements this arrangement produces.

Based on concerns about students who struggle with transitions, there can be an independent benefit to avoiding the disruptive effect of transitions. Several studies in the United States have found benefits in student outcomes to eliminating entirely the

transition between primary and lower secondary schooling and keeping students in their same primary school through Year 8 (Rockoff and Lockwood, 2010[12]; Schwerdt and West, 2013[13]). In Sweden, a 1994 reform aimed at integrating grades 7-9 in locally run basic schools, led students to keep attending smaller schools closer to their homes, while having no significant impacts on educational outcomes as a result of the policy change (Holmlund and Böhlmark, 2017[14]).

A greater integration of different levels of education can also be achieved through an alternative administration of schools and curricula for a more efficient allocation of resources. By grouping schools offering different levels of education, Portugal's cluster system enables students to complete their entire school education within the same extended school community if they so wish (see Chapter 3, Box 3.6). The move towards a reformed school administration was facilitated by an earlier revision in curricular standards that integrated Years 1-9 under a unified basic education curricular framework. Concomitantly, while different schools may still offer different cycles of basic or upper secondary education, clustering helps ensure a coherent curricular progression, leveraged by a unique administration and increased collaboration among teachers from different cycles (Portugal Ministry of Education, forthcoming[15]).

Transitions to post-secondary education and the labour market

Vertical transitions from the upper secondary level are instrumental to prepare students for integration in the labour market or for studying in higher education institutions. Of course, an additional critical transition point is that between post-secondary education and the labour market, although this falls outside the focus of this analysis. There is substantial evidence of students struggling to successfully complete the transition to post-secondary education. This can take several forms. Some students may not be aware of their eligibility for financial support or their competitiveness for entry into tertiary education (Hoxby and Avery, 2013[16]), an important concern in both countries with high tuition fees or opportunity costs related to foregone earnings. Ineffective transitions can also stem from an increasingly well-documented phenomenon of "summer melt", in which students indicate their intent to enrol in post-secondary institutions in the spring of their last year of secondary school, followed by a failure to ever enrol. Behavioural research in the context of the United States has shown that this is especially prevalent among students from disadvantaged socio-economic backgrounds. In some analyses, 4 in every 10 students from low-income families who have reported a desire to enrol in tertiary education, fail to do so during the summer (Castleman and Page, 2014[17]). Financial barriers for enrolment are an obvious constraint, but policymakers must also be conscious of other constraints. In particular, the way in which the information for enrolment in higher levels of education is conveyed may contribute to persistent inequality of access. Students may suffer from inadequate counselling and insufficient incentives to access formal support even when it is available. Effective career advice helps students to understand their potential, to update their initial expectations and to better situate all their post-secondary options.

Effective transitions to post-secondary education and the labour market depend on intensive, individualised coaching and guidance. Guidance counselling is a key tool to help students self-identify their aspirations and abilities. It includes both general career and post-secondary counselling, where students learn about the work environment and post-secondary options, as well as individual advice, where students reflect on their potential choices.

If based on high-quality information, student guidance has the potential to better link student preferences with post-secondary and labour market demands. The growing complexity of school-to-work and post-secondary transitions, propelled by a rapidly changing skills demand, fuels the urgency of effective student counselling. Recent causal evidence finds that counselling can shift enrolment choices toward long-cycle tertiary options that have higher graduation rates than the alternatives students would otherwise choose. Counselling also improves persistence through at least the second year of tertiary studies, suggesting the potential to increase the degree completion rates of disadvantaged students (Castleman and Goodman, 2016[18]). Where there are no formal career guidance services at schools, students rely on informal sources – such as parents and peers – which tend to reinforce existing socio-economic inequalities (OECD, 2010[19]).

Counselling is thus crucial to set students' sights higher, while providing them with smoother transitions to post-secondary education or the labour market. However, education systems face a series of concerns regarding the effective provision of this type of support. An OECD review of upper secondary VET identified a number of these challenges: inadequate preparation of counselling staff, multiple staff and institutions responsible for different aspects of counselling, a shortage of counsellors, and lack of relevant labour market information (OECD, 2010[19]). The ratio of students to counsellors in many countries is very high, resulting in superficial and insufficient services to most students. Data on labour market supply and demand, as well as tertiary education quality and affordability often require cautious interpretation. Effective counselling should allow students to navigate these complex decisions, while updating their initial preferences and expectations.

Figure 4.2 depicts the percentage of 15-year-old students who have accessed different types of career guidance across several OECD countries for which data is available. Access to this type of service varies widely. While in countries like Denmark and Finland more than 80% of the students have consulted with career advisors at school, less than 3 in 10 students have accessed these services in Austria, Belgium, Hungary or the Slovak Republic. Figure 4.2 also shows that in countries where students rarely consult advisors at school, this is not replaced by career guidance outside the school environment. On the other hand, education systems where interaction with career advisors at school is low tend to have somewhat higher frequency of worksite visits and internships.

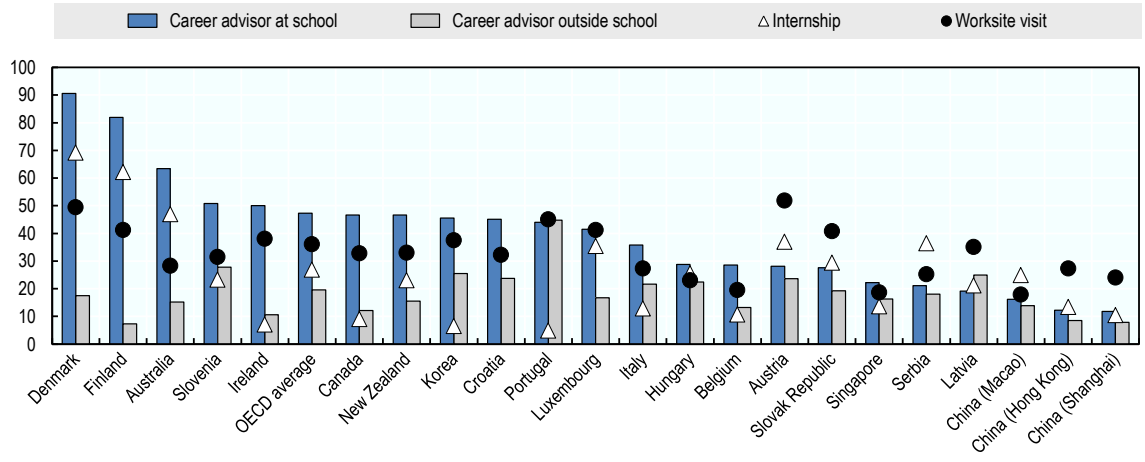
Formal career guidance services were often underdeveloped in many OECD review countries. In Austria, educational psychology and career guidance (*Schulpsychologie / Bildungsberatung*) was provided by 77 information centres with only 150 educational psychologists for the whole country, mainly relegating that function to teachers with counselling preparation. Figure 4.2 shows that Austria has below average guidance at schools, mainly relying on visits to employers instead. In order to address the limited access students had to school-based guidance, the Austrian government made career guidance classes compulsory in lower secondary education (Nusche et al., 2016[20]; Federal Ministry for Digital and Economic Affairs, 2012[21]).

Other countries participating in the Review have expressed that high-quality student counselling is a clear policy priority. In Slovenia, the Ministry of Education, Science and Sport aims to improve the provision of career guidance for students in schools across all levels of education. The planned reforms are intended to be implemented vis-à-vis a modernisation of the Slovenian VET system and a move towards a system of apprenticeships. Vocational guidance in the country is co-ordinated by counselling services, also offered in lower secondary education. In co-ordination with teachers, external experts

and career advisors of the Employment Service of Slovenia, school counselling services provide visits to companies, career information, counselling on educational choice and occupations, evaluation of students capabilities and follow-up of the counselees (Republic of Slovenia Ministry of Education, 2016[22]). This policy priority seems to be confirmed by the data, where Slovenia is a comparative leader in the accessibility of career advisors at school and in the frequency of worksite visits (Figure 4.2).

Figure 4.2. Percentage of 15-year-old students who reported having accessed different types of career guidance, 2012

Selected OECD countries and partners



Note: Countries and economies are ranked in descending order of the share of students who had access to a career advisor at school.
Source: OECD (2012), PISA 2012 Database.

StatLink https://doi.org/10.1787/888933831431

Comparative data on the availability of guidance counsellors to students is difficult to obtain. In the United States, there was one guidance counsellor for every 491 students in 2013/14, whereas the maximal recommended number of students per guidance counsellor is 250 and the rate should be lower for guidance counsellors serving large numbers of students with social and educational disadvantages (American School Counselor Association, 2015[23]). The overall comparative pattern suggests that students across OECD countries would benefit from greater access to guidance services.

While guidance services have clear positive benefits for students in terms of labour market participation and post-secondary enrolment, other less resource intensive interventions may produce similar benefits for students. When students receive information on the schools for which their qualifications make them eligible and opportunities for financial support, they are more likely to attend more rigorous institutions (Hoxby and Avery, 2013[16]). When standard information is already pre-populated on application forms, and when students receive regular text messaging reminders to complete application processes, they are much more likely to enrol in post-secondary education than when left to their own devices (Castleman and Page, 2013[24]; Castleman, Page and Schooley, 2014[25]). This is particularly true for students from disadvantaged socio-economic backgrounds.

Addressing barriers to students' vertical progression

The progression of students through vertical pathways in school is affected by institutional factors. These include such educational regulations as academic standards, promotion examinations, year repetition practices, structures to support struggling learners and others. Education systems must constantly navigate a tension between adopting policies intended to, on the one hand, impose high standards for students' knowledge and skills to ensure that they acquire the necessary skills for future life success, and on the other hand to promulgate policies that do not unnecessarily inhibit students' vertical progression.

Addressing high rates of year repetition through policy interventions and intensive support for struggling students

Whether students acquire specific academic skills may or may not determine whether they progress from one year to another, depending on system policies and cultural contexts (Goos et al., 2013[26]). At the extremes within OECD countries, all students in Japan and Norway progress from one year to the next as a matter of policy, whereas a full 34% of 15-year-olds in Belgium and 31% of students in Luxembourg, Portugal and Spain had repeated at least once in primary, lower secondary or upper secondary school (OECD, 2016, p. 368 Table II.5.9[2]).

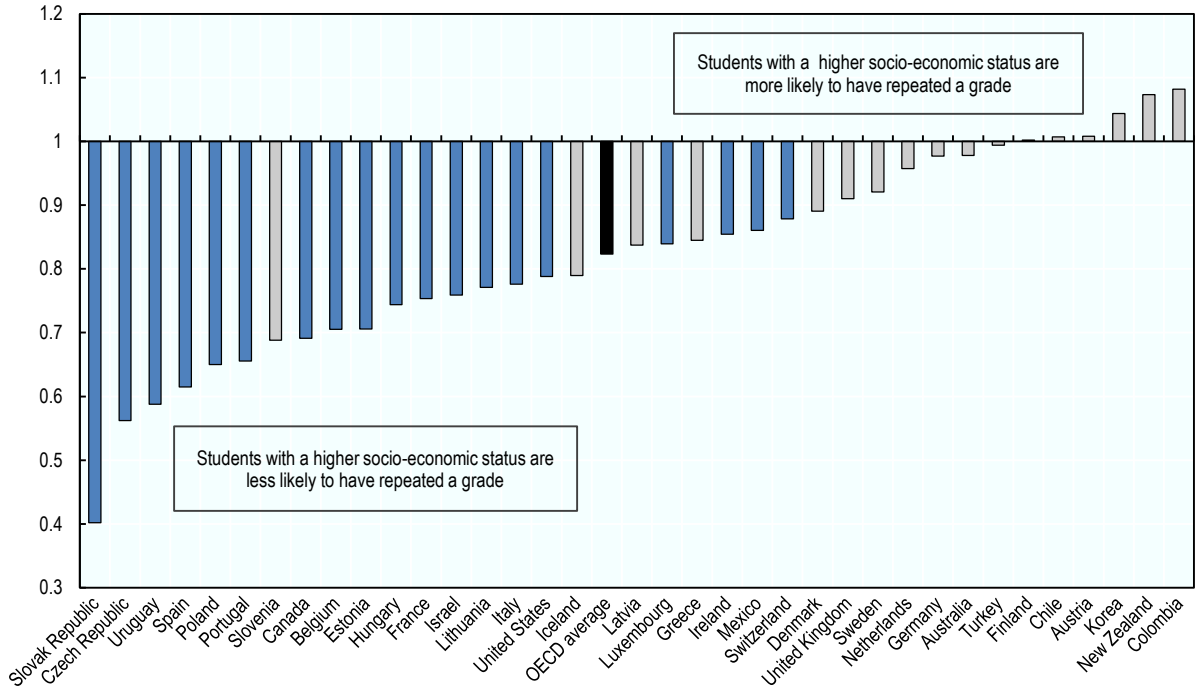
International evidence provides no support for systematic grade repetition practices. Clear evidence shows that students who repeat years do worse on a host of measures than students who have never repeated (OECD, 2016[27]; Ikeda and García, 2014[28]). Researchers debate the proper counterfactual – how would students do had they never repeated? The evidence points to worse – or at best mixed outcomes for repeaters (Schwerdt, West and Winters, 2017[29]; Eren, Depew and Barnes, 2017[30]; Allen et al., 2009[31]; Jacob and Lefgren, 2004[32]; Jimerson, 2001[33]; Jimerson, Anderson and Whipple, 2002[34]) — and greater costs to society associated with retaining children in their year (Manacorda, 2012[35]; OECD, 2011[36]; Alet, Bonnal and Favard, 2013[37]; Benhenda and Grenet, 2015[38]). Poor results from year repetition may be partially explained by the fact that year repetition is rarely accompanied by a modified curriculum or additional instructional resources for the affected students. Disadvantaged students who fall behind may also not have the same access to early support and remedial opportunities as advantaged students.

Furthermore, year repetition raises equity concerns as socio-economically disadvantaged students are nearly 20% more likely to have been held back even when their academic performance, gender, level of motivation and immigrant status is identical to their more advantaged peers (Figure 4.3). Across OECD countries, one in five socio-economically disadvantaged students reported that they had repeated a year at least once since they entered primary school, while only 7% of advantaged students did. Similarly, boys were more than 1.5 times as likely as girls (and immigrants nearly twice as likely as native-born students) to have repeated a year, even when their academic performance, level of motivation and socio-economic status were identical (OECD, 2016, p. 164 Figure II.5.6[2]).

Year repetition, which adds an additional year of schooling and delays entry into the labour market by one year, is a costly practice. In a recent OECD estimate, the total estimated cost of year repetition was equivalent to 10% or more of the annual national expenditure on primary and secondary school education for some countries. The cost per 15-year-old student can be as high as USD 11 000 or more (Figure 4.4) (OECD, 2011[36]).

Figure 4.3. Students' socio-economic profile and year repetition, 2015

Change in the odds of having repeated a year associated with socio-economic status

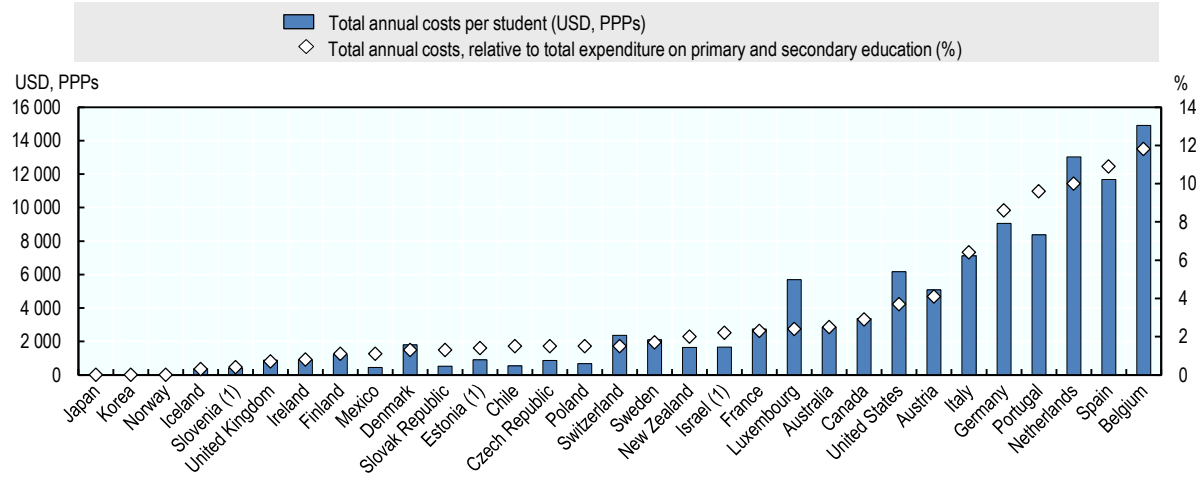


Note: Countries and economies are ranked in ascending order of the impact of socio-economic status on likelihood of year repetition. Statistically significant differences are marked in a darker tone. The socio-economic profile is measured by the PISA index of economic, social and cultural status. The logit regression model accounts for students' performance, truancy, motivation, gender and immigrant background.
Source: OECD (2015), PISA 2015 Database, http://dx.doi.org/10.1787/888933436132, Table II.5.13.

StatLink https://doi.org/10.1787/888933831450

Figure 4.4. Cost of grade repetition, 2009/10

Assuming that repeaters attain at most lower secondary school



Note: These estimates add up both the direct and the opportunity cost and are based on the assumption that students who repeat years attain, at most, lower secondary education. These estimates do not address either the potential benefits of year repetition or the costs if school systems do not allow for year repetition. For example, students who have repeated a year might be better prepared for the labour market than if they had not done so. Schools might also have to spend more to offer remedial classes to struggling students if those students are not permitted to repeat a year.

1: In Estonia, Israel and Slovenia, gross annual full-time earnings are used as annual labour costs are not available in EAG 2010.

Source: OECD (2011), "When Students Repeat Grades or Are Transferred Out of School: What Does it Mean for Education Systems?", *PISA in Focus*, No. 6, OECD Publishing, Paris, http://dx.doi.org/10.1787/5k9h362n5z45-en, Figure 2.

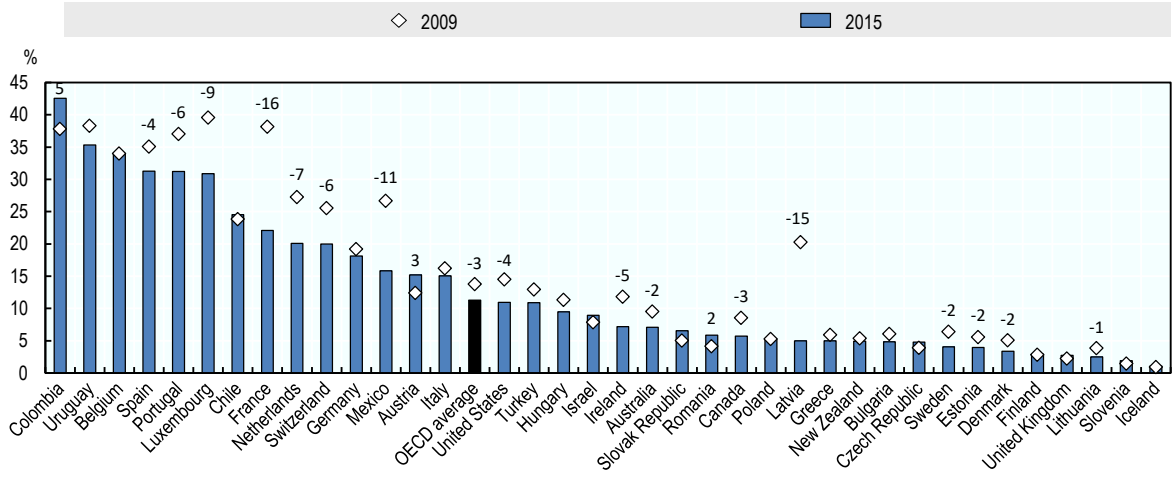
StatLink https://doi.org/10.1787/888933831469

Despite research evidence suggesting the ineffectiveness of year repetition, there are strong cultural attitudes in support of year repetition in many countries, particularly among educators (Paul, 1997 cited in (Field, Kuczera and Pont, 2007[39])).Teachers frequently believe that students must be held accountable for mastering year-level standards and skills prior to advancing to the next stage of education. Additionally, the threat of repetition can serve as a motivating tool to encourage productive behaviours in students (Range et al., 2012[40]). These are surely valid concerns, and for some students traditional forms of year repetition can be a valuable opportunity to solidify their learning gaps. However, using this practice as selectively as possible has educational performance, equity and cost benefits.

Over the past years, a number of OECD countries have taken steps to reduce their reliance on grade repetition practices. Across OECD countries, the percentage of 15-year-old students who reported that they had repeated a year at least once decreased by almost three percentage points between 2009 and 2015. Notably, the percentage of 15-year-old students who had repeated a year at least once had dropped by a margin of 10 percentage points or more in France, Latvia, and Mexico. By contrast, in Austria the percentage was higher in 2015 than it was in 2009 (Figure 4.5).

Figure 4.5. Change in the year repetition rate between 2009 and 2015

Percentage of students who had repeated a year in primary, lower secondary or upper secondary school



Note: Statistically significant differences are shown above the bars. Only countries and economies with comparable data from PISA 2009 and PISA 2015 are shown. Countries and economies are ranked in descending order of the percentage of students who had repeated a year, in 2015.
Source: Source: OECD (2016) *PISA 2015 Results (Volume II): Policies and Practices for Successful Schools*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264267510-en, Table II.5.11.

StatLink https://doi.org/10.1787/888933831488

Reducing year repetition begins by providing intensive, individualised support to struggling students: learning gaps between students should be targeted early with necessary supports provided for students with difficulties so that they can be put back on track before the learning gaps widen. For example, in the Finnish education system, almost all students are automatically promoted (none are retained prior to Year 10). Every child has the right to individualised support provided by trained professionals as part of their regular schooling. A teacher who is specifically trained to work with struggling students is assigned to each school and works closely with teachers to identify students who need extra help. Similarly, Austria postpones assigning course grades and provides extra resources and up to 11 additional hours of language courses to recently arrived migrants. As the OECD has previously recommended, "this support should be offered on a regular and frequent basis, supplementing rather than repeating the workload, using different methods and ensuring continuity in student-teacher relationships" (OECD, 2012, p. 52[41]).

In situations in which schools do decide that decisions must be made to retain some students, flexible, comprehensive and evidence-based criteria should be used to assess whether a student should repeat a year. This can ensure that those students whose profiles suggest that they are most likely to benefit from repetition are the only ones who are retained (OECD, 2012, pp. 52, Table 2.1[41]).

Students' academic performance (either grades or test marks) is too narrow a criterion on its own to assess the appropriateness of repetition. Light's Retention Scale is one assessment instrument that examines a variety of non-cognitive factors including physical and emotional maturity, other learning disadvantages, supports already provided, chronological age, and a variety of other factors that may proscribe repetition (Light,

2015[42]). Unfortunately, there exists limited research base on the validity and reliability of scales such as these for accurately predicting which students would benefit from repetition. Therefore, whatever tool school personnel uses, the process should be minimally formalised and subject to clear criteria.

At higher years, limiting repetition to a module, subject area, or a failed course instead of an entire year can smooth transitions. At the upper secondary level in Canada, New Zealand and the United States, repetition "is usually restricted to the specific classes that the student failed. A student can be promoted in a mathematics class but retained in a language class. Usually this is complemented with additional opportunities to learn and be assessed." (OECD, 2012, p. 54[41]). This form of "conditional promotion" can involve students being required to take an on-year level course at the same time they take a remedial class in the subject area in which they struggle at the expense of an elective or enrichment class. It satisfies many educators' practice-based preferences for student-level accountability and support, while avoiding system-level concerns about its associated harms. In Finland, at the upper secondary level, schools operate on a course system whereby students can repeat the courses that were not passed rather than the entire year. With this modular and intensified counselling approach, only 4% of students drop out during general upper secondary school in Finland (Välijärvi and Sahlberg, 2008[43]).

A similar approach in upper secondary education is to allow students to change to other equivalent educational programmes to ensure completion when different educational pathways exist in the year to be repeated. In some countries such as the Netherlands and Spain, students in a general upper secondary pathway may be given the option, in the event of course failure, to shift into a vocational stream to avoid repeating a year (OECD, 2012[41]). However, while there can be benefits to permitting switches between educational programmes, care must be taken to ensure that such measures do not become a form of demotion to a lower-level track for struggling students. Stream switches should permit transitions between pathways that meet students' interests without constraining future opportunities. Critical to accomplish this goal is ensuring that different school pathways have unique profiles and all promote labour market success.

As important as policy proscriptions against repetition or shifts in how the practice of repetition is enacted, cultural shifts in the education profession and school-level incentives to avoid repetition are critical. Decisions to retain a student are typically taken by school leaders and teachers, sometimes involving parental consultations, and may be governed by national or sub-national guidelines and regulations (European Commission, 2011[44]). Ultimately, however, the decision lies in the hands of educators, so shifting their perceptions on the benefits and drawbacks of repetition is critical. Raising awareness through professional development and initial and ongoing teacher preparation programs is one tool.

France has managed to reduce year repetition since turning serious attention to this issue in 2008. The Ministry of Education set ambitious objectives to reduce repetition rates. School leaders were required to explain their school level results and encouraged to decrease the number of repeaters. Students struggling in the last two years of primary school were provided with two additional hours of academic support. The rate of primary school repetition was still 14% in 2009, so the ministry set a goal of halving this rate by 2013. In 2014, Parliament passed a decree addressing school repetition [*Decree 2014-1377 of 18 November relating to the monitoring and educational support of pupils*]. The decree indicates that the repeating of a year should be considered "exceptional." (Benhenda and Grenet, 2015[38]). The decree also highlights the value of dialogue between

the student and the school staff prior to the decision on a student's repetition. Though overall rates of repetition are still quite high, France experienced the greatest drop of any PISA country in the proportion of 15-year-olds who had repeated a year at any time in their schooling between 2009 and 2015, declining by 16.1 percentage points from 38.2% to 22.1% of all students. However, this rate of repetition is still the sixth highest in the OECD, and 12.7% of students are still retained at least once in primary school, thus more work remains (OECD, 2016, pp. 368-369 Tables II.5.9 and II.5.11[2]).

It is worth noting that budget savings from year repetition abolition appear gradually. Indeed, as a French case study shows, the abolition of this practice can induce short-term costs related to the more rapid flow of students towards higher and more costly educational levels. The first savings could appear in the medium term (after two years in the French case) and increase gradually over time. This has important implications in terms of policy as "first, the savings to be made by abolishing year repetition can only be realised and used for other education purposes gradually. Second, the reform would require several years of careful and rigorous management of the recruitment and allocation of teaching staff over the whole transition period." (Benhenda and Grenet, 2015, p. 4[38]).

In countries where year repetition is very high and deeply rooted such as in Belgium and Uruguay, UNESCO advises a gradual transition away from repetition practices. Limits can be placed on the number of times a student repeats a year within a schooling cycle, for instance "dividing the average six-year cycle of primary schooling into two-year sub-cycles with no repetition allowed within each sub-cycle. When practiced alongside a system that identifies and supports weaker children, this approach has been found to increase quality" (UNESCO Institute for Statistics, 2012, p. 57[45]).

Addressing student dropout through professional development, second chance education and predictive data systems

Students who fail in school often find it difficult to recover later on. They are less likely to continue learning in adult life and face significant barriers in the labour market. While prevention through interventions in earlier years is more effective and less costly, addressing the urgent needs of students who have left school early or are at risk of doing so is a critical educational and economic priority. Large proportions of students across the OECD still fail to complete upper (and in some cases lower) secondary education. The first-time graduation rates in OECD review countries range from less than three quarters to over 90%. These averages, however, mask heterogeneity within each country in the severity of early leaving. For instance, in Lithuania, in 2013, the percentage of early school leavers aged 18 to 24 was 3.6% in urban and 11.4% in rural areas. Rates for early school leaving also vary dramatically across socio-economic backgrounds, gender, immigration status, and educational history among students (OECD, 2016[5]).

Educational authorities have the potential to design and implement policies to reduce early school leaving. While variability in the dropout rate is related to student background characteristics, there is still a wide range of variation across communities with similar demographic makeups. For instance, the Slovak Republic and Japan have a statistically indistinguishable proportion of students in the bottom 20% of the international income distribution (7.6% vs. 7.9% with standard errors of 0.6 and 0.5, respectively). However, the first-time upper secondary graduation rate across all programmes is 97% for Japan and 83% for the Slovak Republic.

There are a variety of common reasons across countries and regions for these differential outcomes, such as poor match between students' interest and their programme of study,

weak and under-resourced counselling, or barriers to accessing the curriculum due to early skills gaps. There are also some country-specific policy challenges that produce differences in outcomes for different populations. For example, according to the Lithuanian National Reform Programme report, "the main causes for […] increasing regional differences [in the dropout rate] are believed to be an inadequate school network, underdeveloped infrastructure of educational support, and insufficient qualifications and competences of teachers" (Shewbridge et al., 2016, p. 14[46]). Thus this report presents some common strategies that can benefit all school systems in addressing the problem of early school leaving, but in each case, the solutions must be adapted to the local context.

Several OECD review countries provide systems of individualised support for at-risk students. For instance, although Uruguay and Austria have dramatically different rates of school dropout, both have been using similar prevention approaches based on reinforced human interaction with students. In Uruguay, "Community Classrooms" (*Aulas Comunitarias*) exist for over-age students under 17 who have not yet completed Year 7 to receive additional compensatory and remedial support. The Community Teachers Programme pairs youth with members of the community to provide coaching support (Santiago et al., 2016, p. 57;83[47]). In Austria, the Youth Coaching Service provides support to challenged secondary students (Nusche et al., 2016[20]) (see Box 4.1 for more information on these programs). Norway's Follow-Up Project (discontinued in 2013) paired non-enrolled youth, aged 16-21 with officers trained in motivational techniques to encourage youth to complete secondary and tertiary credentialing (OECD, 2013[48]).

Students who struggle to remain motivated may be re-engaged through the possibility of early acceleration into joint upper secondary (ISCED 3) and short-cycle tertiary (ISCED 5) programmes. Though such programmes take a variety of forms, a common structure involves providing students with the opportunity to earn tertiary credits and credentials while enrolled in secondary school, and often with the opportunity for embedded employer internship. One such Early College High School in New York City is the Pathways in Technology Early College High. "The school provides students with an enriched curriculum that is aligned with actual employment opportunities with industry partner IBM and that enables them to earn both a high school diploma and a cost-free Associate in Applied Science (AAS) degree in six years. Students have professional mentors, substantive workplace experiences (which differ from school to school), and internships" (MDRC, 2017[49]).

Emerging evidence indicates that students enrolled in these types of programmes had a higher chance of graduating from secondary education and further enrol or graduate from post-secondary education than those who – despite applying – were not selected (Berger et al., 2013[50]; Berger et al., 2014[51]; Edmunds et al., 2017[52]). Although opportunities for tertiary acceleration have shown potential for some at-risk students, these programmes do not address what happens when students do fall behind in secondary school. Second chance programmes can tackle this issue in a variety of ways including literacy and numeracy remediation or course repetition through online or in-person classes.

In Norway, the Transition Project identified the lowest performing students at the end of Year 10 and in upper secondary education and provided them with additional support in core skills. The project worked with teachers to provide concrete strategies for making Norwegian, English and mathematics more meaningful to students' lives. It also instructed teachers on ways to provide basic remediation to struggling students when this may not have been the focus in secondary teachers' pre-service preparation (OECD, 2013[48]). This project has since ended without a full evaluation of its effectiveness. While there is evident

potential for benefits from a second chance system, it may also induce students to dropout at earlier ages if they know they can always re-enrol (Field, Kuczera and Pont, 2007[39]). Additionally, the quality and rigour of these courses are often called into question (Kohli, 2017[53]). Thus, careful attention must be paid to the timing at which second chance programmes are offered to students, the standards of the course material, and the qualifications of their instructors.

Using early warning systems to support student-level interventions

The collection and analysis of data on students' transitions and distribution across programmes can facilitate the identification and mitigation of unsuccessful educational transitions. In multiple OECD review countries (e.g. Austria, Belgium (Fl.), Denmark, Estonia, Portugal and Uruguay), the OECD review teams have recommended that data on the distribution of student demographic groups across educational programmes be collected. Collecting disaggregated data on early tracking, VET placement, course failure, and early school leaving are necessary pre-requisites to address these challenges.

In some cases, the lack of data may reflect capacity constraints: countries such as Uruguay need to develop the information technology infrastructure to track this student-level data. In other cases, disagreements about the appropriate statistics with which to define whether an individual has completed secondary education can cause differences in how the dropout rates are reported. Within the United States, for example, multiple definitions of the status dropout rate, cohort graduation rates, and the use of alternate certification criteria (GED) tell different stories about who is a dropout (Murnane, 2013[54]).

In other systems such as Belgium (Fl.), Denmark, Estonia and Portugal, data on repetition or early leaving is systematically collected but not disaggregated, though student-level demographic indicators do exist. For instance, information on the rate of language learners' placement into vocational tracks in Belgium (Fl.) is not available (Nusche et al., 2015[55]). Similarly, in Estonia where Russian-speaking students attend vocational education programmes at higher rates than their peers, no information is collected on why they more frequently take (or are assigned to) these courses (Santiago et al., 2016[56]). It is possible that the failure to disaggregate the data or research these topics may be reflective of cultural concerns regarding the impact of presenting such educational disparities publicly.

Whatever the reasons, when educators cannot holistically review students' profiles and anticipate which need the most help, some will fail to receive the help they need. The Norwegian Completion Statistics project establishes attainment goals and a common set of data on which to base analysis of the dropout problem (OECD, 2013[48]). Critically, students receive targeted help when there is an identified risk of school failure. The Diplomas Now Project at Johns Hopkins attempts to quantify measures of student risk and define a program of intervention (see Box 4.1).

Box 4.1. Reducing year repetition and early school leaving using data and people

Early warning indicators

Informed by a body of research by Robert Balfanz at Johns Hopkins University, the Diplomas Now Program in the United States works by assembling a cohort of school- and community-support members who analyse students exhibiting Early Warning Indicators (EWI) of falling off track. Teams of educators hold regular meetings to discuss student progress, assess collected data and set a support plan in motion. Students are identified based on data in three domains found to have the greatest predictive power in whether a student will leave school early, also known as the ABCs of School Success:

- Attendance
- Behaviour and
- Course Grades

Critical to this support is pairing children with caring adults and setting aside time during the school day for them to meet either individually or in small groups with at-risk students. For the neediest students, Diplomas Now helps by forming support groups and connecting students with community resources, such as counselling, health care, housing, food and clothing. Full-time employed young adults welcome students to school, call them if they are absent, and offer tutoring. They intervene to help resolve problems and celebrate positive behaviour. After school, they help with homework and involve students in service and enrichment programs (Diplomas Now, 2016[57]).

Early evaluation of the program finds that there are some positive outcomes with respect to the ABC indicators, though not consistently across all measures. The ongoing study on long-term outcomes will culminate in 2019 (Corrin et al., 2016[58]).

Specialised staff

In Uruguay, the Community Teachers Programme (*Programa Maestros Comunitarios*) allocates one to two community teachers to disadvantaged schools depending on the size of the school. This programme aims to prevent students from falling behind and having to repeat a year by supporting children who perform poorly. This is coupled with the Teacher + Teacher (*Maestro más Maestro*) Programme providing either after-school or team teaching support for students in underserved communities (Santiago et al., 2016, p. 80[47]).

In Austria, the Federal Ministry for Labour, Social Affairs Health and Consumer Protection (*Bundesministerium für Arbeit, Soziales, Gesundheit und Konsumentenschutz,* BMASGK*)* provides a nationwide "Youth Coaching" initiative. Youth coaches advise and accompany young people aged 15-19 at risk of dropping out from school or being marginalised (Nusche et al., 2016[20]).

Source: Diplomas Now (2016), *What We Do, Diplomas Now*, http://diplomasnow.org/about/what-we-do; Corrin, W. et al. (2016), Addressing Early Warning Indicators: Interim Impact Findings from the Investing in Innovation (i3) http://diplomasnow.org/wp-content/uploads/2016/07/DiplomasNow-3rd-2016_2.pdf; Santiago, P. et al. (2016), *OECD Reviews of School Resources: Uruguay 2016*, http://dx.doi.org/10.1787/9789264265530-en; Nusche, D. et al. (2016), *OECD Reviews of School Resources: Austria 2016*, http://dx.doi.org/10.1787/9789264256729-en.

4.3. Horizontal co-ordination and students' transitions across parallel pathways

In response to students' different preferences, abilities and needs, many school systems offer a variety of educational pathways and parallel programmes, often tracking students into separate learning environments. The development of different pathways, tailored to different students' needs, is generally justified on the basis of increased choice and effectiveness, even if it may come at the expense of equity in educational outcomes. According to its proponents, educating students with similar skills and interests can help better target pedagogical interventions and more adequately allocate school resources. Concurrently, providing alternative paths for students disengaged from academic studies, those attuned to practical learning or those requiring special education services may help increase attainment and success in school education.

The design of horizontal transitions is instrumental to ease the successful progression of students. Providing multiple pathways and educational programmes raises the chances of meeting the interests of a diverse student population and the skills demands of a differentiated labour market. Challenges stemming from the integration of students from different socio-economic backgrounds, immigrants, students with special educational needs or those uninspired by traditional academic content have led countries to explore different policy options to cover the full spectrum of educational demand and provide "made-to-measure curricula" for students. Notably, this has resulted in multiple strands of offers, programmes and schools, which often raise efficiency and equity concerns.

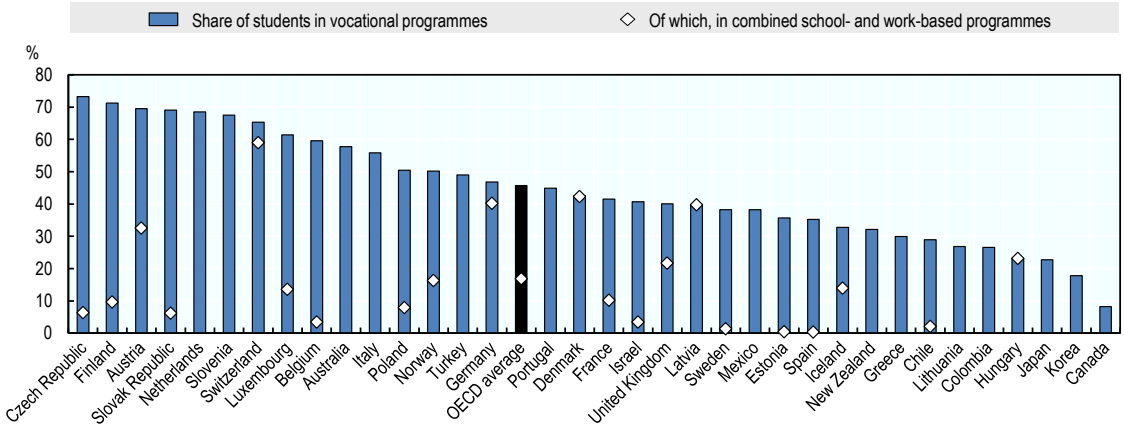
This section focuses on the co-ordination of education programmes for two specific sectors: vocational education and training (VET) and the provision of education to students with special needs.

Co-ordinating pathways for general and vocational education

High-quality vocational programmes are costly but critical to expand students' learning and labour market opportunities

VET programmes play a substantial role in the education of upper secondary students. On average across OECD countries, nearly half the students in upper secondary education, and over two thirds in some countries, are enrolled in VET (Figure 4.6). Vocational education programmes are primarily intended to help students acquire the practical skills leading to employment. In contrast to general academic programmes, they are targeted to prepare students primarily to enter a specific occupation often with a defined qualification, rather than providing the general academic background necessary for tertiary education (OECD, 2010[19]).

Figure 4.6. Share of students enrolled in upper secondary VET, 2015



Note: Countries ranked in descending order of the share of students in vocational programmes. Missing values indicate the absence of combined school- and work-based programmes or a lack of data (see online Figure).
Source: OECD (2017), *Education at a Glance 2017: OECD Indicators*, OECD Publishing, Paris, http://dx.doi.org/10.1787/eag-2017-en, Table C1.3.

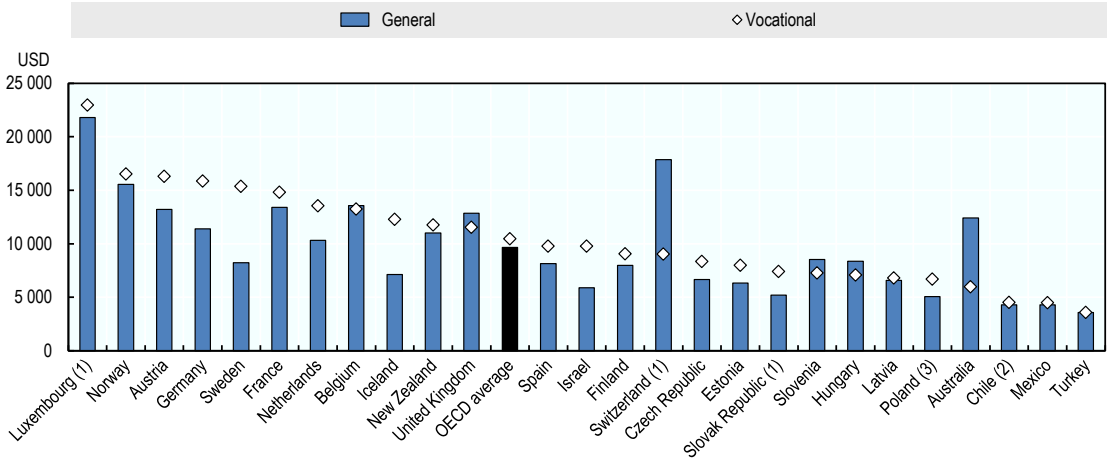
StatLink https://doi.org/10.1787/888933831507

In recent years, policymakers have come to see VET as critical to national economic success, as employers seek a wider array of skills from secondary school graduates than those provided by the traditional academic disciplines. In fact, most employment growth in the European Union (EU) is predicted to be in the "technicians and associate professionals", an occupational category demanding some form of technical training (CEDEFOP and European Center for the Development of Vocational Training, 2017[59]). In North America, the field of greatest growth is projected to be in "healthcare professionals and technical occupations", as well as "healthcare support occupations" (Richards, 2015[60]). While these types of professions may require some type of post-secondary training, tertiary academic education is not required. More broadly, the labour market has experienced a hollowing-out of routinized, middle-skilled jobs as a result of automation and technical innovation (Autor, Levy and Murnane, 2003[61]). The jobs of the future require technical and interpersonal skills, but not necessarily at the tertiary level; the value of vocational education is at premium (Hoffman and Schwartz, 2017[62]).

From a system perspective, vocational education programmes entail considerable costs. Driven by smaller classes and increased expenditure on infrastructure and specialised equipment, the annual expenditure for secondary VET students was higher than that for general education students in 19 of 26 OECD countries with available data. Across the OECD, the average spending per VET student in 2014 was 10% higher compared to those enrolled in general education (see Figure 4.7). Therefore, and in order to increase their overall efficiency, VET programmes have also been increasingly called to justify the higher costs by providing ever more relevant opportunities for students.

Figure 4.7. Annual expenditure per student by educational institutions in general and vocational secondary education, 2014

In equivalent USD converted using PPPs for GDP, by level of education, based on full-time equivalents



Note: Countries ranked by annual expenditure per student in vocational secondary education.
1: Public institutions only (for Italy, for primary and secondary education; for Canada and Luxembourg, for tertiary education and from primary to tertiary; for the Slovak Republic, for bachelor's, master's and doctoral degrees).
2: Year of reference 2015.
3: Vocational programmes in upper secondary education include information from vocational programmes in lower secondary education.
Source: OECD (2017), *Education at a Glance 2017, OECD Indicators*, OECD Publishing, Paris, http://dx.doi.org/10.1787/eag-2017-en, Table B1.1.

StatLink https://doi.org/10.1787/888933831526

The benefits of vocational education are borne out by labour market data from across the OECD. Employment rates for 25-34 year-olds are 10 percentage points higher among those who graduated from upper secondary VET than those who only completed upper secondary general programmes as their highest level of education (OECD, 2016, p. 107 Table A5.5[5]). Furthermore, increasing causal evidence points to benefits of VET for students that, based on prior performance, were on the margin of being assigned to a vocational or general track. Although VET's impact on students' test score outcomes is ambiguous, mounting evidence points to improved secondary graduation rates, higher rates of enrolment in tertiary education, and better labour market outcomes for students at the margin (Dougherty, 2016[63]; Neild, Boccanfuso and Byrnes, 2015[64]; Neild and Byrnes, 2014[65]; Kemple, 2008[66]; Murnane, 2013[54]; Oreopoulos, Brown and Lavecchia, 2017[67]; Hemelt, Lenard and Paeplow, 2017[68]). Interestingly, data from OECD's Programme for the International Assessment of Adult Competencies (PIACC) suggest that while tracking overall has negative impacts on adult skills, a focus on vocational skills within a tracked system increases the weakest students' numeracy skills (Heisig and Solga, 2015[69]).

Although the benefits from graduating with a VET diploma may be high, students in vocational programmes frequently fail to complete their studies. In order to curtail the relatively higher dropout rates in vocational programmes, some countries have been re-designing the educational offer to help meet students' needs. Denmark, in 2008, reformed its VET system, rationalising provision into 12 main study areas with updated syllabi. Alongside the new study programmes, the VET track also allows easier transitions

to post-secondary education (see also Box 4.4). The country has further implemented a new reform on VET in 2015 with the objective of enhancing the attractiveness of the vocational track. Despite the relatively well-perceived status of VET in the country, Denmark is below the OECD average with regards to the number of enrolled students. Danish authorities set goals for 2020 to increase the proportion of young students enrolling in vocational programmes directly after primary or lower secondary education by at least 25%, to offer ever more flexible programmes tailored to each student's level of ability and to deepen the involvement of labour market stakeholders (Nusche et al., 2016[70]).

Among other factors, consistently low rates of successful completion in VET programmes make it harder for them to attain parity of esteem relative to academic programmes. The perceived low status of VET programmes is a shared concern among several education systems visited by the School Resources Review. In countries like the Czech Republic and the Slovak Republic, although enrolment in VET is higher than the OECD average (Figure 4.6), graduation rates are low. In the Czech Republic, where overall graduation rates are climbing, completion rates of upper secondary VET have decreased by more than 30 percentage points between 2005 and 2014 (Shewbridge et al., 2016[71]). Other Central-Eastern European countries, such as Lithuania or Estonia face similar challenges, despite lower levels of enrolment in VET. Lithuania, where graduation from general programmes is considerably above OECD average, has one of the lowest graduation rates from upper secondary VET among OECD and partner countries (OECD, 2017, p. 62 Table A2.2[1]). In Estonia, one out of every five students enrolled in vocational programmes stops attending school each year (Santiago et al., 2016[56]). The persisting challenges with VET in Central-Eastern European countries had already been identified by the World Bank in 2006. Besides the high dropout rates, curricula relatively isolated from the world of work and a significant mismatch between job placement and the formal qualification of entrant workers remains a challenge of vocational programmes in these countries.

Separate provision and governance of general and vocational education must weigh trade-offs

General and vocational tracks are often regarded as disconnected strands of the educational offer. Vocational schools often require specific buildings and equipment, which encourages the provision of general and vocational programmes in separate schools. In countries such as Austria, France, Germany and the Netherlands, school-based VET instruction generally occurs in dedicated schools. Establishing a tier of institutions providing a clearly distinct offer may help to improve the profile of vocational programmes. Specialised provision deters schools from drifting towards an academic mission, with the risk of marginalising its specific vocational offer. An excessive "academisation" of VET programmes may feed perceptions of vocational programmes as a lesser version of the general curricula or cause students to become disaffected due to the repetition of the general curriculum from which they have already opted out. VET-specific schools may, therefore, be better able to distinguish themselves from general schools by having specialised curricula and infrastructure making themselves more attractive to potential VET students (OECD, 2014[72]).

But the provision of VET in separate schools may incur considerable costs. An excessive fragmentation of the course offer often compromises the ability of education systems and schools to provide services at scale. Differentiated provision often implies spreading the educational offer across smaller schools (see Chapter 3). For example, in the Austrian education system, students are selected into different schools according to their abilities and interests in both the transition from primary to lower education and – at a later stage – in

the transition to upper secondary education. Upper secondary education in Austria is offered in five different types of schools, including pre-vocational schools providing only one year of education and schools providing part-time vocational programmes. Combined with a relatively sparse distribution of population in rural areas, fragmentation of the educational offer into separate schools can further hinder school network consolidation (Nusche et al., 2016[20]). Austria has, however, made recent efforts to allay these concerns. Beginning with 2018/19 school year, schools are allowed to cluster under a common leadership and administration, even when offering different tracks.

The Czech Republic has one of the most differentiated education systems by international comparison. Schools offer specialised provision at both lower secondary and upper secondary levels, including general, artistic, technical and vocational education, which contributes to the high number of small schools and small class sizes existent in the country. Moreover, the governance of the educational offer limits incentives for rationalisation. While vocational schooling is organised and planned at the regional level, there is limited collaboration across regions, hindering the ability to consolidate programmes into broader vocational fields. In the past, the school funding design worked as a mechanism to keep existing programmes in place. Schools would not experience a decrease in their funding allocation if student numbers in a given programme were to decline. Therefore, there was little incentive for schools to rationalise their educational offer and design programmes that were appealing to both students and employers (Shewbridge et al., 2016[71]). However, based in part on recommendations from the School Resources Review, reforms were initiated in 2017 that will come into force for the 2018/19 school year. Schools will now receive funds based on the total number of student-hours taught, and this is forecast to reduce regional funding inequalities (European Commission, 2017[73]).

The provision of VET in comprehensive schools can also have the potential for improving its status. In Lithuania, the review team was optimistic that increased collaboration with general lower and upper secondary provision could be a way for vocational schools to provide a broader range of curricular options and to allow students to experience at first hand the high-quality facilities that exist in many vocational education centres (Shewbridge et al., 2016[46]). Recently, Portugal has been increasingly offering vocational programmes in comprehensive upper secondary schools, gradually departing from a traditional model of VET provision in a network of publicly funded professional schools. Concurrently, both enrolment and graduation rates of students in VET have been converging towards parity with general programmes (Liebowitz et al., 2018[74]). Finally, the provision of VET programming in comprehensive schools has the potential to lower rates of social segregation insofar as VET pathways tend to attract greater proportions of low-income, immigrant students.

The risk of fragmentation in the educational offer extends beyond the separation of the general and vocational offer. A proliferation of parallel tracks in general or vocational secondary education can be costly without substantially improving students' learning experience. In multiple OECD review countries, greater school autonomy and a trend towards providing greater choice to students and their families has led to an expansion in the number of both courses and the types of school providers. Proponents of school autonomy argue that providing schools with independence for setting the curricula yields the potential to foster pedagogical approaches that are better tailored to students' and local needs. It is anchored in this ambition that the Flemish Community of Belgium, for example, combines curricular autonomy with free choice of schools. There are no catchment areas and students and their families are free to choose any school from its three umbrella

networks of providers. However, the OECD Review of School Resources noted that, despite the curricular autonomy, most of the schools abide by the curricular guidelines and assessments developed by their umbrella networks, failing to systematically develop wholly innovative practices (Nusche et al., 2015[55]). The impressions drawn seem to echo different strands of research in the context of charter schools in the United States which show that greater diversity of providers does not necessarily lead to significant pedagogical innovations (Lubienski, 2003[75]; Preston et al., 2011[76]).

National and regional collaboration across governmental actors and with private providers is critical for a well-designed VET offer

Fragmented vocational systems are often the result of inefficient governance arrangements for the oversight of VET provision, such as a lack of co-ordination among the local administrative entities responsible for the VET system, or between public authorities and private providers. These difficulties have in many cases led to schools offering similar vocational programmes in close proximity to one another and, by extension, duplicating costs.

Countries have taken steps to provide regional support systems to improve the quality of vocational education and its co-ordination at the regional level. In the Slovak Republic a recent 2015 reform nurtured the creation of regional training centres for the purpose of increasing the efficiency of the VET system and is expected to bring improvements to regional co-ordination across sectoral employer organisations, regional state authorities and VET providers (Santiago et al., 2016[11]). With sufficient capacity, regional and local training centres have the potential to take stock of the skills sought by local and regional employers, steer vocational curricula and foster collaboration.

VET programmes can also benefit from greater collaboration with private providers of resources and facilities. Schools in close geographic proximity often purchase and provide students with similar equipment. Regional and local training centres can either decide to consolidate these options or allow schools to share the physical resources. Hungary, Germany, France and the Netherlands have all implemented such measures aiming to improve the cost efficiency of vocational training. In Lithuania, multi-functional, regional vocational training centres bring small rural providers under a unified administrative structure. The regionalised structure can increase the quality of the educational offer in rural areas and helps avoid duplicative course pathways, while the multi-functionality allows these centres to better serve the community and students' needs (see Box 4.2).

Avoiding duplication in the purchasing of materials and capturing the benefits of sharing specialised equipment requires the willingness of providers to engage in active collaboration. In practice, the scope of these agreements may be limited by a lack of incentives, the absence of established communication channels, or legal barriers such as insurance liabilities or contractual restrictions on those permitted to use equipment. In addition, as investments in workshops and other specialised infrastructure and equipment are large, school principals and local authorities often have a strong sense of ownership over their physical resources, which may reduce their initial willingness to collaborate.

Box 4.2. The establishment of regional multi-function and vocational training centres in Lithuania

As one of the Eastern and Central European countries that inherited a large number of small technical and vocational schools, Lithuania launched a programme in the early 2000s to restructure and enhance the efficiency of its vocational school network. Since the country's accession to the EU, this process of regionalising VET provision has been supported by the EU's Structural Funds and resulted in the establishment of regional vocational training centres, equipped with practical training facilities. The first regional training centres were created by merging training institutions within a given region and focussing their provision on one or several sectors of the Lithuanian economy, which caused a significant reduction in the number of VET schools. By 2008, 13 of these training centres had been granted self-governing status and increased budgetary autonomy, which allowed them to involve a greater variety of stakeholders in their management (including enterprises alongside regional and municipal government representatives).

Likewise, support from EU Structural Funds has allowed some Lithuanian municipalities to create "multi-function centres" (*daugiafunkcis centras*) that bring together day care services with pre-primary and primary education, as well as a community facility under a single management structure. In 2015, 11 municipal primary schools and 40 municipal basic schools were operating as part of such multi-function centres. Their primary purpose is to improve the quality and accessibility of public services in rural areas and reduce their isolation. This integrated approach allows for the benefits from economies of scale and collaboration which a small, isolated primary school could not, on its own, provide. It also provides the opportunity to better align pre-primary and primary education – a concern that had been picked up in an EU funded research project in 2012.

Source: Shewbridge, C. et al. (2016), *OECD Reviews of School Resources: Lithuania 2016*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264252547-en, p. 62; Santiago, P. et al. (2016), *OECD Reviews of School Resources: Slovak Republic 2015*, OECD Publishing, Paris, http://doi.org/10.1787/9789264247567-en.

Early tracking of students may limit educational efficiency and equity

Despite the potential benefits of high-quality vocational programmes, concerns remain regarding the selection of students into these programmes. In some OECD countries, students can be placed into selective tracks from as early as age 12 (e.g. in the Netherlands and Belgium), age 11 (e.g. the Czech Republic and the Slovak Republic) or even age 10 (e.g. Austria and some German states) (OECD, 2016, p. 167 Figure II.5.8[2]). Particularly where tracking occurs at a young age, students' choice of or selection into tracks tends to be strongly associated with their socio-economic background. School education may thus contribute to reproducing – rather than mitigating – initial differences in educational opportunities. In most OECD countries, students from disadvantaged socio-economic backgrounds are significantly overrepresented in vocational tracks. According to PISA 2015, the share of 15-year-old students enrolled in a vocational track is 21 percentage points smaller among students in advantaged schools (the top 25% of schools ranked by the average socio-economic status of their students) than among students in disadvantaged ones (the bottom 25% of schools) (OECD, 2016, pp. 168; 375-377 Figure II.5.9 and Table II.5.17[2]).

Selection into different educational tracks and separation of students according to academic ability has been extensively studied. While proponents of early tracking argue that educating children in different learning environments allows more tailored pedagogical practices from a young age, cross-country evidence rather suggests that such practice yields no significant gains for students. In multiple contexts, tracking has been shown to marginally increase the educational outcomes of high achieving students, while substantially decreases the performance of low-achievers; thus increasing educational inequality with no overall average benefits to academic performance (Hanushek and Wossmann, 2006[77]; Epple, Newlon and Romano, 2002[78]; Schütz, Ursprung and Wößmann, 2008[79]). Causal evidence on a reform in the German state of Bavaria in 2000 showed that moving forward the timing of student selection into basic (*Hauptschule*) and middle-track (*Realschule*) schools from grades 6 to 4 significantly decreased student performance in both types of schools. Moreover, the share of very low performing students significantly increased, while the achievement of students selected into the academic track (*Gymnasium*) remained unchanged (Piopiunik, 2014[80]). Descriptive data from PISA lends further support to the claim that separation into different learning environments may be detrimental to overall cognitive development. In fact, OECD countries that tend to educate students from different ability levels in the same classes and schools also have higher levels of performance in science. Furthermore, less of the variation in students' achievement in these countries can be explained by students' socio-economic background (OECD, 2016, pp. 172;383-385, Figure II.5.12, Table II.5.25[27]).

Separation of students into different schools according to ability is a common practice in some of the countries visited by the OECD School Resources Review. In the Czech Republic, where selection into competitive strands first begins at age 11, students move into either a basic school or an eight-year *Gymnasium*. Students can later move to a six-year *gymnasium* after two years of basic school and finally be selected into one of six different tracks in upper secondary education. Educational offer in the country is thus highly stratified. In particular, and similar to other countries, family background significantly influences selection into programmes offered in the most prestigious tracks (*Gymnasium*) (Santiago et al., 2012[81]). Concomitantly, even if not causally, the Czech Republic has the lowest upward educational mobility rate of all OECD countries: 82% of 25-44 year-olds failed to complete tertiary education if both their parents only accomplished upper secondary or post-secondary non-tertiary (compared to an OECD average of 57%) (OECD, 2016[5]).

The Flemish Community of Belgium also tracks students relatively early, between the ages of 12 and 14. Secondary school is divided into three stages, and educational pathways are further multiplied within those stages. While students can move from the vocational to the academic track, this rarely happens at the upper secondary level (see Figure 4.8, Panel B). Instead, students frequently transfer to less academically oriented schools or programs (known colloquially as the "waterfall system"). As a policy response to the negative effects of early tracking, the Flemish Community of Belgium has developed a "Master Plan for Secondary Education" aimed at – among other objectives – attracting and retaining more students from disadvantaged socio-economic backgrounds in general programmes. In order to reach such objective, the reform envisioned creating a more comprehensive stage of schooling in lower secondary education, delaying early tracking. While delaying early tracking as a means to reduce the impact of student background in the selection of study programmes seems promising, its effectiveness crucially depends on other complementary policies, such as the introduction of better system to monitor the characteristics of students going into different tracks and a strengthened early diagnosis and response to language

learning needs as a means to avoid students being referred to vocational programmes due to language difficulties – a common reason for student selection into VET courses in the Community (Nusche et al., 2015[55]). Similar to Belgium, Austria has also made recent efforts in moving towards a more comprehensive system and reducing inequality in student learning opportunities (Box 4.3).

Box 4.3. Towards a more comprehensive system - New Secondary Schools in Austria

The New Secondary School (*Neue Mittelschule*, NMS) was introduced in 2008 as a pilot project. It was originally designed as a comprehensive school for all 10-14 year-old students (Years 5 to 8), combining the lower secondary stages of general secondary school (*Hauptschule*, HS) and higher-end academic secondary schools (*Allgemein bildende höhere Schule – Unterstufe*, AHS). While the initial intention was to abolish early tracking in the long run, due to a political compromise within the government coalition, all lower secondary stages of academic secondary schools continued to exist next to the NMS. However, since their introduction the NMS have become the standard lower secondary schools in the country, with most students enrolling and effectively replacing HS in 2016.

The NMS has similar curricula to the AHS-U, but different educational goals. Unlike the previous HS, students are not separated into different ability groups in core subjects. Rather are assessed on a differentiated grading scheme depending on students' academic ability in Years 7 and 8. Better results in the NMS are also sought by applying new pedagogical approaches, including more individualised and project-based learning and a competence-orientation.

The NMS were introduced as a means to mitigate the effects of early tracking and ability grouping in lower secondary education. Students are admitted to the NMS after completing their primary education without further pre-requisites. The NMS are also intended to open up better chances for their students, and particularly to help them continue their education at an upper secondary academic secondary school (*Allgemein bildende höhere Schule – Oberstufe*, AHS-O) and follow to an academic leaving certificate (matriculation examination, Matura).

The governance and funding distribution of New Secondary Schools is retained at the provincial level. Provincial schools are financed by provinces and municipalities using funds which are largely raised at the federal level and distributed across provinces. Political commitment to the development of NMS has been followed by a significant increase in public spending with relatively higher per-student expenditure than in AHS-U schools. The additional spending is largely dedicated to introduce new pedagogical methods in order to respond to the heterogeneity of the student population in the NMS. However, by the time of the review visit, available evaluations were limited to the schools in the pilot phase and the NMS as a new school type had not yet been evaluated on full-scale.

Source: Nusche, D. et al. (2016), *OECD Reviews of School Resources: Austria 2016*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264256729-en.

The vocational offer is often misaligned with labour market needs

The design of high-quality vocational programmes crucially depends on the adequate match between student preferences and the skills demanded by the labour market. However, vocational programmes in many countries are often artefacts of past labour market needs, relying on outdated curricula and insufficiently informed by system-wide planning and

strategic steering. Evidence-based strategies for governing and regulating vocational programmes are critical to developing a VET sector aligned with the needs and opportunities of evolving labour markets. Given recent trends in the development of artificial intelligence and continued integration of technological replacements for traditionally human skills, there are growing concerns related to the development of an adequate set of skills in secondary education. A recent OECD report based on the assessment of different computer science experts and PIAAC data points out that while literacy skills are increasingly used at work, only 13% of workers use them on a daily basis with higher proficiency than computers (Elliott, 2017[82]).

One of the major concerns across OECD countries is that demand for the skills that students acquire through vocational programmes may be short-lived in rapidly changing labour markets. VET that certifies narrow or non-transferable skills is more likely to lead to periods of under-employment or unemployment over the individual's life cycle. International evidence on the impact of VET on long-term labour market trajectories showcases informative differences in outcomes throughout an individual's career. While graduates from general education programmes experience greater initial difficulties in finding employment, they also tend to have higher rates of employment as they age, compared to VET graduates. Additionally, graduates from general programmes also earn more as they age and are more likely to receive additional on-the-job training (Hanushek et al., 2017[83]). Similar evidence shows that, although graduates from vocational programmes have an easier transition from school to work, the value of vocational education relative to general programmes tends to decrease over the career span (Lavrijsen and Nicaise, 2017[84]). Differences associated with gains throughout life can be partially explained by the relative struggles of vocational graduates have in adapting to changing skills demands. Adult workers require high levels of transferable skills – often in advanced literacy and numeracy – to update their skills profile (Abadzi, 2015[85]). Therefore, forecasting of long-term skills needs, strategic planning of the educational offer in consultation with labour market actors and building transferable literacy and numeracy skills into VET curricula are crucial to enhance long-term outcomes of vocational graduates.

Education systems increasingly recognise the need of students in vocational programmes to learn more transferable skills. The continuous evolution of the skills profile sought by companies and technological developments have led to a wider and more flexible range of abilities required from workers (Autor, Levy and Murnane, 2003[61]; Goldin and Katz, 2008[86]). Nonetheless, the development of transferable skills that are simultaneously appropriate to firm- or occupation-specific needs depend on the close involvement of labour market stakeholders. As firms rarely have a short-term incentive to unilaterally invest in the development of long-term human capital, education systems must support vocational programmes that meet these complex demands (OECD, 2016[87]).

Government authorities use complementary mechanisms to inform curriculum options in vocational education, such as regular consultation with labour market actors and rigorous forecasting of projected skills supply and demand. Co-ordination among stakeholders in advisory boards, councils or associations is commonly found across OECD countries. For instance, in the Slovak Republic, the government established a National Council for Vocational Education and Training alongside regional and sectorial VET councils, with the purpose of fostering links to the labour market. The Council has the mandate to discuss and review VET programmes and recommend to the Ministry of Education the fields of study that ought to be kept or excluded. Its members include employers' representatives and regional educational authorities (Santiago et al., 2016[11]).

Other countries have a long tradition of early identification of skills demand. Since 1999, in Germany, the Federal VET Institute, the Trade Union Confederation and the Employers' Organisation for Vocational Training co-ordinate with a network of research institutions (*FreQueNz*) to anticipate skills needs and adapt the vocational offer accordingly. These institutions work in close collaboration through the use of various complementary approaches such as: the development of forecasting models of labour market development, early identification of skills shortages, surveys of companies and employees, job advertisement analyses, among others (Hensen-Reifgens and Hippach-Schneider, 2014[88]). Long-term forecasts are complemented by short-term forecast exercises that directly feed into the planning of vacancies in apprenticeships, which permits the system to be flexible enough to respond to short-term fluctuations in qualification needs (OECD, 2016, p. 40[87]).

With the objective of better aligning educational offer with labour market needs, several countries have also been recently designing and implementing national qualification frameworks. National qualification frameworks provide a systematic recognition of qualifications – such as degrees, diplomas and other credentials – that are agreed among multiple stakeholders and help to signal the competencies of graduates to employers in the country. Additionally, these frameworks are intended to explain how qualifications relate to each other, and to build pathways within education systems. While national qualification frameworks have been widely applied, there is little empirical research on its effects in the gap between skills supply and demand, mostly showing mixed results (Raffe, 2013[89]). Two recent reports from the International Labour Organisation (ILO), comparing across more than 20 countries, have found little evidence that such policy instrument has led to significantly improved communication between education systems, employers and trade unions. Countries that most benefited were those able to develop national qualification frameworks as a complement, rather than a substitute, to other policies targeted at improving the recognition of qualifications (Allais, 2010[89]; Allais, 2017[90]).

The costs of implementing a national qualifications framework can be significant: policy analysis, assessment of international experience, development of qualification options, engagement of labour market stakeholders, and establishment of specific national agencies can all be particularly resource intensive activities. In fact, the OECD report *Learning for Jobs* points out that where national qualification systems are seen as a separate policy initiative (e.g. New Zealand, South Africa or the United Kingdom), they tend to be seen as capturing resources from other activities. In more embedded qualification systems building on a broader set of strategic, complementary policies (e.g. Scotland [UK]), there is greater potential for efficiency (OECD, 2010[19]). Therefore, gradual institutional change, grounded on capacity building, improved training and professional development for teachers and trainers and continued improvement of VET programmes seems to be more likely to lead to successful and less costly national qualification frameworks (Allais, 2010[89]; Allais, 2017[90]; OECD, 2010[18]).

Work-based learning has the potential to reduce the skills gap and further involve labour market stakeholders

A distinctive feature of upper secondary VET systems across OECD countries is the extent to which the vocational education offer incorporates work-based learning. Work-based learning – typically by means of apprenticeships or traineeships – involves the formal acquisition of knowledge and skills at the workplace enabled by employers' involvement in vocational training. Combined school- and work-based programmes are ones where between 25% and 90% of the learning activities take place in the work environment (OECD, 2016, p. 287[5]). Evidence from OECD countries shows that labour-market

outcomes of VET graduates are stronger if their programmes include substantial work-based learning time (OECD, 2014[72]).

There are several potential reasons behind the observed benefits of work-based learning. First, it fosters the application of theoretical and technical skills obtained in a school context to a workplace setting. Through direct contact with employers, students have more opportunities to learn about the nature of the workplace and determine the best fit for them. A dual system based on apprenticeship helps to ensure a smoother school-to-work transition for students who do not wish to continue on to tertiary education (OECD, 2010[92]). Second, students have the opportunity to apply their new-found skills in an authentic setting, and may, therefore, feel more motivated to learn necessary skills in the classroom context. Third, it enables employers to have access to a pool of skilled and potential future employees. This is especially relevant in strongly regulated labour markets, where companies have fewer incentives to provide initial training. In some contexts, graduates of work-school programmes have priority-status in applying to positions within the partner company (MDRC, 2017[49]). Finally, it enables budget-constrained schools to keep specialised types of training, while restraining costs through transferring part of the training responsibility to employers.

Over reliance on school-based vocational learning may cause inefficient purchasing patterns for schools. In particular, limited work-based learning and involvement with employers makes it more difficult to flexibly adapt the type of vocational training on offer to the skills demand of the labour market, as purchasing new equipment relies mostly on school systems' budgets. For schools, continuously updating the vocational offer to ensure its relevance to the labour market involves significant investments into equipment and physical infrastructure, discouraging innovation in the vocational offer (OECD, 2017[93]).

Despite its benefits for the quality and efficiency of upper secondary VET, most students across the OECD are enrolled in programmes where work-based learning is limited or non-existent (Figure 4.6). In several education systems visited by the OECD School Resources Review work-based learning in upper secondary VET is in the initial stages of development. For instance, in the Czech Republic, work-based learning remains limited, with no mechanisms to involve small companies in the provision of apprenticeships (Shewbridge et al., 2016[71]). In fact, despite high overall rates of enrolment in vocational programmes, most initial VET programmes take place exclusively in the school context. Only around 9 in each 100 students enrolled in vocational programmes in 2014 participated in some form of work-based learning (Figure 4.6).

However, there exist countries that have a strong work-based learning tradition. Austria, Denmark, Germany, and Switzerland have a long history of training through apprenticeships. These so-called dual systems employ a structure in which practical training in an apprenticeship is combined with a sound theoretical knowledge base obtained in a school context (see Box 4.4). In countries with substantial work-based learning in upper secondary VET, collaborations with employers are strong both in the form of cost sharing arrangements and the direct provision of apprenticeships. As a result, transitions from school to work tend to be relatively easier in countries with dual systems: the median age for leaving formal education is higher and a greater share of students aged 15-29 are already working (OECD, 2010, p. 55[92]).

In light of the evident benefits, some countries have enacted recent policies to create more work-based learning opportunities. For example, in the Slovak Republic a new VET Act came into force in 2015, introducing features of a dual system. Employers contribute to the practical component of students' training and the state provides tax incentives to employers

for their participation in the dual system. The new legislation has supported work-based learning as schools are now encouraged to establish partnerships with companies for providing practical training in accordance with their needs (Santiago et al., 2016[11]).

In the Flemish Community of Belgium, the offer of vocational programmes was perceived to be primarily determined by the interests of schools and their staff rather than by labour market demand (Nusche et al., 2015[55]). In particular, employers are minimally involved in the content and organisation of the programmes (Musset, 2013[94]). In order to address such concerns, a recent reform has separated VET into two strands: a fully school-based track and an improved dual learning track with 60% of the time spent in the workplace context. In the new system, a closer articulation with employers is also sought. Companies are involved in interviewing potential candidates and evaluating their training performance. Completion of any of the tracks leads to the same certification, organised in modules. This way, students who fail to complete the school-based component are still able to get professional qualifications or modular certificates for the competencies acquired during their work-based training (OECD, 2017[95]).

Box 4.4. Vocational programmes in Northern European countries

VET programmes in Northern European countries are offered relatively late. Either due to prolonged pre-primary education (e.g. Finland and Sweden), or by having 10 instead of the typical 9 school years leading to the completion of lower secondary education (e.g. Denmark or Norway), student transitions to vocational programmes typically occur at age 16.

VET systems in these countries enjoy a high-status; they are regarded as instrumental for successful transitions from school to work. The high degree of confidence among stakeholders in vocational pathways is partly owed to work-based learning being an integral part of the curriculum, and also to the solid theoretical knowledge learned in the school context. Nonetheless, the development of relevant work-based learning opportunities is not without challenges.

Different admission criteria

Admission criteria for vocational routes in Northern European countries vary considerably. For instance, in Sweden, fewer courses with passing grades are required for entry into the vocational pathway. Other countries opt for stricter admission policies; Denmark launched a reform of its VET system in 2015 that included increasing performance requirements in Danish and maths to gain access to vocational schools (Cedefop, 2018[96]). In Finland, student selection is based on students' grades. VET providers also have the right to set selection criteria that may include work experience or aptitude tests, according to government regulations.

Alternative arrangements of work-based learning

In Norway, work-based learning is built into vocational programmes in a series of alternative arrangements. Most upper secondary VET programmes in the country follow a 2+2 model, implying two years of school-based learning followed by two years of paid apprenticeship training in a company or public institution. Other models place more emphasis on school-based and work-based learning respectively (e.g. 3+1 or 1+3). Graduation from these

programmes allows students to earn a trade (or journeyman's) certificate and to enter the labour market. Nonetheless, Norway is currently working to increase the participation of employers in VET.

In other countries, work-based learning requirements are somewhat more flexible. In Finland, a VET qualification can be earned either through apprenticeship training or competence-based qualifications. In apprenticeship training, learning takes place in a working context 70% to 80% of the total learning time, while a competence-based qualification only requires students to sit through competence tests.

Sweden's VET system also enables different dosages of work-based learning. Students in vocational programmes can attend either a school-based education or an apprenticeship education. In order to complete their upper secondary degree, apprentices need to spend a minimum of 50% of their time in work-based learning, while school-based learners only need a minimum of 15% of on-the-job training.

Integrated general and vocational certification

In Denmark, vocational learning is offered in a range of different programmes, with varying duration and focus on practical training. From short basic vocational programmes with practical training in enterprises, to longer VET combining longer periods of theoretical education in a secondary vocational college. In particular, the Danish education system offers a combination of VET with a three-year general education programme enabling students to gain both a vocational and a general upper secondary school leaving certificate. The integration of both paths allows the development of job-specific skills without jeopardising the acquisition of general academic ones.

Another option for integrating general and vocational education is by increasing the permeability of the pathways. In Norway, students enrolled in VET programmes, with two years initial education in schools, can opt to change to an academic bridge course in the third year, replacing two years of apprenticeship in a firm. Despite not leading to a trade certificate, successful completion of the bridge course grants access to academic higher education. Students who have also attained trade certificates have the right to attend a fifth year of general supplementary studies. On the other hand, Sweden opts for a modularised approach. In order to facilitate transitions across tracks, students are allowed to transfer completed courses across study pathways and gain alternative qualifications based on accumulated curricular credits.

Sources: Nusche, D. et al. (2016), *OECD Reviews of School Resources: Denmark 2016*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264262430-en; Norweigian Centre for International Cooperation in Education (SIU) (2016), *Vocational education and training in Europe - Norway*, Cedefop ReferNet VET in Europe reports, http://libserver.cedefop.europa.eu/vetelib/2016/2016_CR_NO.pdf (accessed on 06 September 2017); Koukku, A. and P. Paronen (2016), *Vocational education and training in Europe Finland*, http://libserver.cedefop.europa.eu/vetelib/2016/2016_CR_FI.pdf (accessed on 19 September 2017); Skolverket and ReferNet Sweden (2016), *Vocational education and training in Europe Sweden*, Cedefop ReferNet VETin Europe reports, https://cumulus.cedefop.europa.eu/files/vetelib/2016/2016_CR_SE.pdf (accessed on 19 September 2017); Cedefop (2018), *Developments in vocational education and training policy in 2015-17: Denmark*, Cedefop monitoring and analysis of VET policies, Brussels, http://www.cedefop.europa.eu/en/publications-and-resources/country-reports/vet- (accessed on 16 July 2018).

Opportunities for transitions across tracks are critical to meet students' changing interests and skills

The way in which programmes and course pathways are designed may help to reduce the impact of socio-economic background on students' choice of pathway and outcomes. A crucial design feature is the way in which opportunities for horizontal transitions across tracks exist. Early tracking risks placing young students in programmes that do not correspond to their potential performance and changing interest. Effective barriers to transitions can further accentuate the mismatch between the profile of the student and the track initially assigned, often leading to early school leaving. Moreover, inflexible transitions from vocational programmes in upper secondary education to post-secondary studies may exacerbate the separation of tracks and limit the progress to tertiary education opportunities.

In order to allay these concerns, education systems across the OECD have made efforts to ease the progression of students desiring to change tracks, and thereby better match their evolving needs with the available educational offer. In the Netherlands – where a wide range of vocational education programmes is offered starting at age 12 – teachers have the discretion to delay tracking of students in lower secondary education by placing them in "bridge classes". Additionally, a legal framework for "scaffolding diplomas" allows students, upon graduation from a longer vocational programme in upper secondary education, to have unconditional access to academic tertiary education (OECD, 2016, pp. 173-175[2]; OECD, 2016[96]). In Germany, where tracking may occur as early as Year 5, students are allowed to change tracks when moving from lower to upper secondary education. Recent evidence shows that for marginal students – i.e. students close to the threshold between two different tracks, and potentially misallocated – attending a lower track in lower secondary education has no significant impact on long-term outcomes such as wages, unemployment or occupational choice relative to individuals early assigned to the academic track (*Gymnasium*). The authors present evidence for the fact that such outcomes are only possible due to the in-built flexible mechanisms allowing students to change tracks when entering upper secondary education (Dustmann, Puhani and Schönberg, 2017[97]).

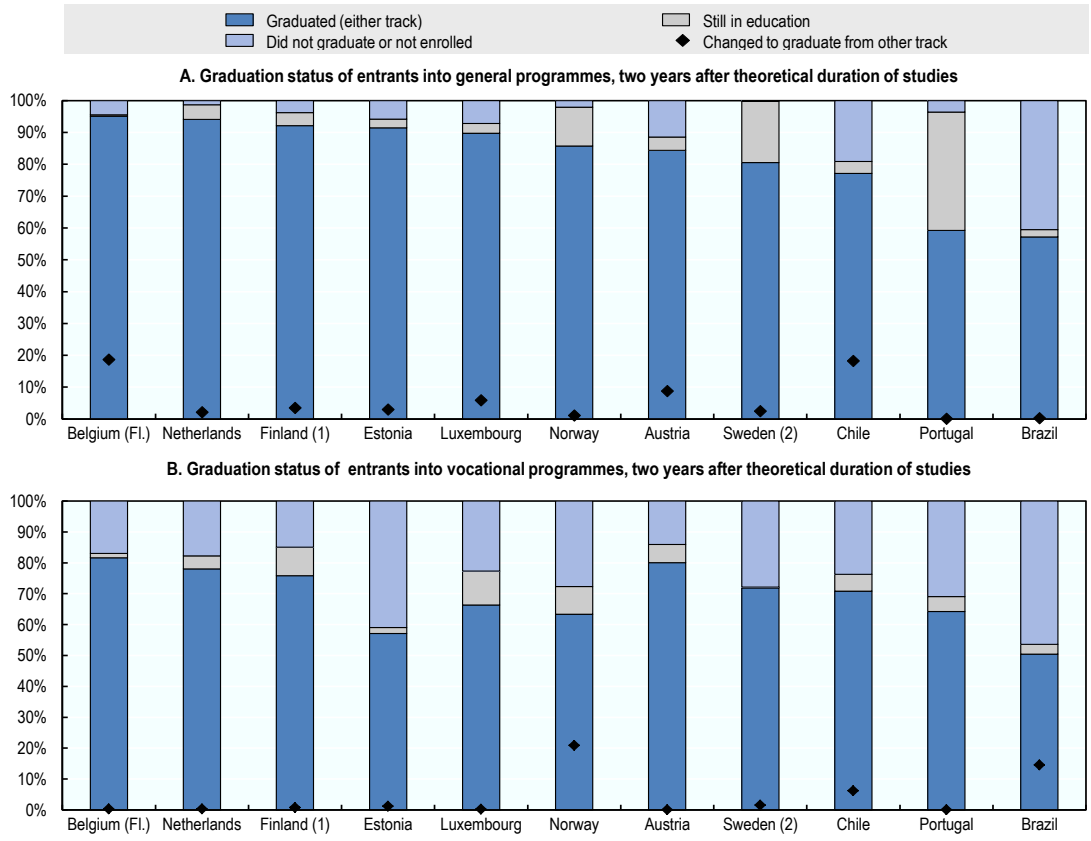
Other countries opt to create direct pathways from upper secondary VET to post-secondary VET and tertiary education. In Austria, students graduating from part-time vocational schools (*Berufsschule*, BS) and secondary technical and vocational schools (*Berufsbildene mittlere Schule*, BMS) have the option to gain access to higher education by sitting a series of general tertiary entrance examinations (*Berufsreifeprüfungen*). Additionally, graduates from ISCED 5-level Colleges for Higher Vocational Education *(Berufsbildene höhere Schule*, BHS) – required to complete one additional year than students in the academic track or other vocational strands – gain direct access to university entrance (*Matura*) (Nusche et al., 2016[20]). Similarly, in Denmark, students can combine a VET programme with a general academic examination to gain access to tertiary education. Moreover, an upper secondary track combining vocational and general programmes enables students to gain both a vocational specialisation, as well as a general upper secondary school leaving certificate to access tertiary education (Nusche et al., 2016[70]).

Combinations of VET and general curricula have been one of the strategies used by countries to improve horizontal transitions in upper secondary education and facilitate progression to tertiary education. This combination is often eased through the modularisation of curricula – i.e. the division of traditionally full-year courses into short duration modules – which has been widespread in the VET sector, particularly among European countries. Modular VET may provide greater flexibility to students and aide the

adaptation of curricula to the changing demand for skills (Cedefop, 2015[98]). For instance, Sweden opted to modularise vocational programmes, allowing students enrolled in upper secondary VET to transfer completed courses to any other programme and graduate from the general track (Skolverket and ReferNet Sweden, 2016[100]).

Despite these efforts, OECD data for a small cohort of countries indicates that, even where there are in-built mechanisms to facilitate flexible transitions across pathways, students rarely transfer across programmes. Figure 4.8 reports the graduation status from upper secondary education two years after the theoretical duration of their studies, i.e. two years after the regulatory or common-practice time it takes a full-time student to complete a level of education. While Panel A describes the graduation rates of those that entered into general programmes, Panel B displays the successful completion of entrants into vocational programmes. Crucially, both panels show that few students transfer across programme orientation before completion. In 5 of the 11 countries for which there is available data, the proportion of students that transition from vocational to general programmes rounds to zero. For instance, despite Sweden and the Netherlands policy efforts, fewer than 5% of students actually transition from one track to the other (Figure 4.8, Panel B). High transition rates across pathways could be indicative or poor initial placement, and it is impossible to fix a goal rate of transition. Nevertheless, very low rates of transition, particularly from the vocational to the general pathway, indicates few opportunities for students to move from the traditionally disfavoured VET track and bears further scrutiny.

Figure 4.8. Completion rates and track-switching of upper secondary students, 2015



Note: Data presented in this figure come from an ad hoc survey and only concern initial secondary education programmes for young people. It is based on a true cohort method, following one cohort of students for a period corresponding to the theoretical duration of their degrees (N) and N plus two years (N+2). N is defined as the regulatory or common-practice time it takes a full-time student to complete a level of education.
1: Year of reference 2014.
2: Students who continued their studies in the adult education system are included in the column of "Did not graduate or not enrolled".
Source: OECD (2017) *Education at Glance 2017: OECD Indicators*, OECD Publishing, Paris, http://dx.doi.org/10.1787/eag-2017-en, Table A9.2.

StatLink https://doi.org/10.1787/888933831545

Designing effective opportunities for flexible transitions is possible, however. More than one-fifth of Norwegian students who begin in vocational programmes end up earning a general upper secondary education degree within two years of the end of their theoretical time in this system. An explanation for this might be the structure of the vocational offer in Norwegian schools (see Box 4.4). At the end of a two-year school-based component, students may apply to an apprenticeship position in a company or transfer to a third year of bridging course, enabling them to qualify with a general upper secondary certificate (Norwegian Centre for International Cooperation in Education (SIU), 2016[101]). Such structure helps alleviate the relatively high share of students who do not complete vocational programmes or are still in the same education level two years after the duration of theoretical studies (36%; Figure 4.8, Panel B).

Transitions from general to vocational programmes are somewhat more common across the countries presented. Nevertheless, only in the Flemish Community of Belgium and Chile did more than 10% of students who started in a general programme ultimately graduate from the vocational track (Figure 4.8 Panel A). While it is possible to view such a transition as a stronger match between student interest and programme, many countries use a "waterfall" system such as this as a justification for failing to support struggling students in general programmes. As students experience failure in general settings, they may be pushed into low-opportunity vocational tracks. In this light, the low rate of transfers from general to vocational pathways can be considered a relative success. On the other hand, where vocational programmes can still lead to access to higher education (e.g. Austria) and good labour market opportunities, higher rates of transition from the general to vocational track may also signify success in addressing the risk of students otherwise dropping out from education altogether.

Co-ordinating pathways for mainstream and special needs education

Historically, school opportunities for students with SEN have been limited in OECD countries. Prior to the 1970s, students with moderate or severe SEN were typically excluded entirely from school. Minimal supports existed for students with mild- or moderate SEN in mainstream settings, and they were often tracked into low-skills classes, having significantly lower levels of educational attainment (Shapiro, 1993[102]). In the worst cases, children with disabilities were relegated to overcrowded, abusive and unsanitary institutions (Fisher, 1997[103]). Over the past 40 years, at varying rates and accelerated by international efforts such as the United Nations (UN) Convention on the Rights of Persons with Disabilities, countries have recognised the moral imperative to provide equal educational opportunities to students with SEN (see Box 4.5 for an example from the Flemish Community of Belgium) (OECD, 2017[104]).

Box 4.5. Reforming special education provision in the Flemish Community of Belgium

After the Flemish Parliament ratified the UN Convention on the Rights of Persons with Disabilities in 2009, the Flemish Community legally reinforced the right of students with special educational needs to be enrolled in mainstream education, through the passing of the M-Decree in 2014, with measures that included:

- Updating the definition categories for special needs students, including a category for children with autism.
- Requiring mainstream schools to make reasonable adjustments, such as providing specialist equipment and support staff to accommodate special needs students in the mainstream system, and requiring mainstream schools to only refer a student to special needs education once all such "reasonable adaptations" have been tried.
- Providing parents of a child with special educational needs who disagree with a school's refusal to enrol their child with the right to appeal to a Student Rights Commission (*Commissie inzake leerlingenrechten* or CLR). This commission is comprised of experts in equality and education law and was created by the Parliamentary Act of 2002 on Equal Educational Opportunities.

The measures imposed in the M-Decree were implemented in 2015/16, and national sources indicate an already noticeable decrease in the number of primary students in special needs education in the first school year under the new measures (Department of Education and Training et al., 2017[105]).

Source: OECD (2017), *Education Policy Outlook: Belgium*, OECD Publishing, Paris, available at: www.oecd.org/edu/profiles.htm.

In 2015, the UN's adoption of the Sustainable Development Goals in 2015 underlined this imperative in its Goal 4: "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all". Consequently, countries have set themselves the target to "build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all" and to ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations, by 2030 (United Nations, 2015[106]).

Recently, empirical evidence has added to the ethical argument for inclusion as it has demonstrated improved academic and life outcomes from educating students with SEN in the least restrictive environments while providing additional supports (Hanushek, Kain and Rivkin, 2002[107]). In some cases, however, education systems have used special needs education as a catch-all to respond to educational difficulties for some students, resulting in the over-identification of racial and ethnic minorities, low-income students and boys (Losen and Orfield, 2002[108]; Harry and Klingner, 2006[109]).

Due to substantial differences in how countries classify students with SEN, internationally comparative data is difficult to collect. The OECD Teaching and Learning International Survey (TALIS) 2013 data includes 26 countries where more than 5% of principals reported that their schools comprise a population of students with SEN of at least 10%. Teachers working in these schools educating a substantial proportion of SEN students represented an average of 26% of the countries' total teaching populations (OECD, 2014[110]).

The decision about the setting in which to educate students with SEN is a highly complex one. The causal evidence does not generally show harm to SEN students, or their general education peers, by including them in mainstream settings (Hanushek, Kain and Rivkin, 2002[107]; Ruijs and Peetsma, 2009[111]). However, neither does it show consistent benefits. Analysis using TALIS 2013 data suggests that where there are more students with disabilities included in mainstream settings, greater classroom disruptions occur and teachers spend less time teaching and more time correcting student behaviour (Cooc, 2018[112]). This accords with evidence from the United States context suggesting negative peer effects and increased teacher turnover associated with the inclusion of students with an emotional or behavioural challenges (Gilmour, 2018[113]). Additionally, every student has an individualised range of specific supports and environments in which he or she will experience the most educational success. Further complicating comparative analysis is that the categorisation of students with SEN is highly idiosyncratic within countries, let alone in cross-country samples. Nevertheless, it is instructive to note that there is an enormous spread in the proportion of SEN students who are fully included in mainstream settings.

As increasing numbers of SEN students are educated in mainstream settings, education systems must make significant investments and build capacity in mainstream schools to meet the needs of students with SEN. Schools are often not physically designed to be accessible to all SEN students. Finally, and most critically, teachers in the TALIS surveys indicate significant levels of discomfort and lack of experience in working with students with SEN (OECD, 2014[110]), necessitating meaningful embedded professional development to create more welcoming and productive classrooms for students with special needs.

School systems struggle to properly identify, resource and integrate students with SEN

As noted above, the rate at which School Resources Review countries identify and include students with SEN in mainstream settings varies widely. Lithuania, for example, has an official SEN identification rate of 11%, more than three times that of Uruguay at 3%. Even when countries have relatively similar rates of SEN identification, the setting (general or special needs-specific schools) in which they educate those students can vary (see Table 4.1).

These discrepant rates of special needs identification and inclusion are a product of differing statutory, regulatory, cultural and demographic conditions. Some countries have mandates imposing upon school systems a legal obligation to identify cases of SEN in their student population and requiring schools to educate students with SEN in the most mainstream setting possible. For instance, in the Czech Republic, there exist five legally defined categories of disability. According to Decree No. 72/2005, a team of "school advisors" (a team of psychologists, social workers and pedagogical staff established and overseen by the National Institute for Education) is responsible for identifying and providing services to students with SEN. Critically, if the school advisory team provides a professional evaluation of disability, the student's parents or guardians are consulted and have a veto power over the child's placement in a separate setting (Shewbridge et al., 2016[71]). However, in 10 of the 12 completed School Resource Reviews countries, these requirements to educate substantial proportions of students in mainstream settings either do not exist or have only been instituted in the previous 15 years. Thus, there is a limited evidence and knowledge base built around long-term inclusion practices.

As a result of the differing standards for identification, cross-country differences in identification rates are difficult to interpret, particularly as they relates to "softer" categories of special needs (Categories C, I, J, K, L and M in Chart 3.1 in the OECD's comparative classification system (OECD, 2005[114])). For instance, low rates of identification of "K. Severe and/or Moderate Learning Problems" could be indicative of effective early intervention programming that prevents students from falling behind, or it could be due to neglect in identifying these learning problems. Similarly, high rates of inclusion could be indicative of a school system that has successfully promoted equitable practices, or it could be a cost-saving effort providing minimal supports and weak outcomes for struggling students.

In fact, in the majority of the OECD review countries, the ministries of education reported concerns around incentives built into funding formula provisions for special education students to retain students in separate schools. Indeed, in several OECD review countries, the overall secondary school populations are declining while the enrolment in special needs schools has remained consistent, with growing shares of students educated in these separate settings. Additionally, educators working in separate schools may only have qualifications to work in these settings, or may only work without qualifications in special education

schools. Educators in this situation may feel pressured to identify more students as disabled and requiring separate schooling in order to retain their positions. Non-transferable licenses also prevent reallocation of these teachers in the event of school consolidations.

As with most OECD countries and partner nations, OECD review countries struggle to avoid inaccurately identifying students who are simply struggling in school or suffer from other societal disadvantages as having special needs. Some of the OECD review countries have disproportionate rates of special needs identification for low-income, immigrant and ethnic populations (particularly Roma). Despite legal provisions in Austria, for example, against labelling a students as having a SEN simply due to unsatisfactory achievement, this continues to be an issue when students show learning problems, especially when they are also migrants (Bruneforth and Lassnigg, 2012[115]). Box 4.6 describes some of these cultural biases and other barriers to successful integration of SEN students in more detail.

Misidentification may be stigmatising, result in lowered expectations or inappropriate types of support for the affected student. It also has negative externalities on the entire education system. The costs of educating students with SEN are high and resources may be inaccurately channelled to some students at the expense of others.

What is without question is that international evidence indicates that teachers and school leaders do not feel prepared to meet the needs of students with SEN. Almost half of teachers in TALIS have a principal who reports working in a school where "a shortage of teachers with competencies in teaching students with special needs" hinders the school's capacity to provide quality instruction (OECD, 2014, p. 47 Figure 2.6[110]). Only about a quarter of TALIS teachers report having participated in professional development in the past 12 months that had "a large" or "moderate" positive impact on their teaching of students with special needs (OECD, 2014, p. 106 Figure 4.12[110]). However, the single highest-need topic of professional development for TALIS teachers was teaching students with special needs (OECD, 2014, p. 109 Figure 4.14[110]).

Despite the expressed need educators report for expertise in serving SEN students, the results from the TALIS survey indicate that there are fewer experienced teachers (more than 5 years of teaching) in schools where more than 10% of students have special needs (OECD, 2014, p. 41 Figure 2.4b[110]). Thus, consistent with other similar evidence, school networks struggle to effectively distribute skilled (or, minimally, experienced) teachers to the students who need them the most.

Box 4.6. Cultural barriers to the inclusion of SEN students

In addition to the policy and practice barriers to successful integration documented in this report, OECD country review teams consistently heard concerns in country background reports and in interviews with stakeholders that there exist persistent cultural biases against the integration of students with SEN in mainstream settings. This accords with practitioner interview research on this topic (Skiba et al., 2006[117]).

Given the spectrum of ability within each SEN category, this can result in special education evaluation teams assigning students to a separate class or school even if the severity of the student's special educational need does not preclude them from a general education setting. Since each presentation of learning disability or difficulty is so unique and contextual, there are few ways to correct this through a document review or inspectorate process.

These cultural biases can distort the intended effects of inclusion policies even when SEN students are nominally placed in general education classes. For example, a classroom that is designed to be inclusive by policy may have two teachers: one responsible for general education students, the other for SEN students. They can be in the same physical space, but be working towards entirely different learning objectives and organised in groups that interact only minimally with each other.

Strategies to overcome cultural barriers to inclusion:

- Advocacy on the part of system leaders for attitudinal changes.
- Professional development to build educators' self-belief and efficacy in working with this population of students.
- Time and protocols for special needs and subject-area teachers to collaborate during the school day to design fully inclusive lessons.
- Inspectorate monitoring reviews to ensure that legal requirements for inclusion are followed both in the letter of the law and in its spirit.

Source: Skiba, R. et al. 2006, *The Context of Minority Disproportionality: Practitioner Perspectives on Special Education Referral*, *Teachers College Record,* Vol. 108/7, pp. 1424-1459.

Standards, procedures and training for the identification of SEN students

Several OECD review countries have enacted recent legislative reforms to improve the identification process to avoid under-, over- or misidentification. In June 2015, the Slovak Republic passed an amendment to the School Act which defines criteria for placement for students with special educational needs. It precludes students from being assigned to special classes or schools based on socio-economic disadvantage and limits assignment to such a setting for students with a medical disability. The amendment also mandates that the Slovak State Schools Inspectorate monitor the organisations responsible for managing identification (Pedagogical and Psychological Consulting and Prevention Centres). The Inspectorate may require corrective actions from the Centres and impose sanctions if their identification practices result in over-identification or excessive exclusion of socially disadvantaged groups (Santiago et al., 2016[11]).

To support these appropriate identification standards, funding formulas must avoid creating perverse incentives to over-identify students or place them in more restrictive settings. This could mean equalising weighted per-student allocations across placements and

differentiating them based on the objectively defined category of disability or special educational need.

In addition to providing legal guidance for identification, clear protocols for how teams of educators and health professionals recognise students' special needs help avoid misidentification. In fact, in one sample of schools in Chile, more than 30% of schools designed their own protocols for detecting learning disabilities (Marfán et al., 2013[118]). This makes it difficult to gain a precise understanding of students' educational needs and may lead to a misidentification resulting in inappropriate kinds of support being offered.

Developing standardised protocols to be used in evaluation meetings can ensure that all actors (student, family, teachers, school leaders, social workers, guidance counsellors, psychologists, health professionals and others) have appropriate voice in the decision making. Additionally, these protocols can ensure all students have access to appropriate testing and evaluation procedures. Finally, these protocols can mandate the collection of data that facilitate agencies that monitor whether all steps of the evaluation process have been taken and potential differentials in identification by student demographic background (Santiago et al., 2017[117]).

With the support of these protocols, it is critical to assemble the appropriate collection of stakeholders to determine a students' need for special education services and his or her most appropriate educational placement. Students of different socio-economic backgrounds have differential access to mental and physical health personnel which can result in under- (and sometimes over-) identification in certain communities. Timely identification and provision of services to socio-economically vulnerable children depends on access to healthcare professionals. At the same time, teachers and other educators who observe students every day in classes can have more in-depth and extensive insights than a health professional who may observe a child sporadically in a clinical setting (Fletcher and Vaughn, 2009[120]). This may be particularly true in situations in which the child's special educational need may be informed by his status as a language learner (Ortiz et al., 2011[121]). Thus, all perspectives are critical to the evaluation process.

However, as evidenced in TALIS 2013, at least a quarter of mainstream and special education teachers feel they need additional professional development to understand and meet the needs of students with SEN. Appropriate training for educators to effectively participate in the evaluation and identification process can improve the quality of these practices.

Integration of mainstream and SEN schools and staff

To ensure that investments into appropriate identification and integrated learning improve educational opportunities for SEN students not only in terms of access but also quality, attention should be paid to both the inclusion of special needs students, as well as the specialised materials, human resources and skills required to serve students with SEN. In order to benefit from the resources and experience of SEN schools and staff, OECD review countries have used a variety of strategies to create synergies between the two sectors. This can take structural forms such as physically siting special needs schools in the same building as mainstream school to provide opportunities for SEN students to take more classes in general education settings. It can also involve efforts to build professional connections between mainstream and special educators, and to encourage teachers with special education expertise to coach their colleagues. Finally, any efforts to mainstream special education students will require a reallocation of human and physical resources. This can be a budget neutral proposition (or even result in some cost savings if special education

schools are closed), but it does require an increase in the level of resources targeted towards mainstream schools for the purposes of SEN.

In some countries such as the Czech Republic and the Slovak Republic, special education schools are governed by different authorities than mainstream schools. In addition to the difficulties this creates in monitoring school quality, licensing teachers, co-ordinating resources, and the creation of staff development plans, different governance structures make partial integration of students difficult. For instance, students in the two systems might be on a different daily schedule, so having them travel between schools would be difficult. Without a common oversight body, adjusting schedules would require negotiations across the two schools and systems.

To promote learning by and between SEN and mainstream staff, several countries have developed centres devoted to special needs capacity development. In Estonia, regional support centres (called "Pathfinder Centres") provide services to students, parents, teachers and schools to support children with special educational needs. This might include the provision of speech therapists, special education teachers, social pedagogues and psychologists (Santiago et al., 2016[56]). Similarly, the Czech Republic has four regional "pedagogical advisory centres" that provide support to the school advisory facilities in the identification of and support for students with disabilities (Categories 2 through 5) (Shewbridge et al., 2016[71]). Danish special education service organisations like VISO (*Videns- og Specialrâdgivningsorganisation* – Specialised Knowledge and Counselling Organisation) and municipal PPRs (*Paedagogisk Psykologisk Râdgivning* – Local Educational-Psychological Advisory Services) play key roles in facilitating the inclusion process in mainstream schools (Nusche et al., 2016[70]). These types of centres can be responsible for the provision of sequences of professional development courses, add-on special needs licenses for subject-area teachers, and curriculum to facilitate integration. In Portugal, specialised support to students with SEN within schools is complemented by a network of 93 specialised resources centres for inclusion (*centros de recursos para a inclusão – CRI*) and 25 ICT resource centres for special education spread across the country. The resource centres are designed to support the inclusion of children with disabilities, build partnerships with local actors and facilitate the access of students with SEN to different activities (Liebowitz et al., 2018[74]).

In New Zealand, schools have worked together in Communities of Learning (*Kāhui Ako*) to develop a Learning Support Service Delivery model where multiple stakeholders contribute to the services that children receive. Specialists, teachers, resource providers and others collaborate to follow a six-point approach: (i) family and extended family (*whānau*) connections; (ii) individualised child educational plans with goals and supports required to meet them; (iii) flexible support services; (iv) increased co-ordination of services cross providers; (v) use of data to identify successful interventions; and (vi) the use of a facilitator to ensure all parties are able to co-operate and work together. New Zealand has attempted this integrated approach in one region, and is gradually extending it nationwide. Additionally, New Zealand has developed an Inclusive Education website that provides schools, leaders and teachers concrete resources to help with inclusive practices ranging from language-based strategies to initiate cultural shifts to classroom strategies to make curricular material more accessible to all students (New Zealand Ministry of Education, 2018[122]). Nevertheless, continuing to develop teacher capacity to support the needs of students with SEN remains an ongoing policy priority in New Zealand.

Promoting collaboration between mainstream and special education staff requires schools and networks to dedicate time during teachers' contractual days and develop protocols to

effectively guide the process. Dedicated regional support centres can play a role in creating teacher professional learning team protocols, modelling effective team-taught lessons, writing curriculum to promote integration, and creating teacher schedules that provide collaboration time.

Funding robust inclusion systems

The integration of SEN students requires time and short-term resource investments, although cost savings may be achieved in the long run. To improve the provision of services for children and youth with permanent SEN and the quality of education for these students, authorities should make sure that schools which enrol and retain SEN students have the resources, as well as incentives in place to serve these students. Funding approaches must recognise the additional investments needed to provide an inclusive education to students with SEN in terms of infrastructure, educational materials and human resources.

Increasing the capacity of mainstream schools to provide integrated instruction may require infrastructure adjustments including additional classrooms for pull-out options in mainstream schools and the conversion of some special schools into resource centres supporting the integrated work of mainstream schools. This may also involve refitting some special schools to serve mainstream and integrated populations of SEN students (Nusche et al., 2015[55]). Some school systems have particular holes in their apportionment of special education funds. For instance, Estonia and Portugal were particularly under-staffed in special education teachers and teaching assistants to support mainstream inclusion (Santiago et al., 2016[56]; Liebowitz et al., 2018[74]). These types of staffing shortfalls may require the development of a funding formula with additional weighting for the education of special needs students in mainstream settings, the re-calculation of the appropriate coefficient for this additional weight for students at different levels of special needs, the reapportionment of staffing from more costly special schools to mainstream settings, or some combination of these three depending on the country context.

As one example of a country policy to ensure that additional funds for special education are effectively used, Chile requires schools that receive specialised grants for inclusion provide a rigorous investment plan detailing how the funds will be invested in resources that directly benefit students with special needs, including teachers or specialists, teacher training, teaching materials, diagnostics, co-ordination or collaborative work between specialists and teachers (Marfán et al., 2013[118]).

Accountability and flexibility in the use of SEN funding

In order to effectively integrate SEN children in mainstream schools and classroom, care must be taken in how funding is allocated and monitored for these purposes. Schools are often resource constrained and attention must be paid to ensure that these funds are not re-purposed for general education. At the same time, the categorical nature of these funds should not prevent schools from using funds such as these for the purposes of intervening with students who face the same learning difficulties as SEN students but have not (yet) being identified as such. In some contexts, for example, students without explicit learning disabilities are prohibited from participating in reading or mathematics support classes if students are part of the school's special education programme, even if these other students would benefit from them.

School actors would often like to be able to use some of their targeted SEN funds to provide intensive support to struggling students to prevent them from needing to experience

complete failure before they can receive additional support. This sort of an approach is justified by the educational research literature on the Response to Intervention (RtI) strategy (RTI Action Network,(n.d.)[123]), but often not supported in practice due to constraints on how special education funding can be spent.

In the United States, policymakers attuned to this situation provide for two side-by-side solutions. First, school districts operating a school receiving categorical funding for a high-incidence of low-income students may combine their special education funding under the Individuals with Disabilities in Education Act (IDEA) with their compensatory programming for low-income children to design a school-wide system of remediation (Individuals with Disabilities Education Act, 2004, p. §300.613[124]). There are limits on the total amount of special education funds that a sub-national school district can provide to a school for that purpose, depending on the total number of students with SEN enrolled in the school, but this program ensures that schools and school districts can use their special education funds in a flexible way to address all needs, while maintaining services for students with SEN. Secondly, school districts with a history of over-identifying sub-populations of students may be required, and others may choose, to use up to 15% of their special education funds for Comprehensive Co-ordinated Early Intervention Services (CEIS) that provide intervention programming intended to limit the number of students identified for special education placement (Individuals with Disabilities Education Act, 2004, p. §300.646[124]). Nevertheless, there is wide variability in states' and districts' use of these opportunities, ranging from 0% of eligible districts taking advantage of this provision in several states to over 64% in Louisiana (U.S. Department of Education, 2016, pp. 270-1[125]). Thus significantly more must be done to ensure that appropriate guidance, incentives and capacity building are in place to promote early intervention to minimise over-identification.

Supporting the transition of students with SEN into independent lives and work after school

Students with SEN have substantially worse levels of educational attainment and labour market participation rates than peers without special needs. Their long-term rates of employment, wages, post-secondary education attainment, residential independence and other indicators are lower than their general education peers (Blackorby and Wagner, 1996[126]). Though their experience in some contexts has improved in recent years, including their level of community and civic engagement (e.g. seeing friends, voting), their post-secondary experiences generally measure worse than their peers (Newman et al., 2011[127]). This challenge speaks to the inter-connected dimension of horizontal and vertical transitions. Students entering the special education pathway sometimes struggle with transitioning to a parallel system, as well as from one level of education to the next and further into the world of independent living.

Though few school systems explicitly plan for transition activities after the age of compulsory education, these strategies hold promise. Participation in post-schooling transition planning programmes increased rates of post-secondary enrolment for youth with autism spectrum disorders (Wei et al., 2016[128]; Chiang et al., 2012[129]). Transitional activities improve functional independence (Wagner et al., 2005[130]; Carter, Austin and Trainor, 2012[131]), post-secondary attainment and employment (Shattuck et al., 2012[132]).

Minimal standards to ensure access to school for special needs children

Some OECD review countries are substantially further behind in meeting the basic requirements of identification and service provision. In some cases, they fail to identify many students with SEN. In others, they educate all but a handful of students with SEN in entirely separated facilities. In the most serious cases, they fail to provide any schooling options to some categories of students with SEN beyond the primary years. In these situations, countries must develop a comprehensive strategy that includes: i) categories of special needs and a definition of educational success or goals for students in each of the categories; ii) mechanisms to identify students with special needs; iii) a shared reflection process about the role of special schools with respect to the mainstream setting; and iv) a significant increase in the resources allocated for special education services.

4.4. Policy options

Ease students' vertical transitions across school years and levels through effective co-ordination and targeted support

Provide incentives for collaboration and transitions across levels of education

Well-designed pathways through all levels of schooling and into the workforce can help young people develop as human beings and gainfully transition to adult life. Smooth transitions facilitate human capital development, ease entry into the labour market, and reduce costs associated with youth unemployment and worse health outcomes for under-educated adults.

Enhancing the co-ordination between different levels of education yields several efficiency and quality improvements. First, it facilitates resource sharing between school providers, especially when incentives for joint provision are aligned with the goals of each individual school. Ensuring the conditions for reaching agreements across schools specialised in providing different levels of education incentivises sharing of facilities and materials. Second, it fosters greater co-ordination for articulating the curricular and pedagogical offer, facilitating the progression of students throughout the system and helping them to integrate skills and capacities acquired at each level of education.

Ensuring that the curricular sequence progresses smoothly from the initial stages of children's development to completion of upper secondary education helps students successfully move from year to year and minimises reasons to drop out of school. The transition to primary school can be challenging for children faced with the need to adapt to a new environment, with new daily routines. Especially in systems where ECEC has formal learning curricula, co-operation between pre-school and primary school providers can help smooth this transition. This may entail the provision of multiple levels in integrated schools or the exploration of common pedagogical strategies and efficiency gains through organisation into school clusters.

At higher levels of education, and particularly in education systems with early separation of education pathways, it is important to guarantee that the curriculum of less academically-oriented tracks flows smoothly from lower to post-secondary education. Building a shared vision of purpose for all strands and tracks helps providers of different levels of education to explore common curricular options and ensure a continuum of curricular offer.

Policymakers should address the relevant curricular options in consultation with stakeholders and reflect on the appropriate configuration of years and levels of education. Such configuration affects the extent to which services, facilities and materials can be efficiently shared. Greater scale in provision and having curricular options based on shared goals can yield greater school network collaboration and richer learning environments.

Provide effective alternatives to year repetition

School systems can minimise inappropriate year repetition through: i) robust early warning indicators, ii) careful, standardised screening processes, iii) individualised, targeted support, iv) "conditional promotion" practices, and v) symbolic guidance from system leaders and public data reporting intended to shift cultural attitudes around grade repetition practices.

Identifying the contextually specific indicators that are simultaneously highly predictive of year repetition and easy for all stakeholders to interpret is a critical first step to intervening early. This may require building data systems that can track in an integrated fashion student attendance, course marks and behaviour. Once these data systems are built, educational professionals at the school level must be trained to interpret their outputs and design a standardised response protocol.

When students are identified as "at risk" as a result of early warning indicators, they should receive immediate additional help in the form of individualised coaching and extra remedial help both within- and outside of the standard school day. The impact of the coaching and additional academic help should be regularly progress-monitored to assess its effectiveness. For the coaching intervention, this can be accomplished through regular surveys of students' attitudes towards school or sense of self-efficacy. For academic support, short-term monitoring of student grades and exam scores is critical. Adjustments can then be made following these interim progress checks.

If despite intensive intervention, students continue to struggle to demonstrate competency on year-level skills, there may be some students for whom year repetition can be helpful. Employing a culturally relevant screening tool that is validated by comparing recommendations of year repetition to subsequent outcomes and tested for bias in its application is critical to ensure that choices to retain a student in year are done so with the expectation that this decision will benefit the student and are not systematically influenced by cultural biases. Furthermore, school systems can shift away from understanding the year repetition decision as a binary choice. Particularly in higher years, students can be required to take, for example, a prior-year mathematics course in place of an enrichment activity if this is the subject in which they have struggled, rather than repeating the entire previous year. With thoughtful student scheduling, this approach can be implemented at earlier year levels as well.

Finally, in many countries, educators and the public see year repetition as a valuable tool to maintain high standards and there are deep cultural concerns around lessening its practice and the impact it may have on students' sense of personal accountability. In order to allay these concerns and challenge misconceptions of the effects of year repetition, system leaders must publicly present data on the outcomes of year repetition and take strong public stances against its widespread practice. Only through such leadership will long-standing practices shift over time.

Guarantee appropriate student guidance and counselling, informed by latest insights in behavioural science

Students' education pathways are marked by crucial decisions at key transition points. Failing to support students in such significant moments yields several costs, as the consequences of sub-optimal choices impact both the individual and society. Especially in systems with early tracking, students must be adequately supported in selecting the educational pathway that does not unduly limit their ability to make different pathway choices as their individual interests, aspirations and competencies clarify themselves over time. Progression from lower to upper secondary education is a crucial transition point. Typically, common curricular paths are separated into different streams and tracks in the progression to upper secondary education. Student counselling is key to help students navigate the set of available options.

Moments of transitions from upper secondary education to post-secondary education and the labour market are also critical. In some cases, students are unaware of their academic or financial eligibility for tertiary education opportunities. Students' socio-economic background frequently plays a role not only on their ability to financially invest in post-secondary education, including the opportunity costs of not working, but also in their lack of exposure to the necessary qualifications for entry. Students must have adequate information on their post-secondary education options, as well as on the processes for application and enrolment.

Educational authorities should consider the appropriate frameworks for the certification of counsellors who can support students at these critical moments. Advice to students should rely not only on appropriate assessments of student interest but also on future tertiary education and labour market prospects of their choices. Counsellors must also be supported to interpret the course offer in post-secondary education, as well as labour market trends to inform their advice.

Unfortunately, in many contexts, barriers such as complex application and financial support forms, enrolment deadlines, and other logistic concerns prove limiting to students who lack family members or other connections who have already navigated these processes and can guide them through. As a result, even high achieving students may fail to enrol in their best matched post-secondary institution (Hoxby and Avery, 2013[16]).

A first, though costly, investment is to ensure that sufficient guidance counsellors exist and that they are effectively distributed throughout the education system. In the context of constrained resources, investing in guidance counsellors, ensuring their availability in both lower and upper secondary, and disproportionately assigning them to schools with concentrations of high-needs students is a first step.

Complementary strategies, informed by insights of behavioural science, can accomplish similar outcomes at a much lower cost. Systems can provide clear information on post-secondary options, remove unnecessary bureaucratic barriers, and repeatedly remind students of the steps to take to complete their enrolment. These interventions can have major impacts with minimal resource investment.

Use data-tracking systems to develop early warning indicators for students at risk of repeating years and/or dropping out of school

A critical factor preventing many school systems from intervening early and effectively with at-risk students is a failure to systematically identify them early, before their struggles are so pronounced as to minimise the efficacy of interventions. Some profiles of students

who risk repeating a year or dropping out of school are obvious for school staff to identify: students who are frequently disruptive, refuse to complete work and fail examinations. There are, however, other profiles of quieter struggles: students who attempt to avoid being noticed, students who produce the minimal required work at low levels of proficiency, and so on. Designing a comprehensive system to identify all students who are at risk requires robust data systems that are regularly used by school staff.

As a first step, ensuring that each student has a unique identifier that can be tracked across schools and networks is critical to follow highly mobile students who are at significant risk. Second, combining educator expertise with empirical analysis to identify the factors that are most predictive of students failing a course, repeating a year and dropping out of school can clarify which are the key indicators to track. In some contexts, these results can run counter to accepted wisdom. For instance, in the United States context, school attendance, course marks, and behavioural conduct are much stronger predictors of school completion than external test scores (see Box 4.1).

Once countries have built data infrastructure systems and agreed on which indicators to track, extensive training of school personnel (teachers, counsellors and school leaders) must take place to ensure that they both understand the meaning of the early warning indicators and believe in their value. For school staff to see value in this data, clear steps for intervention must exist. This might include targeted small-group teaching and counselling sessions or references to social service providers. The key is a clear protocol for what happens when students are flagged as in need, and then a system to track and ensure that these interventions have, in fact, occurred.

The last step to ensure that the data-tracking system has meaningful impacts is to periodically review the intervention impacts at the school and system levels. This involves analysing trends in early warning indicators across types of students and schools, comparing students' outcomes on the early warning indicators before and after the interventions to track individual growth, as well as more formal evaluation studies using regression discontinuity or matched student to identify the causal effects of the interventions. These types of analyses permit review of areas in which students or schools need extra support, an assessment of the efficacy of specific types of interventions, and an overall evaluation of the programme.

Invest in complementary second chance and early acceleration programmes to re-engage struggling learners and minimise school dropout

Second chance and early acceleration programmes are specific types of interventions for students who have struggled or are struggling to make successful transitions through secondary education and into post-secondary education and the labour market. These differ in substance from the previous types of interventions as they provide a different curriculum and schooling structure to re-engage students, rather than aiming to better support students in the common curriculum.

These two types of programmes tackle the problem in substantially different ways. The classical way of addressing students who have dropped out of school, but later express interest in gaining skills and credentials at the secondary level as adults, is the second-chance programme. Second-chance programmes can tackle skill gaps and school failure in a variety of ways including literacy and numeracy remediation, course repetition through online or in-person classes, or test-based competency demonstrations.

While there is evident potential for benefits from a second-chance system, it may also induce students to dropout at earlier ages if they know they can always re-enrol (Field, Kuczera and Pont, 2007[39]). Additionally, the quality and rigour of these second-chance courses are often low (Kohli, 2017[53]), which may mean that employers discount the value of a second-chance credential as it implies no additional skill acquisition on the part of the student. Thus, careful attention must be paid to the timing of the offer of second-chance programmes to students, the standards of the course materials, and the qualifications of the instructors.

An alternative to the traditional second-chance programme is that one that seeks to alter a student's trajectory before she experiences failure in the first place. School systems can use predictive data to identify students who are at risk of dropping out and intervene before it occurs. These types of early intervention programmes are often premised on an idea of acceleration rather than remediation. Though such strategies assume a variety of models, a common structure involves providing students with the opportunity to earn tertiary credits and credentials while enrolled in secondary school, and often with the opportunity for embedded employer internships. Students are assigned professional mentors, visit multiple workplace environments on learning missions, and access paid or unpaid internships. In some cases, graduates from these early acceleration programmes are given priority in job opportunities with partner private employers.

Ensure greater fluidity in students' horizontal transitions and the coherence of the educational offer

Limit the dispersal of educational options as a resource saving opportunity and leverage models that better meet individualised student demand

The type of opportunities that families and students want from schools is growing all the time, and schools are responding by offering increasingly diverse choices. While students and families demand more customisation, school providers sometimes struggle to adapt and fit the curricula according to the specific options that families seek. This can be due to constraints on the number of highly trained teachers in a particular sub-field of study, or the high costs of building and maintaining multiple high-quality facilities such as a school theatre, chemical laboratories, art studios etc.

Limiting the diversity of educational strands may be an opportunity to free resources up to invest in fewer, higher-quality options. In concrete terms, this may mean that smaller schools do not offer multiple educational pathways, and instead leverage blended-learning models to provide both quality core general and vocational curricula, alongside customised online learning options. Decisions would be made at a higher organisational level (national or sub-national). This would require stakeholder involvement to ensure that these decisions were well-informed and may involve difficult trade-offs and decisions running counter to the interests of some groups.

Educational authorities, in consultation with all relevant stakeholders, should reflect on the adequate balance between quality and variety. In particular, reforms to the curricular structure and the existing educational offer should ensure that each educational strand meets broadly agreed-upon student needs. Where the organisation of the educational offer is planned at sub-central levels of governance, it is important to couple the authority to consolidate programmes with greater local flexibility in resource distribution. Combining these two authorities allows decisions to be made without worry that ending a particular educational pathway will result in fewer overall resources, or that newly created,

labour-market relevant pathways receive insufficient support (OECD, 2017[93]). Aligning financial and human resource incentives with curricular pathway rationalisation is critical for effective implementation.

Reflect on effective alternatives to early tracking

Early tracking of students is a common feature of various OECD education systems. However, international evidence suggests the adverse effects of selecting students to different education streams at an early age. Importantly, the socio-economic background of students is often a significant factor for selection into different tracks. Separation into different streams at an early age often prevents students from maximising their potential, especially when admission into less academically oriented tracks entails less stimulating learning environments. As children develop their capacities at different rates, education systems should flexibly adapt to such differentiated needs. Therefore, delaying the age of first tracking has the potential to allow students to cognitively and socio-emotionally mature and enter the most challenging pathway they can successfully complete.

Where delaying the age of tracking is politically infeasible or undesired, education authorities should consider alternative policies to attenuate its potentially negative effects. Some education systems have been moving towards greater integration in the provision of general, accelerated, pre-vocational and vocational tracks into the same lower and upper secondary schools. Even with early selection, integrated schools providing multiple pathways may generate both better outcomes and free resources to invest in other priorities.

Integrating elements of vocational and general education can create synergies and raise students' awareness of the merits of each of the tracks. Through mingling with peers enrolled in different tracks but in the same school, students also enjoy greater opportunities to observe, experience or be aware of other learning environments. Integrated school settings may also attenuate the impact of socio-economic differences as integrated schools can lead to more fluid transitions for students.

An integrated approach also allows for a more modular approach to tracking where students may pursue different types of applied versus theoretical learning depending on the subject area. Combining this modular approach with intensive counselling (see previous policy recommendation) surrounding selection and admission of students into different tracks can allow students to test out multiple types of courses and pathways before making a supported decision about which direction to pursue.

Such integration of services thus enables a more coherent organisation of educational planning for improved progression throughout the school system. As promising as these integrated approaches may appear, it is important to design them in such a way as to not create a two-tiered school in which some tracks are seen as less prestigious and inferior to the general programme. Counteracting this dominant perception with investments in state-of-the-art facilities and vocal leadership on the benefits of applied learning can help to mitigate these concerns.

Promote strong VET programmes and facilitate their students' horizontal transitions

Use labour market forecasting and local industry consultation to govern the vocational offer and better match supply to labour market needs

Consultations with employers and workers' representatives are important to get a pulse of how labour market actors perceive the skills of the new entrants and project future skills that will be needed. In addition to the qualitative perspective of stakeholders, effective tools for the forecast of skills demand and supply should also be in place to provide evidence-based guidance to educational authorities.

These forecasting processes should be based on high-quality data, including both learning and labour market outcomes. They should be as local or regional as possible, while also considering overall country and international economic trends.

There are at least two critical features of successfully aligning labour market projections with VET programmes: i) convening broad stakeholder groups in some form of Council and providing them with high-quality data on the future of employment; and ii) assigning these Councils with meaningful authority to open, consolidate, shift and otherwise plan the network of the VET offer. Examples such as those found in Austria, Germany, the Slovak Republic and Switzerland can be adapted to fit the particular profile of other countries.

Ensure that the vocational pathway has a well-defined profile while ensuring the development of transferable skills

VET systems are widespread across OECD countries. However, while some education systems limit VET to post-secondary levels others offer it as early as lower secondary education. Whether at the lower secondary or post-secondary levels, several countries struggle with the poor reputation of VET schooling. Vocational pathways are costly and often have higher rates of student dropout. VET is also often regarded as a lesser version of the academically-oriented tracks. Policymakers should thus reflect on the strategies to improve the status of VET programmes. Vocational programming should have a well-defined profile, broadly agreed upon by stakeholders, in order to confer it purpose and esteem. The goals of vocational and general tracks should thus be strictly defined and well understood among all educational stakeholders. Other strategies that can contribute to more positive perception of VET programming among stakeholders include: clearly publicising the value of the VET certification in the labour market, investing in high-quality facilities and equipment, attracting high-profile employers to partner with VET programmes, opening the culture of VET schools and programmes to allow students and families to visit and tour their operations from an early age and including first-hand experience in working environments (see policy recommendation on work-based learning).

Nevertheless, clearly differentiating the profile of VET from that of general education does not necessarily imply a complete separation of their curricula. In light of recent developments in labour markets, educational authorities should aim to strike a balance between an adequate provision of transferable skills with specialised know-how in vocational curricula. In particular, they should ensure that core academic skills – such as literacy and numeracy – are built into vocational programmes. An important consideration in the planning of vocational programmes is whether the skills students are learning will serve them only in the short-term or will allow them to learn and grow in an evolving

labour market. An excessive focus on developing specific "employability" skills at an early age risks limiting students' options to specific jobs that may not exist later in their careers.

Policymakers should also consider incentivising the use of innovative pedagogical approaches to include transferable skills in practical subjects. Hands-on and practical application of theoretical knowledge in vocational programmes may be a way of appealing to students at risk of dropping out, without jeopardising the acquisition of crucial general skills.

National qualification frameworks, systematic frameworks of study and skill verification confirming students' eligibility for jobs in fields with labour market demand, can reduce fragmentation in the educational offer and provide a basis for steering the provision to match students to jobs. Developing qualification frameworks which are nationally consistent and agreed among the different stakeholders – in particular, employers and workers – is critical. This includes keeping the total number of qualifications manageable, while permitting enough flexibility to meet the local conditions.

Reduce barriers to students' mobility across tracks and ease transitions from VET to tertiary education

Having clear goals and a unique profile for vocational programmes should not compromise students' mobility across tracks and the choice of a vocational programme in lower- or upper secondary education should not deter students from progressing to tertiary education. While many countries, in principle, allow students to move across educational pathways, the actual rate at which this occurs is relatively negligible in most school systems.

Some school systems have begun exploring different strategies to ensure greater fluidity between VET and general pathways and into tertiary education. Some of the options followed by countries with strong VET systems include "bridge courses", the modularised provision of courses, joint general-vocational upper secondary diplomas, and legal entitlements to "scaffolding" diplomas that allow students to proceed to the next level of education upon the successful completion of the prior level, regardless of their track.

Include a work-based learning component in vocational programmes

The status of VET systems is often hindered by challenges in making the educational offer relevant to the workplace. Evidence shows that including strong components of work-based learning in this type of programme can decrease dropout rates and ensure smoother transitions to the world of work. Especially in countries with strongly regulated labour markets, policymakers should consider increasing the component of work-based learning in vocational programmes. Strong regulations in the labour market are often effective in protecting employees but may also hinder the entrance of young graduates from upper and post-secondary levels of education. Creating policy frameworks for strong work-based components of learning (e.g. through apprenticeships) may ease the transition to the labour market and help reduce youth unemployment. Nevertheless, the effective promotion of work-based learning depends on striking the right balance between the added-value of the apprentice to the company and the salary paid. Public authorities can explore alternative strategies that can be used in order to increase employer involvement. Tax allowances or subsidies to companies hiring apprentices can help by expanding the opportunities of VET students to deliver productive work while learning in the firm context.

Furthermore, effective work-based learning depends on the right balance between the skills attained in the context of work and those in classroom. Educational authorities, in

co-ordination with employers, should seek to ensure that curricular options enable the adequate combination of general skills and learning on the job. Such integration helps to guarantee that the acquired human capital is neither too general nor too specific to the training firm.

But while work-based VET systems hold the potential to facilitate smooth transitions from school to the labour market, this can only work with significant support by major stakeholders. Apprenticeship systems can only be effective if employers are adequately involved in setting this type of structure – through the provision and design of training schemes, as well as development of curricula.

Provide stronger frameworks for co-ordination in the use of resources in VET institutions and with the private sector

Besides co-ordination in curriculum and between employers and VET providers, policymakers should consider promoting co-ordination across VET providers in their resource usage. Vocational programmes can secure higher quality equipment at lower costs by collaborating within VET networks and across public-private sectors. This would allow more efficient use of high-cost infrastructure and equipment resources that can truly modernise VET curriculum.

Educational authorities should explore different incentive mechanisms for a more adaptable provision of VET. Options may include shared purchasing of equipment and its associated insurance. This would permit a reduction of costs and would incentivise the investment in specialised infrastructure shared between different institutions.

Other cost-saving approaches involve alternative models of equipment provision in co-operation with local and national employers, such as the use of companies' old material - which can still be relevant for learning – or sponsorship agreements.

Ensure the appropriate identification and supportive placement of students with special educational needs

Develop common, standardised definitions of SEN categories and publicly report data in an internationally comparable format

Countries should work with various stakeholder groups within the educational and disability advocacy communities to develop clear definitions of SEN categories. In many instances, countries do have medical definitions of disabilities such as auditory or physical ones. However, several OECD review countries do not have any clear frameworks for categorising SEN. These shared definitions are critical to ensure common identification and reporting standards, and to ensure that resources are allocated in fair and equitable ways. Countries should work towards adopting SEN categories that map to a common framework so that cross-country comparisons around SEN policy are possible. One potential framework for SEN categories is articulated in the OECD 2005 report on *Students with Disabilities, Learning Difficulties and Disadvantages: Statistics and Indicators* (OECD, 2005[114]), which lists 13 different categories related to Special Education, grouped into two broad cross-national categories of Learning Disabilities (A) and Learning Difficulties (B). A third category of Learning Disadvantages (C) describes challenges faced by students such as migration, language learning and poverty.

Once data are collected in a nationally and internationally comparable way, school systems can track identification rates across socio-demographic groups and regions and benchmark

them against other countries. This permits more effective planning of the allocation of school resources, spotlights problem areas and allows research projects to explore patterns of SEN.

Articulate clear standards, involve all relevant actors and implement staff training in the special education evaluation process

In order to promote positive outcomes, limit inappropriate identification, and ensure each child gets what they need in the special education identification process, there must be clear standards for how students are evaluated for special education. This involves creating consistent protocols to incorporate relevant input from the child, family, educator and medical community. Access to specialists such as occupational therapists, psychologists, and other medical personnel should be provided free of charge to all families to ensure that additional support is not contingent on families' socio-economic status.

All staff who participate in the special education evaluation process should be trained to understand the assessment process and how they can contribute to it. Participants may bring different types of contributions to the special education evaluation process (medical reports, classroom evaluations, academic data etc.) and should provide evidence of the types of interventions that have been attempted already to assist the child in overcoming her educational difficulties.

Equalise funding across placement and settings based on agreed-upon SEN categories to limit incentives for retaining students in separate schools

Once school systems reach agreed-upon SEN categories, they can address perverse incentives to retain students in more restrictive educational settings. In several OECD review countries, special SEN schools received their funding precisely because the students they educated were classified as needing to be educated in separate schools. Once categories of SEN are established, however, funding can be set at equitable levels based on the category of SEN, irrespective of the context and setting in which the student is educated. School systems can shift policy, and families can more easily advocate, to encourage more integrated settings for students with SEN. This approach can accomplish three critical objectives: i) it fulfils the ethical obligation to integrate different learners in general settings; ii) it can provide a more intellectually stimulating and challenging setting to a student with SEN, while ensuring complementary supports exist due to the additional funding associated with that child; and iii) it can produce financial savings for the system as the overhead costs associated with running a stand-alone school disappear without any negative impact on the quality of services the child receives.

However, if mainstream schools do not receive adequate support and resources to provide SEN students with an education that is at least of equivalent quality as that offered by special schools, stakeholders are unlikely to support inclusion. To transition towards inclusive education, mainstream schools therefore require investments into infrastructural adjustments and equipment (specialised materials), human capital development, and assistance in using these additional resources to create inclusive learning environments. There may be, therefore, some initial upfront costs as systems transition towards more inclusion, though little empirical evidence exists verifying this in one direction or the other.

Integrate co-ordination and collaboration between mainstream and SEN providers and educators

In many contexts, including several OECD review countries, special education teachers working in separate schools either have a different type of certification or are not certified at all. This creates substantial barriers to efforts to integrate students with SEN as their teachers need to be re-certified. This licensure structure can also create a built-in advocacy group that argues against integration as it jeopardises the stability of their employment conditions. Therefore, creating a certification process that permits the transfer of a special education license between special and general schools is critical. In addition, high-quality in-service professional development can enhance general education teachers' interest and ability to integrate SEN students by providing them with the skills to support SEN students and a license or certificate to attest their capacity.

In addition to ensuring that teachers can move more easily between special and general education programmes, aligning the governance and oversight of the two school pathways is necessary to promote greater integration. If SEN students are to take classes in both mainstream and special settings, or if they are to be able to transition between a special lower secondary school and a general upper secondary school, this transition must be seamless. Their unique identifier must travel from one system to the other, class schedules must be aligned between schools and programmes and course credit must be transferable. All of this is difficult to accomplish when the two different types of schools are governed by different bodies as is the case in several of the OECD review countries. Thus, either placing all pathways of schools and programmes under the same governance within the Ministry of Education, or defining authorities and responsibilities and aligning systems are necessary steps to ensure sufficient opportunities for students to smoothly transition between one system and the other.

Developing a continuum of service models will require re-envisioning the role of special education teachers and schools. Rather than being responsible for a separate class of students with SEN, teachers of SEN students could provide integrated co-teaching, act as consultant teachers to build the skills of general education staff, teach separate special education classes, lead professional development seminars, design individualised learning plans for SEN students and more. Their end goal will be to maximise integration of students with SEN, while ensuring that sufficient supports exist, including targeted separate instruction, to promote SEN students' academic and social success.

Special schools can take on new roles and undergo functional transformations to support the integration of SEN students in mainstream schools by acting as "resource centres" offering specialised diagnostic services or support from speech and occupational therapists, special education teachers, social pedagogues and psychologists to multiple mainstream schools. Support from central authorities and private providers can also play a role in advancing integration, but channelling these supports through the regional resource centres can provide a more seamless one-stop-shopping experience for general education schools.

Design funding mechanisms that allow categorical funds to be used for early intervention, without jeopardising SEN students' funding

In designing compensatory funding schemes, tensions frequently exist between the desire to ensure that the additional funds reach the intended group and a recognition that local actors may have a better sense of their students' needs. There can be particular tensions around categorical funds intended for students who meet certain criteria that cannot be used for

others who fall just short of those criteria. This challenge is particularly pertinent in the area of special needs education, where policymakers are rightly interested in ensuring that targeted funds are not dispersed across students in a way that does not benefit the intended population. However, many students who struggle in school present similar profiles, whether they have or have not been yet formally identified as having special educational needs.

If funding schemes can be designed to permit some flexibility in the use of targeted funds, while ensuring that the use of these resources is transparent and auditable, both goals can be achieved. Explicit provisions such as allowing a fixed percentage of special education funds to be used for early interventions that serve both students with SEN and struggling students who have not been identified for special education is one strategy that preserves the bulk of funds for its primary intended targets while providing some flexibility that can be monitored for its use. Schools or sub-national entities would need to be able to demonstrate that the funds were used for early intervention (such as an instructional period in a special education teacher's assigned schedule), rather than to fill general budget holes (such as a textbook or tablet purchase). Such a strategy would depend on common accounting procedures across schools.

Notes

[1] A key factor in students' vertical transitions is the vertical alignment of the curriculum. Curriculum analysis falls outside the scope of this review, but is addressed in detail in the OECD's *Education 2030 International Curriculum Analysis*, currently underway.

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Annex A. Glossary

Levels of education according to UNESCO's International Standard Classification of Education (ISCED 2011)

Early childhood education (ISCED 0): Provides learning and educational activities with a holistic approach to support children's early cognitive, physical, social and emotional development and introduce young children to organised instruction outside of the family context to develop some of the skills needed for academic readiness and to prepare them for entry into primary education. ISCED level 0 is further divided into two sub-levels: ISCED 01 and ISCED 02.

Early childhood educational development (ISCED 01): Characterised by a learning environment that is visually stimulating and language-rich. These programmes foster self-expression, with an emphasis on language acquisition and the use of language for meaningful communication. There are opportunities for active play, so that children can exercise their co-ordination and motor skills under supervision and through interaction with staff. Programmes providing only childcare (supervision, nutrition and health) are not covered by ISCED. Early childhood educational development programmes (ISCED level 01) are targeted at children aged 0 to 2 years.

Pre-primary education (ISCED 02): Characterised by interaction with peers and educators, through which children improve their use of language and social skills, start to develop logical and reasoning skills, and talk through their thought processes. They are also introduced to alphabetical and mathematical concepts, and encouraged to explore their surrounding world and environment. Pre-primary education programmes (ISCED level 02) are targeted at children aged 3 until the age to start ISCED 1. The upper age limit for the pre-primary education category depends in each case on the theoretical age of entry into ISCED level 1, i.e. primary education.

Primary education (ISCED 1): Usually begins at age 5, 6 or 7, and has a typical duration of 6 years. Programmes at ISCED level 1 are normally designed to give students a sound basic education in reading, writing and mathematics, along with an elementary understanding of other subjects such as history, geography, natural science, social sciences, art and music. The commencement of reading activities alone is not a sufficient criterion for classification of an education programme at ISCED 1. Programmes classified at ISCED 1 may be referred to in many ways, for example: primary education, elementary education or basic education (stage 1 or lower grades if an education system has one programme that spans ISCED 1 and 2).

Lower secondary education (ISCED 2): Programmes are designed to lay the foundation across a wide range of subjects and to prepare children and young people for more specialised study at upper secondary and higher levels of education. The beginning – or the end – of lower secondary education often involves a change of school for young students and also a change in the style of instruction. Programmes classified at ISCED level 2 may be referred to in many ways, for example: secondary school (stage

one/lower grades), junior secondary school, middle school or junior high school. If a programme spans ISCED levels 1 and 2, the terms elementary education or basic school (second stage/upper grades) are often used.

Upper secondary education (ISCED 3): Programmes are more specialised than those at lower secondary and offer students more choices and diverse pathways for completing their secondary education. The range of subjects studied by a single student tends to be narrower than at lower levels of education, but the content is more complex and the study more in depth. Programmes offered are differentiated by orientation and often by broad subject groups. Programmes classified at ISCED level 3 may be referred to in many ways, for example, secondary school (stage 2/upper grades), senior secondary school or (senior) high school.

General, pre-vocational and vocational education: Programmes at ISCED levels 2 and 3 can also be subdivided into two categories based on the degree to which the programme is specifically oriented towards a specific class of occupations or trades and leads to a labour-market relevant qualification: general programmes and pre-vocational/vocational programmes.

General programmes: Refers to programmes that are not designed explicitly to prepare participants for a specific class of occupations or trades or for entry into further vocational or technical education programmes.

Pre-vocational/vocational programmes: This category encompasses both pre-vocational and vocational education. Pre-vocational education is mainly designed to introduce participants to the world of work and to prepare them for entry into further vocational or technical programmes. Successful completion of such programmes does not lead to a labour-market relevant vocational or technical qualification. Vocational programmes prepare participants for direct entry into specific occupations without further training. Successful completion of such programmes leads to a labour-market relevant vocational qualification.

For further details, see:

UNESCO Institute for Statistics (2012), *International Standard Classification of Education*
ISCED 2011, UNESCO Institute for Statistics, Montreal, Quebec, *www.uis.unesco.org/Education/Documents/isced-2011-en.pdf*.

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Levels of governance and administration

For international comparability, levels of governance and administration are described following a standard terminology. The report may, however, use the particular terms of a specific national context where country approaches are described in greater detail. For example, for Austria, the report may refer to “states” when information is presented in a comparable format (e.g. for a group of countries with a similar approach or in comparative tables) or to “provinces” when the Austrian school system is analysed in greater detail.

Central level: The central level specifies authorities that make decisions or participate in different aspects of decision making on a national scale. This includes, among others, the central government, central education, financial and legislative authorities and central auditing services. All authorities below the central level in administrative terms are referred to as sub-central authorities at the sub-central level.

State level: The state level refers to the first territorial unit below the nation in federal countries or countries with similar types of governmental structures. The state level includes, among others, state governments, state education, financial and legislative authorities, and state auditing services. In Austria, for example, the state level refers to the level of the "provinces". In Belgium, the state level refers to the level of the "Communities".

Regional level: The region level is the first territorial unit below the national level in countries that do not have a federal or similar type of governmental structure, and the second territorial unit below the national level in countries with federal or similar types of governmental structures. The regional level includes, among others, regional governments, regional education, financial and legislative authorities, and regional auditing services. In the Czech Republic and the Slovak Republic, for example, the regional level refers to the "self-governing regions". In Spain, the regional level refers to the "Autonomous Communities".

Local level: The local level corresponds to the smallest territorial unit with a governing authority, such as municipalities or communities. This includes local governments, local education, financial and legislative authorities and local auditing services. The local authority may be the education department within a general-purpose local government or it may be a special-purpose government whose sole area of authority is education.

Public and private schools

Public: An educational institution is classified as public if it is controlled and managed by a public education authority or agency, or by a governing body (council, committee, etc.) most of whose members are either appointed by a public authority or elected by public franchise.

Private: An educational institution is classified as private if it is controlled and managed by a non-governmental organisation (e.g. a church, a trade union or a business enterprise, foreign or international agency), or a governing board which consists mostly of members not selected by a public agency. A private institution can receive public funding (publicly-subsidised private schools) or not (independent private schools).

Current and capital expenditure

Current expenditure: Current expenditure describes incurred costs with teaching and learning activities, teachers' and other educational staff's salaries, other operating costs and costs with assets that have a duration of less than one year, except where noted otherwise. Operating costs refer to expenses associated with the maintenance and administration of a school on a day-to-day basis (e.g. heating, electricity, small repairs, perishable instructional materials, etc.).

Capital expenditure: Funding for capital expenditures covers spending on assets that last longer than one year. It includes funds for construction, renovation or major repairs to buildings (immovable) as well as on new or replacement instructional and non-instructional equipment (e.g. furniture, laboratory equipment, computers, etc.).

Allocation mechanisms for capital expenditure

Allocation mechanisms describe different approaches to distributing and transferring resources and funds to different levels of governance and administration, to school providers and to individual schools. Below are the mechanisms most commonly used in the allocation of capital funding, as identified in the review's qualitative data collection. They vary in the level of discretion the recipient has in deciding how the funding is used:

Ad hoc grant: Refers to an ad hoc agreement between the public funder and the entities receiving the funds.

Infrastructure investment programme: Refers to a specific, usually central or state level, initiative targeted at infrastructure investment following medium-term development plans or strategies at the national or sector level for a fixed period of time.

Earmarked grant: Consists of funds that recipients (sub-central authorities or schools) are required to use for specific elements/items of current expenditure in early childhood or school education (e.g. teacher professional development, extra funds for special needs education).

Bases for the allocation of funding for capital expenditure

The basis for the allocation of funding refers to the method which determines the amount of funding distributed to recipients (sub-central authorities and/or schools). Below are the processes most commonly used in the allocation of capital funding, as identified in the review's qualitative data collection:

Administrative discretion: Typically refers to administrators' assessment of the amount of resources that each school needs. It involves decision making about the allocation of funds based on professional judgement and expertise and might involve the use of indicators.

Competition: Refers to an application process in which individual authorities and/or schools apply for funding for capital expenditure. The authority providing the funding selects the recipients based on the quality of their application as judged against relevant criteria.

Negotiated process: Refers to negotiations and agreements between the funding provider and the funding recipient on the amount of funding (e.g. local authorities making a case for additional resources from relevant authority to respond to short-term needs, bargaining between different levels of governance for regular funding allocation).

Annex B. How the School Resources Review was conducted

Governance of the review

Within the OECD Directorate for Education and Skills the review has been carried out by the Early Childhood and Schools Division under the leadership of Michael Davidson (from January 2013 to September 2014) and Yuri Belfali (from October 2014 to July 2016) and by the Policy Advice and Implementation Division under the leadership of Paulo Santiago (since August 2016).

The School Resources Review is overseen by a Group of National Experts (GNE) on School Resources, a subsidiary body of the OECD Education Policy Committee. The GNE on School Resources guides the review and facilitates the exchange of information and experiences concerning school resources among countries. The GNE on School Resources has been chaired by Mr Jørn Skovsgaard, Senior Advisor, Danish Ministry of Education, and vice-chairs Ms Marie-Anne Persoons, Policy advisor, Flemish Ministry of Education and Training and Mr Matej Šišković, Director, Education Policy Institute, Ministry of Education, Science, Research and Sport of the Slovak Republic. Ms Shelley Robertson, Chief Advisor International Education, New Zealand Ministry of Education, served as vice-chair for the GNE from May 2014 to May 2015 and chaired its 1st meeting.

Between May 2014 and July 2018, the GNE on School Resources held five official meetings at the OECD premises in Paris. These were open to all OECD member countries and observers to the Education Policy Committee as well as to the Trade Union Advisory Committee to the OECD (TUAC) and the Business and Industry Advisory Committee to the OECD (BIAC). The project is conducted in co-operation with a range of international organisations to reduce duplication and develop synergies. In particular, within a broader framework of collaboration, a partnership with the European Commission (EC) is established for this project (see below). The review of Kazakhstan was undertaken in co-operation with the World Bank. Other international agencies collaborating with the project include Eurydice, the Inter-American Development Bank (IDB), the Organising Bureau of European School Student Unions (OBESSU), the Standing International Conference of Inspectorates (SICI) and the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the Global Education Monitoring Report.

National co-ordinators

Each participating country appointed a national co-ordinator, who was responsible for: communications with the OECD Secretariat and within the country about the review; ensuring that the Country Background Report was completed on schedule; liaising with the OECD Secretariat about the organisation of the review team visit, for those countries which opted for a country review; attending meetings of the Group of National Experts on School Resources; co-ordinating country responses to the review's qualitative survey on school funding; co-ordinating country feedback on draft materials; and assisting with dissemination activities. Past and present national co-ordinators are listed in Table B.1.

Table B.1. National co-ordinators in participating countries

Country	National co-ordinator(s)
Austria	Bernhard Chabera, Austrian Federal Ministry for Education, Science and Research
Belgium (Flemish Community)	Marie-Anne Persoons, Flemish Ministry of Education and Training
Belgium (French Community)	Philippe Dieu, International Relations Directorate of the Federation Wallonia-Brussels
Chile	Amanda Castillo Rodríguez, Chilean Ministry of Education Eduardo Candia Agusti, Chilean Ministry of Education Carla Guazzini, Chilean Ministry of Education
Colombia	José Luis Sánchez, Colombian Ministry of National Education
Czech Republic	Luci Priknerová, Czech Ministry of Education, Youth and Sports Michael Vlach, Czech Ministry of Education, Youth and Sports
Denmark	Jon Jespersen, Danish Ministry of Education Sigrid Lundetoft Clausen, Danish Ministry of Education Cathrine Scheuermann, Danish Ministry of Education
Estonia	Kadi Serbak, Estonian Ministry of Education and Research
Iceland	Sigríður Lára Ásbergsdóttir, Icelandic Ministry of Education, Science and Culture
Kazakhstan	Zhannat Mussina, Information Analytic Center Assem Satmukhambetova, Information Analytic Center
Lithuania	Aidas Aldakauskas, Lithuanian Ministry of Education and Science Vilma Bačkiūtė, Lithuanian Ministry of Education and Science
Luxembourg	Amina Kafai, Luxembourg Ministry of National Education and Vocational Training Charlotte Mahon, Luxembourg Ministry of National Education and Vocational Training
Portugal	Pedro Abrantes, Portuguese Ministry of Education Ana Neves, Portuguese Ministry of Education
Slovak Republic	Matej Šiškovič, National Institute for Educational Assessment
Slovenia	Klemen Surk Kokalj, Slovenian Ministry of Education, Science and Sport
Spain	Vicente Alcañiz, National Institute for Educational Assessment Isabel Couso Tapia, Spanish Ministry of Education, Culture and Sport
Sweden	Gunnar Stenberg, Swedish Ministry of Education and Research Merja Strömberg, Swedish Ministry of Education and Research
Uruguay	Cecilia Llambi, National Institute for Educational Evaluation Cecilia Oreiro, National Institute for Educational Evaluation

Collaboration with the European Commission

Within a broader framework of collaboration, the OECD School Resources Review has benefited from a partnership with the European Commission (EC) that was established for the project. The support of the EC has covered part of the participation costs for members of the European Union Erasmus+ programme and contributed significantly to the preparation of a series of thematic comparative reports, including this publication. Within the EC's Directorate-General for Education and Culture, the collaboration was organised by *Unit A.2: Education and Training in Europe 2020* by Mónika Képe-Holmberg under the leadership of Michael Teutsch (until December 2016) and Denis Crowley (since January 2017), and *Unit B.2: Schools and Multilingualism* under the leadership of Sophie Beernaerts (until December 2016) and Michael Teutsch (since January 2017) and deputy leadership of Diana Jablonska. Through its Country Analysis unit, the EC contributed to planning individual country reviews in the countries listed in Table B.2, with the relevant country desk officers participating in planning visits, providing input for the organisation of the main visit and offering feedback on draft country review reports.

Table B.2. European Commission contribution to country reviews

Country	EC Country Desk Officer contributing to the planning of the review
Slovak Republic	Christèle Duvieusart, European Commission
Estonia	Krzysztof Kania, European Commission
Belgium (Flemish Community)	Patricia De Smet, European Commission
Denmark	Joanna Basztura, European Commission
Czech Republic	Christèle Duvieusart, European Commission
Lithuania	Joanna Basztura, European Commission
Austria	Klaus Koerner, European Commission
Portugal	Antonio García Gómez, European Commission

Country Background Report

Information on countries' policies and practices was gathered through country background reports (CBRs). The CBRs were prepared in response to a common set of issues and questions, and used a common framework to facilitate comparative analysis and maximise the opportunities for countries to learn from each other. The CBRs were a key source of information for the review's thematic comparative reports. The guidelines for the preparation of CBRs are set out in a dedicated document available on the review website (*www.oecd.org/education/schoolresourcesreview.htm*). The CBRs were structured around the following main chapters:

1. The national context
2. The school system
3. Governance of resource use in schools
4. Resource distribution
5. Resource utilisation
6. Resource management

The CBRs are intended for four main audiences: The Secretariat and OECD member and observer countries as an aid to sharing experiences and identifying common problems and policy options; the team of external reviewers who visited the countries which opted for a country review; those interested in the use of school resources in the country concerned; and those interested in the use of school resources at international level and in other countries. All CBRs are available on the review website (*www.oecd.org/education/schoolresourcesreview.htm*).

Qualitative data collection

In addition to the country background reports, the School Resources Review collected information on countries' national approaches to school funding through a qualitative questionnaire prepared by the OECD Secretariat. Seventeen systems participated in this qualitative data collection. The questionnaire focused on formal requirements for funding in terms of laws and regulations for early childhood and school education that were in place in 2016. It did not cover observed practices which can vary considerably. The questionnaire covered the following issues: raising resources for education; the public funding of private providers; budgeting and planning procedures; the distribution of

current and capital expenditure; targeted funding; VET funding; the use of funding at the school level; and monitoring and reporting procedures.

The qualitative survey provided crucial information to complement the information available through CBRs and to support the review's analysis. Selected information gathered through the survey is reflected in the review's first thematic report on school funding as well as Chapter 2 and Chapter 3 of this report. The review team made every effort to ensure in collaboration with countries that the information available in this report is as valid and robust as possible and reflects specific country contexts while being comparable across countries. However, given the complex nature of school funding and the qualitative nature of this survey, information should be interpreted with care. Country contacts for the qualitative data collection are listed in Table B.3.

Table B.3. Country contacts for the qualitative data collection

Country	Country contact(s)
Austria	Bernhard Chabera, Austrian Federal Ministry for Education and Women's Affairs
Belgium (Flemish Community)	Marie-Anne Persoons, Flemish Ministry of Education and Training
Belgium (French Community)	Philippe Dieu, International Relations Directorate of the Federation Wallonia-Brussels
Chile	Eduardo Candia Agusti, Chilean Ministry of Education Carla Guazzini, Chilean Ministry of Education
Czech Republic	Luci Priknerová, Czech Ministry of Education, Youth and Sports
Denmark	Jon Jespersen, Danish Ministry of Education
Estonia	Kadi Serbak, Estonian Ministry of Education and Research
Iceland	Gunnar Jóhannes Árnason, Icelandic Ministry of Education, Science and Culture
Israel	Daniel Levi-Mazloum, Israeli Ministry of Education Yoav Azulay, Israeli Ministry of Education
Kazakhstan	Dilyara Tashibaeva, Information Analytic Center Saniya Boranbayeva, Information Analytic Center
Lithuania	Jurga Zacharkienė, Lithuanian Ministry of Education and Science
Portugal	Ana Neves, Portuguese Ministry of Education
Slovak Republic	Ján Toman, National Institute for Educational Assessment
Slovenia	Klemen Surk Kokalj, Slovenian Ministry of Education, Science and Sport
Spain	Isabel Couso Tapia, Spanish Ministry of Education, Culture and Sport
Sweden	Gunnar Stenberg, Swedish Ministry of Education and Research
Uruguay	Lucía Castro, National Institute for Educational Evaluation Cecilia Oreiro, National Institute for Educational Evaluation

Country review reports

Another major source of material for this report was the set of country review reports prepared by the external review teams that visited participating countries engaging in a full country review. By providing an external perspective on the use of school resources in the countries concerned, the country review reports were also intended to contribute to national discussions, as well as inform other countries about policy innovations underway. The country review reports were also published as a publication series, *OECD Reviews of School Resources*, in order to enhance the visibility of these country-specific outputs as part of the review.

For each country visited, a team of up to five reviewers (including at least two OECD Secretariat members) analysed the country background report and associated materials and subsequently undertook an intensive case study visit over the course of about seven days. The reviewers were selected in consultation with the country authorities to ensure that they had experience relevant to the main policy issues in the country concerned. The study visit aimed to provide the review team with a variety of perspectives on the governance, distribution, management and utilisation of school resources and included meetings with education and finance authorities at national and sub-national levels; relevant agencies (e.g. audit offices); teacher professional organisations and unions; parents' organisations; representatives of schools and school leaders; students' organisations; teacher educators; researchers; as well as students, teachers and school leaders at the schools visited. The objective was to accumulate sufficient information and understanding on which to base the analysis and policy recommendations.

At the time of publication, 12 review visits had been conducted, involving 25 external reviewers with a range of research and policy backgrounds. The reviews involved a planning visit and a main review visit. Details on the composition of the review teams for the main visits can be found in Table B.4. The country review reports are published on the project website (*www.oecd.org/education/schoolresourcesreview.htm*).

Table B.4. Country reviews and team members

Country	Review visit team
Kazakhstan 31 March-9 April 2014	Anna Pons, OECD Secretariat (co-ordinator) Jeremie Amoroso, World Bank Jan Herczyński, Institute for Educational Research, Poland Igor Kheyfets, World Bank Marlaine Lockheed, Princeton University, United States Paulo Santiago, OECD Secretariat
Slovak Republic 7-14 October 2014	Paulo Santiago, OECD Secretariat (co-ordinator) Gábor Halász, University Eötvös Loránd, Hungary Rosalind Levačić, Institute of Education - University of London, United Kingdom Claire Shewbridge, OECD Secretariat
Estonia 20-27 October 2014	Paulo Santiago, OECD Secretariat (co-ordinator) Anthony Levitas, Brown University, United States Péter Radó, Education Consultant, Hungary Claire Shewbridge, OECD Secretariat
Belgium (Flemish Community) 3-10 November 2014	Deborah Nusche, OECD Secretariat (co-ordinator) Gary Miron, Western Michigan University, United States Paulo Santiago, OECD Secretariat Richard Teese, University of Melbourne, Australia
Lithuania 2-9 December 2014	Claire Shewbridge, OECD Secretariat (co-ordinator) Katrina Godfrey, Department of Education of Northern Ireland, United Kingdom Zoltán Hermann, Institute of Economics - Academy of Sciences, Hungary Deborah Nusche, OECD Secretariat
Uruguay 17-25 March 2015	Paulo Santiago, OECD Secretariat (co-ordinator) Beatrice Avalos, Universidad de Chile, Chile Tracey Burns , OECD Secretariat Alejandro Morduchowicz, Inter-American Development Bank Thomas Radinger, OECD Secretariat
Denmark 22-29 April 2015	Deborah Nusche, OECD Secretariat (co-ordinator) Torberg Falch, Norwegian University of Science and Technology Thomas Radinger, OECD Secretariat Bruce Shaw, Ontario Ministry of Education, Canada
Czech Republic 26 May - 2 June 2015	Claire Shewbridge, OECD Secretariat (co-ordinator) Jan Herczyński, Institute for Educational Research, Poland) Thomas Radinger, OECD Secretariat Julie Sonneman, Education Consultant - Learning First, Australia
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Portugal 8-12 January 2018 (report forthcoming)	David Liebowitz, OECD Secretariat (co-ordinator) Pablo González, University of Chile Edith Hooge, Tilburg University, Netherlands Gonçalo Lima, OECD Secretariat Deborah Nusche, OECD Secretariat

Analytical background papers

The School Resources Review was also informed by the following analytical background papers and literature reviews prepared in the context of the project:

- *School Size Policies: A Literature Review*, by Macarena Ares Abalde, OECD Education Working Paper No. 106 (2014), http://dx.doi.org/10.1787/5jxt472ddkjl-en.
- *Learning Support Staff: A Literature Review*, by Francesc Masdeu, OECD Education Working Paper No. 125 (2015), http://dx.doi.org/10.1787/5jrnzm39w45l-en.
- *Student Learning Time: A Literature Review*, by Anna Gromada and Claire Shewbridge, OECD Education Working Paper No. 127 (2016), http://dx.doi.org/10.1787/5jm409kqqkjh-en.
- *Budgeting and Accounting in OECD Education Systems: A Literature Review*, by Tala Fakharzadeh, OECD Education Working Paper No. 128 (2016), http://dx.doi.org/10.1787/5jm3xgsz03kh-en.
- *Regulating Publicly Funded Private Schools: A Literature Review on Equity and Effectiveness*, by Luka Boeskens, OECD Education Working Paper No. 147 (2016), http://dx.doi.org/10.1787/5jln6jcg80r4-en.

Dissemination

To facilitate dissemination and encourage feedback, all project documents and outputs are published on the review's website (*www.oecd.org/education/schoolresourcesreview.htm*). Throughout the review, the OECD Secretariat presented the project and its findings at a wide range of internal and external meetings and a significant number of countries organised national events to discuss both the international results from the review and the conclusions of specific country reviews.

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