MULTIPLE AVENUES OF INTERMEDIATION, CORPORATE FINANCE AND FINANCIAL STABILITY

E Philip Davis[1]

Brunel University, Uxbridge, West London

and

Capital Markets and Financial Studies, IMF, Washington DC

Abstract: Using data from the US, UK, Japan and Canada, this paper provides evidence on the benefits to an economy from "multiple intermediation buffers". The overall conclusion is that the existence of active securities markets alongside banks is indeed beneficial to the stability of corporate financing, both during cyclical downturns and during banking and securities market crises. The benefits are to limit volatility arising from the normal patterns of credit demand and supply that obtain over the cycle, and changes in agency costs as companies' net worth varies. They also restrict the impact of undue limits on credit availability arising solely from weakness on the supply side, be it from liquidity crises in the securities markets or from liquidity or solvency problems among financial intermediaries. The benefit will be greater, the more comparable the size of securities market and intermediated financing, as well as the larger the proportion of companies able to access both loan and securities markets. The analysis raises a number of policy issues and research topics for further investigation.

Introduction

In recent speeches, Alan Greenspan (1999, 2000) has pointed out the benefits that arise from "multiple avenues of financial intermediation" which had helped to protect the US economy during periods when either banks or bond markets suffered from financial problems. In 1990-1 and 1998, for example, he noted that the unaffected market moved to counteract a decline in credit granted by the market in crisis. By preventing a major funding gap from arising, the effects of financial turbulence on the macro economy were diminished. The issue has wide international resonance. Following the Asian crisis, securities market development is widely recommended to the countries involved for the protection it offers to the economy against a banking crisis (see for example Knight (1998), Stone (2000)). Furthermore, the development of securities markets in the euro area is likely to gather pace, shifting the financial system closer to the "Anglo Saxon" structure with a diminished role for banks in corporate financing (Davis 1999a).

In this context, the aim of this paper is to investigate the patterns of external credit-market borrowing by the corporate sector in four major industrial countries with active securities markets, in order to assess the benefits of smoothing of flows arising from "multiple avenues". We seek in particular to assess to what extent different crises and these countries' varying experiences tend to back up the general suggestion of effective diversification. In order to provide a satisfactory overall assessment, the analysis has to look at the issues from a number of angles:

- there are different types of credit market. We utilise data on aggregate net flows of corporate financing arising from domestic debt securities markets and intermediated borrowing, as well as gross-flow data for debt securities and intermediated borrowing in the international markets. We group financings solely by intermediation status and not by maturity (e.g. we do not distinguish within domestic securities issuance between CP and bond issuance[2]). The main focus is on quantities rather than prices, although we note that a "funding gap" may reflect price rationing as well as quantity rationing of credit.

- there are different kinds of shocks needing to be smoothed via multiple avenues. Besides those outlined by Greenspan, i.e. systemic problems affecting credit supply either in the banking market or the securities market, one has to take into account the broader range of cyclical effects on the market which affect the supply and demand for credit. For example, there may be demand shocks

---

[2] In fact, much of the discussion of "multiple channels" has related to long term financings. Unfortunately, although one can usually divide securities between money market and bond market issues, the division of short and long term is not readily made in the data for bank lending.

arising from the cycle and also supply side effects arising e.g. from changes in markets' perceptions of risk. Whereas the systemic shocks are in a sense "disequilibrium phenomena", that may lead to credit rationing regardless of the credit standing of the borrowers, the cyclical shocks reflect "equilibrium patterns" where credit standing and demand for funds are the major driving forces.

- the access of borrowers to markets varies, which will affect benefits arising from multiple avenues. Some borrowers, such as small firms, can only access domestic banking markets. A second group can access both domestic banks and securities markets. A third will also be able to access international banking and bond markets[3]. While we do not have disaggregated data allowing for these separate types, we seek to take into account their existence and relevance in the overall analysis.

The paper is structured as follows. In Section 2 we look at the longer term patterns, correlations and volatilities of the different financial flows (derived from national flow-of-funds data for the US, UK, Japan and Canada), to gain an overall impression of the cyclical trends in the different financial flows and whether they act to smooth overall financing. We then go on to focus specifically on changes in intermediated and non-intermediated financial flows during periods of financial turbulence. It is investigated inter alia whether there have been periods even in countries with a diversified financial system where financial difficulties have affected both markets simultaneously. We also examine the financing patterns in the international capital markets from the countries concerned, to assess whether they provided a further buffer against credit rationing for those firms of sufficient standing.

An investigation of simple shifts in financing would not, however, provide a complete account of securities/loan substitution and the benefits of "multiple avenues". In order to assess what "equilibrium behaviour" would be expected in response to cyclical shocks, we need consider underlying corporate financing behaviour and the forces driving it, as set out in Section 3. Important background to this on the theoretical side includes both theories of corporate financing based on agency costs and asymmetric information, as well as some of the complementary theories of financial intermediation (which illustrate why firms borrow from banks as opposed to securities markets).

These theories help us to interpret the patterns in the data shown in Section 2 as involving different regimes. The "equilibrium" mechanisms may be expected to operate during periods when financial markets are operating normally. On the other hand, when there is systemic risk there may be a supply-

---

[3]   In practice a wider range of firms can access banking than bond markets internationally (see Davis and Mayer 1991).

side blockage in credit supply, which entails rationing for firms regardless of their credit demand and their credit quality. The theories also motivate a simple modelling exercise on determinants of the flows, provided in Section 4. This permits us, first, to further illustrate the differences between the determinants of securities and banking flows (thus further demonstrating their complementarity), and second to provide a counter-factual estimate of what changes in flows could be expected on the basis of normal cyclical behaviour, in order to judge the "abnormality" of market behaviour in the wake of systemic crises.

In these empirical sections, we focus principally on the US, Canada, UK and Japan over 1970-2000, using flow of funds data for loans, securities issuance and total credit market financing by the corporate sector. These are complemented by an examination of equity issuance and trade credit and data from the international capital markets. We choose these economies for being among the most securitised at present, and thus possible models for EMEs and for the euro area.

Section 5 examines some analytical and policy issues arising from the topic of multiple avenues, including whether there is a risk that banks and markets could collapse together, the vulnerability of some sectors of the economy even if there are multiple avenues, the costs of crises in banks and in securities markets, the role of the authorities, and the possible behaviour of a financial system in transition to multiple avenues. We also offer some suggestions for further work.

A concluding section takes stock of the overall message from the work. We contend that the overall results, which are inevitably tentative rather than conclusive, cast favourable light on the stability of advanced financial systems to an extent dependent on the size of securities markets. In this context, beneficial effects of multiple avenues of intermediation are largely confined to the United States and Canada and are not very evident in the UK and Japan where external debt financing is dominated by banks. Access to international capital markets is a further safety valve, which is available to high-quality borrowers within financial systems, whether or not there are developed domestic securities markets.

2   Patterns of bond issuance and lending –long-term patterns and shifts during turbulence

To reiterate the motivation for the work that follows, it is clearly desirable to avoid additional constraints on the provision of external financing to corporations from the supply side, owing to a financial crisis among banks and/or in the securities markets. If this leads to credit rationing (by price or quantity) which is otherwise unwarranted by the state of the corporate sector, there may be further

real economic effects via reduced corporate expenditures, while in the context of a recession such credit rationing may lead to liquidity crises for firms and ultimately bankruptcies. This implies that the smooth provision of finance to corporations is essential to the development of the economy as a whole, while dysfunction can lead to major losses to the economy, as occurred in the Asian crisis (Stone 2000). The question that arises is whether securitised financial systems are particularly well-able to maintain such smooth provision of financing via offsetting shifts in the availability of intermediated and non-intermediated debt finance.

We begin our empirical assessment of corporate financing in a securitised economy by illustrating in Section 2.1 the overall patterns of corporate credit market financing over time, before focusing in Section 2.2 on patterns of issuance that have actually occurred during crises. Following the objective set out above, the que stion posed is whether shocks affecting the financial sector have been followed by sharp and undue declines in total financing, either arising from declines in bank lending or bond issuance, or whether it has been damped by an opposite reaction of the "other" market to shocks affecting a given sector. We do not for the present seek to allow for the normal cyclical interaction between supply and demand for lending (this issue addressed further in Section 4). Finally in Section 2.3 we look at euromarket financing patterns, so as to assess whether international markets offer a buffer against domestic financial turbulence.

The raw material for this work are respectively, flow data on funds raised in the credit market by non-financial corporations from the flow-of-funds data for the US, UK, Japan and Canada over 1970-1999, as well as gross issuance data for the euromarkets from the private non-financial corporate sector in the same four countries over 1980-2000. The flow of funds data are respectively from the US Flow of Funds (produced by the Federal Reserve Board), UK Financial Statistics (Office of National Statistics), Canadian National Income and Expenditure data (Statistics Canada) and Japanese flow of funds data (Bank of Japan); the euromarkets data are from Capital Markets Data Loanware and Bondware.

2.1 Long term patterns of intermediated and market based debt finance

As background we show data on the long term trends in corporate credit market financing since 1970 in Charts 1-6 appended. "Real debt securities" in this and other charts is corporate bond issuance plus CP (where available[4]) deflated by the CPI, while "real loans" is bank lending, mortgages and other loans to companies, similarly deflated. Real borrowing is the sum of these two sub-components.

Chart 1 shows the pattern for the US since 1970. Overall external financing shows a broadly cyclical pattern, reaching peaks in the booms of the early and late 1970s, late 1980s and mid-to-late 1990s; there is no single quarter throughout the period when total credit market borrowing is negative. Securities market financing tends throughout to be larger than lending, although this pattern is accentuated in the 1990s. Whereas net intermediated lending is often negative, notably in 1973-5 and 1990-3, net securities issuance is not – the nearest is at the start of 1994. It can be seen in a rough and ready way that there is some negative correlation between bank lending and securities issuance, such that overall intermediation is more stable. Securities markets appear to smoothe aggregate flows, while intermediated financing is more volatile – although the issue arises whether individual borrowers are able to substitute, and whether this varies over time. Chart 2 looks at the shares of corporate borrowing, and again shows the dominance of debt securities over lending. The symmetry between the different types of finance is of course a matter of construction, and does not cast light (unlike Chart 1) on whether the forms of intermediation offer a buffer to the economy.

Charts 3 and 4 show similar patterns for the UK in terms of the cyclicality of fund raising, which has unlike the US at times been negative. It is noteworthy that for much of the period shown, securities issuance was a trivial share of credit market borrowing by corporations. Only since 1991 has it become a significant share of the total, although slight increases were already apparent in the mid 1980s.

Looking at flows in Japan (Charts 5 and 6), both cyclical and seasonal patterns are apparent in the credit market borrowing data. As in the UK, the scope of bond issuance was minimal until the mid-1980s, and it fell back again in the 1990s, being frequently negative. (For a discussion of the liberalisation of bond market financing and its effect on large companies see Hoshi et al (1993).) Lending has also been periodically negative, perhaps partly for seasonal reasons, but also more structurally during the banking crisis and notably in 1998-9.

In Canada there is shown to be a sharp increase in borrowing in the late 1970s and early 1980s (accompanying an energy boom), which was followed by a corporate debt crisis in the following recession. In the early 1990s, net repayments of debt securities took place. Canada is shown to be similar to the United States in terms of the importance of securities market financing, which is commonly as or more important than bank lending. It contrasts with the UK and Japan, where debt securities issuance was peripheral in most of the years shown.

---

[4] CP data were not available consistently for the UK and Japan

The charts are complemented by simple descriptive statistics (shown in Table 1), which show the size and volatility of the different financing flows relative to GDP since 1970. Credit market financing is a similar average proportion of GDP in all four countries, varying from 3.2% in the United States to 4.9% in Japan. As indicated by the charts, the proportion accounted for by securities varies strongly across countries, with two clear groups of countries emerging. In both the US and Canada, securities flows account for around half of credit market financing, while in the UK and Japan the share is much lower (around 10-20%). Splitting the sample in 1985, there is some increase in the proportion of securities issuance in all four countries, but the divide between the North American countries and the others remains wide. This of course gives an a priori basis to expect the multiple avenues to operate more effectively in the US and Canada than elsewhere, depending on the correlations between the types of financing. In the UK and Japan the securities markets are just not large enough to take up the slack for a banking collapse.

The right hand side of Table 1 gives an impression of volatilities of the different forms of financing relative to GDP. The most striking feature of the table is the very high standard deviation of Japanese credit market financing and its main component, bank lending. This is no doubt partly an artifact of the lack of seasonal adjustment (US and Canadian data are seasonally adjusted, while the UK and Japanese are not) but also links to the banking crisis in Japan, which has led to enormous and sustained falls in credit market borrowing (see Charts 5 and 6). A second point of note is that the cyclical volatility of bond market financing is considerably lower than that of lending in all countries. This is particularly relevant in the US and Canada where the series means are comparable. Volatilities relative to GDP tend to be higher since 1985, except for Canada (perhaps unsurprising given the massive volatility of financing in Canada in the early 1980s shown in Chart 7). Of course, high volatility of the components of borrowing may not be of concern if total borrowing is dampened by offsetting movements, as the data suggest – although the issue arises of how firms confined to banking markets may fare.

Table 2 complements these data, by showing in more detail the volatility and correlation of the different financing flows, deflated by the CPI rather than as a ratio to GDP. These give a further view of the degree to which multiple avenues of intermediation lead to a smoothing of flows, averaged both over crisis and non-crisis periods. The volatility measure shown is the coefficient of variation[5]. In all cases, the coefficient of variation for total credit market financing is lower than that of the subset intermediated lending, suggesting immediately that there are benefits in terms of multiple avenues

---

[5] This is the standard deviation divided by the mean. This allows series of different magnitudes to be more readily compared than for the standard deviation alone.

relative to a system dependent on intermediated lending alone. It is also lower than the volatility of the subset securitie s financing, except in the US where the figure is comparable. The shortfall of the volatility of credit market financing relative to intermediated lending is much greater in the US and Canada than in the UK and Japan, reflecting the greater dominance of intermediated lending in the latter countries (i.e. credit market financing is itself largely intermediated lending).

Table 2 also shows correlations between the two sub-series and their correlations with total credit market financing. These show that in all four countries, credit market financing in aggregate tends to be more closely correlated with loans than securities issuance, perhaps reflecting greater cyclicality of the latter, while the correlation between securities and loans is low – around 0.3 for all the countries except Canada where it is actually negative.

These correlations show in a preliminary way that lending and securities will move to balance each other out on average over time, although the effectiveness of this will depend on the size of the markets. The greater stability of securities flows than intermediated flows suggests that the former helps to smooth overall credit flows over the cycle. Further evidence on corporate financing and smoothing on average over time is provided in econometric estimates given in Section 4.

But these long run average data alone do not answer the question whether smoothing – either by securities or intermediated lending - also applies during periods of crisis in one market. It is conceivable that there could be a high positive correlation in such periods indicating both channels are blocked, owing to pervasive high risk and uncertainty. This could be balanced out in the average correlations by stronger diversification in normal times. Also the data do not show whether the shifts in corporate financing even after crises were in a sense justified by normal supply and demand conditions in the credit market relating to corporate financing. To address these issues, we first turn to a more detailed examination of the patterns in the data after various financial-sector shocks that were thought at the time to be likely to impact of the efficiency of financing; the second issue (of what changes in corporate financing would be anticipated on a "normal cyclical basis" during crisis periods) is addressed in Section 4.

2.2   Corporate financing in crisis periods

In this section we focus on financial flows at the time of systemic shocks, which originated in and affected the financial system, completely or largely independent from the behaviour of the corporate sector. These hence would be expected to impose a supply side constraint on the cost and availability

of finance to corporations, separate from the normal supply and demand conditions in the credit market. Some of the crises affected international as well as domestic markets.

The periods of systemic risk are picked on a judgmental basis, with no definite benchmark to define a crisis event. Judgement is in our view inevitable, especially if one wishes to include securities market liquidity crises as well as crises affecting intermediated lending. Some types of financial instability are unsuitable for inclusion. For example, some countries have had long lasting problems in the financial sector (such as the US thrifts crisis) which had no clear crisis point, but which could have impacted on the efficiency of intermediation. There have also been regional crises (such as the Texas and New England crises), which did not impact on national credit flows but may have affected regional flows[6]. Even among the shocks considered to have national or international impact, the severity of the impact on the financial system varies strongly. Also the date of onset of the crises, while clear in many cases, must be a matter of debate in others. The small number of examples means that the work will need to rely on a case study approach rather than a statistical one.

With these caveats in mind, the shocks selected are as follows (descriptions are provided in Davis (1995a), (1995b) and (1999b)): for the United States, Franklin National/Herstatt (Q2 1974); the onset of the LDC debt crisis (Q3 1982); the Stock Market Crash (Q4 1987); the bank capital/credit crunch (Q1 1991); the bond market reversal (Q1 1994) and the Russia/LTCM crisis (Q3 1998). For the UK, there has been the Secondary Banking Crisis (Q4 1973) and the Small Banks crisis (Q1 1991). For Japan there is the initial monetary tightening (Q3 1990) which precipitated the fall in asset prices, as well as the initial peak of the banking crisis when the Jusen housing institutions were in difficult (tentatively Q4 1993). Note however that the whole of the 1990s have seen banking problems, with another peak occurring when Yamaichi (Q4 1997) and later LTCB failed (see also Hutchinson and McDill (1999)). Finally, for Canada, periods of systemic risk have been rather rare (partly due to the centralised and diversified banking system), although there were clear and present dangers during the Northlands banking failures (Q2 1985).

Note that with the exception of the 1987 stock market crash, 1994 bond market reversal and Russia/LTCM in 1998, all of these events had a principal effect on banks, and hence for "multiple financial intermediation" to be an effective buffer, one would be looking for activity in the bond and CP

---

[6]   Even regional crises could benefit from multiple channels, however. Research into the causes and consequences of the Texan crisis (Gunther et al 1995) suggest that the regional economic downturn was a key feature underlying the bank failures, but there was not a strong knock-on effect in terms of a local restriction on credit supply leading to further repercussions on the macroeconomy. Possible reasons for this were that banks and financial intermediaries from outside the area may have provided necessary lending, *while businesses were able*

(continued)

markets to expand in the wake of them. The crises of 1974, 1982, 1987, 1994 and 1998 affected international as well as domestic markets, while the other crises were more domestic in scope, meaning that international markets could provide smoothing (see Section 2.3 below). It is emphasised that we omit at present any consideration of counterfactuals, i.e. what would be the expected pattern of corporate financing if the crisis had not occurred, in the light of general macroeconomic and monetary conditions. This issue is considered in Section 4.

Looking first at the US (Table 3), there is a broad pattern of equilibration by the market less severely affected by the turbulence. Thus for example following the Franklin National failure (which also coincided with the Herstatt crisis in the international markets), lending fell by around 75% (comparing flows in the year prior to the crisis to those in the year beginning in the quarter of the crisis), while securities issuance doubled. Accordingly, total credit market borrowing fell by less than half, or by 2% of GDP as opposed to 3% for lending. In the bank capital crunch (dated here Q1 1991) a sharp fall in loans outstanding was accompanied by flat securities financing, suggesting a degree of "insurance". The onset of the LDC debt crisis is an exception, as it shows a pattern of declining issuance of securities and falls in loans outstanding, although the fall in loans was more marked (1.6% of GDP as compared to 0.5% for securities).

As for the three securities-market related events, they tended to show at most a minor or short term fall in issuance, while loans were increasing. Credit market financing was hence not adversely affected. Both for the stock market crash and Russia/LTCM, the fall in issuance was most apparent in the quarter of the crisis. Averaged out over the year following, issuance was virtually unchanged from the year prior to it. Whereas a more sustained fall in securities issuance took place in 1994, this was compensated by a strong turnaround in lending (from markedly negative to strongly positive), so that credit market financing actually increased.

Complementing the tables of corporate credit market financing, we show in Table 4 the overall patterns of US equity issuance, trade credit and total demand for external finance. Generally speaking, the patterns shown do not suggest that the alternative sources of external finance strongly offset the overall shifts in fund flows generated in the credit markets. Comparing the years before and after the crisis, trade credit was flat or declining for all of these episodes, except for the 1994 bond market reversal, when it rose strongly. Equity issuance was generally low or negative, as has been the case in most recent years owing to equity retirements and take-overs. In most cases the figure for equity issuance was lower in the year following the crisis than in the year prior. The exception is the onset of

to make use of commercial paper and other types of securities market financing in national markets.

the LDC debt crisis in 1982, when issues were somewhat higher in the year after the crisis. As noted above, bank lending and securities issuance both fell, suggesting in this case a degree of equilibration from the equities side.

Do the broadly favourable patterns for "multiple avenues of intermediation" seen in the US apply also to the UK and Japan? Note that these countries were chosen as having relatively active securities markets – and well as important episodes of financial turbulence – in recent years. They compare favorably in terms of bond and CP issuance with Germany, France and Italy that remained (at least till the onset of EMU) bank dominated. But the size of the securities market is not at all comparable with banking, suggesting a priori that the degree of insurance they can provide against banking problems is small.

Consistent with this suggestion, in general, the equilibrating effect in the UK is minor in the episodes shown (Table 5). For example, 1973-4 saw a fall in securities issuance as loans rose slightly, despite the systemic concerns raised by the secondary banking crisis. (The sheer size of lending relative to GDP is a notable feature of this period). Following the small banks crisis of 1991, and in the accompanying fall in credit market financing, there was a tenfold fall in the flow of loans to companies, while securities rose slightly. There was still a fall in credit market financing equivalent to 4.5% of GDP, however. Looking at other components of the UK's sources of funds table (Table 6), the most noteworthy positive contribution was by equity issuance in 1991-2, with other contributors being static on a year on year basis.

Turning to Japan (Table 7), the agony of the economy and financial sector has persisted throughout the 1990s, so as noted it is difficult to pick specific dates for evaluation of multiple intermediation channels. Suffice to say that in all three periods shown, the loans and securities financing flows weakened together, taking the year beginning the crisis as compared to the year before it. Trade credit (Table 8) fell in the aftermath of the monetary tightening and after the Yamaichi failure but became less negative after the banking crisis itself. It hence played a minor role in stabilising corporate financing in 1993-4, when other avenues were closed.

As regards the patterns for Canada in Q2 1995, it is evident that the Northlands crisis only entailed a pause in overall corporate financing, with both loans and securities picking up strongly after falling in the quarter of the crisis.

The interim judgement is that, consistent with the long term average correlations and size of financing, the US and Canada show a more favourable pattern of equilibration between lending and securities

than the UK and Japan. This relates both to the size and the sign of the adjustments in the "unaffected market". However, we take a number of further steps in investigating this issue before reaching any conclusions.

2.3   International capital market financing during turbulence

Whereas the above -mentioned tables show the overall patterns of corporate financing, and hence illustrate at a most basic level the benefits of multiple avenues of intermediation, it is also of interest to consider the patterns of borrowing in the international capital markets both over the long term and in the quarters that followed the crises. Particularly where the crises were largely domestic, the international capital markets could offer a substitute source of finance (albeit only for firms of sufficient credit standing and reputation). An important additional reason to look separately at offshore financing is that there are offshore transactions, e.g. by foreign subsidiaries of multinationals based in the home country, that may be missed by domestic flow of funds data.

Table 11 shows descriptive statistics for euromarket financing by private companies from the four countries studied, comparable to those for the domestic market shown in Table 1 (albeit only covering 1980-2000, owing to absence of 1970s data from the sources used). Note that the financial flows are gross in the euromarket databases, and hence are not strictly comparable with the flow of funds. Another distortion is that syndicated credits in the euromarkets are recorded at their full amount when signed, even if the drawdown is later. Also, note facilities are recorded at the ir full potential size rather than at the amount of drawdown at a given time. This means they are both distorted indicators of actual flows, although they are sensitive in showing the amount of "credit insurance" provided.

As is the case for domestic borrowing, total euromarket financing is less volatile than its components, given they are themselves imperfectly correlated. It is interesting to note that credit facilities (including both syndicated credits and euronotes) and eurobond issues are more strongly correlated with each other than are domestic securities and loans (compare Table 2), at least for the US and UK. The correlations of the various forms of euromarket financing with total domestic credit market finance suggest that international markets can contribute to stabilisation on average over time. All the correlations with this series are quite low – particularly in the cases of Japan and Canada.

How did international capital market financing change when there were crises? One can distinguish the crises that actually affected international capital markets in some degree (LDC debt; stock market crash; bond market reversal; Russia/LTCM) from the others. It may be added that the data for international credit facilities in Japan is highly volatile owing to the sporadic nature of such financings

for Japanese firms. Comparing financings in the year before with the year beginning the crisis (Table 12), the most consistent pattern observable is the decline in credits for companies in the US, UK and Canada after the LDC debt crisis, which severely affected international banking markets. This was not echoed in the eurobond market, except for Canada – for the UK and US there was a marked increase in issuance after the onset of the LDC debt crisis, thus offering equilibration (although note that the levels were quite low).

The stock market crash, although it caused some initial disruption in euromarket activity (see Davis (1995a)) evidently did not have a long lasting effect, since virtually all the data show an increase in financings. A decline in eurobond issuance is apparent for all countries except the US after the bond market reversal, while credit facilities picked up strongly, hence offering equilibration. Finally, Russia/LTCM, like the stock market crash, clearly had only a short term effect on eurobond issues, while credits fell off in the following year. Amongst all these cases, the net overall change in euromarket financings was negative only for the US, Canada and Japan after the debt crisis, for Japan in 1994 and for the US and Canada after Russia/LTCM. Overall, the international capital markets show themselves to be resilient and adaptable in the wake of turbulence affecting them directly, according to these data.

What of the domestic crises (which were generally in banking markets)? Did access to international capital markets offer a safety valve for the domestic corporate sector against any undue credit rationing that it may have faced? It appears that this was the case largely for international securities financing. As shown in Table 13, the overall pattern is one where eurobond issuance consistently picked up in the wake of the domestic crises, apart from in Japan in 1993 and 1997. On the other hand, international credit facilities were generally down on the wake of the domestic turbulence. The Canadian Northlands crisis was the only cases where both intermediated and disintermediated euromarkets increased in volume after the crisis. In most cases the total euromarket financing volume fell, again with the exception of Canada in 1985 and Japan in 1990. This evidence is less favourable for an equilibrating role of international capital markets.

3   Implications of the theory of corporate finance for financing patterns

The main focus of the previous section was on empirical patterns of financial flows during periods of turbulence, where emerging patterns appear broadly favourable to the benefits of multiple avenues of intermediation. But we suggest that in order to address multiple intermediation channels more deeply, it is essential to remind the reader of some key theoretical and empirical insights in corporate finance and financial intermediation. These help us to interpret the results of the previous section, as well as

motivating the empirical work on determinants of financing patterns which follows both by identifying relevant variables which may be expected to influence "equilibrium" patterns of finance over the cycle and giving some hypotheses about differences to be expected in determinants of the different types of finance.

3.1 Credit demand, agency costs and credit rationing

Concerning the *demand for credit* by firms, both macro and finance theory suggest that fixed investment and other financing vary cyclically, while interest rates also affect the demand for credit. As regards the sources of funds the traditional "pecking order" view of corporate finance (Myers 1984) suggests that external debt finance, either in the form of securities or lending, ranks highly for borrowing firms as a source of funds. Internal funds are cheaper, but are generally limited by the scale of expenditures (including dividends) that tend to outstrip such internal funds increasingly during a cyclical upturn – while cash-flows shrink in a downturn. Whereas in principle equity issuance is also a feasible alternative, firms tend to see it as costly and less desirable than debt, while investors often see equity issuance as an adverse signal about the firm. A further alternative, the run-down of liquidity, is limited by the need for precautionary levels of such liquidity to be maintained to avoid liquidity crises. Collateral is also limited by the size and structure of the balance sheet.

The *supply of external debt finance*, be it intermediated or not, is nevertheless problematic, as a consequence of asymmetric information between borrowers and lenders and the inability of lenders to write complete contracts covering borrowers' behaviour in every eventuality. These give rise to the well known agency problems of the debt contract, linked to adverse selection in advance of lending and moral hazard after the financing has taken place. These effects may vary over time, giving rise to cyclical changes in credit supply in equilibrium.

In more detail, Mishkin (1991) suggests that variations in agency costs affecting credit supply may occur via a number of channels, prompting potentially sharp changes in the availability of corporate finance (the channels may also affect financial intermediaries during periods of systemic risk). First, if *interest rates rise* due to monetary tightening or merely to balance the credit market, adverse selection may increase sharply, giving rise to a substantial decline in credit availability. Second, *heightened uncertainty*, such that lenders find it harder to screen borrowers, increases adverse-selection problems, potentially reducing credit supply. It is suggested that in each case the impact is greatest on borrowers whose credit quality is difficult to ascertain - which are likely to be low quality (where overall borrower quality may be indicated by the credit quality spread). Again, collateral is a means whereby asymmetric information problems may be reduced (as the lender is then confident of recovering his loan even if the

borrower proves to be of low quality). But this means that a *decrease in the valuation of assets* (e.g. a stock market decline provoked by a change in future profit expectations), by lowering collateral values, sharply increases adverse selection for lenders. Reductions in credit supply will impinge more on low-quality borrowers for whom there is asymmetric information. A parallel mechanism operates via the link of net worth to moral hazard. Given asymmetric information and incomplete contracts, borrowers have incentives to engage in activities that may be to their advantage, but which harm the lender by increasing risk of default. They hence limit credit availability, or subject the borrower to costly monitoring. The agency problem is greater when borrowers have low net worth as they have less to lose from default. Besides due to stock-market declines, net worth could decline due an unanticipated disinflation or deflation that redistributes wealth from debtors to creditors. Such effects are plausibly greater for low-quality firms that have low net worth before such crises occur and which may be confined to banking markets.

Such patterns are said to give rise to a "financial accelerator" (Bernanke, Gertler and Gilchrist 1996) as changes in cash flow or asset prices over the cycle give rise to pro-cyclical feedback effects of agency costs on the cost of external finance and hence on real corporate expenditures. This will operate particularly via borrowers whose net worth is most heavily affected during a recession, and for borrowers whose activities are riskier or harder to monitor[7].

We are not seeking to assess effects of changes in credit on the real economy in this paper. Such theories and related empirical verification are nevertheless important in the present context since they imply that borrowing may have an inherent cyclical pattern, as firms are credit-rationed in equilibrium during downturns. These patterns are not avoided in any financial system, however smoothly running and well-diversified. If financial crises occur in periods of recession, some fall in lending may be normal in the light of lower demand and increased agency costs, rather than all being a consequence of dysfunction in the credit market.

In the section below we seek to estimate equations for lending of different types, including both cyclical and agency cost variables, which allow us both to further assess the "multiple avenues" and also provide a counter factual for assessing patterns of financing during financial crises.

---

[7] Important empirical tests of the hypothesis include Kashyap et al (1993) using aggregate data, who show that after a tightening of monetary policy, commercial paper issue rises while bank lending is flat, either because firms are rationed from bank lending, or owing to rationing of those categories of borrowers limited to bank lending markets. Using micro data, Christiano et al (1996) show that following a monetary policy shock, borrowing of large firms rises for some time before falling off in the subsequent recession (perhaps because cash flows fall before expenditures can be adjusted), while borrowing of small firms (whose net worth may be hit by the monetary policy action) is much weaker.

3.2   Theories of intermediation

The theories of corporate finance, agency costs and the financial accelerator outlined above tend to apply to debt finance in general rather than distinguishing intermediated and non-intermediated finance. Hence they need to be supplemented in order to understand the forces underlying the choice of borrowers between banks and securities as a source of such external finance, as well as possible asymmetries in credit rationing. There are a number of "theories of intermediation" (Davis and Mayer 1991) that cast light on this issue, highlighting in general the advantages of banks. As a corollary they suggest that the determinants of intermediated and market financing may differ significantly, benefiting those firms able to access both types of finance.

Such theories include those focusing on *economies of scale* (small borrowers do not access bond markets due to fixed costs of doing so) and *commitment* (that banks can offer long term relationships to borrowers not available in the bond market, which reduce information asymmetry and moral hazard). However, the most relevant in the current context are those linked to asymmetric information and control.

Following the discussion above, the existence of *asymmetries of information* between borrowers and lenders gives rise to difficulties in screening the quality of entrepreneurs and firms to avoid adverse selection (Leland and Pyle 1977) and monitoring their performance to minimise moral hazard (Diamond 1984). Leland and Pyle suggested that intermediaries can communicate proprietary information at lower cost than borrowers, and then sell claims to diversified portfolios of these assets to investors. Diamond suggests that financial intermediaries act as delegated monitors to overcome asymmetric information, whereby diversification reduces monitoring costs. A corollary is that market finance is only available to borrowers with a reputation (Diamond 1991). Hence small firms with low levels of public information will be served by banks, while larger firms with a higher degree of public information will have the option to be served by securities markets. Whereas these theories as set out in the literature do not have a cyclical element, they do imply that developments that increase the need for financing by small firms will drive up bank finance, as will developments that increase asymmetric information and moral hazard. On the other hand, technological changes which impact on the technology of information provision and thereby reduce information asymmetry, and the related development of markets for lower rated bond issuance, will increase the scope for securities market financing, and hence raise the proportion of firms able to substitute between lending and securities.

Theories of intermediation based on control also highlight the incompleteness of loan contracts and suggest that intermediaries are better able to influence the behaviour of borrowers while a loan is outstanding and seize assets or restructure in the case of default than markets (Bolton 1990). The corollary of control theory is that a higher degree of risk in a transaction will tend to be accompanied by bank financing, as banks are better able to influence the behavior of borrowers while a loan is outstanding and seize assets or restructure in the case of default. Such patterns may potentially be cyclical (as default risk rises in downturns), with firms switching to banks as credit quality declines. Note however that this assumes lower credit quality firms can access securities in the first place - as is feasible if there are high-yield bond markets.

An interesting point arising from the theories of intermediation is that they suggest that banks should provide a larger proportion of credit when there is heightened risk. Intuitively this could be taken to imply provision of credit in downturns, whereas we have seen that in practice it is securities market financing that falls less in recessions. The empirical work below casts light on the possible resolution of this point. Meanwhile the description of the theories of intermediation points to an additional form of insurance offered by multiple channels, namely that they offer a diversified set of contracts to the economy, which offer different forms of risk sharing.

4 Econometric estimates of loan/debt securities substitution by corporate borrowers

Following the above theoretical outline, we offer some estimates of the determinants of total credit market lending, securities issuance and loans, with the aim of (1) probing further the long term nature of credit market activity and the benefits of multiple avenues of intermediation, by illustrating the different determinants of securities and lending flows and the relationship of the types of flow in the four countries studied, and (2) providing a benchmark "counterfactual" change in equilibrium flows that would be expected to occur in crisis periods. Against this, one can evaluate the actual changes in issuance and borrowing after crises for "disequilibium" supply side effects.

4.1 Specification

Drawing on the theory in Section 3.1, the specification seeks to combine demand and cost elements, with a similar basic specification being estimated for total credit market financing and the two sub-components, securities and lending, in each of the four countries. Note that in focusing on external debt financing, we abstract throughout from possible changes in internal financing of corporate expenditures and shifts on the assets side of the corporate balance sheet. These could in principle balance out the effect of shocks on the liabilities side on real corporate activity. However, both the results here and

earlier work by Christiano et al (1996) support this abstraction, as they show credit market financing is the most flexible aspect.

Corporate demand for external finance is considered to be related most strongly to investment spending, with a proviso that demand increases as the upturn proceeds and internal funds are exhausted, as proxied by the investment/GDP ratio. The demand for finance is also dependent on monetary policy and its effect on the cost of external funds (i.e. the overall level of interest rates). Agency costs and consequent restrictions on the supply of funds, as outlined in the theory in Section 3.1 above, will depend on factors such as trends in share prices (proxying firms' net worth), the corporate credit-quality spread for bonds (showing markets' view of risk) and again the change in the short term interest rate (which increases adverse selection). For the bond and lending equations we add to these variables the term spread as indicating the relative cost of fixed and floating rate finance. Seasonal dummies are added where their effects are significant.

We may expect the importance of the above mentioned demand and cost variables to vary between securities and lending markets, given the associated structural elements outlined by the theory of intermediation in Section 3.2 (which suggests that agency problems and risks may be more readily handled by banks, for example). Note that the assumption underlying the inclusion of the term spread is that firms may substitute between bank and bond financing. This may of course not be the case for many firms which are structurally confined to banking for the different reasons set out in the theory of intermediation set out above (small size, high risk, lack of reputation, desire for credit insurance from relationships), or which lose access to securities markets during downturns (e.g. high yield bond issuers).

The dependent variables are the difference of the real financing flow in question (respectively, credit market financing, debt securities and lending). Because these variables are often negative, we have to specify the equations in linear rather than loglinear form. All the cost variables are included as levels and differences to allow roughly for differences between short and long run effects to be captured. Share prices, which are inherently trended, are included as first and second differences. On the demand side, we include the difference of real investment to capture short term cyclical demand effects, and the level of the borrowing/investment ratio and the level of the investment/GDP ratio to capture potential long term equilibrium effects. As shown in Table 14, all of the differenced terms are stationary, while some of the levels terms are I(1), notably the short rate and yield curve in several countries. We continue to enter these variables as levels as well as differences (also following economic logic that these variables cannot be trended in the long term), while noting that this may lead to some difficulties in interpretation of the results in respect of short and long run effects.

We emphasise that much more detailed estimation work would be needed for a complete characterisation of the determinants of these flows, which would be usable for example in forecasting. (The flow of funds itself is one of the more difficult areas to forecast.) For example, we deliberately adopt a fairly simple Hendry-style specification, so as to ensure it can be employed and compared readily for all the countries studied. We do not at this stage utilise the Granger-Engel two step procedure to estimate a cointegrating vector before estimating the short run. Further work would also be needed to precisely identify demand and "equilibrium" supply effects - although we do make some suggestions about smoothing of shocks to demand and supply in the light of differing results for the types of finance. The reason for simplicity is that our aim here is a limited one. At a most basic level, multiple channels of intermediation are of benefit if they are uncorrelated and respond to different variables over the cycle [8] (Section 4.2) while dummies may help us to interpret patterns of issuance and lending in the wake of systemic crises (Section 4.3).

4.2   Results of estimation

The results of the parsimonious specifications are shown in Tables 15-18. Some general comments may be made on the estimates. There are major differences between the determinants of securities issuance and lending, suggesting that there is indeed a form of diversification for the economy - which benefits those borrowers able to access both markets. The error-correction term relating the flow in question to investment is always significant, suggesting an equilibrium relationship of investment to flows.

There appears to be a stronger cyclical component to bank lending than securities, with typically a significant effect of the change of real investment and the investment/GDP ratio. Securities markets hence provide greater smoothing on average over the cycle and related demand shocks. (The pattern may alternatively reflect some segmentation, with firms limited to bank finance switching over the cycle between bank lending and internal funds as investment rises, whereas firms accessing bond markets may do so more evenly over the cycle.)

On the other hand, price and agency cost variables tend to emerge more frequently and with correct signs for the securities markets. Examples include a positive effect of share prices on securities issuance in the US and UK while the lending relation is negative; and a negative effect of the short rate

---

[8]   There is an underlying assumption that effects arising from systemic crises are sufficiently rare – and random – not to seriously affect the coefficients of the estimates.

in the US, Canada and the UK. (The share price is positive for both equations in Japan.) The term structure relation proxying the relative cost of fixed rate funds is also correctly signed in the US and UK (demand for bond finance is lower when the long rate rises relative to prime). This implies that bank lending may smooth when securities market conditions are unfavourable.

Looking at the price and agency cost variables in the lending equations, the credit quality spread enters with a correct negative sign for the US and Canada (lending falls when risk increases). There are also some apparently-perverse effects, with share price changes affecting lending negatively in the US, UK and Canada. This may link on the one hand to "distress borrowing" which firms unable to access securities undertake in a downturn linked to falling share prices, as well as scope for firms to access cheaper financing in the bond markets when net worth rises with share prices. The term spread enters negatively in the UK and Canada, which may link to cyclical patterns, possibly affecting firms unable to access the bond market. The short rate is positive in Japan, which may link to the overall pattern of the banking crisis, with the authorities cutting rates as lending (and share prices) slumped.

The interim conclusions from this analysis are that there are indeed major differences between the economic and financial determinants of flows of lending and securities. Bank lending is more sensitive to the cycle (and thus markets help to smooth demand shocks) while bond markets are more sensitive to financial variables, reflecting costs of funds to the borrowing firm (so banks may help to smooth the supply of finance in such cases). While the cyclicality of lending may seem contrary to the theory of intermediation, the fact securities issuance is more sensitive to financial market conditions indicative of heightened risk enables the observation to be partly reconciled[9].

These are promising results for multiple avenues of intermediation and benefits of diversification. If the economies concerned were dependent on bank lending there would be more cyclically volatile funding of corporates than is shown to be possible with securities markets. As noted, some firms may not benefit from the multiple avenues, but these effects are not readily captured with macroeconomic aggregate data for the corporate sector[10].

An additional experiment conducted with these equations was to assess the effects of flows in the "other market" (i.e. intermediated financing in the securities equation, and vice versa) as an independent variable to test directly for offsetting shifts. We have not included these in the basic

---

[9]   Another possible explanation is that we may be seeing compositional effects with large firms accessing bond markets less vulnerable to the cycle.
[10]   For some estimates of lending patterns for the US using disaggregated data, see Gertler and Gilchrist (1992) and (1994).

specification as they are not demand or cost variables (note that we already have a relative price term in the equations, i.e. the term structure spread). This is, rather, a variant of "Granger causality testing". We entered the "other flow" in terms of the difference of real financing and the lagged ratio of financing to investment. To avoid simultaneity, we instrumented the difference with three lags in an autoregressive distributed lag framework. The results are shown in Table 19. Patterns are quite different between the US and Canada, on the one hand, and the UK and Japan, on the other. For both the North American countries, there is a significant negative effect of the "other flow", suggesting offsetting shifts in quantities. The term on the lagged ratio of the "other flow" to investment is significantly positive for each of the North American equations except for Canadian loans in the securities equation. In other words, the more important that one flow is for financing investment, the more the other will increase next period - again equilibrating. The UK and Japanese estimates are largely insignificant, with the exception of estimates suggesting loan growth prompts securities issuance (thus being complementary), while in Japan the lagged loan/investment equation enters the securities equation with a correct (positive) sign. This may reflect the limited role of the securities markets in these countries and consequent limited information in the data.

For the United States, data were obtained for high-yield bond issuance from 1982:3 to 2000:3[11], as shown in Chart 9. Such issuance opens up the possibility of substitution of securities financing for a wider range of companies, thus increasing the smoothing benefits to the economy as a whole. While we do not have disaggregated data to test directly whether there is increased substitution, we do address some related hypotheses. For example, opening of the high yield market would be expected to increase securities issuance and lower bank lending. Conversely, the periodic closure of the high-yield bond market (as in 1990, 1994 and 1998) could lead to a fall in overall financing if companies that have been accessing high yield bonds are unable to access banking markets. We would expect that high yield bond issues would have a separate effect on total, securities and loan financing if this were the case. Following the methodology above, we incorporated an instrumented difference of real high-yield bond issues and a lagged ratio to investment in each equation. The results are shown in Table 20. The high yield issues are not significant except in the bond issue equation themselves. This implies that the existing variables in equations 15-18 continue alone to explain total financing and loan financing, and the opening of high-yield markets has not had a marked - or at least stable - effect on them.

4.3   Are errors in the equations consistent with offsetting "supply effects" on credit granted?

We now go on to use the equations to cast further light on the changes in financing after the crises which were discussed in Section 2.2. We seek to use the equations' *fitted values* when periods of financial turbulence highlighted in Section 2 took place, to provide a benchmark for changes in issuance and borrowing. They should for example give an idea of whether a fall in lending would have been expected on a normal cyclical basis, rather than being due to systemic risks affecting the financial system. In contrast, the equation *errors* may be attributable to extraneous factors including systemic problems affecting credit supply. Technically, we add dummy variables for the period of the shock and the quarter afterwards to the above described equations for the different types of financing. A negative (positive) error suggests a priori that there is a greater fall (rise) in issuance or lending than would be anticipated by looking at general economic conditions, averaged out over the sample period. This suggests that there could have been a separate supply side effect operating on the market, be it a direct effect of systemic risk (if negative) or an offset by the market that was unaffected and is hence facing unexpected demands for funds from creditworthy borrowers (if positive). Note that since the equations are in first differences, a single decline that is not offset in the next quarter implies a sustained fall in actual flows. The accuracy of this method is limited by shortcomings in the data, estimation and specification, but they should nonetheless give some idea of the direction and size of the shock.

The results are shown in Table 21. Many of the dummies are consistent in sign and magnitude with the a priori suggestions made about offsetting shifts in financing made in Section 2.2 (commenting on Tables 3,5,7 and 9). On the other hand, the implied shocks are also generally within the bounds of 2 standard errors of the estimates, thus casting some doubt on the supply side effects. This may of course reflect the imperfection of the equations rather than a strong conclusion that no independent supply side effect was operating.

Looking first at the US, the pattern of signs in 1974 is consistent with offsetting rises in securities relative to their long run determinants and falls in bank lending. A consistent (and statistically significant) shift in the opposite direction (i.e. a rise in bank lending offsetting weak bond issuance) is found after Russia/LTCM, consistent with contemporary accounts (IMF 1998) and Greenspan's remarks (2000). In 1991 there is a clear and significant fall in lending below its long term determinants (the so-called "capital crunch") while the bond market effect is estimated to be zero; in 1994 a bond market decline is only initially offset by a rise in bank lending relative to the predicted level. In 1982, where as shown in Table 3 both lending and issuance fell, it is the bond market effect that is shown to be significantly unusual relative to the average. The 1987 crash's effect on debt markets is put in perspective by positive dummies in the equations (i.e. financing was higher than anticipated).

In the UK and Japan, the size of the negative dummies in bank lending relative to the positive one in the bond market casts further light on the weakness of the securities markets in those countries as a means of stabilising corporate financing. Falls in lending relative to historical trends are particularly marked in 1991 in the UK and in 1998 in Japan. Finally in Canada in 1985 the most significant effect is a recovery in bond issuance relative to the equation prediction in the quarter after the crisis.

Concluding this section, the tentative econometric work presented tends to support the suggestion made by examining the data in Section 2, namely that multiple channels of intermediation provide stabilisation to corporate financing, both on average over time and (more tentatively) in periods of crisis. Of particular interest is the cyclical nature of bank financing, while securities fluctuate largely in response to market conditions. This section strengthens the conclusion to the extent that we are allowing for the economic determinants of corporate financing which would be expected to operate in normal times, when there is no systemic problem affecting the banks or markets. The fact that many of the dummies are insignificant offers some counter evidence. The work is of course also subject to standard caveats of any econometric work, such as the risk that structural change may future patterns different as well as imperfections in the specification and estimation methods used.

Before concluding the paper, we go on to consider certain financial, policy and conceptual issues that arise from "multiple channels". In combination with the statistical work, they help also to provide a suggested agenda for future work.

5   Analytical and policy issues arising

Is there true independence between banking and bond markets such that one may truly be unscathed if the other is in crisis? One feature is that banks often provide backups for commercial paper programmes, meaning that CP may not be readily issuable when banks are in crisis. A second is that bank financing is typically needed in order for primary bond markets to operate, e.g. via underwriting, as well as providing finance for the operation of trading markets in securities and derivatives. Banks in effect provide "insurance" to the markets. This is particularly the case where there is universal banking where commercial banks provide market financing direct. Arguably the markets in the US and Japan have in the past been partly insulated from banking difficulties by the separation of commercial and investment banking - although commercial bank financing of investment banks was still important even when such separation was effective, as experience in the 1987 crash showed.

Third, US experience shows that bond markets generally find rescheduling after financial distress difficult, and banks generally play a major role in restructuring, acting in many ways like German or Japanese relationship banks (Gilson et al 1990). Meanwhile, banks may rely to some extent on bond and short term paper issuance to finance lending, so that a liquidity problem in the securities markets could have feedback effects on lending. A severe crisis affecting both markets is hence conceivable, although it has not yet occurred under postwar conditions.

Will some sectors of the economy still be vulnerable even if there are effective multiple channels of intermediation? Besides smoothing, the fact that bond issuance is less cyclical than bank lending may partly reflect credit rationing for loans, with the largest firms being unaffected by the cycle and the small firms confined to the banks, as highlighted by the theories of intermediation, being badly affected. It is notable that the opening of the high yield bond market has increased the cyclicality of US bond market financing, suggesting a greater role for rationing (although the borrowers could still generally access bank credit, given the hierarchy of access to credit. A corollary may be that if the large firms were confined to banks, that bank lending would be less cyclical. This would seem plausible, since the credit quality of large firms is inherently more stable than that of small firms, with their operations being more diversified, and more transparent. On the other hand, large firms in bank dominated economies would remain vulnerable to supply side effects arising from banking failures independent of their own credit quality, to the extent that they cannot access the international capital markets. This was of course the difficulty faced by solvent companies during the Asian crisis.

On the other hand, the distinctions made above between types of borrowers may be diminishing, as witness for example the growth of securitisation even for small-firm loans. This could mean that a banking market collapse could at a certain stage in financial development, perhaps not yet reached even in the US, be followed by a switch to securitised lending even for borrowers which were historically confined to banks[12].

What are the relative costs of a crisis in the securities markets compared to banking? It appears that in each case there has been quite rapid recovery in debt-securities financing following crises in the securities markets. This may link to the contrasting nature of systemic risks in the two markets. As has been argued elsewhere (Davis 1994, 1999b) both banking and securities markets may be subject to liquidity crises. For banking, as set out by Diamond and Dybvig (1983), these arise from

---

[12]   See recent papers on theory of intermediation by Allen and Santomero (199 8) and Scholtens and Wensveen (1999), who question the relevance of the traditional theories of intermediation set out in Section 3.2 for contemporary banking activity.

maturity transformation, imperfect information regarding the bank's assets, inability of the bank to sell or cash illiquid assets (i.e. loans) at par, and the "sequential servicing" process whereby claims are distributed. There is thus an incentive for panic runs by depositors even if banks are solvent. Meanwhile if doubt arises over the future liquidity of a debt securities market for whatever reason (it could be heightened credit risk or market risk), it is rational to sell first before the disequilibrium between buyers and sellers becomes too great, and market failure occurs (i.e. yields are driven up sharply, and selling in quantity becomes extremely difficult). Sellers may either seek cash or more reliably liquid instruments. Moreover, if it is not always be easy for market participants to distinguish liquidity and credit shocks, then disruption to markets may be aggravated. Such crises may be more common when market making is of low profitability and market makers are poorly capitalised. Liquidity crises in both banking and bond markets can have adverse effects on corporate borrowers which cannot readily switch sources of finance, as well as on investors dependent on the liquidity of their claims.

There are several reasons why securities market crises may be less damaging and protracted than banking crises. First, the parallels made above between crises in banks and securities markets are not exact, since securities investors who are not constrained to sell do not make a loss by "sitting tight" – the underlying value of their assets arising from income streams does not change purely in the case of temporary liquidity failure (although marking to market means that their balance sheets will be affected). In contrast, banks can clearly become insolvent. And indeed, as shown by Gorton (1988), although bank liquidity crises can be "sunspots", they are typically triggered by solvency concerns. In other words, markets, unlike banks, may become illiquid but cannot become insolvent and may hence more readily recover.

In this context, approaching bank insolvency can be obscured by the lack of pricing of intermediated claims. A related point is that since risk is priced in the securities markets, concerns about solvency problems among borrowers are likely to emerge at a much earlier stage than for loans held on banks' books. This gives an independent reason why banks are more vulnerable to solvency problems.

Second, difficulties arise for issuers when market have a liquidity crisis arise only in the case that an existing securities issue is maturing and needs rolling over – or there is a pressing need for a further issue - when the liquidity problem arises. Loans generally have a shorter maturity, and banks in difficulty may be forced to call loans. These suggest there will be more "breathing room" for the economy when markets collapse than when banks fail.

Third, given that bank lending involves private information, banking failures are more likely to generate deadweight loss of information to the economy in the manner pinpointed by Bernanke (1983) as occurring during the Great Depression. Since information in the bond markets is public, it is more readily utilised by other providers of credit (e.g. in the lending or international markets) when securities markets suffer liquidity failure. And since information is not destroyed in this way, markets can operate freely as soon as the liquidity blockage is removed, as was the case in the events pinpointed in this paper, while banking crises may involve prolonged falls in lending. Finally, banks may also be more vulnerable to "herding" and concentrating their risks in sectors such as real estate than are markets.

There are clear implications from these arguments for the need for risk to be priced into financial instruments, as is the case for securities markets as opposed to banks. Transparency is indicated to be better for financial stability.

What was the role of the authorities in the various episodes? Generally, they have sought to defuse what is considered to be systemic risk by liquidity and interest rate policies, as in the US interest rate cuts in 1982, 1987 and 1998. But there is arguably also much more implicit and explicit protection for banking than for securities markets, although the latter is seen to be stabilising corporate financing. Conceptually, the authorities could be seen, following the argument above, to be protecting the private information that banks accumulate (as well as protecting depositors and the deposit insurance system). But transparency and further market development may improve stability without a need for such a broad safety net.

Are there any benefits to bank domination, given the thrust of this paper is the benefit of securities markets and consequent "multiple channels"? In this context it is interesting to begin by citing the views of Allen and Gale (1997) that Anglo-American capital markets dominated by institutional investors may have a disadvantage in terms of risk sharing, despite their "multiple intermediation buffers". In effect, competition and opportunities for arbitrage are said to constrain intermediaries - including banks - to only carry out cross-sectional risk sharing, i.e. exchanges of risk among individuals at a given point in time. This, it is argued, leaves non-financial firms more vulnerable to undiversifiable risks arising over time, e.g. owing to macroeconomic shocks [13]. In contrast, financial systems where banks have some monopoly power over savers facilitate elimination of such intertemporal risks by accumulation of reserves and smoothing of returns over time.

---

[13]   . In Anglo-American countries, the focus on cross-sectional risk sharing may help explain the intense focus on risk management via derivatives (Allen and Santomero 1999).

As noted, one counter argument is that banking failures in bank dominated systems are likely to be much more damaging. Even abstracting from this, as argued by Greenspan (1999), the benefits of intertemporal risk sharing as practised in Continental Europe may require less efficient allocation and utilisation of capital, given the apparent need for intensive involvement of the public sector in the banking system (including direct ownership) in order to provide "insurance". Furthermore, the distinction may be less clear cut than Allen and Gale suggest, since Anglo-Saxon systems have intertemporal smoothing via "market-priced" forms of insurance such as backup credit lines, commitments etc.

The argument here could be turned on its head and posed as the question whether there are any disadvantages to having large securities markets? In general the answer is no, but with one proviso, namely that multiple avenues will only be effective when sectors are of comparable size. If banks declined to a low level, they could not provide effective substitute finance in a securities market crisis. Moreover, it may be noted that securities market crises are typically international rather than purely domestic, implying global ramifications absent for most banking crises.

What behavior in terms of smoothing could be expected of a system in transition towards a greater role for capital markets – as is the case for the EMU countries? Following the above discussion of intertemporal smoothing via relationship banking, financial integration, openness to global markets and institutional-investor growth are likely to transform European systems to securitisation. This will incidentally reduce the benefits of intertemporal smoothing as per Allen and Gale, since savers will not accept lower yields on their deposits than obtainable via securities markets, while borrowers may also seek cheaper financing outside their traditional relationships (see Petersen and Rajan 1993). This means the behaviour of "Anglo Saxon" financial systems as illustrated in this paper is of considerable relevance as a model for the future.

But one can also ask whether there will also there be a period of transition in EMU before multiple intermediation becomes effective, when the system could be especially vulnerable to systemic risks in the banking system. It can be argued (see Davis (2000)) that this will be the case, as banks are challenged by heightened cross border competition, nascent securities markets and exiting excess capacity. Fully functioning securities markets cannot develop overnight but need infrastructure such as alternative means of corporate control (hostile take-overs and direct influence by institutional investors) as well as means of reducing asymmetric information and aiding control by debt holders (rating agencies, changes in credit structure and possibly a lower debt/equity ratio). This risk was arguably realised to some extent in Japan, and EMU countries may need to study closely the transition that the Japanese financial system is passing through at present (see also Hoshi et al (1999), Nakaso (1999)).

Further research and analysis in the area of "multiple avenues" could include the following:

• Assessment of the funding of unincorporated/small firms – do they benefit or lose out as the financial system becomes more diversified?

• Examination within the flow of funds data of the sources of funds for new securities market financing when they "fill the gap" during a banking crisis.

• Investigation of patterns of bank financing in Germany and France, as well as in Sweden, where the contribution of securities issuance to corporate financing is small.

• Focus on bank capital in the loans equations as a possible source of constraint on bank lending (as in the US "capital crunch" of the early 1990s).

• Different estimation techniques for the econometrics, including VARs which incorporate both bond issuance and lending, which could enable some of the effects of cyclical and financial variables to be distinguished via impulse response functions [14].

• Further consideration of policy issues, in particular those which enhance transparency, help to develop securities markets or render securities markets less vulnerable to liquidity failure. Note that although property rights, accounting standards, transparency etc. may be necessary conditions, it is not clear they are sufficient, as witness the UK experience of weak domestic securities markets. Arguably a strong institutional investor sector focused on debt securities is also needed.

• Further consideration of the benefits of openness and the buffer role of international capital markets. Do the favourable indications shown in the data apply only to advanced economies (which are less likely than emerging markets to face sudden constraints on international borrowing).

• Use of micro data for the international capital markets to assess changing maturity of financings and credit quality of issuers during periods of turbulence. Following Davis and Mayer (1991) such an examination would also cast light on the nature of financial intermediation more generally. Note in this context that international markets may offer a cleaner dataset for examining the substitution between securities and lending, given all firms in the international market are of a certain size and credit quality, while domestic markets feature many firms that could not access securities markets.

• Analysis of the substitution role of offshore markets.

Conclusions

---

[14]   Using a VAR, besides obviously examining the effects of shocks in securities and loans on the "other form of financing", one could assess the effects of liquidity shocks (rise in short rates) and solvency shocks (rise in credit quality spread) on financing.

This paper has provided evidence on the benefits to an economy from "multiple intermediation buffers". The overall conclusion is that the existence of active securities markets alongside banks is indeed beneficial to the stability of corporate financing, both during cyclical downturns and during banking and securities market crises. The benefits are to limit volatility arising from the normal patterns of credit demand and supply that obtain over the cycle, and changes in agency costs as companies' net worth varies. While bank lending is largely cyclical, securities financing is more highly responsive to indicators of agency costs, implying a degree of complementarity in response to shocks. They also restrict the impact of undue limits on credit availability arising solely from weakness on the supply side, be it from liquidity crises in the securities markets or from liquidity or solvency problems among financial intermediaries. The benefit will be greater, the more comparable the size of securities market and intermediated financing, as well as the larger the proportion of companies able to access both loan and securities markets. The analysis raises a number of policy issues and research topics for further investigation.

Table 1: Corporate external financing/GDP

	% of GDP	% of GDP since 1985	S.d.% of GDP	S.d.% GDP since 1985
US				
Credit market	3.15	2.92	1.65	1.89
Securities	1.65	1.81	0.72	0.84
Loans	1.50	1.11	1.48	1.44
UK				
Credit market	3.57	4.15	3.20	3.83
Securities	0.67	1.20	1.04	1.25
Loans	2.90	2.96	2.92	3.41
Japan				
Credit market	4.94	3.63	4.46	4.94
Securities	0.54	0.77	0.93	1.26
Loans	4.40	2.86	4.07	4.09
Canada				
Credit market	4.31	3.30	2.66	1.96
Securities	2.01	1.65	1.49	1.70
Loans	2.30	1.64	2.37	1.77

Table 2: Volatility and correlation of real corporate debt financing flows

	Coefficient of variation	Correlations		
		Credit market	Securities	Loans
US				
Credit market	0.59	1.00		
Securities	0.56	0.64	1.00	
Loans	1.01	0.86	0.16	1.00
UK				
Credit market	1.03	1.00		
Securities	1.72	0.60	1.00	
Loans	1.10	0.94	0.28	1.00
Japan				
Credit market	1.03	1.00		
Securities	2.04	0.64	1.00	
Loans	1.01	0.97	0.45	1.00
Canada				
Credit market	0.61	1.00		
Securities	0.77	0.45	1.00	
Loans	1.04	0.81	-0.15	1.00

Table 3: Corporate debt financing amid financial turbulence – United States 1970-1999

Billions of USD, 1995 prices/*% of GDP*, Annual rates

		Year before	Quarter of crisis	Year after	*Year before*	*Quarter of crisis*	*Year after*
US Franklin National (Q2 1974)	Credit market	249	208	149	*5.3*	*4.5*	*3.2*
	O/w						
	Securities	55	83	95	*1.2*	*1.8*	*2.1*
	Loans	194	125	54	*4.1*	*2.7*	*1.2*
US Mexican default (Q3 1982)	Credit market	211	178	100	*4.1*	*3.5*	*1.9*
	O/w						
	Securities	83	59	55	*1.6*	*1.2*	*1.1*
	Loans	129	119	45	*2.5*	*2.3*	*0.9*
US Stock market crash (Q4 1987)	Credit market	234	269	289	*3.7*	*4.2*	*4.4*
	O/w						
	Securities	106	76	126	*1.7*	*1.2*	*1.9*
	Loans	128	193	163	*2.0*	*3.0*	*2.5*
US Bank capital crunch (Q1 1991)	Credit market	149	-50	-51	*2.2*	*-0.8*	*-0.8*
	O/w						
	Securities	66	59	66	*1.0*	*0.9*	*1.0*
	Loans	83	-109	-117	*1.2*	*-1.6*	*-1.8*
US Bond market reversal (Q1 1994)	Credit market	50	138	141	*0.7*	*1.9*	*1.9*
	O/w						
	Securities	97	60	53	*1.4*	*0.8*	*0.7*
	Loans	-47	78	88	*-0.7*	*1.1*	*1.2*
US Russia/LTCM (Q3 1998)	Credit market	367	334	406	*4.6*	*4.1*	*4.9*
	O/w						
	Securities	240	186	227	*3.0*	*2.3*	*2.7*
	Loans	127	149	180	*1.6*	*1.8*	*2.2*

Table 4: Equity issuance, trade credit and total liabilities – US 1970-99

Billions of USD, 1995 prices/*% of GDP*, Annual rates

		Year before	Quarter of crisis	Year after	*Year before*	*Quarter of crisis*	*Year after*
US Franklin National (Q2 1974)	Trade credit	121	124	46	*2.6*	*2.7*	*1.0*
	Equity issuance	26	16	13	*0.5*	*0.3*	*0.3*
	Total liabilities	419	376	236	*8.8*	*8.1*	*5.1*
US Mexican default (Q3 1982)	Trade credit	-12	42	5	*-0.2*	*0.8*	*0.1*
	Equity issuance	-23	-12	28	*-0.4*	*-0.2*	*0.5*
	Total liabilities	309	339	216	*5.9*	*6.6*	*4.1*
US Stock market crash (Q4 1987)	Trade credit	48	88	60	*0.8*	*1.4*	*0.9*
	Equity issuance	-101	-148	-142	*-1.6*	*-2.3*	*-2.2*
	Total liabilities	316	520	427	*5.0*	*8.0*	*6.5*
US Bank capital crunch (Q1 1991)	Trade credit	34	-53	26	*0.5*	*-0.8*	*0.4*
	Equity issuance	-73	-7	20	*-1.1*	*-0.1*	*0.3*
	Total liabilities	214	94	75	*3.2*	*1.4*	*1.1*
US Bond market reversal (Q1 1994)	Trade credit	38	53	79	*0.5*	*0.7*	*1.1*
	Equity issuance	22	-10	-46	*0.3*	*-0.1*	*-0.6*
	Total liabilities	230	144	248	*3.3*	*2.0*	*3.4*
US Russia/LTCM (Q3 1998)	Trade credit	45	0	38	*0.6*	*0.0*	*0.4*
	Equity issuance	-126	-288	-276	*-1.6*	*-3.5*	*-3.3*
	Total liabilities	384	476	531	*4.8*	*5.8*	*6.4*

Table 5: Corporate debt financing amid financial turbulence – United Kingdom 1970-1999
Billions of GBP, 1995 prices/*% of GDP*, Annual Rates

		Year before	Quarter of crisis	Year after	*Year before*	*Quarter of crisis*	*Year after*
UK Secondary banking crisis (Q4 1973)	Credit market O/w	27.3	50.5	32.9	*5.9*	*10.9*	*7.3*
	Securities	0.7	0.3	-0.1	*0.2*	*0.1*	*0.0*
	Loans	26.5	50.2	33.0	*5.7*	*10.9*	*7.3*
UK Small banks crisis (Q1 1991)	Credit market O/w	37.7	7.3	9.0	*5.7*	*4.4*	*1.4*
	Securities	4.3	0.9	6.2	*0.7*	*0.5*	*0.9*
	Loans	33.4	6.4	2.8	*5.1*	*3.9*	*0.4*

Table 6: Equity issuance, foreign financing and total liabilities – UK 1970-2000

Billions of GBP, 1995 prices/*% of GDP*, Annual rates

		Year before	Quarter of crisis	Year after	*Year before*	*Quarter of crisis*	*Year after*
UK Secondary banking crisis (Q4 1973)	Overseas finance	9.3	6.6	11.4	*2.0*	*1.4*	*2.5*
	Equity issuance	0.9	0.3	0.2	*0.2*	*0.1*	*0.1*
	Total liabilities	34.9	60.2	44.5	*7.5*	*13.0*	*9.8*
UK Small banks crisis (Q1 1991)	Overseas finance	22.8	5.1	18.2	*3.5*	*0.8*	*2.8*
	Equity issuance	3.4	1.0	13.1	*0.5*	*0.1*	*2.0*
	Total liabilities	63.9	13.3	40.3	*9.7*	*2.0*	*6.2*

Table 7: Corporate debt financing amid financial turbulence – Japan 1970-1999

Trillions of JPY, 1995 prices/*% of GDP*, Annual rates

		Year before	Quarter of crisis	Year after	*Year before*	*Quarter of crisis*	*Year after*
Japanese monetary tightening/credit restrictions (Q3 1990)	Credit market O/w	73.9	71.6	49.2	*10.3*	*9.6*	*6.6*
	Securities	12.0	8.2	5.2	*1.7*	*1.1*	*0.7*
	Loans	61.8	63.4	44.0	*8.6*	*8.5*	*5.9*
Japanese banking crisis (Q4 1993)	Credit market O/w	18.9	31.5	4.8	*2.5*	*4.1*	*0.6*
	Securities	2.5	6.2	1.0	*0.3*	*0.8*	*0.1*
	Loans	16.5	25.3	3.8	*2.2*	*3.3*	*0.5*
Japan Yamaichi/LTCB failures (Q4 1997)	Credit market O/w	1.8	56.0	-6.3	*0.3*	*7.1*	*-0.8*
	Securities	2.3	3.8	1.5	*0.3*	*0.5*	*0.2*
	Loans	-0.5	52.2	-7.9	*0.0*	*6.6*	*-1.0*

Table 8: Trade credit – Japan 1970-2000

Trillions of JPY, 1995 prices/*% of GDP*, Annual rates

		Year before	Quarter of crisis	Year after	*Year before*	*Quarter of crisis*	*Year after*
Japanese monetary tightening/credit restrictions (Q3 1990)	Trade credit	27.7	23.0	14.6	*3.9*	*3.1*	*1.9*
Japanese banking crisis (Q4 1993)	Trade credit	-4.5	55.2	-1.4	*-0.6*	*7.2*	*-0.2*
Japan Yamaichi/LTCB failures (Q4 1997)	Trade credit	7.0	37.3	-19.6	0.8	4.7	-2.5

Table 9: Corporate debt financing amid financial turbulence – Canada 1970-2000

Billions of C$, 1995 prices/*% of GDP*, Annual rates

		Year before	Quarter of crisis	Year after	*Year before*	*Quarter of crisis*	*Year after*
Canada Northland Banking Crisis (Q2 1985)	Credit market	17.7	7.0	20.5	*2.7*	*1.1*	*3.1*
	O/w						
	Securities	6.2	-0.2	7.1	*0.9*	*0.0*	*1.1*
	Loans	11.6	7.1	13.4	*1.8*	*1.1*	*2.0*

Table 10: Corporate debt financing amid financial turbulence – Canada 1970-2000

Billions of C$, 1995 prices/*% of GDP*, Annual rates

		Year before	Quarter of crisis	Year after	*Year before*	*Quarter of crisis*	*Year after*
Canada Northland Banking Crisis (Q2 1985)	Trade credit	4.1	-1.2	0.9	*0.6*	*-0.2*	*0.1*
	Equity issuance	13.2	21.2	15.0	*2.0*	*3.2*	*2.3*
	Total liabilities	37.1	18.9	38.1	*5.7*	*2.9*	*5.7*

Table 11: Volatility and correlation of gross corporate debt financing in international capital markets

	Coefficient of variation	Correlations			
US		Eurobonds	Credit facilities	Total	
Eurobonds	1.28	1.00			
Credit facilities	1.02	0.75	1.00		
Total euromarket	1.02	0.80	1.00	1.00	
Memo: Total credit market finance	Na	0.74	0.63	0.66	1.00
UK					
Eurobonds	1.17	1.00			
Credit facilities	1.16	0.70	1.00		
Total euromarket	1.11	0.80	0.99	1.00	
Memo: Total credit market finance	Na	0.66	0.61	0.66	1.00
Japan					
Eurobonds	0.91	1.00			
Credit facilities	3.02	-0.11	1.00		
Total euromarket	0.85	0.86	0.41	1.00	
Memo: Total credit market finance	na	0.36	-0.34	0.15	1.00
Canada					
Eurobonds	0.99	1.00			
Credit facilities	0.90	0.23	1.00		
Total euromarket	0.82	0.38	0.99	1.00	
Memo: Total credit market finance	na	-0.10	0.22	0.19	1.00

- 36 -

Table 12: Changes in corporate financing in international capital markets during turbulence

Billions of US dollars equivalent

(4Q/4Q % change)	Mexican default	Stock market crash	Bond market	Russia/LTCM
	Q3 1982	Q4 1987	Q1 1994	Q4 1998
EUROBONDS				
US	41.85	-29.41	19.09	58.14
UK	413.60	12.32	-40.78	60.94
Japan	-61.94	4.62	-45.97	-30.92
Canada	-29.63	11.50	-14.55	37.79
SYNDICATED CREDITS AND NOTE FACILITIES				
US	-73.58	73.11	52.40	-14.93
UK	-15.90	99.92	64.97	-9.61
Japan	2489.15	4347.70	-12.38	2989.78
Canada	-9.80	295.58	66.22	-10.90
SYNDICATED CREDITS				
US	-83.50	89.39	56.61	-14.06
UK	-47.85	394.20	89.27	-14.05
Japan	na	na	0.53	3162.31
Canada	667.74	441.46	75.36	-14.25
TOTAL				
US	-64.54	54.51	50.31	-9.72
UK	21.14	79.61	24.47	4.35
Japan	-45.54	11.85	-45.54	119.43
Canada	-15.26	225.57	41.82	-7.15

Table 13: Changes in financing of domestic companies in international capital markets during domestic turbulence

Billions of US dollar equivalents

(4Q/4Q % change)	US bank capital crunch	UK small banks	Japan tightening	Japan crisis	Japan failures	Canada Northlands
	Q1 1991	Q1 1991	Q3 1990	Q4 1993	Q4 1997	Q2 1985
Eurobonds	23.76	68.07	23.83	-16.08	-47.17	178.32
Credits and facilities	-16.19	-25.96	-90.36	-12.38	48.09	100.93
Credits	-15.34	-31.05	-89.26	0.53	42.17	114.93
Total	-14.02	-14.79	8.35	-16.03	-43.73	111.34

Table 14: Dickey-Fuller Unit Root tests

** denotes stationarity accepted at 95%; * at 90%
D1 indicates a first-differenced variable

	US	UK	Japan	Canada
D1 Real Securities	-4.9**	-1.1	-3.8**	-4.3**
D1 Real loans	-6.2**	-4.9**	-3.6**	-8.1**
D1 Real borrowing	-5.5**	-5.0**	-3.2*	-7.1**
D1 Investment	-3.7**	-4.7**	-3.2*	-3.5**
D1 Short rate	-3.9**	-6.0**	-3.8**	-4.1**
D1 Corporate risk spread	-4.2**	-5.7**	-5.4**	-4.0**
D1D1 Share prices	-6.0**	-5.4**	-6.0**	-5.1**
D1 Term structure	-6.2**	-6.6**	-6.0**	-4.1**
Securities/investment ratio	-3.2*	-0.1	-1.8	-4.0**
Loans/investment ratio	-3.2*	-3.1*	-1.8	-4.0**
Borrowing/investment ratio	-2.8	-2.6	-1.7	-3.6**
Investment/GDP ratio	-2.5	-3.0	-2.1	-3.9**
Term structure	-2.9	-2.4	-3.1*	-3.1
Short rate	-2.5	-2.9	-3.5**	-2.6
D1 Share prices	-6.4**	-5.6**	-4.1**	-6.1**
Corporate risk premium	-3.9**	-3.0	-3.4**	-3.7**

Table 15 Econometric estimates for changes in flows of external finance - United States

(1970Q3-1999Q4); t values in parentheses.

Dependent variable Independent variables	D1 Real credit market financing	D1 Real securities issuance	D1 Real intermediated lending
Constant	-2531 (3.0)	375 (4.2)	434 (4.3)
D1 Real investment	1271 (4.6)	317 (1.8)	792 (2.7)
D1 Short rate		-106 (2.4)	
D1 Credit spread			-571 (2.6)
D1D1 Share price	-2264 (2.2)	1526 (2.7)	-4159 (4.1)
D1 Term spread		-129 (3.0)	
Financing/Investment ratio (-1)	-4.8 (6.3)	-33 (5.5)	-4.0 (5.7)
Investment/GDP ratio (-1)	21840 (3.7)		
Term spread (-1)		-33 (1.5)	
Short rate (-1)			
D1 Share price (-1)	-2920 (2.3)	1159 (1.7)	-4852 (3.6)
Credit spread (-1)			
R2	0.33	0.27	0.35
DW	2.3	2.3	2.3
SE	649	351	649

Table 16 Econometric estimates for changes in flows of external finance - United Kingdom

(1970Q2-1999Q4) ; t values in parentheses.

	D1 Real credit market financing	D1 Real securities issuance	D1 Real intermediated lending
Constant	-45 (1.1)	20 (3.5)	-115 (2.9)
D1 Real investment	1696 (3.6)		1912 (4.5)
D1 Short rate			
D1 Credit spread			
D1D1 Share price		21.9 (1.9)	
D1 Term spread			
Financing/Investment ratio (-1)	-0.15 (6.1)	-0.13 (5.4)	-0.21 (7.8)
Investment/GDP ratio (-1)	393 (1.7)		804 (3.7)
Term spread (-1)		-1.52 (2.9)	-3.4 (2.6)
Short rate (-1)		-1.6 (3.3)	
D1 Share price (-1)			-89 (2.3)
Credit spread (-1)			
R2	0.31	0.2	0.47
DW	2.2	2.1	2.2
SE	40	13	34

Table 17: Econometric estimates for changes in flows of external finance - Japan

(1970Q2-1999Q4) ; t values in parentheses.

	D1 Real credit market financing	D1 Real securities issuance	D1 Real intermediated lending
Constant	-1133	192	-1001
	(1.8)	(4.9)	(1.7)
D1 Real investment			3.5
			(2.1)
D1 Short rate			
D1 Credit spread			
D1D1 Share price	1313		
	(1.9)		
D1 Term spread			
Financing/Investment ratio	-684	-1252	-850
(-1)	(6.1)	(9.5)	(6.8)
Investment/GDP ratio (-1)	6444		5107
	(3.0)		(2.4)
Term spread (-1)			
Short rate (-1)		15	52
		(1.8)	(2.3)
D1 Share price (-1)	2472	354	1504
	(3.2)	(1.8)	(2.7)
Credit spread (-1)			
R2	0.56	0.59	0.56
DW	506	153	425
SE	2.6	2.1	2.5

Note: Dummy in securities equation for deregulation of the bond market (1 to Q4 1984, 0 thereafter);
coefficient –140 (3.3)

Table 18: Econometric estimates for changes in flows of external finance - Canada

(1970Q3-1999Q4) ; t values in parentheses.

	D1 Real credit market financing	D1 Real securities issuance	D1 Real intermediated lending
Constant	-405 (3.5)	-211 (2.5)	-58 (0.5)
D1 Real investment	520 (2.0)		969 (3.2)
D1 Short rate	24.1 (2.7)	-22 (2.9)	46 (5.0)
D1 Credit spread			-140 (1.8)
D1D1 Share price			-321 (3.0)
D1 Term spread			
Financing/Investment ratio (-1)	-0.86 (7.0)	-1.7 (13.7)	-1.1 (9.4)
Investment/GDP ratio (-1)	3067 (4.3)	1724 (1.3)	1040 (1.9)
Term spread (-1)			-28 (3.7)
Short rate (-1)			
D1 Share price (-1)			-457 (2.1)
Credit spread (-1)	-73 (1.9)		
R2	0.39	0.62	0.54
DW	2.2	2.0	2.2
SE	98	89	101

Table 19: Inclusion of "other flows" in the loan and securities equations

(* instrumented by three lags)

	Loan equation		Securities equation	
Country	Difference of real bonds*	Lagged bond/investment ratio	Difference of real loans*	Lagged loan/investment ratio
US	-0.1 (1.9)	443 (2.4)	-0.4 (2.4)	889 (3.0)
UK	-	-	0.06 (1.8)	-
Japan	-	-	0.1 (2.3)	105 (2.6)
Canada	-0.36 (3.6)	0.47 (3.0)	-0.36 (4.8)	-

Table 20: Inclusion of "high yield bond issues" in the US credit market, loan and securities equations

(* instrumented by three lags)

Equation	Credit market financing		Securities financing		Loan financing	
Data period	Difference of real high yield bonds*	Lagged high yield bond/ investment ratio	Difference of real high yield bonds*	Lagged high yield bond/ investment ratio	Difference of real high yield bonds*	Lagged high yield bond/ investment ratio
1971-99	-	-	3.8 (4.4)	-	-	-
1982-99	-	-	3.5 (3.1)	-	-	-

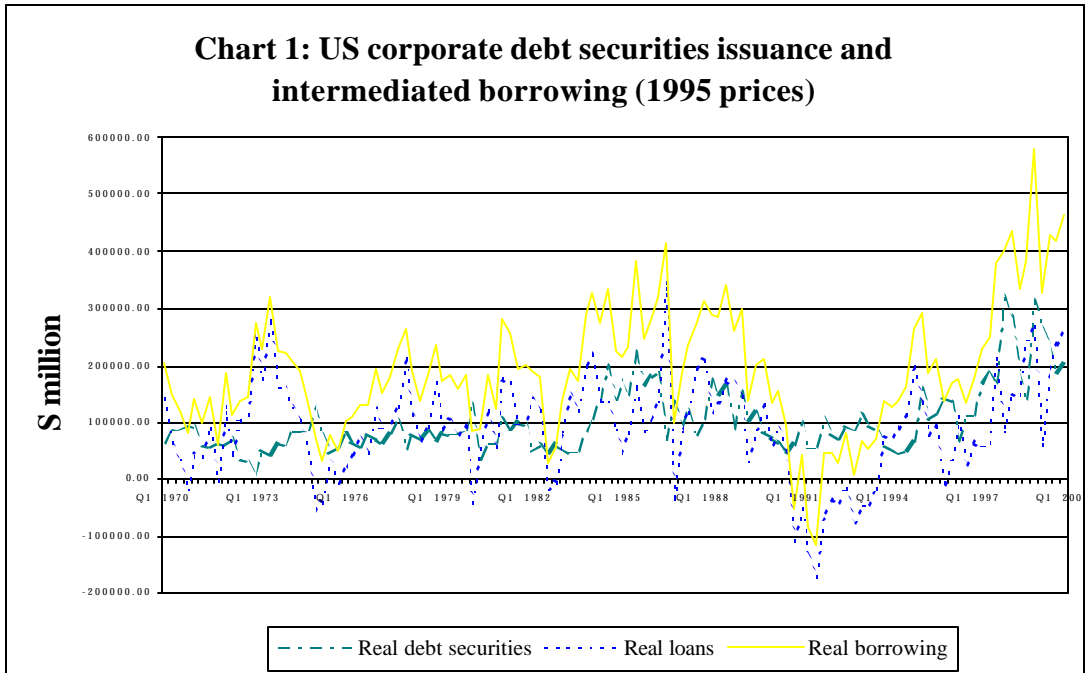**Table 21: Dummies in equations for shifts in financing after crises**

(* significant at 90%, ** significant at 95% level)

| Country	Period	Dummy for credit market financing	Dummy for securities financing	Dummy for loan financing
US (USD billion AR)	Q2 74	34	13	-12
	Q3 74	-1	31	-52
	Q3 82	34	-21	40
	Q4 82	-111	-84**	-5
	Q4 87	20	29	2
	Q1 88	59	-3	31
	Q1 91	-96	-33	-124*
	Q2 91	58	24	-22
	Q1 94	31	-28	36
	Q2 94	-42	-1	-71
	Q3 98	-60	-55	16
	Q4 98	20	-66*	137**
UK (GBP billion AR)	Q4 73	18	1	24
	Q1 74	-6	2	4
	Q1 91	3	-2	-4
	Q2 91	-16	2	-24*
Japan (JPY trillion AR)	Q3 90	905*	108	534
	Q4 90	506	239	-28
	Q4 93	-37	-80	-93
	Q1 94	-471	-84	-308
	Q4 97	825*	-121	779*
	Q1 98	-2222**	-222	-1851**
Canada (C$ billion AR)	Q2 85	-14	-13	-1
	Q3 85	13	19**	-13

References

Allen F and Gale D (1995), "A welfare comparison of the German and US financial systems", European Economic Review, 39, 179-209.

Allen F and Gale D (1997), "Financial markets, intermediaries and intertemporal smoothing", Journal of Political Economy, 105, 523-546

Allen F and Santomero A M (1998), "The theory of financial intermediation", Journal of Banking and Finance, 21, 1461-1485

Allen F and Santomero A M (1999), "What do financial intermediaries do?", Working Paper No 99-30-B, Financial Institutions Center, The Wharton School, University of Pennsylvania

Bernanke B S (1983), "Non monetary effects of the financial crisis in the propagation of the Great Depression", American Economic Review, 73, 257-76

Bernanke B S, Gertler M and Gilchrist S (1996), "The financial accelerator and the flight to quality", Review of Economics and Statistics, 78, 1-15

Christiano L J, Eichenbaum M and Evans C (1996), "The effects of monetary policy shocks; some evidence from the flow of funds", Review of Economics and Statistics, 78, 16-34

Davis E P (1994), "Market liquidity risk", in eds. Fair D. and Raymond R., "The Competitiveness of Financial Institutions and Centres in Europe", Kluwer Academic Publishers

Davis E P (1995a), "Debt, financial fragility and systemic risk, revised and expanded version", Oxford University Press.

Davis E P (1995b), "Institutional investors, unstable financial markets and monetary policy", in eds. F Bruni, D Fair and R O'Brien, "Risk management in volatile financial markets", Kluwer, Amsterdam (also Special Paper No. 75, LSE Financial Markets Group).

Davis E P (1999a), "Institutionalization and EMU: implications for European Financial Markets", International Finance, 2, 33-61.

Davis E P (1999b), "Russia/LTCM and market liquidity risk", The Financial Regulator, 4/2

Davis E P (2000), "Financial stability in the Euro Area, some lessons from US financial history", LSE Financial Markets Group Special Paper No 123.

Davis E P and Mayer C P (1991), "Corporate finance in the euromarkets and the economics of intermediation", CEPR Discussion Paper, No. 570.

Diamond D (1991), "Monitoring and reputation; the choice between bank loans and directly placed debt", Journal of Political Economy, 99, 401-19.

Diamond, D (1984), "Financial Intermediation and Delegated Monitoring", Review of Economic Studies, 51, 393-414

Diamond, D, and Dybvig P (1983), "Bank Runs, Deposit Insurance, and Liquidity", Journal of Political Economy, June, 401-19

Gertler M and Gilchrist S (1992), "The cyclical behaviour of short term business lending; implications for financial propagation mechanisms", mimeo.

Gertler, M, and Gilchrist S (1994), "Monetary Policy, Business Cycles, and the Behaviour of Small Manufacturing Firms", Quarterly Journal of Economics, 59 ,309-40

Gilson, S, Kose J, and Lang L (1990), "Troubled Debt Restructurings", Journal of Financial Economics, 27, 315-53

Gorton G (1988), "Banking panics and business cycles", Oxford Economic Papers, 40, 751-781

Greenspan A (1999), "Do efficient financial markets mitigate financial crises?", speech to the Financial Markets Conference of the Federal Reserve Bank of Atlanta, 19 October.

Greenspan A (2000), "Global challenges", speech to the Financial Crisis Conference, Council on Foreign Relations, New York, 12 July.

Gunther J W, Lown C and Robinson K J (1995), "Bank credit and economic activity; evidence from the Texas banking decline", Journal of Financial Services Research, 9, 31-48.
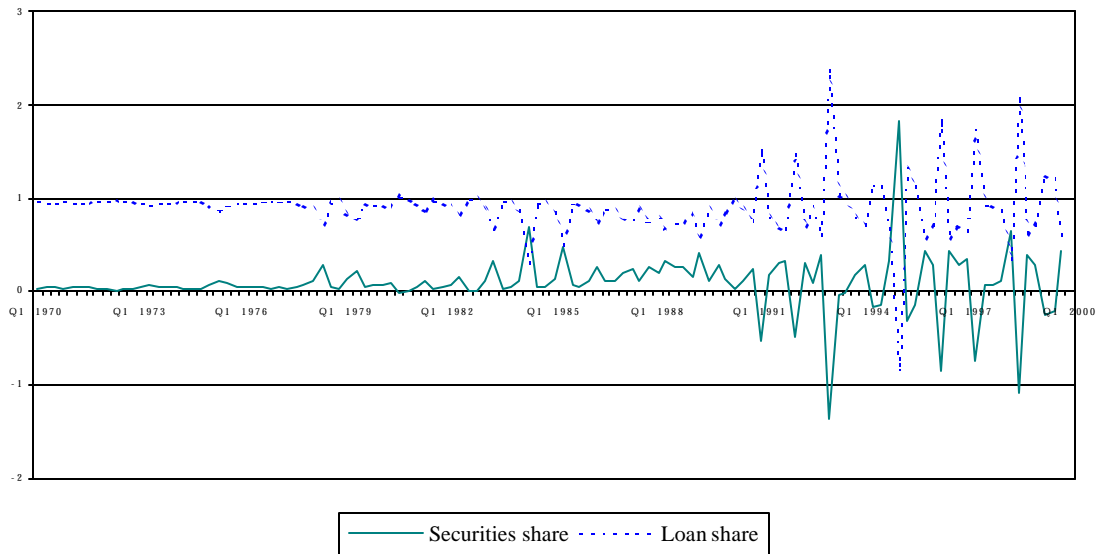
Hellwig M (1991), "Banking, Financial Intermediation and Corporate Finance". In ed A Giovannini and C P Mayer, "European Financial Integration", Cambridge University Press, Cambridge.

Hoshi, T, Kashyap A, and Scharfstein D (1993), "The choice between public and private debt; an analysis of post deregulation corporate financing in Japan", Working Paper No. 4211, National Bureau of Economic Research.

Hoshi, T, and Kashyap A (1999), "The Japanese banking crisis – where did it come from and where will it end? ", Working Paper No. 7250, National Bureau of Economic Research.

Hutchinson M and McDill K (1999), "Are all banking crises alike? The Japanese experience in international comparison", NBER Working Paper No 7253

IMF (1998), "World Economic Outlook and International Capital Markets, Interim Assessment December 1998 – Financial Turbulence and the World Economy", International Monetary Fund, Washington D.C.

Kashyap A, Stein J and Wilcox D (1993), "Monetary policy and credit conditions, evidence from the composition of external finance", American Economic Review, 83, 78-98

Knight M (1998), "Developing countries and the globalization of financial markets", IMF Working Paper No WP/98/105

Mishkin F S (1991), "Asymmetric Information and Financial Crises: A Historical Perspective", in Hubbard R G (ed), "Financial Markets and Financial Crises", University of Chicago Press, Chicago.

Myers S and Majluf N (1984), "Corporate financing and investment decisions when firms have information that investors do not have", Journal of Financial Economics, 13, 187-221

Petersen M A and Rajan R G (1993), "The effect of credit market competition on firm-creditor relationships", paper presented at CEPR/ESF workshop in financial regulation, Toulouse, June 1993.

Scholtens B and van Wensveen D (1999), "A critique of the theory of financial intermediation", forthcoming, Journal of Banking and Finance

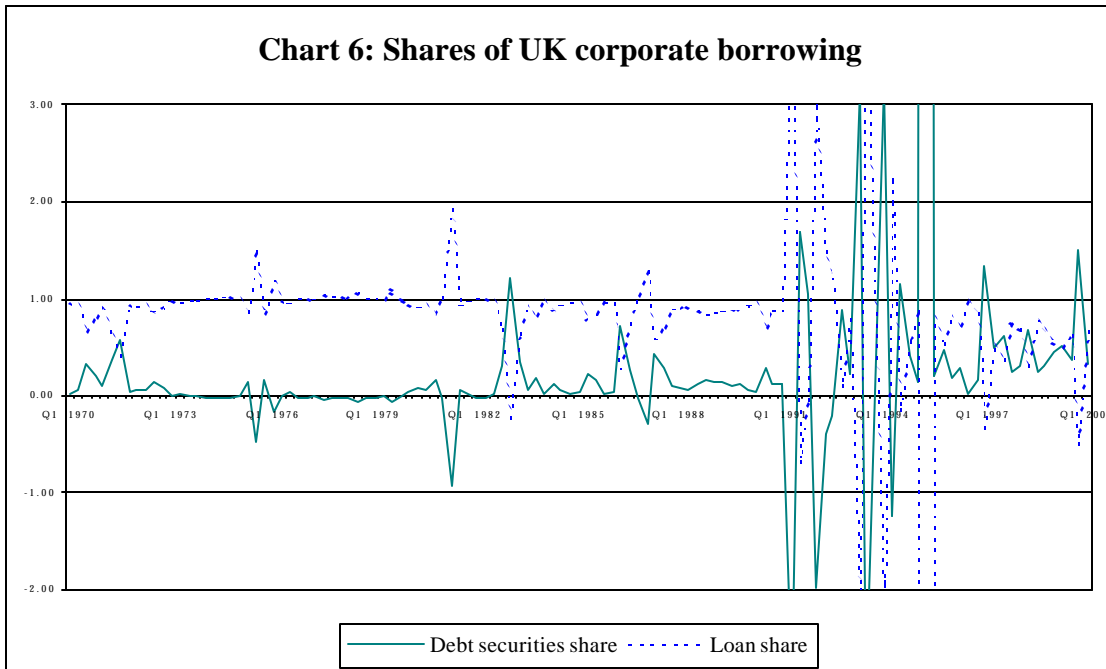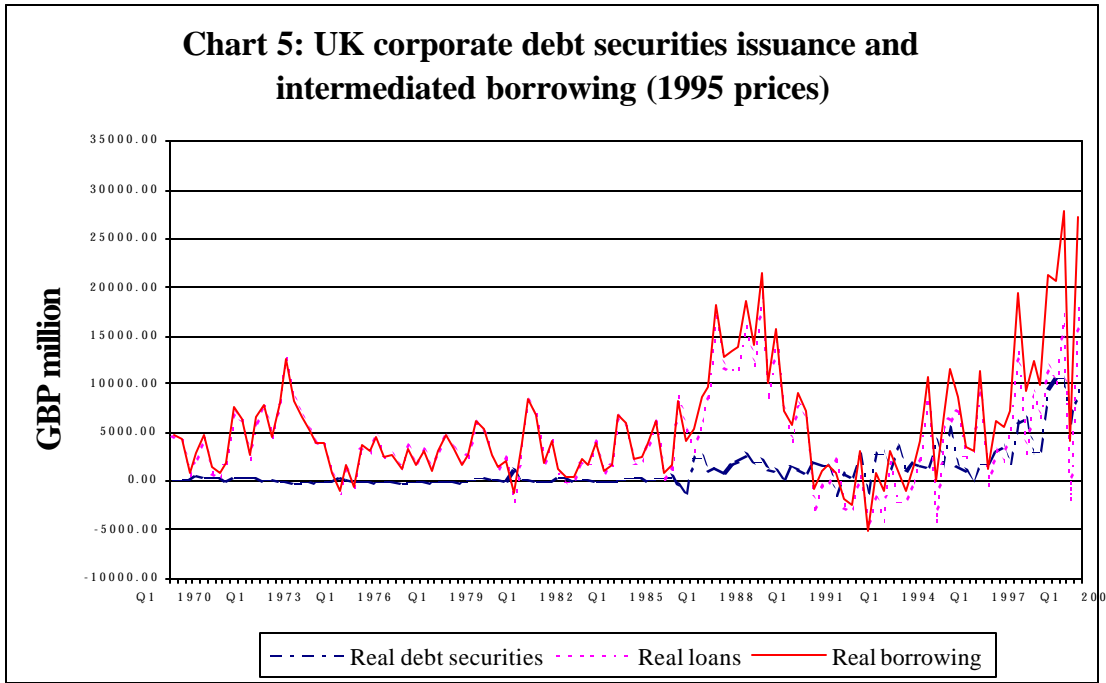Stone M A (2000), "The corporate sector dynamics of systemic financial crises", IMF Working Paper No WP/00/114

**Chart 1: US corporate debt securities issuance and
intermediated borrowing (1995 prices)**

Chart 2: Shares of US corporate borrowing
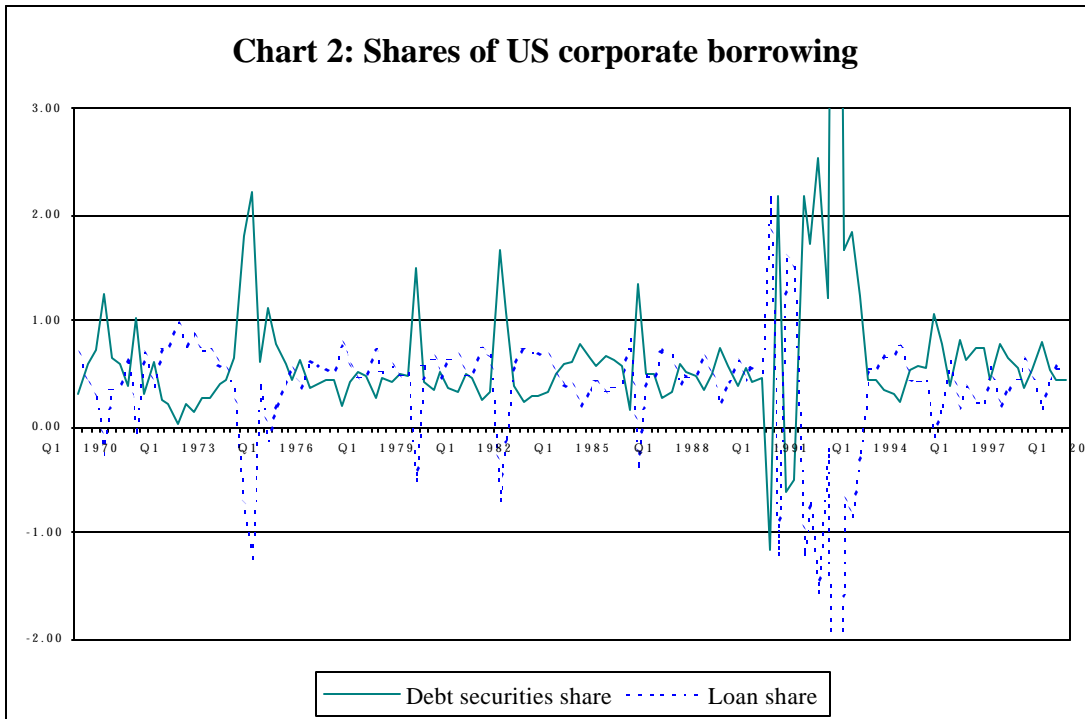
## Chart 3: Japanese real securities issuance and borrowing
(1995 prices)
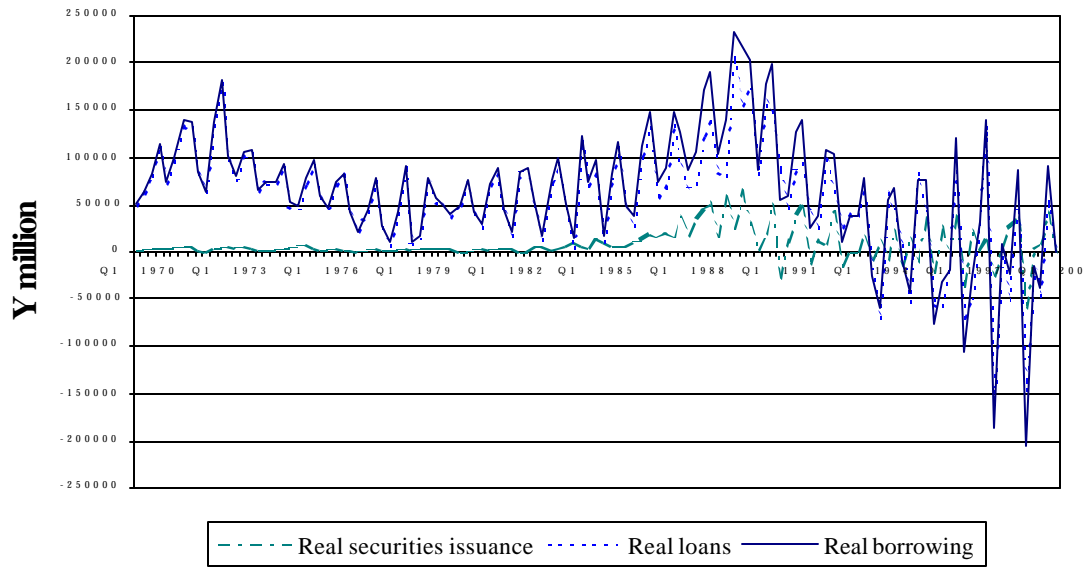
Chart 4: Shares of Japanese corporate borrowing

**Chart 5: UK corporate debt securities issuance and
intermediated borrowing (1995 prices)**

Legend: — · — Real debt securities   ······· Real loans   —— Real borrowing

Chart 6: Shares of UK corporate borrowing

Legend: —— Debt securities share   ······ Loan share

Chart 7: Canadian corporate debt securities issuance and intermediated borrowing (1995 prices)

C$ million

| | | | | | | | | | | | |
|100000| | | | | | | | | | | |

Real debt securities · Real loans —— Real borrowing
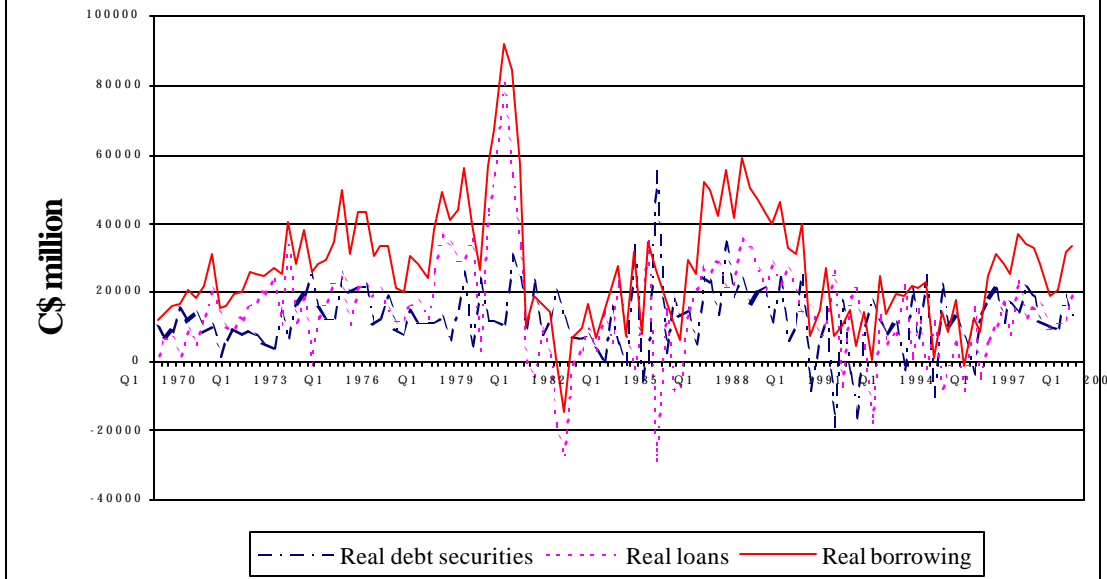
Chart 8: Shares of Canadian corporate borrowing

—— Debt securities share ····· Loan share
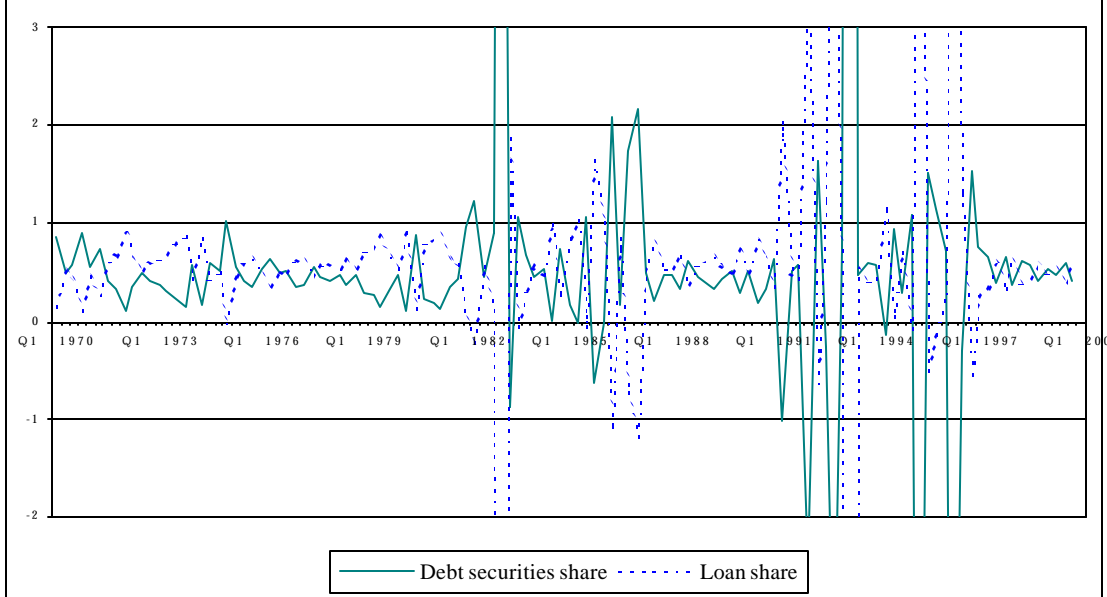
Chart 9: US high-yield bond issuance (1995 prices)