A "Credit Crunch"? The Recent Slowdown in Bank Lending and Its Implications for Monetary Policy

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This paper examines the recent slowdown in bank lending that has affected several large OECD countries. The analysis begins with a description of the importance of bank credit in the financial systems of the countries considered. The origins of the lending slowdown are analysed -- including the importance of deteriorating bank balance sheets and the BIS capital rules -- as well as its potential to depress economic activity. The paper concludes with a discussion of how monetary policy should react to unusually sluggish bank lending.

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Cette étude analyse le ralentissment récent du crédit bancaire dans plusieurs grands pays de l'OCDE. Elle décrit tout d'abord l'importance du crédit bancaire dans les systèmes financiers des pays considérés. Les facteurs à l'origine de la contraction du crédit sont ensuite passés en revue, notamment la dégradation des bilans bancaires ainsi que l'incidence des ratios de capital plus stricts imposés par les banques centrales. L'étude tente d'apprécier, en outre, dans quelle mesure ces facteurs pourraient exercer une influence négative sur l'activité économique. Enfin, l'étude examine la façon dont la politique monétaire devrait réagir à ce ralentissement inhabituel de l'expansion du crédit.

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I. Introduction

Growth rates of broad monetary aggregates and of bank lending have slowed sharply in most G10 countries (Chart A). This phenomenon generally began in 1989 or earlier, in response to a tightening of monetary policies. However, it has persisted through 1991 despite -- with the notable exception of Germany -- a generalised reduction in interest rates.

One factor contributing to the slower monetary expansion has been a marked reduction in bank lending. This has been partly in reaction to a cyclical decline in credit demands, likely exacerbated by high levels of debt of many private sector borrowers. However, it also appears that banks have become less willing to supply credit in association with i) a deterioration in asset quality, and ii) stricter attitudes of regulators, especially more stringent capital standards. This change in banks' behaviour has implied a reduced volume of bank credit which, potentially at least, could impede economic activity. Such a risk has been considered serious enough to have contributed to recent easings of monetary policy in the United States.

These developments raise a number of issues that are addressed in this paper:

-- How has financial liberalisation changed the role of banks in financial intermediation?

-- To what extent can other sources of credit be substituted for bank loans?

-- How much of a risk to economic activity is the current slowdown in bank lending?

-- What should be the appropriate monetary policy response to the changes in bank lending behaviour?

The following section of the paper provides evidence, both empirical and theoretical, that banks remain important in financing private expenditure, despite the changes brought by financial liberalisation. Next the current situation is considered in more detail. In several countries, most visibly the United States, there is evidence of a disturbance to the bank lending process that could restrain economic activity. The final section reviews possible policy responses by central banks.

II. Evolving Role of Banks in Financial Intermediation

A. The market share of banks (2)

The process of financial liberalisation, including the deregulation of domestic financial markets, the removal of controls on international capital flows, technical improvements in information processing, and financial innovation, has greatly expanded alternatives to banks as sources of credit. One result -- the expansion of securities finance, both debt and equity -- can be seen in Chart B, which summarises the evolution since the 1970s of the gross funding sources of the corporate sector, scaled by investment spending, in seven large countries (3). In all cases shown there has been an increased reliance on total equity finance -- the sum of share issues and retained earnings. Bond finance -- which includes short-term securities -- also has increased in most of the countries considered, but it is of significant magnitude only in the United States and Canada. In addition, the historically greater reliance on bank loan finance in Japan and continental Europe (lower panel) is clearly apparent relative to the United States, the United Kingdom and Canada, where market finance has been more important. Interestingly, however, the share of bank loans has been declining more in the former countries so that by the late 1980s -- Japan excepted -- there is much less difference in banks' share of corporate funding between the two groups.

Financial liberalisation also has affected banks' liabilities, as households have gained access to a variety of alternative instruments, including mutual funds and unit trusts, insurance contracts, and small-denomination securities. As shown in Chart C, in many countries the result has been that, relative to income, household deposits failed to grow as rapidly as overall household financial assets (4). Again, it is notable that the share of deposits in total household assets was most stable in the United States and Canada where securities market finance is better established. The share of deposits in household assets has declined most in the bank-oriented systems of continental Europe, though it remains superior to levels in the United States. The deposit share was steady in the 1980s in the United States and Canada, countries where fierce competition for depositors' funds began much earlier.

The impact of these trends on banks' asset portfolios can be seen in Chart D, which shows bank assets scaled by GNP/GDP. With the exception of Germany, commercial lending has taken on a less important share of overall banking assets -- even where banks' commercial lending has not declined relative to output -- while the shares of lending to households and of real-estate related lending have risen (5). This development has been more marked in the countries in the top panel of the chart, where securities markets have had a relatively more important role, though it also has been a notable feature in Japan, where securities markets have been expanding rapidly (6).

Perhaps the most interesting aspect of Chart D, however, is that there is no obvious difference between the countries in the upper and lower panels in terms of the trend of bank assets relative to GNP. In no country do bank assets fall relative to output. This pattern seems somewhat at variance with the picture of increasing competition for banks from securities markets and non-bank intermediaries, and it may suggest that bank credit is maintaining an important role in financing economic activity, despite the increased presence of other sources of funds.

One reason bank credit is not declining relative to output is that financial liberalisation has had offsetting effects on banks. Deregulation and the removal of direct controls on bank lending have loosened liquidity constraints and allowed more borrowing. Thus, while many alternatives to bank credit have been made available as well, and certain borrowers have switched from bank finance to other sources, an overall increase in business and household borrowing has maintained the demand for bank loans. (Indeed, Charts B and C show that financial assets and liabilities have increased relative to expenditures or income in most countries). In addition, banks have responded to competitive pressures with new products, such as, in various countries, adjustable rate mortgages, credit cards, or other forms of consumer credit.

The steady share of bank assets relative to output may be a better indication of banks' continued importance in a liberalised financial system than their declining share of total credit. (This decline has been sharpest in the United States, where the ratio of bank assets to total non-financial debt fell to around 26 per cent in 1990, from a peak of 40 per cent in the early 1970s and about 30 per cent in 1980.) Non-bank credit grew more rapidly in the United States in the 1980s, largely because of heavy government borrowing and debt related to corporate restructuring. However, banks have for some time ceased to be a major source of finance to the U.S. government, and the restructuring activity often reflected a substitution of debt for equity by large firms, so that much of the resulting credit expansion did not fund spending. Securities markets have been much less of a factor in financing smaller firms and households, except for residential mortgages, and these borrowers apparently have continued to turn to banks.

B. Why bank finance matters

The fact that financial liberalisation has not reduced the ratio of bank credit to economic activity may reflect a durable "core" role for banks in financing spending. Economic theory has offered a number of rationales for the existence of financial intermediaries. These theories largely begin with the observation that it is costly for savers to inform themselves about borrowers, and then to monitor them to ensure that they invest borrowed funds efficiently and fulfil their commitments. Financial intermediaries realise efficiencies by specialising in these activities; additional efficiencies may result from pooling many loans into a diversified portfolio. As a result, intermediaries offer higher returns to savers too small to evaluate borrowers and diversify their assets, and provide lower costs of credit to borrowers who are unable to access securities markets.

Finance theory has identified some additional rationales for the existence of intermediaries. For example, with a very large number of small shareholders, effective control over the management of a modern firm is difficult to co-ordinate and subject to free-rider problems. Intermediaries can provide a control mechanism which discourages excess risk-taking by corporate managers, as they are in a position to aggregate the funds of a large number of individuals and, unlike shareholders, can withdraw the funds they have lent. Because intermediaries can influence management investment strategy, shareholders may use them to effect a better alignment of managers' objectives for the firm with their own (7). An additional role for

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intermediaries may be found in a "signalling" equilibrium for a firm's capital structure (8). A firm's market value may not reflect all relevant information, because it may be difficult for management to communicate credibly its prospects. In such circumstances, management may employ an increase in debt to send a favourable signal to the market, indicating the firm's confidence that it can meet non-contingent interest payments. When intermediated debt is increased, the market's interpretation may be even more favourable since the firm is, in addition, committing itself to being monitored and evaluated regularly (9).

While these arguments justify the existence of financial intermediaries *per se*, they do not necessarily explain why they largely exist as "banks" -- intermediaries that both extend illiquid loans and offer more-liquid deposit liabilities. Some recent theories have deduced banks' liability structure as a means of solving the agency problem arising between depositors and the bank (10). However, the traditional explanation remains convincing: the structure of bank balance sheets, with deposit liabilities more liquid than bank assets, allows society to conserve on liquid assets, freeing capital for longer term, and presumably more productive use (11).

Whatever the reason, banks' role as suppliers of liquid assets used to make payments -- and as key elements of the payment system itself -- have provided an important basis for their public support. Banks are distinguished from other financial intermediaries and typically receive explicit protection against liquidity problems, and varying degrees of implicit backing against insolvency, in exchange for special supervision and regulation. This safety net provides banks with another advantage over securities markets and over other intermediaries as sources of credit, as it allows them to charge less for the liquidity risk of holding a loan (12).

How has financial liberalisation affected these rationales for the existence of banks? Fundamentally, financial liberalisation has meant the erosion of the informational frictions that give rise to financial intermediaries by opening new markets, creating new contracts, and allowing the more efficient processing of information. A widening set of borrowers find that direct issuance of securities, or borrowing from non-bank intermediaries such as pension funds, can best meet their needs. For other borrowers, the process of securitisation has blurred the distinction between bank loans and securities issuance (13).

Nevertheless, these effects of liberalisation have had limits, and many borrowers, because of their size, credit quality or heterogeneity, continue to rely on banks. For example, some evidence of the limits of securitisation can be found in the U.S. residential mortgage market, probably the most successful application of the practice. The securitisation of residential mortgages in the United States relies to an important extent on credit enhancement by U.S. government sponsored agencies. These agencies, whose links to the federal government give them top credit ratings, account for over 90 per cent of securitised mortgages (Board of Governors, 1991c). Commercial mortgages, or residential mortgages that because of their size or other characteristics do not conform to these agencies' standards, are rarely securitised (14).

Moreover, not all of the expanded role of securities markets in the 1980s proved to be durable when business conditions deteriorated. The junk

bond market was the most prominent example of how investors could disappear when risk increased (15). In addition, as observed in Diamond (1991), banks' skills as credit monitors become more valuable in recessions, increasing the demand for bank credit relative to securities finance. Firms that suspect they could have credit problems prefer bank loans, so their problems can be resolved privately instead of damaging their reputations.

C. Empirical evidence on the economic importance of bank lending

The durability of banks as providers of finance to important classes of borrowers, as well as the theoretical arguments about the special properties of bank loans, suggest that the quantity of bank credit may have a bearing on aggregate economic activity. Empirical evidence on this point is somewhat ambiguous. In terms of microeconomic analyses, Bernanke and Lown (1991) do not find any evidence that differences in growth rates of bank loans across states in the United States explain inter-state differences in employment growth. On the other hand, Samolyk (1991) did find a positive causal statistical relationship between interstate loan growth rates and growth rates of state output. Also for the United States, Cromwell (1990) found that bank failures in local markets appeared to retard subsequent employment growth, particularly among smaller firms which would be expected to rely most on banks (16). At a macroeconomic level, King (1986) could not find conclusive evidence in post-war U.S. data that bank lending caused, in a statistical sense, real GNP. On the other hand, Bernanke (1983) presents evidence that the loss of bank intermediation services in the United States following the wave of bank failures early in the 1930s was a factor contributing to the Great Depression.

Some cross-country evidence on the importance of bank lending can be gained from time series comparisons of this variable with nominal income. From a recent analysis by the OECD Secretariat (Blundell-Wignall, Browne and Manasse, 1990) the following conclusions emerged:

-- Bank credit did show some indicator value for all G7 countries except Canada.

-- In most countries, periods where this indicator value appeared largely corresponded to times when quantitative controls on bank credit or deposit interest rates were in force.

-- Otherwise, intervals when bank credit helped to forecast nominal income tended to be brief, and to be subsets of longer episodes when broad monetary aggregates also worked as indicators.

Table 1 offers updated results that compare bank credit and broad money as predictors of nominal income (17). These results indicate that fluctuations in bank credit have some statistical relationship with subsequent output growth, but not to a greater extent than is evident for money. Unpredicted fluctuations in bank credit growth alone explain more than 10 per cent of the forecast error variance of nominal income growth in the United States (post-1983), Japan, Germany (pre-1983), the United Kingdom, and France, and in the United States and Japan this degree of importance survives when a broad monetary aggregate is added as an additional explanatory variable (18). However, these results may not be reliable in terms of identifying "loans" as a causal factor for income independent of money. As Blinder and Stiglitz (1983)

point out, these two series often can be highly collinear, as they have been recently in many countries (see Chart A).

Another approach, taken in Annex A, is based on the finding that the yield spread between private and risk-free government debt has displayed predictive power for output in the United States. This may reflect a cost of substituting securities for bank debt for two reasons. First, restrictive monetary policy forced banks to curtail lending or to raise loan rates. Borrowers who could shift their fund-raising to securities markets did so, so that the increased demand caused spreads to rise. A second reason would be the greater importance of agency costs in securities markets; these presumably worsen when business conditions deteriorate or bank credit is less available.

The results reported in Annex A are consistent with a cost advantage for bank debt. The risk spread is found to improve forecasts of output for the United States, the United Kingdom, and Canada, countries where securities finance has been most widespread -- and thus where borrowers could shift from bank finance to other sources of funds when monetary policy tightened -- and where financial structure would appear to leave firms more vulnerable to agency cost problems. In the other countries studied -- Japan, Germany, France and Italy -- the spread does not prove useful in predicting output, perhaps because the high levels of intermediated debt reduce agency costs.

On balance, the empirical evidence leaves open the possibility that the relative quantity of bank loan finance could be a determinant of economic activity. Banks' abilities in evaluating credit quality and monitoring borrowers, and their preferential access to liquidity, give them special advantages in lending to borrowers whose size or riskiness make direct finance expensive or inaccessible. In light of this evidence, the current reduction in bank lending in some countries could be increasing the cost of credit to these borrowers and so impinging on economic activity. The following section considers this possibility.

III. The Slowdown in Bank Lending: Causes and Consequences

A. Factors behind reduced bank credit expansion

The widespread slowing of bank credit expansion (see Chart A) appears to reflect influences of both demand and supply. Credit demands in general have become more subdued as economic growth has slowed. This factor has been reinforced by a more cautious attitude toward borrowing in a number of countries, as firms and households have reacted to the elevated levels of debt accumulated during the 1980s. Chart E shows, for example, how heavy borrowing by households in many of the large countries in the past decade has pushed debt-to-income ratios to high levels. It is true that households generally also have acquired more assets than debt over the period. However, many of these assets are illiquid or do not produce much cash flow, equities and real estate for example, and therefore do not entirely offset the burden of a higher debt-income ratio. Corporate balance sheets have deteriorated as well, though this development is not so widespread internationally. Chart F shows trends in corporate sector debt-to-equity ratios in the G7 countries over the past 20 years. The 1980s saw a substantial rise in leverage only in the United States and United Kingdom. (The declines in leverage in Japan, Germany, and

France are consistent with the increases in equity finance shown in Chart B.) (19)

In addition to reduced demands for credit, however, there is evidence that banks themselves are contributing to the decline in lending activity through a decreased willingness to extend credit. One sign of this can be seen in Chart G, which compares the growth rate of bank loans in real terms with the spread between a representative business loan rate and a marginal cost of bank funding. In several of the countries shown in the chart -- the United States, Japan, France and the United Kingdom -- the current slowdown in bank lending has been accompanied by a rise in the spread (20). This negative association of price and quantity changes implies that bank credit supply has been reduced relative to demand.

In all of the above countries there is corroboratory evidence of such a reduced willingness by banks to supply credit. For more than a year survey evidence in the United States found banks becoming less willing to extend credit and toughening non-price credit terms, such as collateral requirements, though the most recent survey (November) indicates this process has stopped (Board of Governors, 1991b). Interest rates charged by U.S. banks on personal and automobile loans have declined by much less than market interest rates (Board of Governors, 1991c). Japanese banks are lending more cautiously as well (Bank of Japan, 1991) and also have been subject to administrative restraints on real-estate lending. Tighter lending standards and wider margins on lending to firms and households also have been noted in other countries (Banca Commerciale Italiana, 1991; Bank of England, 1991a; and Banque de France, 1991).

To a certain extent this behaviour by banks is a normal cyclical response to recession or slowing economic growth. In such circumstances prospective borrowers' credit quality deteriorates, as evidenced by rising debt-to-income ratios or declines in cash flow and collateral values. In addition, banks' own balance sheets deteriorate as more existing loans encounter payment difficulties. However, it is likely that the current pullback in credit supply has been more severe than in earlier economic cycles. As already noted, for many countries the mid- and late-1980s were marked by high credit demands and generous lending attitudes leading to a very rapid expansion of bank credit -- so that the contractionary phase of the current credit cycle has been characterised by unusually poor financial health of borrowers and banks alike (21). Chart H shows a rise in banks' loss provisioning relative to bank earnings in a number of countries at the close of the 1980s, especially the United States and the United Kingdom (22). As loan quality typically lags cyclical conditions, these figures may well have risen above their 1990 levels in those countries that have experienced recession or asset-value declines (23).

On top of these cyclical effects, the current increase in the relative cost of bank credit also reflects in several countries a permanent component coming from more stringent prudential standards, most notably increased capital requirements. In general, higher capital need not raise the cost of equity, as better capitalised banks are less likely to fail and therefore face a lower cost of borrowing (24). However, explicit and implicit safety nets for banks in many countries made it optimal for them to minimise capital and rely to a greater extent on cheaper insured deposits. The BIS capital adequacy rules

were intended to offset this effect and to force banks to put more of their liabilities outside the safety net. The cost of this "deductible" is passed on largely to borrowers for the same reason Fama (1985) gives for the cost of reserve requirements: the demand for bank loans is much less interest elastic than the supply of marginal funding to banks.

Annex B summarises the BIS capital rules and gives examples of how much they can increase loan interest rates. It is shown that this increased cost depends on the marginal addition to capital, as well as any change in the cost of capital or equity premium. This latter component of the cost of meeting capital requirements probably has risen as the risk of bank failure is increased by the more competitive atmosphere in which banks now operate in many countries (Bank of Japan, 1991). In addition, the regulatory philosophy behind the BIS rules implies a greater willingness to let banks "fail" in the sense that stockholders' funds will be tapped before public guarantees are drawn upon.

It is difficult to quantify the effects of these capital-cost considerations on loan rates. Based on the example in Annex B, and depending on tax rates and bank costs of equity, each 1 percentage point increase in capital ratios could raise loan rates relative to funding costs by 10 to 20 basis points or more. These magnitudes are significant relative to the increases in the spreads shown in Chart G. This chart also reveals that the upward pressures on loan rates have been greatest in countries where the BIS rules have bound the tightest: the United States, Japan and France. More specific evidence that capital levels affect loan supply was found by Bernanke and Lown (1991). They demonstrate, across states in the United States, a positive relationship between average bank capital asset ratios and the subsequent average growth rate of bank loans.

In sum, at least part of the current slowdown in bank lending reflects supply factors. This is not to say that the current situation is a "credit crunch" in the sense that lending criteria have become so stringent, or bank resources so limited, that bona-fide borrowers cannot get credit. Nor is it a "capital crunch" in the sense that banks lack enough capital to meet required capital ratios; national banking systems have, in the aggregate, sufficient capital to meet the BIS standards, and individual banks could raise capital if lending were sufficiently profitable. Instead, it would appear that an increase in the cost of bank intermediation, resulting from loan losses and higher capital costs, has caused the supply of bank credit to contract, so that borrowers must pay more for the same quantity of bank credit (25). This increase in cost likely is larger than in past cycles because of the current marked deterioration in banks' asset quality, and the costs of complying with the BIS capital standards. However, from the perspective of monetary policy, the critical question about the slowdown in asset quality is the extent to which this phenomenon represents a significant, cyclically independent, drag on aggregate demand that should be resisted.

B. Macroeconomic impact of bank credit supply shocks

A simple theoretical exposition of how fluctuations in the cost of bank credit can affect the economy can be found in Bernanke and Blinder (1988). Starting from the traditional IS/LM approach, they assume that bank loans and bonds are not perfect substitutes. They derive an alternative to the IS

schedule, which is affected by the price of bank loans relative to other sources of credit. In this framework an increase in the relative cost of bank credit has the effect of an inward shift of the IS schedule; it reduces loans and raises loan rates, consistent with recent observations from several countries. A useful feature of this approach is that it is not dependent on the reason for the increased cost of bank credit. This could be because bank borrowers have become poorer credit risks, or because of a shock to the costs of intermediation, such as loan losses or increased prudential capital ratios.

One key question in this framework is the extent to which bank debt is substitutable with alternative sources of credit. Section II above argued in several ways that bank credit had properties that made it advantageous to borrowers. If bank loans become more expensive, borrowers would face higher credit costs or lose the benefits of bank relationships. Moreover, in the short run, borrowers likely face adjustment costs in tapping alternatives to bank lending. When a loan relationship is severed, the borrower sacrifices the reputational capital it had built up at the bank. Re-establishing this capital with another lender can be costly, especially if business conditions are poor and lenders and investors are reluctant to take on new risks. Some empirical evidence on credit substitutability is found in Hannan (1991); he shows that local banking markets do exist and that banks can exploit local market power to increase interest rates on loans.

An equally important question is the macroeconomic significance of a contraction in loan supply. Even if the cost of credit to bank loan clients has risen, the aggregate impact may be small. The evidence reviewed on this point in Section II was not conclusive, but did not rule out an important effect. An additional approach is to look directly at the effects of the loan rate spread shown in Chart G -- the relative cost of bank credit. Evidence on this point is found in Table 2 which shows the estimated response of the growth rate of output four quarters after a permanent 1 per cent increase in the spread between loan rates and interbank rates (26).

The results in the table reveal that the loan rate spread was negatively related to subsequent growth rates of real output in five of the major OECD countries in the 1970s and in four countries in the 1970s and 1980s taken together. The positive response for Japan is a sign of the extreme inflexibility of loan rates there; monetary tightening narrowed the spread, and worked entirely through quantity effects (Bank of Japan, 1991). The negative effects in the table are not small in magnitude; a 1 per cent (permanent) increase in the spread depresses real growth a year later by 1/2 to 1 percentage point in several countries, including the United States and the United Kingdom. The hypothesis that the spread terms do not belong in the output equations is rejected only once in the table, however, which indicates that these responses are not reliable. Still, in several countries they are of an economically significant magnitude, and thus represent a risk that a rise in the spread could adversely affect output.

Table 2 also shows a decline or disappearance of the negative spread effects moving into the 1980s, consistent with deregulation and a more stable interest rate environment. However, the current situation may be more comparable with the "credit crunches" of the 1970s, though the source of the current supply disturbance is different: then it was regulation of interest rates or credit volumes and now it is poor credit quality and new prudential

policies. Another relevant point of comparison is whether the cost of substituting out of bank debt is lower now than it was in the 1970s. The development and liberalisation of securities markets probably have given many borrowers alternatives to banks. However, these markets may not be very deep in some countries (Chart B shows that the share of debt securities issuance in corporate funding has not increased in most of the countries considered). Also, where securities finance has expanded significantly, many firms able to tap markets may already have abandoned banks; the proportion of remaining bank clients who have access to securities markets may not have risen as much.

On balance, the case that an increase in the cost of bank intermediation is weighing on economic activity is suggestive for some countries, though not conclusive. A structural link between higher capital standards or loan losses and economic activity has not been demonstrated, in no small part because the current changes in bank lending behaviour are a new phenomenon. Nonetheless, given the coincidence in several countries of a more cautious attitude of banks with unusually sluggish money growth and hesitant economic activity, policymakers may need to respond. Indeed, in the United States, the Federal Reserve concluded that the bank credit supply situation was serious enough to merit a response:

> "The policy easings this year (1991) were undertaken to foster a turnaround in the economy and to help ensure a satisfactory expansion.......Continuing weakness in the monetary aggregates and further restraint on credit availability, especially at banks, also were important indicators of the need for additional policy easing." (Board of Governors, 1991b)

IV. The Response of Monetary Policy to Changes in Bank Lending Behaviour

A. Reaction to bank credit supply shocks

As argued above, several countries appear to be facing a contraction in loan supply that is partly cyclical -- caused by recession and the resultant reductions in credit quality -- and partly secular -- caused by stiffer bank capital requirements and an erosion of rents accruing to banks because of declining regulatory protection from competition. There certainly are positive aspects of this phenomenon, implying, as it does, a more sustainable pace of private debt accumulation, more prudent lending standards, better capitalised banks, and greater efficiency in the financial system. Nonetheless, banks' reduced willingness to lend could, because of the cost or absence of substitute sources of credit for certain borrowers, depress economic activity to an undesired degree, particularly in countries where growth is already weak.

As the Bernanke and Blinder (1988) analysis shows, a contraction in bank loan supply can be thought of as a leftward IS shift, which can be offset by an easier monetary policy. Lower interest rates might not necessarily act by stimulating bank lending, however; they could instead foster more spending in those sectors of the economy with access to non-bank sources of credit and so reproduce the monetary authorities' desired, pre-shock path of aggregate nominal spending. (The composition of spending might differ, however, as certain sectors are more dependent on bank credit.) A portion of this

reduction in interest rates might need to be reversed later, as the economy recovers.

One difficulty in implementing such a policy response is calibration -- what level of interest rates is appropriate to compensate for the shift in loan supply? The natural answer to this question is to follow a path indexed by a monetary aggregate since the credit supply changes are a "real" shock (affecting the cost of bank intermediation). This path may involve a lower rate of monetary expansion, however, than pre-shock norms would imply. Should an increase in the costs of intermediation cause banks to cut the growth of their balance sheets, they would reduce the interest rates paid on deposits to keep their liabilities in line with their assets (27). The resulting increase in deposit opportunity costs would imply a rise in velocity that should be accommodated since it means that a lower growth rate of money would be consistent with a given objective for nominal spending. However, if money growth were to fall short of the path implied by deposit opportunity costs, this would be evidence of a shortfall in demand -- likely because of the increased price of bank credit, and the cost of tapping non-bank credit supplies -- that should be resisted.

Such a strategy does not appear feasible in the current situation, however, as the slowdown in bank lending has been accompanied in most countries by a deceleration of the broad monetary aggregates and an unusual increase in their velocity. These developments do not seem explicable in terms of relative declines in the interest rates paid on deposits. For example, econometric models of M2 in the United States explicitly take account of deposit interest rates; these have fallen to some extent, but the slowdown in M2 growth has been more pronounced than larger opportunity costs would imply (Board of Governors, 1991b). The situation in Japan is similar. A portion of the deceleration of the M2+CDs aggregate reflects the shifting of funds into the Postal Savings System; but broader aggregates that include Postal Savings also have slowed inexplicably (28).

Consequently, the current set of broad monetary aggregates may not give reliable signals with which to steer monetary policy through a bank lending shock. Current money demand functions probably do not measure deposit opportunity costs completely -- and this measurement error has become increasingly important as barriers between deposits and other assets are eroded. Average opportunity costs have become quite narrow, and demand elasticities may have increased. Non-price elements may become important as well -- survey evidence in the United States has found a sharp drop in promotional efforts to raise deposits (Board of Governors, 1991a). Still, these factors are difficult to quantify, and the prospects for structurally linking bank loan supply to broad money demand are not promising.

Alternative definitions of money may be less affected by these distortions, but they have other disadvantages. For example, a narrow, transactions-based monetary aggregate probably would be less affected by banks' funding needs, as its opportunity cost is relatively large. Indeed, M1 has decelerated by much less than broad money in the United States, Japan and France, while M0 remains within its target range in the United Kingdom. However, the demand instabilities that plagued narrow money in the 1970s and 1980s have not been satisfactorily resolved. Broader financial aggregates, such as total liquid assets, could internalise a shift of financial

intermediation outside of banks. However, the value of these broader aggregates for policy is suspect, because of a lack of a clear linkage with underlying monetary policy objectives, as well as problems of definition and measurement.

In addition to the difficulty of calibrating a monetary policy response to the current slowdown in bank lending, there is the fact that lower interest rates can only affect symptoms of that slowdown rather than its underlying causes of poor credit quality and tighter prudential standards. The latter factor is of course not a problem in itself but rather a solution to past poor lending decisions on the part of banks, and monetary policy would not want to stimulate economic activity to a degree that would encourage banks to lend unwisely. In addition, economic growth will operate only very slowly to bring resources into line with debt obligations, and steady moderate growth probably is superior to sharp swings in activity that could exacerbate problems of financial fragility.

These considerations seem to counsel caution in attempts to use monetary policy to offset a reduction in bank lending. Policy should keep to its medium term objectives, and seek at most to offset the effects of the credit supply problems on demand, not to solve these problems. Efforts to support growth rates of monetary or credit aggregates near previous objectives run the risk, unless velocity shifts are allowed for, of over stimulation and the reawakening of inflationary pressures. Similarly, attempts to shape macroeconomic conditions to the advantage of banks are likely to be counterproductive and lead to a prolongation of their difficulties.

Given the potential risks implied by an interest rate response to a shock to bank credit supply, monetary authorities might consider alternative tools for directly affecting the relative cost of bank credit. To a certain extent such a strategy could be justified by the fact that financial liberalisation does not yet seem to have yielded a financial system where smooth price adjustment alone allocates credit. The current situation in a number of countries would seem to imply discontinuities, such as shifts in bank lending behaviour and imperfect substitutability of bank loans for other sources of credit, which could justify policy efforts to affect credit supply directly. However, any serious attempt to reimpose quantity or price regulation of banks or credit markets is unlikely to prove beneficial. The costs in terms of lost efficiency and other distortions almost surely would outweigh any possible macroeconomic gains (29).

A potential tool that could avoid these problems would be reductions in reserve requirements. These remain in force in most countries, and they raise, to varying degrees, the cost of bank loans relative to other sources of credit. A cut in reserve requirements could work to offset a cost-based contraction in loan supply. This was one purpose of the cuts in reserve requirements in the United States in December 1990 and in France in November 1991. However, cuts in reserve requirements are primarily part of a trend toward financial liberalisation and regulatory harmonisation, and indeed this was the major reason for the United States move and recent cuts in reserve requirements in other countries (30). In those countries where reserve requirements exceed levels needed for monetary control, they could be a possible alternative or complement to an interest rate adjustment.

B. Interaction of monetary and prudential policy

Important complementarities exist between monetary and prudential policy, as indicated by the current attention paid to bank asset quality, prudential standards and credit supply. Prudential initiatives may have macroeconomically significant effects on credit expansion, and monetary policy may ease or worsen banks' financial position. This is well known and many of the issues involved -- such as the organisation of monetary and prudential authorities, or the need to co-ordinate policy actions -- are beyond the scope of the present paper. However, the above discussion does raise several questions relevant to the implementation of monetary policy.

One of these questions concerns the importance of the health of banks for the effective working of monetary policy. Well-capitalised, profitable banking systems will be better able than weak, under-capitalised ones to weather credit losses: banks with low capital must react more quickly to raise margins when loan losses erode capital, because their costs of capital and unsecured borrowing rise more rapidly. This at least partly explains why bank credit supply problems have been much more apparent in those countries -- primarily the United States, but also in Japan and France -- where banks have little capital margin beyond the BIS standards, than in Germany where banks have ample capital. In the longer run, therefore, this factor suggests the BIS capital standards may support the working of monetary policy by improving the financial health of banks. On the other hand, though, there is a risk that these rules also have raised the standards by which the markets judge banks, so that banks' market standing may be more vulnerable to losses than in the days of lower, but also more ambiguous, capital rules. Potentially, the resilience of banking systems *vis-à-vis* credit losses could decline, as markets focus on bank capital levels, and monetary policy in most countries probably will need to remain cognizant of systemic risks.

Recent changes in financial intermediation may put these dangers of systemic failure in a somewhat different light. Traditionally, monetary policy has been concerned about the implications of bank failures for a monetary contraction. However, as Goodhart (1988) argues, the danger of bank runs in larger industrial countries now are typically a flight of funds between banks, not from banks to currency. Thus the risk is not to the money supply, but to the credit supply to the customers of a failed bank. The evidence that other credit may not be immediately substitutable for bank loans may make the loss of intermediation services the more serious implication of bank failure.

A very visible aspect of current prudential policy is the impact of the BIS capital rules on the cost of credit. As addressed above and in Annex B, these rules may be increasing the costs of bank intermediation, potentially to a degree that may affect the supply of credit to the economy (because more stringent capital standards imply that a smaller proportion of the credit risks faced by banks will be borne by the public safety net and more by their stockholders). While highly desirable from the perspective of disciplining banks, this also means that risky borrowers will have to be prepared to bear higher credit costs.

More generally, financial regulation is one determinant of the competitive position of banks relative to other lenders and to securities markets. Banks have unique capabilities in terms of their access to liquidity

combined with the ability to process information about borrowers. These make
them preferred sources of credit for smaller, riskier, or more heterogeneous
borrowers, and can give them a special role in the allocation and control of
capital on an economy-wide basis. As a consequence, prudential policies can
have implications for the economy that go beyond their effects on the stability
of the banking system.

V. Conclusion: What Lies Ahead?

This paper has described how the behaviour of banks in a number of
countries has changed, due to increased competition, associated with financial
liberalisation, and more rigorous prudential supervision. Nonetheless, banks
appear to retain an important role in financial intermediation, in recognition
of their uniqueness as evaluators of credit risk and monitors of borrowers.
Recently, cyclical credit losses and deteriorating borrower quality, as well as
the imposition of higher mandatory capital ratios, have led banks in several
countries to raise the relative price of loans. Given the special features of
bank credit, and because substituting other credit sources for bank lending may
be costly in the short run, this may have had a depressive effect on demand.

In principle, any such demand effect might be neutralised by a more
accommodative monetary policy. However, one obstacle to such a policy would be
proper calibration, as the contraction of bank lending has reduced the
indicator value of broad monetary aggregates. Without accurate alternative
indicators, monetary easing pursued to counter a bank credit supply pullback
risks reawakening inflationary pressures or encouraging imprudent lending.

Are these differences specific to the current period, a result of
over-aggressive lending following deregulation and the imposition of the BIS
capital adequacy rules, or will they persist and spread to other countries? To
a certain extent, the current problems are temporary. The health of banks is
likely to improve in those economies where these problems have been the most
evident, as growth resumes and stricter lending standards strengthen bank asset
quality. This should work to damp banks' current unwillingness to lend. On
the other hand, banks likely will remain under competitive pressures from
securities markets and other financial institutions even as they continue as
significant providers of credit for certain customers. Moreover, their
business will stay concentrated in those assets whose liquidity is low. In
these circumstances banks may not have much cushion of reserve earnings, and
probably will tend to react quickly to signals, both positive and negative,
from the capital markets.

More generally, cyclical swings in asset values may introduce a natural
variability in bank credit supply in a liberalised environment. This process
may have been masked by close regulation of banking and a comprehensive safety
net; deregulation and greater scope for market discipline may be allowing it
to reappear (31). It is therefore likely that fluctuations in bank credit
supply will remain important in the future with the necessity for monetary
policy to cope with lending shifts beyond the current cycle.

Notes

2. By banks is meant deposit-taking financial intermediaries that extend
    credit to a broad range of customers. This definition essentially
    encompasses commercial banks, though in some countries the separation of
    commercial banks from specialised mortgage lending institutions is
    increasingly being blurred by financial liberalisation. This definition
    also excludes other financial intermediaries such as insurance companies
    or pension funds. These institutions do make loans, but their lending
    tends to be specialised -- long term mortgages for example -- and their
    liabilities are not as liquid as deposits. In the empirical examples
    available national data are employed, which for some countries include
    other institutions.

3. Gross funding is used here since it better reflects the relative
    influence over or control of investment by banks. The chart would be
    little different if net funds raised was used instead, except that the
    relative contribution of banks would be reduced by offsetting deposits.

4. Chart C is based on flow-of-funds data, and includes all deposits,
    including the deposit liabilities of non-banking firms.

5. The distinction between real-estate and commercial lending differs
    across countries and may understate the amount of lending that
    ultimately is backed by real estate. This may be the case especially
    for Japan, where controls on banks' real estate credit led them to lend
    instead to finance companies -- a part of commercial lending -- and to
    other intermediaries, who in turn financed commercial real estate. The
    data for France do not break out real-estate related lending from
    household and commercial credit.

6. This trend predates the adoption of the BIS capital standards which
    placed a lower capital ratio on residential mortgage assets. This
    feature of the capital requirements further encourages the acquisition
    of residential real estate assets, though it does not apply to
    non-residential real estate loans.

7. Prowse (1990) finds that measures of the severity of the scope for debtholder-shareholder agency conflict (essentially measures of the extent to which corporate assets can be manipulated by shareholders at the expense of debtholders) have statistically significant negative effects on firm leverage for the U.S., but not Japanese, firms. This is evidence that bank debt, which is a more common source of finance in Japan where banks also take a more active management role, may alleviate agency costs.

8. See Ross (1977) and Leland and Pyle (1977).

9. James and Wier (1990) demonstrate such an effect.

10. See, for example, Calomiris and Kahn (1991).

11. Bencivenga and Smith (1991) show how the existence of financial intermediaries (banks) increases economic growth rates for this reason.

12. Some have argued instead -- for example Goodhart 1988 -- that the safety net for banks is justified by banks' unique value as credit evaluators and monitors.

13. Securitisation means the sale of bank loans to non-bank investors. There are a wide variety of securitisation techniques in use, largely in the United States. Most retain a role for banks in evaluating and monitoring borrowers, and many involve the retention of some credit risk by banks, and thus continue to rely to some extent on banks' special features.

14. Nearly half of bank mortgage assets are commercial mortgages; some of their residential mortgages may be in the process of securitisation. As for consumer credit, total securitised consumer credit is less than 1/4 of bank consumer lending; this exaggerates the extent to which bank consumer lending has been securitised as it includes securitised assets of finance companies and retailers (Board of Governors, 1991c).

15. Another example is the venture capital market; activity in this sector has declined as returns were not seen as justifying the risks (*Financial Times*, 1991a).

16. The Samolyk and Cromwell results use reduced-form approaches that reveal only statistical causality. They attempt to control for the possibility that deteriorating business conditions appear first in terms of slow lending or bank failures.

17. The table shows the contributions of broad money and bank credit growth rate innovations to the forecast error variance of nominal income changes in a VAR defined in terms of log differences of income, money and/or credit, and levels of the short-term interest rate. Only the quantities were differenced as they show obvious non-stationarity. Two lags of the independent variables were used. (Alternative specifications do not greatly change the results.) In all cases the ordering used was interest rates, money and/or credit, and income.

18. Because money is ordered ahead of bank credit in the VAR system, the response to innovations in bank credit reflects only that part of the bank credit innovations that are independent of innovations to money.

19. Differences in accounting data and coverage mean that the levels of the debt-to-equity ratios in Chart F are not strictly comparable across countries. Still, leverage of the corporate sector probably is higher in Japan, Germany and France than in the United States or the United Kingdom. This does not necessarily imply greater debt burdens in these countries, however, as the debt largely is bank debt, and bank-borrower links are closer.

20. The loan rates shown are generally for loans to commercial borrowers of average quality. Loan pricing can be very borrower specific, and the patterns on the chart should be viewed as indicative rather than revealing the actual change in the price of bank credit.

21. Evidence on this point is scattered, but highly suggestive. Beyond the trends shown in Charts E and F, there is the fact that rates of net losses on commercial, real estate and consumer loans at larger U.S. banks were higher in 1990 than any time in the 1980s (Brunner, Duca and McLaughlin, 1991). The same could be said of company liquidations, mortgage arrears, and mortgage repossessions in the United Kingdom (Bank of England, 1991b). In Japan, the end of the asset-price boom of the 1980s also has left serious strains; company bankruptcies in the first 10 months of 1991 were three times larger, by value, than in 1990 (*Financial Times*, 1991c).

22. The spike in losses in 1987 was caused by provisioning for loans to LDCs. Domestic problems contributed more to the 1989-90 rise.

23. For example, the big four U.K. clearing banks reported loan loss provisions in the first half of 1991 above 1990 levels (*Financial Times*, 1991b).

24. Chairman Greenspan of the Federal Reserve Board presented evidence for this proposition based on both time series and cross-section studies of U.S. banks at last summer's Conference on Bank Structure and Competition at the Federal Reserve Bank of Chicago (Greenspan, 1991).

25. This is not to deny that quantity restrictions, such as the equilibrium credit rationing described in Stiglitz and Weiss (1981) may be operating. However, the observed data are consistent with an increase in the cost of bank intermediation, with the loan market continuing to clear on the basis of price, leaving no need for more complex models. Moreover, if quantity restrictions are operating, the prescriptions for monetary policy, as discussed in Section IV, would be essentially the same.

26. The responses were computed from an equation that explained the growth rate of output by its own past, and past values of the spread and the interbank rate. The inclusion of the interbank rate should reduce the effects of the spread related solely with its correlation with monetary

policy. Statistical significance of the responses is not measured directly, but rather by testing an exclusion restriction on all spread terms in the equation. The sample is split into the 1970s and 1980s; data for 1990-1991 are not included.

27. In some cases, the adjustment could occur through wholesale funds (managed liabilities) with no change in the rate paid on core "retail" deposits that make up most policy-related broad monetary aggregates.

28. In the United Kingdom, on the other hand, it is argued that the deceleration of broad money is consistent with declines in private sector wealth. See Hall, Henry and Wilcox (1989) for a discussion of U.K. models of broad money.

29. See Sargent (1991) for a further discussion of these arguments.

30. Reserve requirements also have been cut recently in Japan and eliminated in Canada, though not in an effort to spur bank lending.

31. The current concerns about bank willingness to lend are surprisingly similar to the debate in the United States in the early 1930s, after a period of permissive lending in a deregulated environment not totally unlike the 1980s (see Klebaner, 1991).

Tables and Charts

Table 1. Relative importance of money supply and bank lending
in explaining nominal income growth
(Per cent of forecast error variance explained, 4-quarter horizon) (1)

|	1970Q1-1982Q4 (2)	1983Q1-1991Q2
United States		
M2 alone	7	22
Bank credit alone	3	23
Jointly: M2	7	28
Bank loans	2	16
Japan		
M2+CDS alone	12	5
Bank loans alone	15	15
Jointly: M2+CDs	12	4
Bank loans	2	13
Germany		
M3 alone	23	4
Bank credit alone	11	2
Jointly: M3	16	3
Bank credit	5	4
France		
M3 alone		24
Bank credit alone		11
Jointly: M3		28
Bank credit		8
United Kingdom		
M4 alone		17
Bank credit alone		10
Jointly: M4		16
Bank credit		1
Italy		
M2 alone	11	9
Bank credit alone	3	6
Jointly: M2	11	10
Bank credit	3	9
Canada		
M3 alone	19	2
Bank credit alone	5	6
Jointly: M3	19	1
Bank credit	4	8

1.   Decomposition of variance based on a vector autoregression of two lags
of the per cent change in nominal GNP or GDP, the per cent change in
nominal bank lending (as defined in Chart A), and the level of
short-term interest rates.
2.   Data on monetary aggregates unavailable for France and the United
Kingdom before 1983 and 1978, respectively.

Table 2.   Response of output growth to change in bank loan spread (1)(2)

	Full sample		1970s		1980s	
United States	0.0018	(0.2911)	-0.0044	(0.1457)	-0.0026	(0.8999)
Japan	0.0041	(0.5746)	0.0117	(0.6478)	0.0031	(0.4089)
Germany	0.0003	(0.8994)	-0.0008	(0.7144)	0.0002	(0.2905)
France	-0.0005	(0.0894)**	-0.0012	(0.6794)	0.0024	(0.4700)
Italy	-0.0006	(0.1152)	-0.0059	(0.6648)	0.0006	(0.3725)
United Kingdom	-0.0047	(0.4887)	-0.0096	(0.2686)	-0.0025	(0.8518)
Canada	-0.0008	(0.4037)	0.0046	(0.4321)	0.0045	(0.6970)

1.   The table reports the difference between output growth 4 quarters after a one percentage point increase in the spread to what it would otherwise have been. Figures in parentheses are marginal significance levels of whether the lagged spread terms can be excluded from the equation. The equation contains a constant, four lags of each of output, the spread and a short-term interest rate.

2.   Interest rates used are defined in Chart G.

* (**) Denotes that the hypothesis that the spread can be excluded is rejected at 5 (10) per cent level.

Chart A. Growth rates of broad money supplies and bank lending
## (4-quarter percent change)

UNITED STATES

FRANCE

JAPAN

UNITED KINGDOM
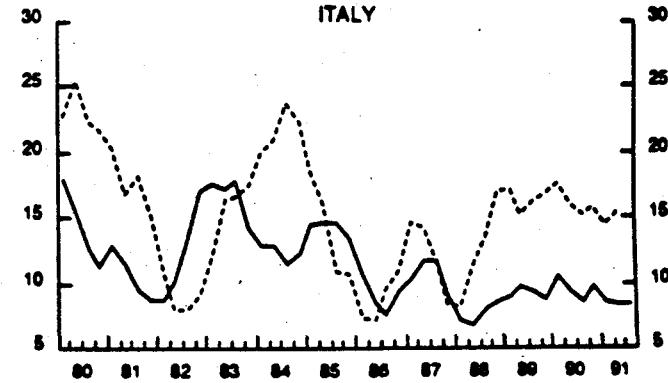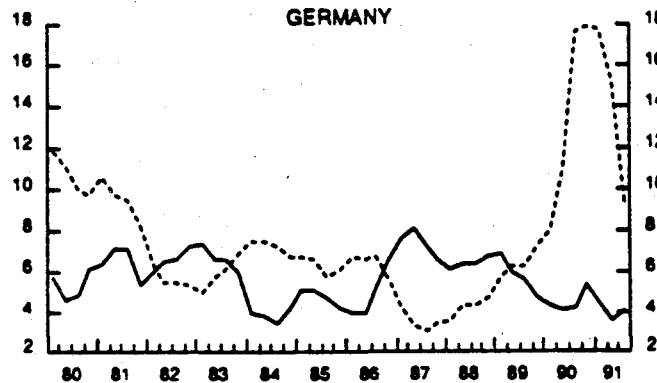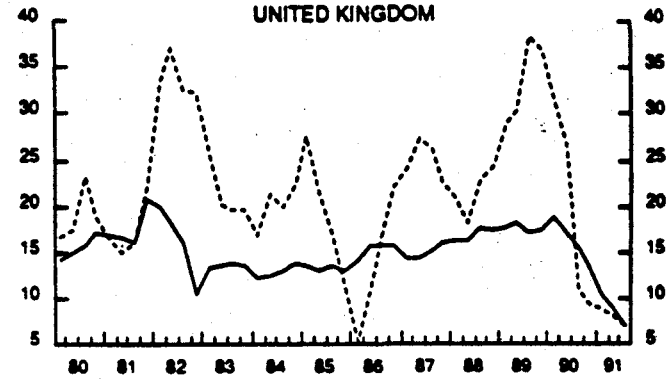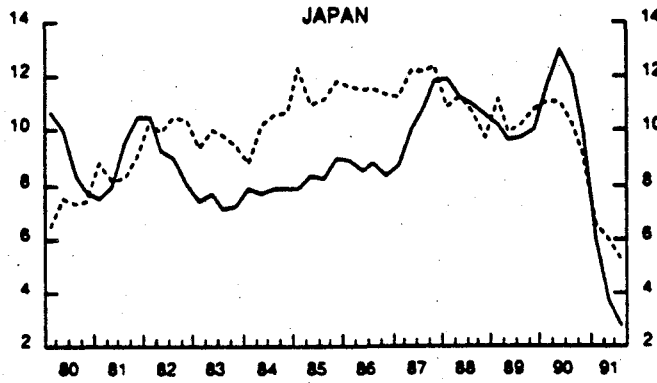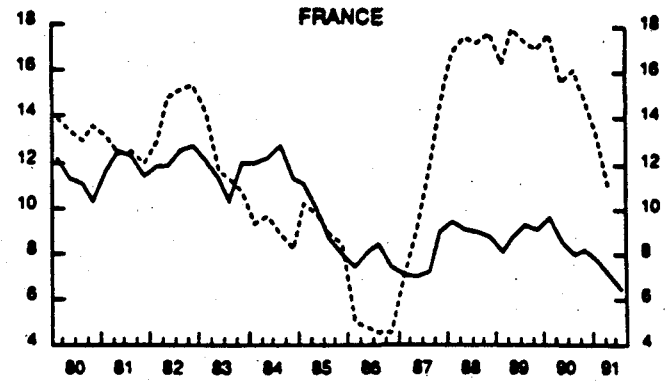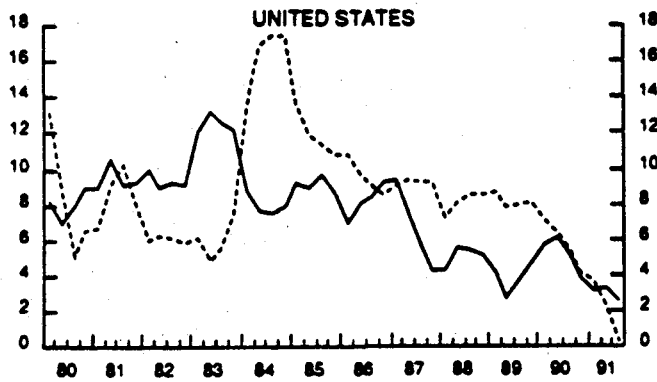
GERMANY

ITALY

——————— Money supply

------------ Bank lending

Money supply :
United States (M2), Japan (M2+CD), Germany (M3)
France (M3), Italy (M2), United Kingdom (M4)

Note: M3 data for Germany have been adjusted for
unification, the loan data are unadjusted.

Bank lending :
United States (commercial bank loans),
Japan (commercial bank loans and discounts),
Germany, France and United Kingdom
(bank credit to economy),
Italy (commercial and saving bank domestic credit).

26

Chart A. Growth rates of broad money supplies and bank lending (cont.)
(4-quarter percent change)

CANADA

SWEDEN

BELGIUM

SWITZERLAND
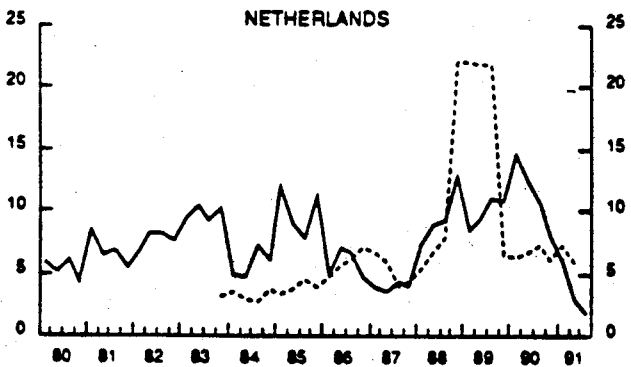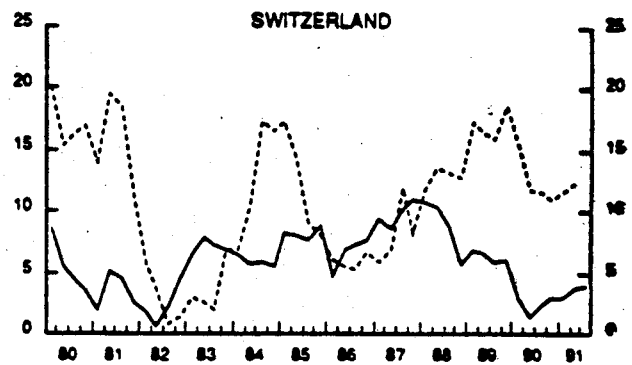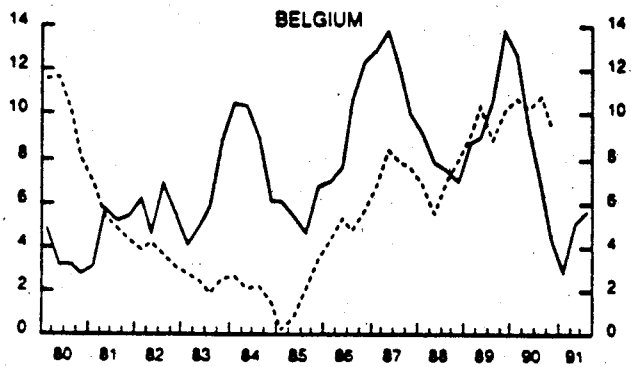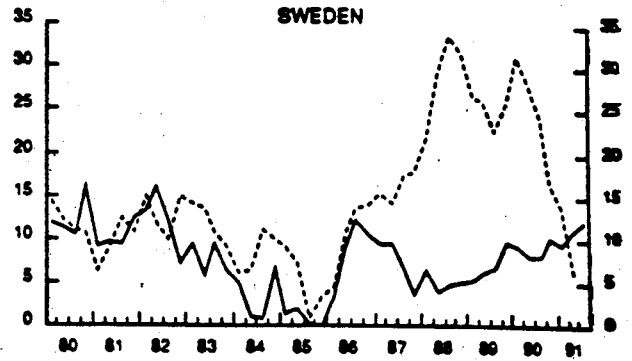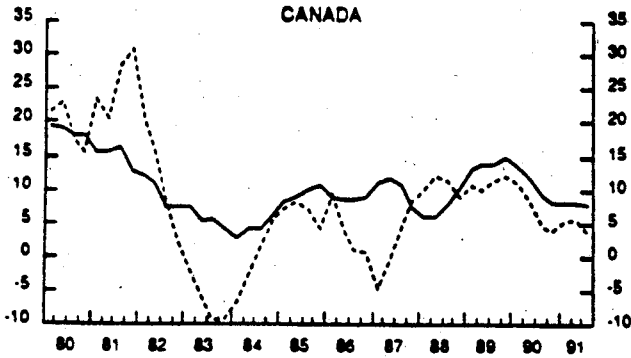
NETHERLANDS

——————— Money supply

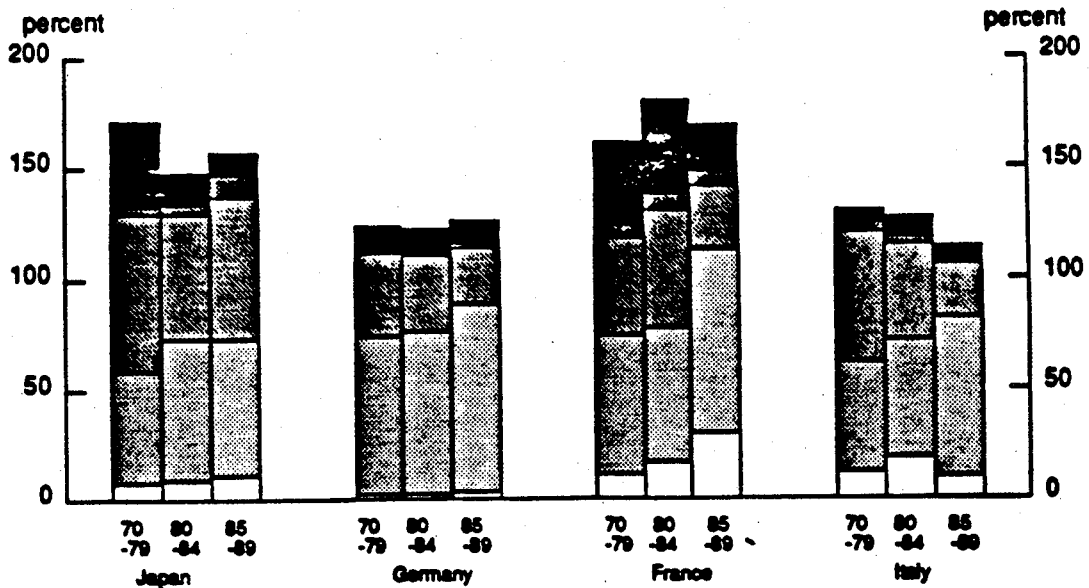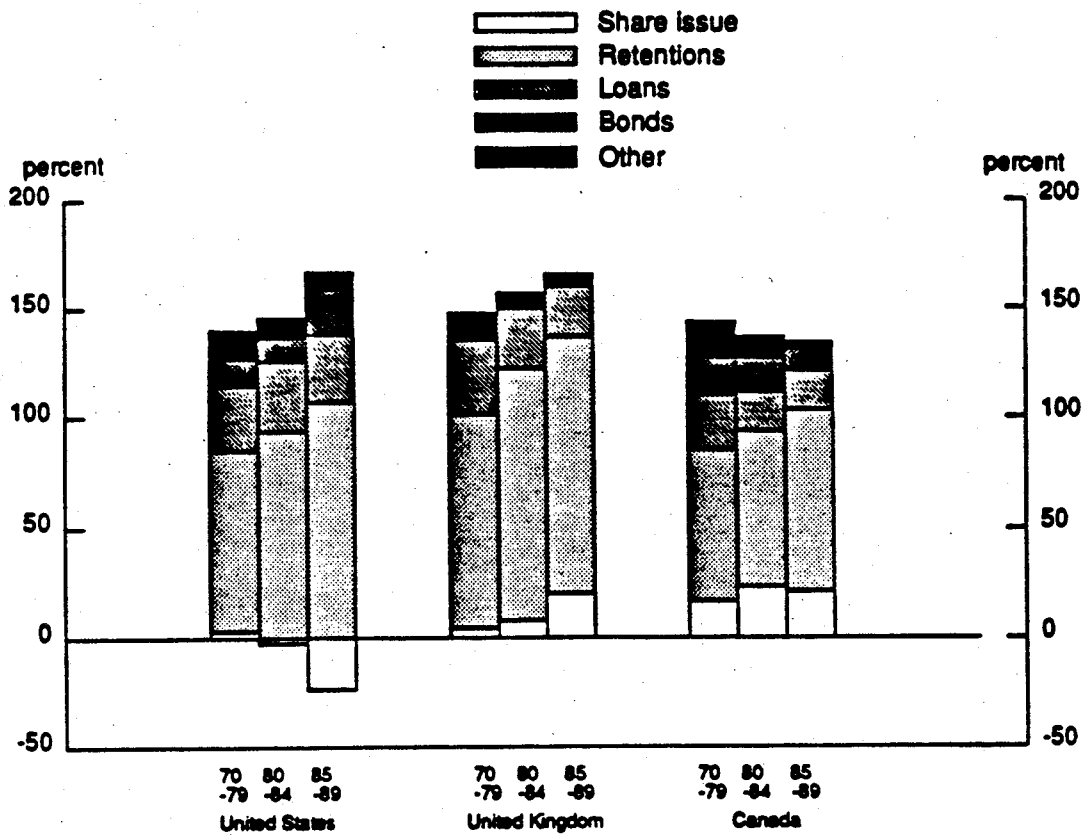·········· Bank lending

Money supply :
Canada (M2), M1 plus quasi-money for Belgium,
Netherlands, Sweden and Switzerland.

Bank lending :
Canada (commercial bank credit to economy),
Belgium (monetary institutions credit to economy),
Netherlands (bank credit to private sector),
Sweden (commercial and saving bank domestic credit),
Switzerland (short term bank credit to private sector).

Chart B. Sources of financing of nonfinancial corporations.
(percent of investment outlays)

Legend:
- Share issue
- Retentions
- Loans
- Bonds
- Other

Top chart (percent, axis 200 / 150 / 100 / 50 / 0 / -50):

70 80 85
-79 -84 -89
United States

70 80 85
-79 -84 -89
United Kingdom

70 80 85
-79 -84 -89
Canada

Bottom chart (percent, axis 200 / 150 / 100 / 50 / 0):

70 80 85
-79 -84 -89
Japan

70 80 85
-79 -84 -89
Germany

70 80 85
-79 -84 -89
France

70 80 85
-79 -84 -89
Italy

Note : Sources of finance are measured on a gross basis, the size of the bars exceeds 100 percent because they include financing of financial as well as physical investment. Loans are largely bank loans, but other lenders are included.

Sources: OECD Financial Statistics. Part 2: Financial accounts of OECD countries and Part 3: Non financial enterprises financial statements.

Chart C. Composition of household financial assets.
(percent of GNP/GDP)

Legend:
- ☐ cash and deposits
- ▨ debt securities and long term loans
- ▨ shares
- ■ other -including insurance and pension funds
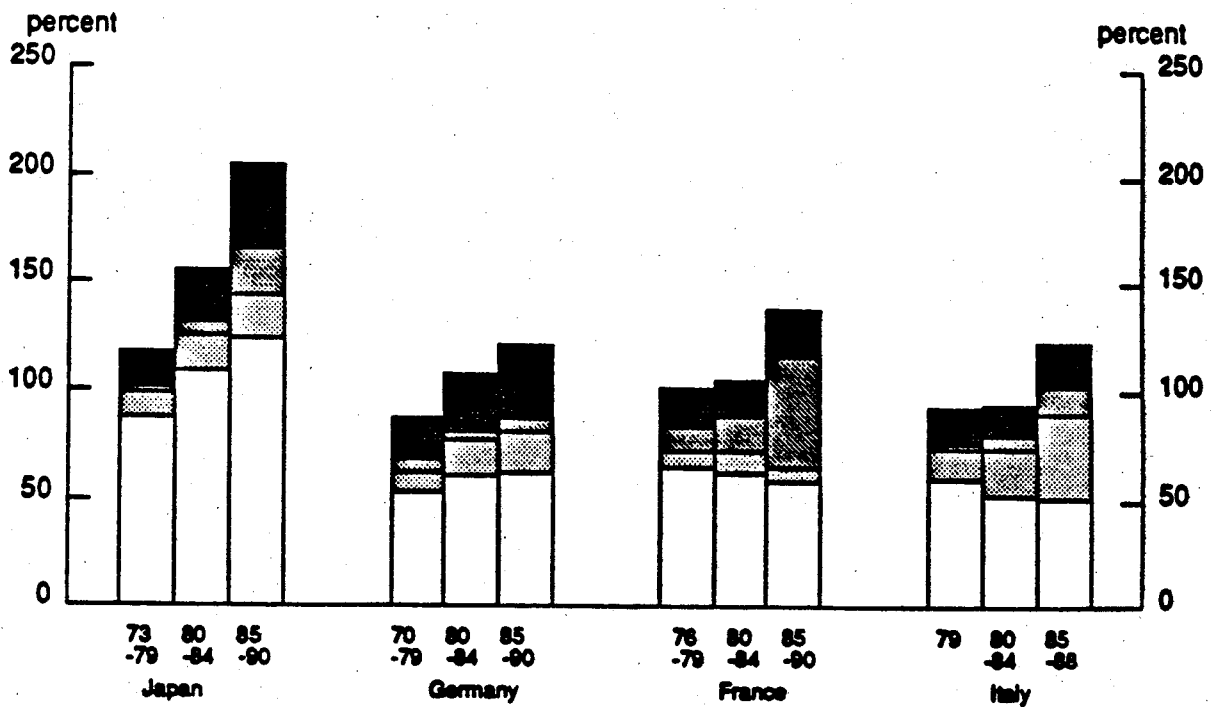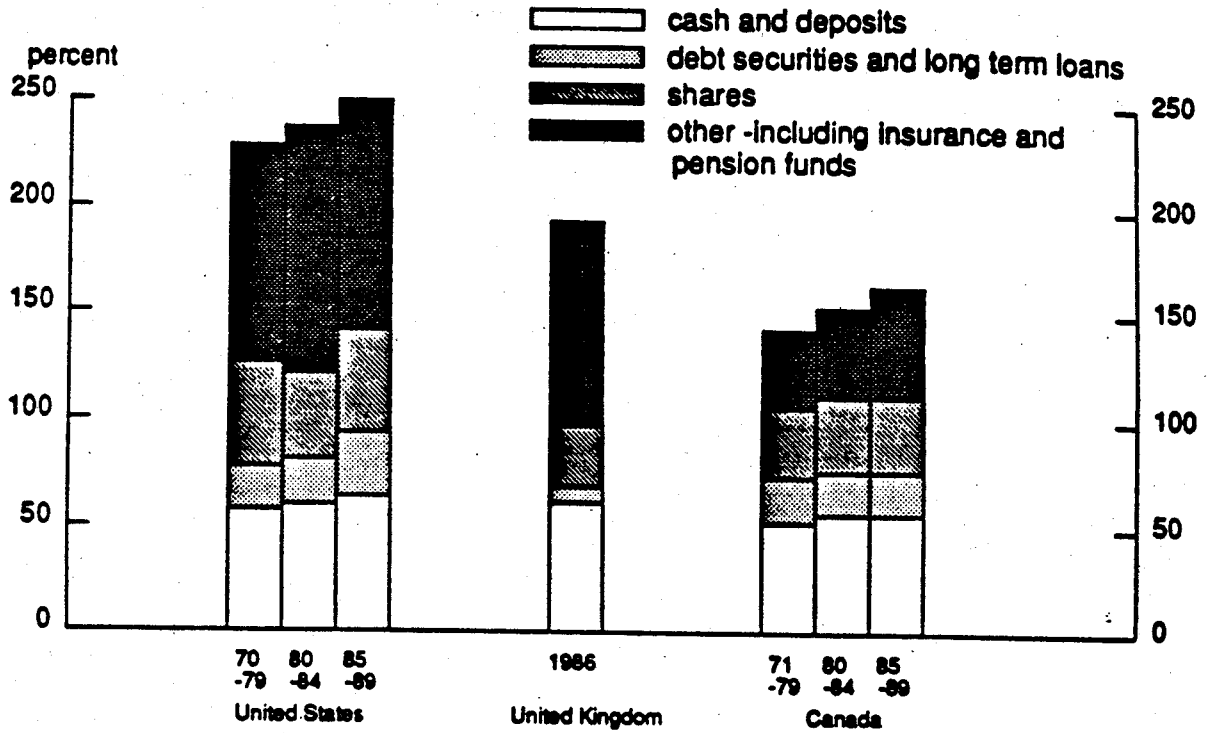
Source : OECD Financial Statistics Part 2: Financial accounts of OECD countries.

Chart D. Composition of bank assets (1)
(percent of GNP/GDP end of year)

Legend:
- ☐ loans to households
- ▨ real estate lending (2)
- ▨ commercial loans
- ■ securities
- ■ other loans

(Top panel: United States, United Kingdom, Canada — years 1980 and 1990)
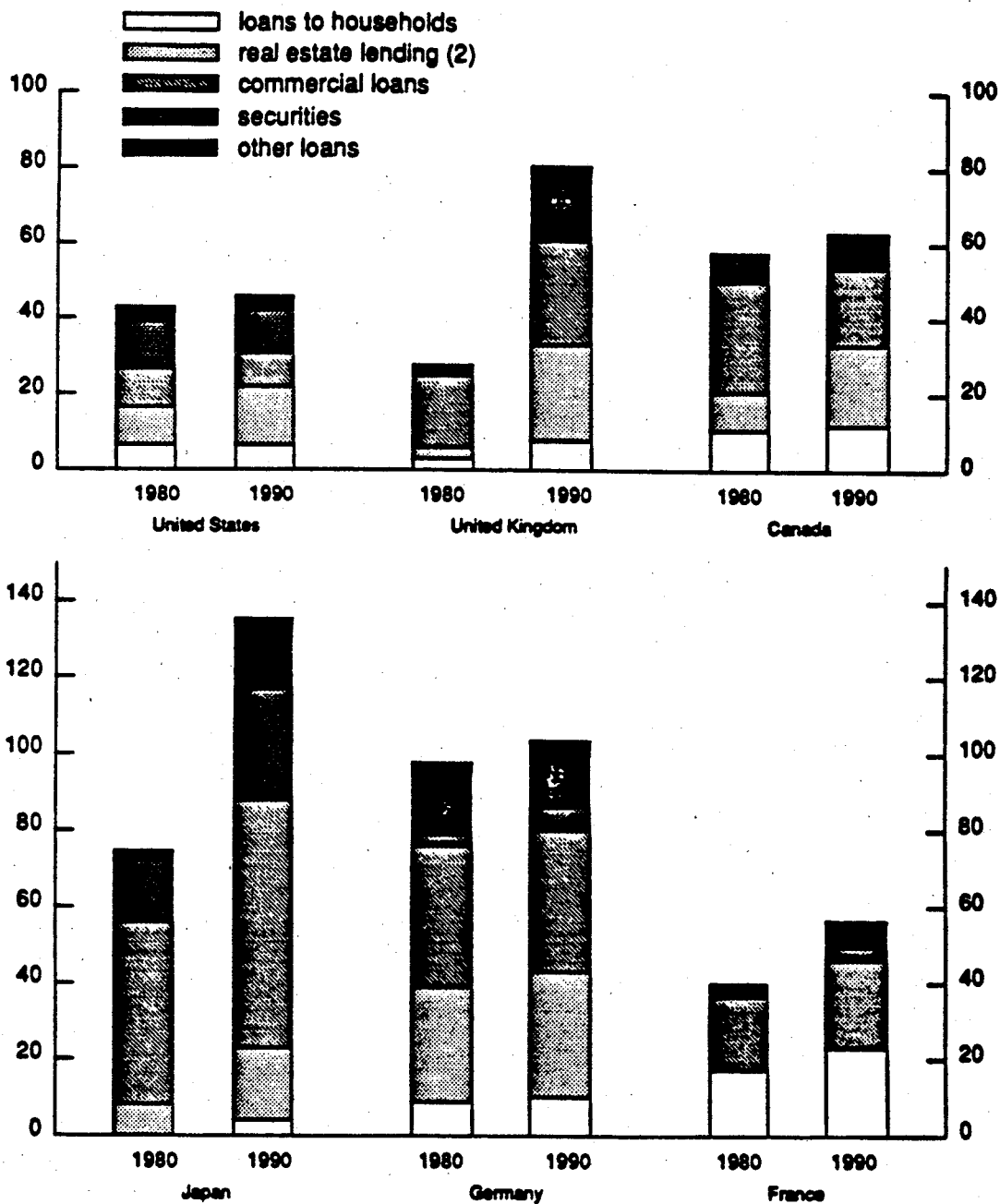
(Bottom panel: Japan, Germany, France — years 1980 and 1990)

(1) Domestic assets, in domestic currency when possible.

(2) Loans backed by residential and commercial real estate. For the United Kingdom, personal mortgages plus construction loans and loans to property companies. For Japan, real estate loans plus loans to real estate companies. For France, real estate loans are included with household and commercial loans.

Sources and institutions covered : United States - commercial banking institutions, Federal Reserve H.8 statistical release; Japan - all banks, Bank of Japan Economic Statistics Annual; Germany - West German Banks, Monthly Report of Deutche Bundesbank; France - Banques AFB, Banque de France, Statistiques Monetaires et Financieres; Canada - Chartered Banks, Bank of Canada, Weekly Financial Statistics.

Chart E. Debt to income ratios of household sector.
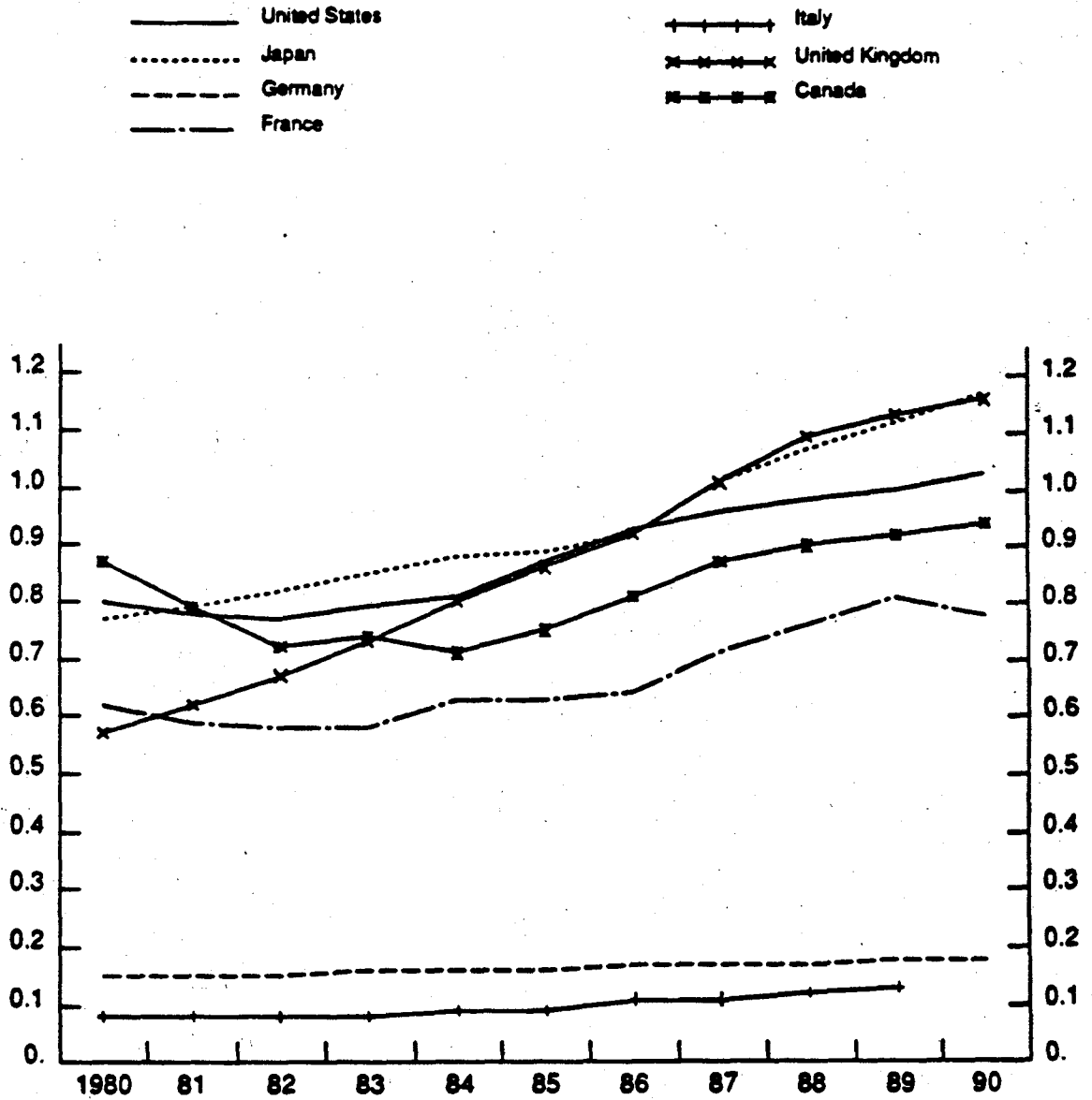
———— United States	+—+—+ Italy
············ Japan	✕—✕—✕—✕ United Kingdom
— — — Germany	▪—▪—▪—▪ Canada
—··—— France	

31

Chart F. Debt to equity ratios of corporate sectors (1).
(percent)

Legend:
- ———— United States
- ■–■–■ Japan
- ········· Germany
- –––· France
- ———— United Kingdom
- +——+ Canada
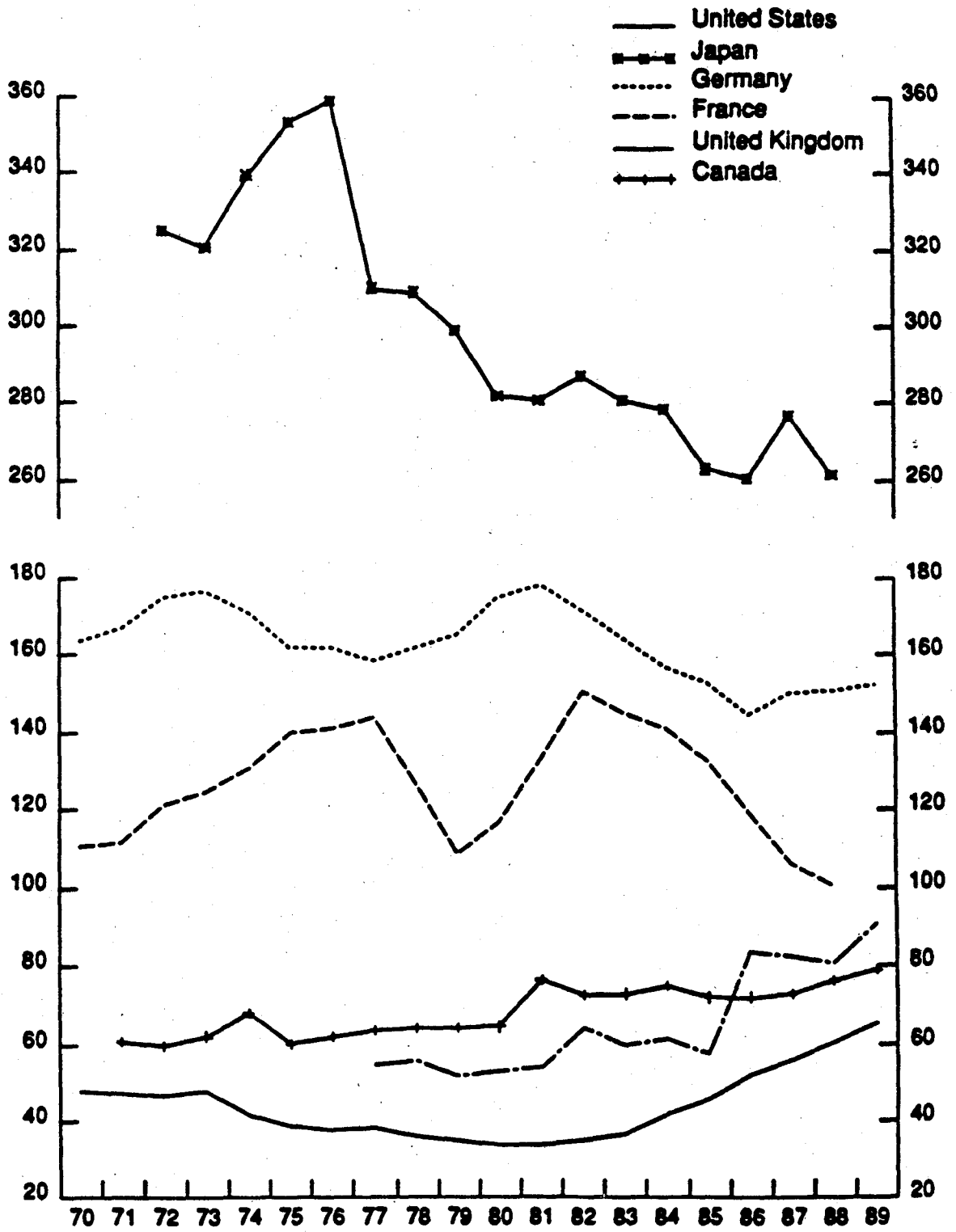
(1) Book-value basis

Source : OECD Financial Statistics.

32

Chart G. Spread between bank loan and interbank interest rates, and real bank lending growth.

(percent and 4-quarter percent changes)
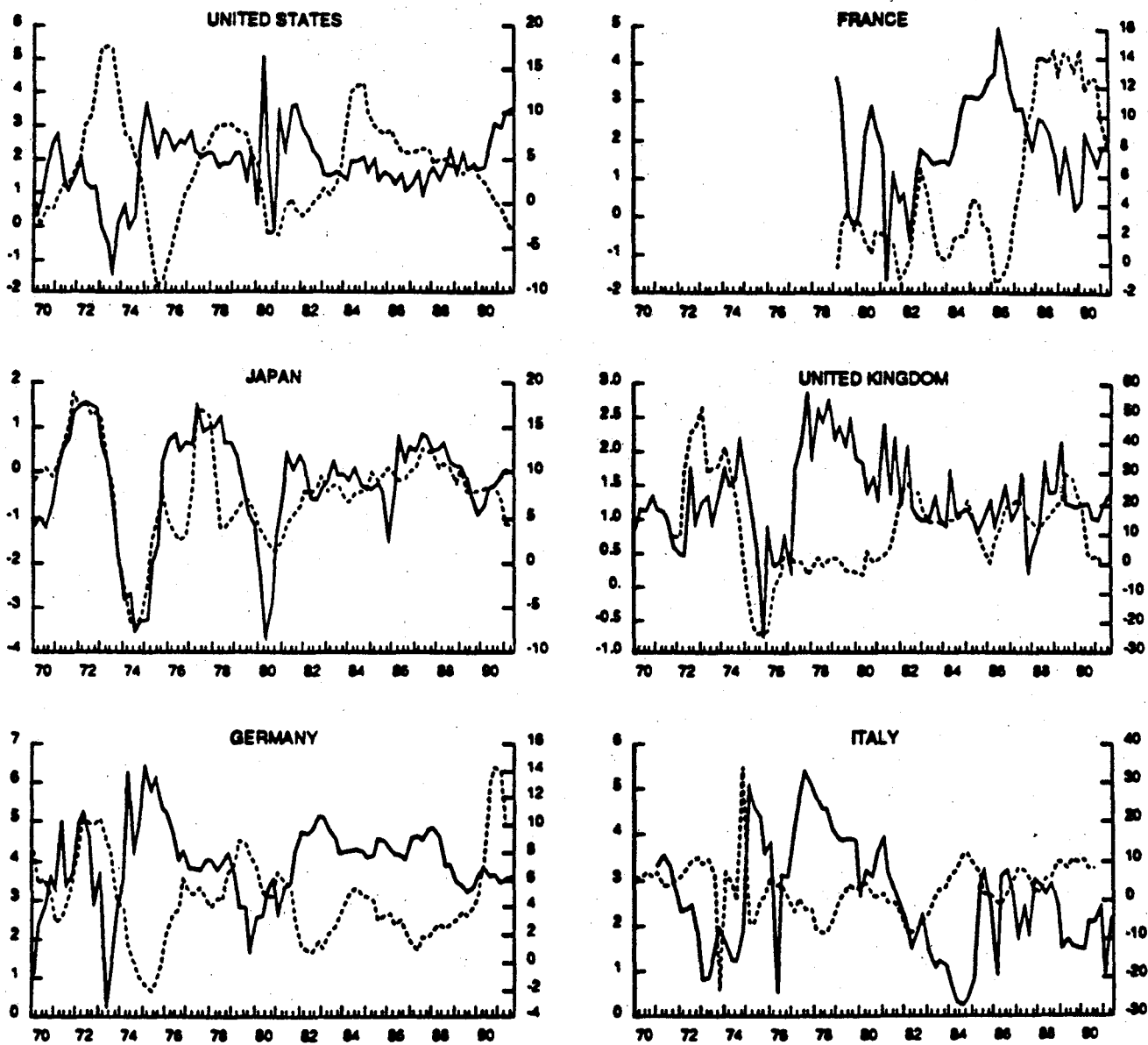
UNITED STATES

FRANCE

JAPAN

UNITED KINGDOM

GERMANY

ITALY

——— spread between bank loan and interbank interest rates (left scale)

.... growth of bank lending deflated with GNP or GDP price indices (right scale)

Bank loan data : see chart A.

Interest rates (loan rates, interbank rates):
Unites States: short term bank loans to business,
federal funds; Japan : average contractual,
call money; Germany : credits in current
account, day to day loans.

France: average rate on overdrafts,
day to day loans against private bills;
Italy: overdrafts with commercial banks,
interbank deposits;
United Kingdom: overdraft minimum,
call money maximum.

33

Chart G. Spread between bank loan and interbank interest rates, and real bank lending growth.(Cont.)

(percent and 4-quarter percent changes)
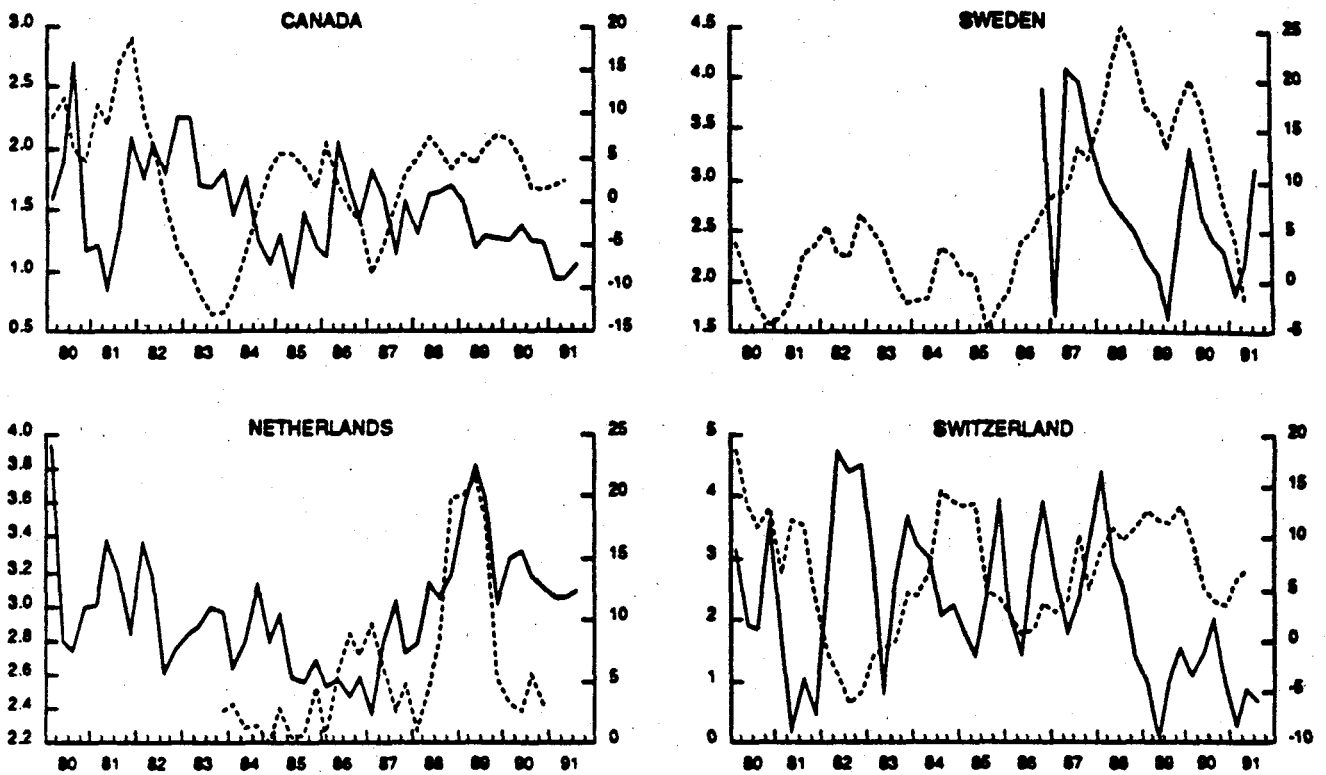
CANADA

SWEDEN

NETHERLANDS

SWITZERLAND

———— spread between bank loan and interbank interest rates (left scale)

-·-·-·-·-·- growth of bank lending deflated with GNP or GDP price indices (right scale)

Bank loan data : see chart A.

Interest rates (loan rates, interbank rates):
Canada : chartered banks prime lending, day to day loans; Netherlands : advances in current account against securities (min), call money.

Sweden: banks'average rate on advances to enterprises, day to day money; Switzerland: overdrafts with commercial banks, day to day loans.

Chart H. Banks' net loan-loss provisions
(As a percentage of gross income)

———— United States	x—x—x—x France
+—+—+—+ Japan	— — — — United Kingdom
o—o—o—o Germany	············· Switzerland
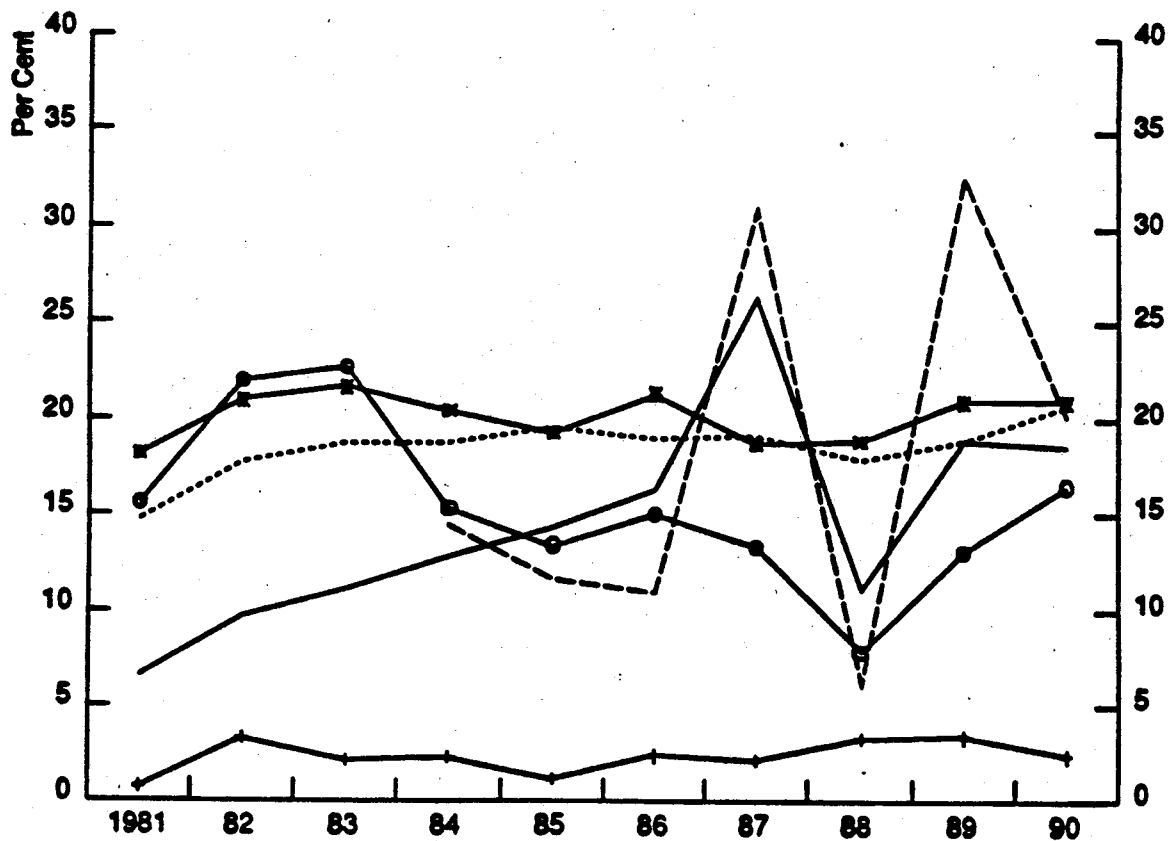
Annex A

The Importance of Bank Lending:
Evidence From Interest Rate Spreads (1)

I. Introduction

The spread between the yield on risky (corporate) debt and the yield on
safe (government) securities has been found to provide significant information
about the future course of real economic activity in the United States (2).
Analyses of this fact have focused on explanations that emphasise the imperfect
substitutability between bank credit and securities finance (3).   One such
explanation is related to monetary policy: tighter policy, it is argued,
increases the cost or reduces the availability of funds to banks, forcing them
either to raise loan rates or reduce lending.   Firms, in turn, borrow more in
the securities markets, where the increased demand boosts spreads (4).   A
complement to this explanation is that the spread captures the effect of agency
costs and informational deficiencies in lending. These deficiencies become
more important when business conditions deteriorate, or when borrowers are
forced to reduce their relative reliance on bank finance (5).

No clear conclusion about which of these interpretations is correct has
been drawn from results based on data for the United States. A common finding
is that when monetary policy is controlled for, the information content of the
spread is reduced.   Nevertheless, it retains some information, which may
suggest that both influences are at work.

The analysis below examines the information content of the spread across
a number of countries that have very different financial systems (6). This is
of interest because the predictive power of the spread may vary systematically
across financial systems, either because the workings of the transmission
mechanism differ depending on the system in place and/or because the nature of
the agency problem and information asymmetries between lenders and borrowers
also differ (7).

II. Graphical Evidence

The relationship between interest-rate spreads and economic activity
(12 month growth in real GDP) in the G-7 countries may be seen by inspecting
Chart 1 (8).   There are a number of points worth noting from the chart. The
first is that during periods of economic uncertainty -- the recessions of the
mid-1970s and early-1980s, and the 1987 fall in stock prices -- spreads
widened.   Such behaviour is clearly apparent in the United States and Canada,
and, to a lesser extent, in the United Kingdom, Germany and Japan. Second, a
strong counter-cyclical correlation stands out for the more market-based
systems of the United States and Canada, although in both cases this

correlation has weakened in the 1980s. There also appears to be some counter-cyclical behaviour in the United Kingdom, Germany and Japan but no clear relationship in France or Italy.

III. Econometric Analysis

A. The modelling approach

An econometric analysis of interest-rate spreads is presented below, following a similar approach used in other papers on this topic (Bernanke, 1990 and Kashyap, Stein and Wilcox, 1991). First, simple forecasting equations containing lags of the variable to be predicted (growth rates of output or investment) and lags of the spread are estimated. Thus, the first reported equation (Table A1) is:

$$\Delta y_t = \alpha + \sum_{i=1}^{4} \beta_i \Delta y_{t-i} + \sum_{i=1}^{4} \gamma_i S_{t-i} + \xi_t \quad , \qquad [1]$$

where y_t is alternatively the log of quarterly real GNP or the log of quarterly real business fixed investment. S is the quality spread between private and public debt and ξ_t is a random error term with zero mean and constant variance. The predictive power of the spread is examined by testing whether it can be excluded from the equation. If the spread adds no predictive power then $\gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = 0$ (9).

The next hypothesis to be tested is that the influence of the spread on output (if any) is not exclusively due to its response to changes in monetary policy. The equation used in this regard is:

$$\Delta y_t = \alpha + \sum_{i=1}^{4} \beta_i \Delta y_{t-i} + \sum_{i=1}^{4} \gamma_i S_{t-i}$$

$$+ \sum_{i=1}^{4} \delta_i r_{t-i} + \xi_t \quad , \qquad [2]$$

where r is a short-term interest rate which reflects the stance of monetary policy. Once again, if the spread has no predictive power, its coefficients will be zero. If the spread does reflect monetary policy influences then the probability of accepting the null should be higher in equation [2].

A factor which must be borne in mind when assessing the forecasting performance of the spread is the depth of the asset markets in question. The market to which the risky rate of interest applies could be affected by agency costs, but the size of the market itself may be so small that their effect is lost on aggregate output and investment. For example, firms in continental Europe make very little use of the corporate bond market. Consequently, a

failure of the corporate-government bond yield spread to predict output in these countries may simply reflect the fact that the amount of funds raised in these markets is too small to affect aggregate economic activity, rather than the absence of agency cost effects.

B. Empirical results

The results from estimating equation [1] indicate that the spread between short-term private rates and short-term government rates (r_p-r_g) has predictive power in the United States and the United Kingdom. In Canada, the short-term spread does not have any predictive power. However, the long-term spread (R_p-R_g) does. In all cases where the spread is significant, the sum of the coefficients was negative, suggesting that increases in the spread are associated with subsequent slowdowns in activity.

The results do not indicate any predictive power in the other countries. For example, the results on the short-term spreads for Germany and France seem to be spurious. Because of a lack of data on short-term government securities in these countries, the spread was calculated by subtracting the yield on long-term government bonds from the short-term private interest rate. This potentially biases the results because such a proxy contains term-structure influences which may provide information on the future course of the economy. To control for this, the German and French equations were augmented by a term-structure variable constructed from yields on long-term and short-term private paper. Once this influence is controlled for the short-term, spread variable no longer has any predictive power (results not reported).

To examine whether the spread simply reflects the stance of monetary policy, a short-term interest rate was added to the equation (i.e., equation [2]). The results suggest that part of the predictive power of the spread is due to the fact that it reflects the stance of monetary policy (see Table A2) (10). However, the short-term spread remains significant in the United States and the United Kingdom (11). The long-term spread remains significant in Canada.

IV. Conclusions

Do these findings suggest that there are costs of substituting between bank finance and other sources of finance? The results obtained indicate that this could be the case in countries with market-based systems. Predictive power of the spread in these countries may result from banks altering lending conditions in response to changes in monetary policy and/or the role of agency costs and asymmetric information. The simple nature of the tests and data limitations make it difficult to distinguish between these two explanations. However, the fact that the spread retains predictive power even when a monetary policy influence is included in the equation suggests that information problems may be part of the explanation.

In addition, the analysis shows that the spread does not have evident predictive power in countries where bank debt is a relatively more important source of finance. This does not indicate a low cost of substituting between bank debt and securities; securities markets are only just becoming significant sources of funds in the countries considered. Instead, this result

suggests that agency costs and informational asymmetries are less severe in these economies, because of the capacity of banks to resolve these problems (see footnote 6). This interpretation is consistent with other recent empirical evidence, for example, Prowse (1990), who finds that measures of the size of potential agency costs have a significant and negative effect on leverage for firms in the United States but not in Japan.

Notes

1. The material in this annex is taken from Browne and Tease (1991).

2. See Stock and Watson (1989), Bernanke (1990), and Kashyap, Stein and Wilcox (1990).

3. Some have suggested that the spread is informative because it captures default risk. However, Bernanke (1990) and Kashyap, Stein and Wilcox (1991) question this view because, amongst other reasons, defaults on prime commercial paper are extremely rare.

4. Bernanke and Blinder (1989) and Bernanke (1990) show that the information content of the spread is to a large extent "absorbed" when a monetary policy variable is included in the estimation. Kashyap, Stein and Wilcox (1991) have argued that the predictive power of the spread is evidence of a credit channel in the monetary transmission mechanism.

5. To the extent that these problems exist they probably reinforce the monetary policy-spread-output link. Bernanke and Gertler (1989) and Gertler, Hubbard and Kashyap (1990) show that agency costs and informational asymmetries are pro-cyclical. Thus, tight monetary policy, by reducing future output, may contribute to larger agency costs and widen the spread.

6. There are substantial differences in the way financial markets are organised across the major OECD countries. These have been well documented elsewhere (see, for example, Bisignano, 1990). In Japan, and the continental European countries banks generally have close ties with, and also more specifically hold equity in, non-financial companies (Prowse, 1990). This suggests a greater community of interest between banks and the corporate sector with a corresponding closer sharing of information. This contrasts with the more market-oriented financial systems (the United States, the United Kingdom and Canada) where banks tend to have a more arm's-length relationship with the non-financial corporate sector and are, except for the United Kingdom, very limited in their capacity to hold shares in the latter. One would therefore expect information asymmetries and agency costs to be more important features of these systems. Moreover, companies in these countries rely more heavily on securities markets where the lender-borrower relationship is even more impersonal than in the arm's length bank intermediation.

7. Data limitations prevent a thorough examination of whether the monetary policy explanation or the agency costs/asymmetric information explanation accounts for the different results across countries. This is because short-term commercial paper rates were not available for all countries. These were proxied by interbank rates.

8. A note on definitions of interest rate data used follows the tables and charts.

9. Since what is of interest is how the spread performs across countries rather than how it performs relative to other variables (index of leading indicators, for example) these variables are not included. Bernanke (1990) has shown that the spread performs at least as well as other leading indicators in the United States and that even when these are controlled for the spread cannot be excluded from the estimated equations. Generally, the results do not change substantially if an alternative spread variable -- for example, the spread between different grades of commercial paper -- is used. Stock and Watson (1989) have found that financial price variables dominate real variables as leading indicators.

10. That is, the addition of a short-term interest rate increases the probability that the spread does not provide any predictive power (Table A2).

11. The short-term spread for France is also significant but note the earlier caveat.

Table A1. The predictive power of the quality spread for output and investment (1)

	United States	Japan	Germany (2)	France (2)	United Kingdom	Italy	Canada
Spread measure							
(rp-rg)	0.0007**	0.8819	0.0352*	0.0003**	0.0132*		0.6847
	0.0001**	0.4435	0.0200*	0.0469*	0.0964*		0.3709
(Rp-Rg)		0.4980	0.4952	0.3980	0.7378	0.7771	0.0565*
		0.8123	0.4624	0.7001	0.3200	0.5427	0.1042

Note: Sample periods vary by country; see note on data definitions following Chart A1.

1. Figures in bold refer to equations in which investment is the dependent variable.
2. Because of lack of data on short-term government securities rg is replaced by Rg for France and Germany.
   The statistics in the table report the marginal significance level for excluding S_t from the equation.
*(**) denotes that the restriction can be rejected at the ten (one) per cent level.

Data Description (for the interest rate series see the note following the tables and chart).

Output: log of real GNP, quarterly.
Investment: log of real business fixed investment, quarterly.
(rp-rg): difference between rates on short-term private interest rates (rp) and short-term government (rg) securities.
(Rp-Rg): difference between yields on long-term private (Rp) and government (Rg) securities.

Table A2. The predictive power of the quality spread for output in equations containing a short-term interest rate

	United States	Japan	Germany (*)	France (*)	United Kingdom	Italy	Canada
Spread measure							
(rp-rg)	0.0429*	0.7073	0.8739	0.0109*	0.0813*	..	0.5299
(Rp-Rg)		0.5353	0.9595	0.8752	0.2608	0.7894	0.0120*

(*)   See note 2 to Table A1.

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Chart A1. Spreads between private and public short-term interest rates and output growth

———————— Interest rate spreads (rp-rg)- right scale

············ 4-quarter growth in real GNP/GDP- left scale

United States

Italy

Japan

United Kingdom

Germany

Canada

France
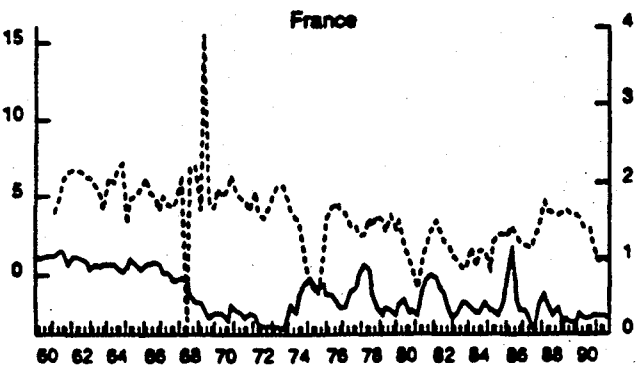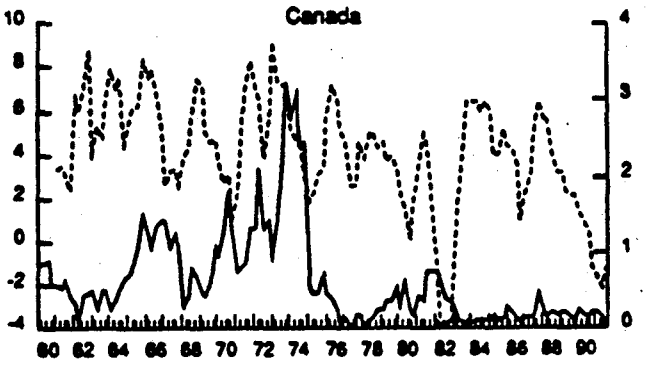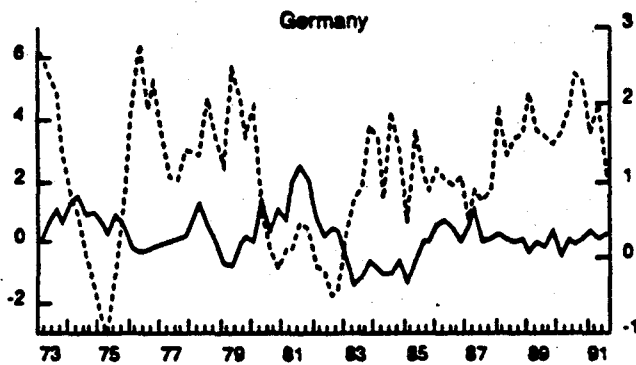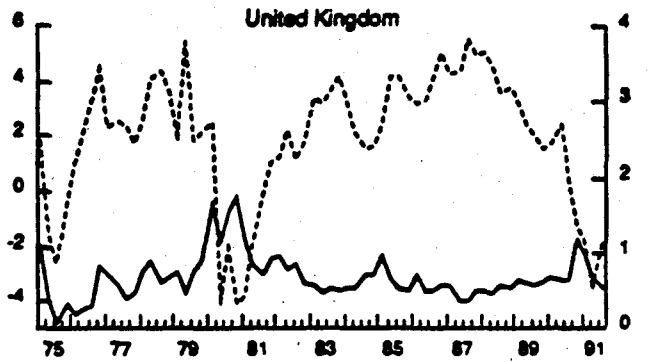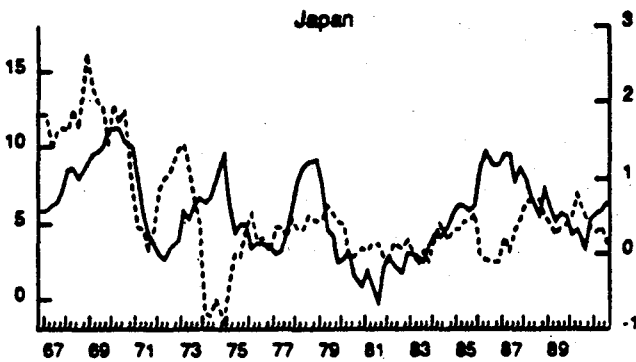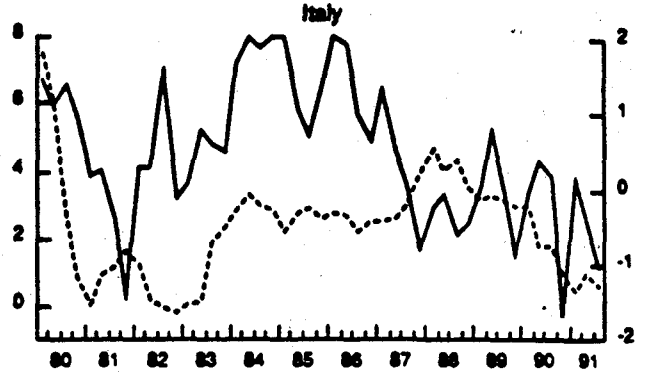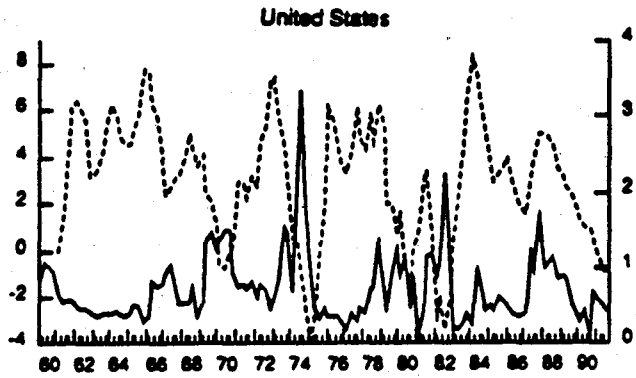
Note : Definition of interest rates used are given on the next page.

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Note on Data Definitions

(Series begin on date indicated: all series end in 1990Q4,
except 1990Q2 for Italy)

United States	r_m	:	Federal Funds rate (1960Q1)
	r_g	:	three-month or six-month yield on Treasury bills (1960Q1)
	r_p	:	three-month or six-month yield on prime commercial paper (1960Q1)
	R_g	:	yield on 10-year government bonds (1960Q1)

Japan	r_m	:	call-money rate (1966Q4)
	r_g	:	proxied by 3-month Gensaki rate (1977Q2)
	r_p	:	proxied by rate on short-term bank loans (1977Q2)
	R_g	:	yield on long-term Central Government bonds (1966Q4)
	R_p	:	yield on industrial bonds (1966Q4)

Germany	r_m	:	rate on day-to-day money market loans (1973Q1)
	r_g	:	proxied by yield on public-sector bonds (1973Q1)
	r_p	:	3-month FIBOR (1973Q1)
	R_g	:	yield on long-term public-sector bonds (1973Q1)
	R_p	:	yield on industrial bonds (1973Q1)

France	r_m	:	rate on day-to-day money market loans (1960Q1)
	r_g	:	proxied by yield on public-sector bonds (1970Q1)
	r_p	:	3-month PIBOR (1970Q1)
	R_g	:	yields on Central Government bonds (1960Q1)
	R_p	:	yields on private sector bonds (1960Q1)

Italy	r_g	:	rate on 3-month Treasury bills (1975Q1)
	r_p	:	proxied by interbank deposit rate (1975Q1)
	R_g	:	yield on Treasury bonds (1960Q1)
	R_p	:	yield on private sector bonds (1960Q1)

United Kingdom	r_m	:	call-money rate (1960Q1)
	r_g	:	rate on 3-month Treasury bills (1975Q1)
	r_p	:	3-month interbank rate (1975Q1)
	R_g	:	yield on 10-year or 20-year government bonds (1960Q1)
	R_p	:	yield on 25-year company bonds (1960Q1)

Canada	r_m	:	rate on day-to-day loans in the money market (1960Q1)
	r_g	:	rate on 3-month Treasury bills (1960Q1)
	r_p	:	rate on 3-month prime corporate paper (1960Q1)
	R_g	:	yield on 10-year Federal government bonds (1960Q1)
	R_p	:	yield on industrial bonds (1960Q1)

Annex B

BIS Capital Requirements and the Cost of Bank Lending

The need for strengthening banks' capitalisation grew out of concerns that the burgeoning international activities of commercial banks required co-ordination by national supervisory authorities. Following discussions held among representatives of the G-10 countries at the Bank for International Settlements (BIS), a draft agreement was reached in late 1987 for the setting of internationally harmonised capital standards. The final provisions of this agreement were published in July 1988 (1) with the objective of making the standards applicable as from January 1991. This annex gives a brief description of these BIS capital requirements and how they can affect the cost of bank credit.

I. Nature and Purpose of the BIS Rules

The BIS agreement had two main goals: i) to increase the safety and soundness of internationally active banks by requiring them to have a minimum amount of capital; ii) to reduce competitive inequities among international banks by making capital adequacy standards more consistent across countries.

Under the BIS rules, international banks have to maintain a minimum amount of capital as protection against possible failure of their counterparties (credit risk) (2). To prevent banks from engaging in more risky lending to try to get a higher return on their equity, the BIS rules classified assets into various risk categories. Beginning in 1993 banks will have to maintain capital equal to at least 8 per cent of their assets weighted by risk asset category; as of 1991 they have been subject to a transitional requirement of 7 1/4 per cent (3). Table B1 summarises the major elements of the risk weighting scheme. The BIS rules also include off-balance-sheet exposures in the capital adequacy framework, to prevent banks from avoiding capital requirements by moving credit exposures off balance sheet.

The definition of capital in the BIS rules is complicated by the need to take account of national differences in accounting standards, tax systems and banking practices. Two types of capital are defined: tier 1 (core capital) and tier 2 (supplementary capital). Tier 1 capital consists of equity capital (including fully paid ordinary stock and non-cumulative perpetual preferred stock) and disclosed reserves (published reserves from post-tax retained earnings). Tier 2 capital consists of other components such as asset revaluation reserves and other undisclosed reserves, unallocated loan loss reserves and various types of hybrid debt/capital instruments. These may be included by national authorities at their discretion. At least half of banks' regulatory capital must qualify as tier 1; thus tier 1 capital must equal at least 4 per cent of risk assets.

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The BIS capital standards are intended to be minimum standards for internationally active banks. They are implemented by individual national regulatory authorities who may set more stringent requirements if they choose (4). In addition, in order to promote consistency of domestic capital standards some countries have applied similar rules to banks without international operations, or to other depository institutions.

II. The Impact of BIS Rules on Bank Credit Cost

The BIS rules have increased the amount of capital needed to fund lending at many banks. To the extent capital is more expensive than other liabilities, the rules can affect the cost of bank loans. The example below explains and quantifies this higher cost of bank credit under various assumptions about capital ratios, corporate tax rates and the cost of capital (5). Consider a stylised bank balance sheet in which loan assets (A) are funded with deposit liabilities (L) and capital (K):

<u>Balance sheet of a hypothetical bank</u>

A:	assets earning		L:	liabilities receiving
	interest rate			interest rate
	of r^a and			of r^l
	risk weight			
	of 100 per cent		K:	capital

For simplicity it is assumed that the bank has no other costs except for the returns paid to liabilities and to capital. The required rate of return on capital (6) is defined to be r^l+c, where c is an equity premium (7) which can be derived from the market price of bank equity and the implicit price this puts on the bank's earnings. The equity premium essentially defines a profitability hurdle for the bank; in the absence of other costs, a new loan must earn, at the margin, a sufficient spread s over the interest rate paid on liabilities -- defined as r^a-r^l -- to cover the equity premium on the additional capital needed to fund the loan. (The exact spread depends on factors such as tax rates and the amount of capital, as is described below.) In addition, existing assets should be producing the same spread; if not they should be liquidated -- if possible -- and the capital reinvested or returned to shareholders (8).

This marginal profitability condition is the true economic constraint on bank lending coming from capital requirements, rather than the average quantity of capital relative to assets. Even if a bank is undercapitalised, it can still lend freely if its marginal lending opportunities are profitable enough for it to pay a market rate of return on capital. Similarly, "excess" capital need not increase lending if profitable lending opportunities are absent.

Given a capital ratio and the corporate tax rate applied to banks, the required loan spread can be determined by equating the after-tax profit on the bank's loan portfolio with the amount required to pay a market return on its capital.

The after-tax profit on the bank's loan-portfolio A is:

$$(1 - t)\{r^a - (1 - k)\ r^l\}\ A,$$

where t is the corporate tax rate and k is the ratio of capital to assets.

With an equity premium of c, the amount required to cover capital costs is:

$$(r^l + c)\ k\ A$$

Equating these two expressions yields the following equation:

$$(1 - t)\{r^a - (1 - k)\ r^l\}\ A = (r^l + c)\ k\ A \qquad [1]$$

After some rearrangements, the spread can be expressed in terms of the capital ratio, the costs of equity, the corporate tax rate, and the interest rate paid on liabilities:

$$s = (r^a - r^l) = k\ (c + r^l\ t)/(1 - t) \qquad [2]$$

As this equation shows, only if both the equity premium, c, and the tax rate, t, are zero, do capital costs not boost loan rates. As the risk premium or the tax rate rise, the spread becomes larger (9).

A critical assumption underlying equation [2] is that the capital ratio has no effect on the equity premium. In general, one would expect a negative relationship. Higher levels of capital make insolvency less likely; this lowers the risk faced by equity providers and should allow them to accept a lower rate of return (10). Still the relative cost of bank credit -- the spread -- would fall only if the equity premium declined by enough to offset the higher capital levels. From equation [2] it can be shown that, for positive marginal tax rates, the spread will decline only if the reduction in the equity premium is more than proportional to the increase in the capital ratio. Moreover, banks differ from other firms in the sense that their probability of failure is to a certain extent a matter of public policy. Banks' cost of capital need not fall, and it could even rise if the capital rules were accompanied by a market perception of a greater willingness on the part of regulatory authorities to intervene in weak banks and tap shareholders' funds before actual insolvency occurred (11). As a point of fact, Cooper, Kalari and Wagster (1991) document statistically significant declines in the prices of equity in U.S., U.K. and Canadian banks when the BIS standards were first described publicly. No such effect was seen for Japan, where stock prices overall were strong at that time, and Japanese banks were viewed as very well capitalised.

Equation [2] can be used to compute the size of the loan interest rate spread given alternative values of capital ratios, tax rates, capital costs and interest rates. These are shown in Table B2. The table is calculated under the assumption that the bank is required to hold capital equal to 4 per cent of its assets, assuming all are of 100 per cent risk weight. (If the assets carry less than 100 per cent risk weight, the required minimum return will be proportionally smaller than the figures of this table.) Moreover, only tier 1 capital is taken into account. It is assumed, on a best-case basis, that

tier 2 capital can be raised at a cost equal to the cost of borrowed funds, r^1.
In fact, tier 2 capital is probably subject to a risk premium less than or
equal to that of pure equity. As a consequence, the spread required by a bank
to meet the 8 per cent BIS capital standard could be as much as double the
figures in Table B2. Note also that the table shows the minimum spread needed
to pay a given rate of return on a 4 per cent capital ratio. The increase in
the spread from the imposition of the capital standard would depend on the
bank's initial capital level and how much capital above the minimum requirement
it chooses to hold.

As Table B2 indicates, the spread is sensitive to changes in corporate
tax rates and the equity premium. With a 5 percentage point increase in the
equity premium, banks facing 50 per cent corporate tax rate have to increase
the loan spread by 40 basis points to maintain a market return on equity (12).
If the corporate tax rate is reduced from 50 per cent to 30 per cent, the
required spread declines 23 basis points, indicating the effects of corporate
taxes on the pricing of bank loans.

This analysis implies that, to the extent that the higher capital ratios
are binding, the spread between bank loan rates and marginal bank funding costs
should rise. Such a phenomenon has been observed in domestic banking markets
in several countries, as shown in the main text. Spreads have risen in the
international syndicated loans market as well. The average spread on such
loans rose from 50 basis points in 1990 to almost 80 basis points over the
first 8 months of 1991; other credit terms such as fees and average maturities
were also tightened (OECD, 1991). This was the purpose of the BIS standards:
to force banks to avoid lending at thin margins and to encourage them to judge
credit quality more closely.

Notes

1. Committee on Banking Regulations and Supervisory Practices (1988.)

2. The rules do not take account of market risk such as adverse movements
    in interest and exchange rates. These are currently the subject of
    study by the Committee on Banking Regulation and Supervisory Practices.

3. Market participants have tended to look past this phase-in provision and
    judge banks by their position relative to the final standard.

4. For example, the United Kingdom put a 10 to 20 per cent risk weight on
    bonds of OECD central governments depending on their maturity so as to
    take account of the interest rate risk. While Japan allows its banks to
    include 45 per cent of unrealised capital gains on their security
    portfolios in tier 2 capital, the United Kingdom and the United States
    do not allow it. On the other hand, the United Kingdom allows its banks
    to include revaluation reserves of real estates, but Japan and the

United States do not allow it [see Yokoyama (1989) for more details on national differences].

5.   More sophisticated approaches to the one here may be found in McCauley and Zimmer (1989) and Zimmer and McCauley (1991). Their results are qualitatively similar, however.

6.   This return may be paid out in dividends on re-invested by the bank. This choice depends on the difference between investors relative tax rates on dividend income or capital gains, an issue not addressed in this analysis.

7.   An equity premium usually is motivated by the greater risk (variance of expected returns) borne by providers of equity. In the case of banks the risk of equity also reflects its likely exclusion from safety-net guarantees compared to deposit liabilities.

8.   Excess capital may not be returned immediately to shareholders because the cost of calling loans may be too high, or regulations may restrict dividend payouts.

9.   Equation [2] also implies that the spread responds positively to changes in the interest rate paid on liabilities. This does not represent much scope for monetary policy to affect the spread, however, as very large changes in interest rates would be needed to move the spread to a significant degree.

10.   If the bank has uninsured debt liabilities, these could become cheaper as well, enhancing profitability.

11.   To the extent that capital levels up to the BIS standards are required, they offer only incomplete guarantees against regulators seizing control of the bank from equity holders. In this sense only capital above the BIS ratios would be truly effective in lowering the equity premium.

12.   According to Zimmer and McCauley (1991), average bank equity costs from 1984 to 1988 -- including the short-term interest rate -- were 3.2 per cent in Japan, 6.9 per cent in Germany, 10 per cent in the United Kingdom and 12 per cent in the United States.

Table B1. Risk weights on bank balance-sheet assets (1)

0 per cent	Cash, claims on central governments and central banks denominated in national currency and funded in that currency, Other claims on OECD central governments and central banks,
20 per cent	Claims on banks incorporated in the OECD and loans guaranteed by OECD incorporated banks, Claims on banks incorporated in countries outside the OECD with a residual maturity of up to one year and loans with a residual maturity of up to one year guaranteed by banks incorporated in countries outside the OECD
50 per cent	Loans fully secured by mortgage on residential property that is or will be occupied by the borrower or that is rented
100 per cent	Claims on the private sector, claims on banks incorporated outside the OECD with a residual maturity of over one year, claims on central governments outside the OECD (unless denominated in national currency - and funded in that currency)

1. The OECD group includes countries which are either full members of the OECD or which have concluded special lending arrangements with the IMF associated with the Fund's General Agreement to Borrow -- in other words, the 24 OECD countries plus Saudi Arabia.

Source: Committee on Banking Regulations and Supervisory Practices (1988).

Table B2. Loan interest rate spread under the BIS rules

(Assuming 4 per cent capital ratios and 5 per cent cost of funds)

Corporate tax rate (per cent)		0	10	20	30	40	50	60
Risk premium on equity (per cent)	0	0.00	0.02	0.05	0.09	0.13	0.20	0.30
	1	0.04	0.07	0.10	0.14	0.20	0.28	0.40
	2	0.08	0.11	0.15	0.20	0.27	0.36	0.50
	3	0.12	0.16	0.20	0.26	0.33	0.44	0.60
	4	0.16	0.20	0.25	0.31	0.40	0.52	0.70
	5	0.20	0.24	0.30	0.37	0.47	0.60	0.80
	6	0.24	0.29	0.35	0.43	0.53	0.68	0.90
	7	0.28	0.33	0.40	0.49	0.60	0.76	1.00
	8	0.32	0.38	0.45	0.54	0.67	0.84	1.10
	9	0.36	0.42	0.50	0.60	0.73	0.92	1.20
	10	0.40	0.47	0.55	0.66	0.80	1.00	1.30

Notes: Spread calculated from the following formula:

$$s = k(c + r^1 t)/(1-t), \text{ where}$$

s = spread over marginal cost of funds
k = required equity ratio
r^1 = marginal cost of funds
t = corporate tax rate
c = risk premium of equity over marginal cost of funds.

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