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**RISING SECTORAL DEBT/INCOME
RATIOS:
A CAUSE FOR CONCERN?**

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RISING SECTORAL DEBT/INCOME RATIOS: A CAUSE FOR CONCERN?

Abstract

Rising debt in relation to income of both the private and public sectors has been of increasing concern to the authorities of several of the major economies in recent years. For example, the ratio of the non-financial sector's gross debt to GNP in the United States rose sharply from around 1.5 in 1981 to approaching 1.8 at the end of 1985. Concern over the consequences of this increase in terms of financial instability has been expressed, *inter alia*, by Volcker (1986). In other major countries, too, rising debt of the household, corporate or public sectors has often been seen as a problem by the authorities in recent years, for example household sector debt in the United Kingdom and public sector debt in Japan. This paper seeks to analyse the implications of the growth of debt for the stability of the non-financial sectors, and hence indirectly for the financial system. We first offer a broad view of theoretical issues relating debt to stability as well as an overview of historical patterns in sectoral debt and related variables, before narrowing the focus to a direct test of the role of debt in risk pricing and default.

It is concluded from the empirical evidence and from economic theory that under certain conditions rising debt/income ratios may indeed be a cause for concern. In the case of the private sector such

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concern arises from increased risk of default, in the public sector from higher interest rates and the need for higher taxes. These conclusions contradict an important strand of economic theory which argues that methods of finance for the company and public sectors are irrelevant to real economic behaviour. It is suggested that these theories make excessively strong assumptions regarding market efficiency and the rationality of agents. We also reject the view often expressed in the literature that, even if bankruptcy may arise from debt issue, it has no real consequences for the economy but merely redistributes wealth. This view appears to underestimate direct costs of bankruptcy as well as ignoring important external effects on the real economy and the financial system that may arise if the rate of default reaches a critical level.

Nevertheless, it is found that economic theory does offer important insights into the conditions required for debt to lead to economic instability. Most importantly, it shows – for a given level of debt – that the extent to which potential default is realised depends on the behaviour of the other components of the sector's budget constraint, notably income, value of assets and real and nominal interest rates.

Theory also suggests indicators of the current likelihood of widespread default, which may be used to test for the strength and significance of effects of rising debt. One may distinguish between rising debt in a free market equilibrium and disequilibrium increases in debt caused by the loosening of rationing constraints. In the former case, the spread between the interest rate on private debt and a riskless rate provides, in principle, a measure of the market's perception of the riskiness of lending. However, the mechanism may not operate when interest rates do not clear the market; for example, where risk is not easily observable to lenders or interest rates are fixed at non-market-clearing levels by regulation. In such cases changes in default probabilities following rising debt can often only be observed by examination of actual defaults rather than interest rate spreads. The rationing case may have been of particular relevance to household credit until recent years, when a decline in

credit rationing has been an important cause of rising household debt.

Graphical analysis of the relationships between debt, income, default, spreads, asset values and interest rate levels illustrates the validity of these conclusions drawn from economic theory. The insights are further borne out by the econometric results, which suggest that private sector debt/income ratios have indeed been an important determinant of both expected and realised defaults. The results also indicate that the magnitude of the effects of debt on default may be estimated when set in a structural econometric specification which allows for the simultaneous effects of the other influences on financial stability. Meanwhile, preliminary results for public debt suggest that *growing* public sector indebtedness in relation to GNP has tended to increase interest rates, thus increasing pressures on the private sector, though the *level* of the public sector debt in relation to income apparently has no significant effect on interest rates. This implies that concern with the level should mainly be associated with problems of the higher taxation required to pay future debt interest costs.

1. Introduction: concerns of the monetary authorities

Rising sectoral debt/income ratios have been a feature of several of the major economies in recent years, as shown in Table 1.1 below. These developments have, in turn, often aroused concern on the part of the monetary authorities and other observers of the financial system. The reasons for this differ between private and public debt. For the private sector the principal concern is that rising debt/income ratios suggest higher leveraging, i.e. payments of interest and principal outstanding are increasing relative to income or net wealth. Although higher leveraging is not a problem per se, nonetheless, when considered in the context of households' and firms' budget constraints, it implies smaller safety margins if interest

Table 1.1
Sectoral gross debt/GNP ratios, 1975 and 1985²
(in percentages)

		Public sector	Personal sector	Corporate sector
United States	1975	42	49	37
	1985 (1986)	54 (56)	61 (65)	42 (45)
United Kingdom .	1975	64	33	46
	1985	59	51	44
Germany	1975	25	42	63
	1985	43	57	73
Japan	1975	39	33	93
	1985	90	46	102
Canada	1975	77	52	65
	1985	107	51	64

rates should rise, income fall or gross assets decline in value, and hence a greater potential fragility of the financial system.¹ For the public sector concern arises partly from fears that rising public debt will push up interest rates, thus "crowding out" private expenditure and perhaps leading to a higher level of private sector default. Additionally, there is the problem of the increased burden of future

¹ The underlying assumption is that widespread default on debt will have severe adverse consequences for the economy. See the discussion in Section 3(c).

² The sectors were defined so as to maintain comparability between countries as far as possible. The exact sectoral definitions used were as follows: for the United States: public sector: Federal Government plus state and local government; company sector: non-financial corporate business; personal sector: households. For the United Kingdom: public sector: public sector (consolidated); company sector: industrial and commercial companies; personal sector: personal sector. For Germany: public sector: Government (total); company sector: enterprises excluding housing; personal sector: households plus housing sector. For Japan: public sector: central government plus local authorities plus public corporations; company sector: companies; personal sector: personal sector. For Canada: public sector: Federal Government plus provincial and local government, plus non-financial government enterprises (unconsolidated); company sector: non-financial private corporations; personal sector: persons and unincorporated businesses. Obviously some inconsistencies remain; the most serious are the inclusion of unincorporated business in the household/personal sector in the case of the United Kingdom, Japan and Canada, the inclusion of nationalised industries in the company sector in the case of Germany, and the inclusion of construction in the personal sector (including housing) in Germany.

taxes to repay interest and principal, and concerns arising from the relationship between government deficits, capital inflows and external indebtedness.

These concerns have been expressed most comprehensively in the United States, where recent years have seen a growth in public, corporate and household debt in relation to GNP. However, recent statements suggest that other countries share similar worries over aspects of this problem. In order to provide a background to the analysis there now follows an outline of some of these expressed concerns. These pronouncements offer preliminary indications of the causes and possible consequences of rising debt.

Commencing with the United States, increased private sector indebtedness was seen by Volcker (1986) to be caused by the interaction of underlying economic factors (inflation and the tax system) with financial liberalisation (which led to a reduction in credit rationing) and other financial market developments (such as the expansion in the use of floating rate instruments and the growth of secondary markets). Thus, growing debt was encouraged by:

(i) *taxation*, which by allowing deduction of interest payments encourages debt rather than equity finance by firms, and household borrowing. The tax code did not change in this respect (until 1987) so the tax code alone cannot explain the acceleration of borrowing. However, the tax system's interaction with inflation in earlier years may have had an effect on the incentive to issue debt, because during periods of inflation a tax deduction is given for that part of interest which is effectively capital repayment;

(ii) *inflation* in the 1970s encouraged borrowing, especially when inflation exceeded interest rates. In fact inflation directly reduces the debt/income ratio, as only the denominator increases, though some of the benefit to borrowers may be offset by higher interest rates. Although inflation has now declined, it may be that attitudes to debt formed by borrowers during the inflationary period have persisted.

(iii) *floating rate* instruments may support the growth of debt, as there is less risk to the borrower if interest rates decline as inflation

falls. On the other hand, if interest rates increase, the cash flow of variable rate borrowers is harder hit than that of borrowers at fixed rates, perhaps increasing the risk of default;

(iv) the development of *secondary markets* allows lenders to issue more credit than their own reserves and capital would permit, were they both to issue and hold the debt, because debt can be passed on in securitised form to other ultimate holders such as life insurers or pension funds. Markets also facilitate management of risk in the asset and liability portfolios of financial institutions and may reduce the incentive to monitor the loans, if it is assumed that risk may be minimised by appropriate portfolio diversification. Both of these factors may encourage the extension of more and riskier loans;

(v) *other new instruments* (swaps, securitisation, third-party guarantees) have given borrowers access to previously unavailable funds, and may have reduced lenders' perceptions of risk;

(vi) *abolition of interest rate and usury ceilings* permits greater competition for funds and makes quantity-rationing of credit less likely, though at the cost of a greater swing in interest rates over the cycle. It is suggested in Section 3(b) below that some of the other recent financial innovations and deregulations may also have eased credit rationing.

Other US commentators have suggested that a further important cause of rising private debt may be the increasing perception that the Government will not allow major financial institutions or firms to fail. In addition, the prevalence of deposit insurance may reduce pressure on institutions to avoid risky loans arising from fears of withdrawal of deposits should such unsound loans be made. These processes might be characterised as a problem of "moral hazard" resulting from the "socialisation of risk" – a process whereby the (social) insurance of an institution leads to an incentive to increase risk exposure.

Volcker points out that rising aggregate debt/income ratios may in some cases overstate the risk of default. Debts on credit cards, insofar as these are used as a means of payment and accounts are

settled each month, may not represent a burdensome form of debt. The same could be true of growth in trade credits on each side of a firm's balance sheet (i.e. increased intermediation by the non-financial sector), and increased debts caused by demographic shifts (which could arise, for example, if there is a rise in the number of young people wishing to buy houses using mortgage credit). More generally, debt issued to buy capital assets provides at least the means to repay itself. In sharp contrast, debt issued to retire equity, a marked feature of the recent wave of takeovers and leveraged buy-outs, increases interest payment obligations without creating a corresponding asset, apart from potentially better management of existing assets.

Volcker's concerns focus on the fact that while hedging techniques such as floating rate debt appear to have reduced the risk for the lenders by shifting it to the borrowers,³ they have certainly not reduced the risks arising from the business cycle or rising interest rates. Borrowers have nonetheless been willing to accumulate debt, given the favourable circumstances prevailing in recent years (falling interest rates, etc.). In such a context the reduction in risk perceived by lenders may be illusory because borrowers may be unable to cope with their debts in adverse circumstances. The risks might be realised should monetary tightening and higher interest rates be required in the future – falling interest rates may have given agents a false sense of security. The risks may be particularly severe if liberalised financial markets – such as those in the United States – require greater swings in interest rates than in the past in order for the authorities to achieve any given degree of monetary restraint, and if private borrowers have failed to take this into account in their decisions to borrow.

Regarding rising US public sector debt, it is argued that there may be costs arising from the increased foreign capital inflows, the

³ The degree to which risk is passed on in this way or shared between lenders and borrowers via fixed rate contracts is likely to depend on such factors as the relative size or market power of the lender and borrower and the potential importance to the lender of a default by the borrower in question.

counterpart to US trade deficits, combined with the need for future taxation to repay interest and principal. This is particularly the case if inflows of foreign funds have largely financed current expenditure,⁴ which, unlike capital expenditure, does not provide income to repay the debt interest. Of course, there are also the risks that a future government might monetise the deficit, leading to inflation. Fears of this could lead holders to demand higher interest rates, thus increasing the danger of a crowding-out of the private sector from the credit market and hence increasing defaults.

It is to be emphasised that Mr. Volcker's speech is only one among many recent discussions of US debt. For example, Kaufman (1986a and b) adopts an even more pessimistic position regarding the likely outcome of debt growth. On the other hand, Eisner (1986) takes a rather sanguine view of the public debt issue. Friedman (1986) emphasises the asset counterpart to growing debt, which may reduce the dangers of a default crisis. Other economists go further and argue that private credit is of no relevance because the private sector cannot affect its net worth through debt issue (theories of the "irrelevance" of debt are examined in Section 3).

Pronouncements by other countries' authorities suggest that many of the above concerns are shared elsewhere. For example, in Canada the growth of debt issue in the late 1970s and early 1980s by the company and household sectors, largely to finance corporate takeovers and real estate acquisition, was seen by the authorities to have led to over-extended balance sheets and resulted in a sharper recession in Canada during the early 1980s than elsewhere. As late as 1982 (see Bank of Canada (1982), p. 6), the Governor stated that "overly large debt positions acquired in an inflationary climate ... will act as a drag on expansion for some time to come".

In the United Kingdom rapid growth of housing finance since 1980 has given rise to concerns that some personal sector borrowers are overextending themselves in terms of interest obligations, as well

⁴ This is true even if one adjusts for the fact that the US National Accounts do not distinguish between public sector consumption and investment.

as to fears that excess borrowing has led to a liquidity overhang which could leak into consumption. More generally, for financial institutions in the United Kingdom, the Bank of England has urged that "in an environment where credit is allocated by price ... increased competition in a rapidly expanding market produces a greater risk of over-exposure. This could prove potentially destabilising" (General Assessment, Bank of England Quarterly Bulletin, June 1986).

Other European authorities, particularly the Dutch, have faced crises in their mortgage banking sectors. These were due to a cycle of overlending (up to 120 per cent. of a property's valuation) during the inflation of the early 1980s, followed by a stagnation of property prices. The German authorities have often expressed concern regarding the high level of corporate debt in relation to equity, a theme which was echoed by the Bank of England when it opposed a recent takeover⁵ because it would have led to high gearing. Germany and Japan share a concern regarding the consequences of the growth of public debt in relation to GNP both in the last ten years and as projected to result from the increased proportion of pensioners in the population in the coming decades.

Finally, the recent Cross Report on Financial Innovation (Bank for International Settlements (1986a)), prepared by a study group established by the central banks of the Group of Ten countries, suggested that many financial innovations may be "credit generating" (i.e. they enable more credit to be issued than would be possible using traditional instruments) (pp. 177-8), and some may entail an underpricing of risk.

This paper analyses the relationship between debt/income ratios and economic and financial stability. After presenting historical data on debt/income ratios in Section 2, we examine in Section 3 the predictions of economic theory regarding the consequences of growing debt. These predictions lead on to further graphical analysis in Section 4 of the relationships between debt, default, assets,

⁵ The proposed takeover of Allied-Lyons by Elders.

income and interest rates. The graphs offer support for some of the hypotheses put forward by theory, and also provide a background for a more rigorous econometric test of the debt/default relationship in Section 5. The focus throughout is on the existence of a debt/default relationship rather than on suggestions for a policy regarding debt or on estimation of the relationship between default and financial instability. However, in the conclusion some reflections regarding policy are offered (is debt a micro-economic or macro-economic problem? should debt issue be curbed? how can financial markets best be protected from the consequences of increased default?) as well as a summary of the main conclusion, namely that a measurable relationship does exist between rising debt/income ratios and defaults.

2. Debt/income ratios, 1966–85

As a first stage in the analysis, we present the data for the non-financial sectors' gross debt/income ratios which underly the concerns summarised above. The data reveal that the United States has until recently shown an exceptional stability both in its aggregate non-financial debt ratio (public plus private) and in the debt ratios of the individual sectors. Other countries' aggregate debt ratios have been far more unstable, and in the cases of Germany and Japan have grown considerably over the relevant period. The implications of this difference for the link between debt ratios and instability are examined below.

Before discussing in detail the long-run changes in these ratios, one may note the most striking features of debt growth in the countries concerned during the last few years. These are: a rapid growth of personal sector debt in relation to GNP in the United Kingdom and the United States, growing corporate debt in the United States, Japan and Germany, and growing public sector debt in the United States and Canada. Looking a little further back, there

was the extraordinary growth of Japanese public sector debt from 39 per cent. of GNP in 1975 to 90 per cent. in 1985. Apart from the increases in corporate debt in Japan and Germany, which are the normal concomitant of rapid economic growth, all of these examples are rather atypical of past behaviour. They form the subject of many of the authorities' concerns summarised above. It should be noted that growth of debt has also been strong in many other countries, for example public sector debt in Italy and Belgium and household sector debt in the Netherlands.

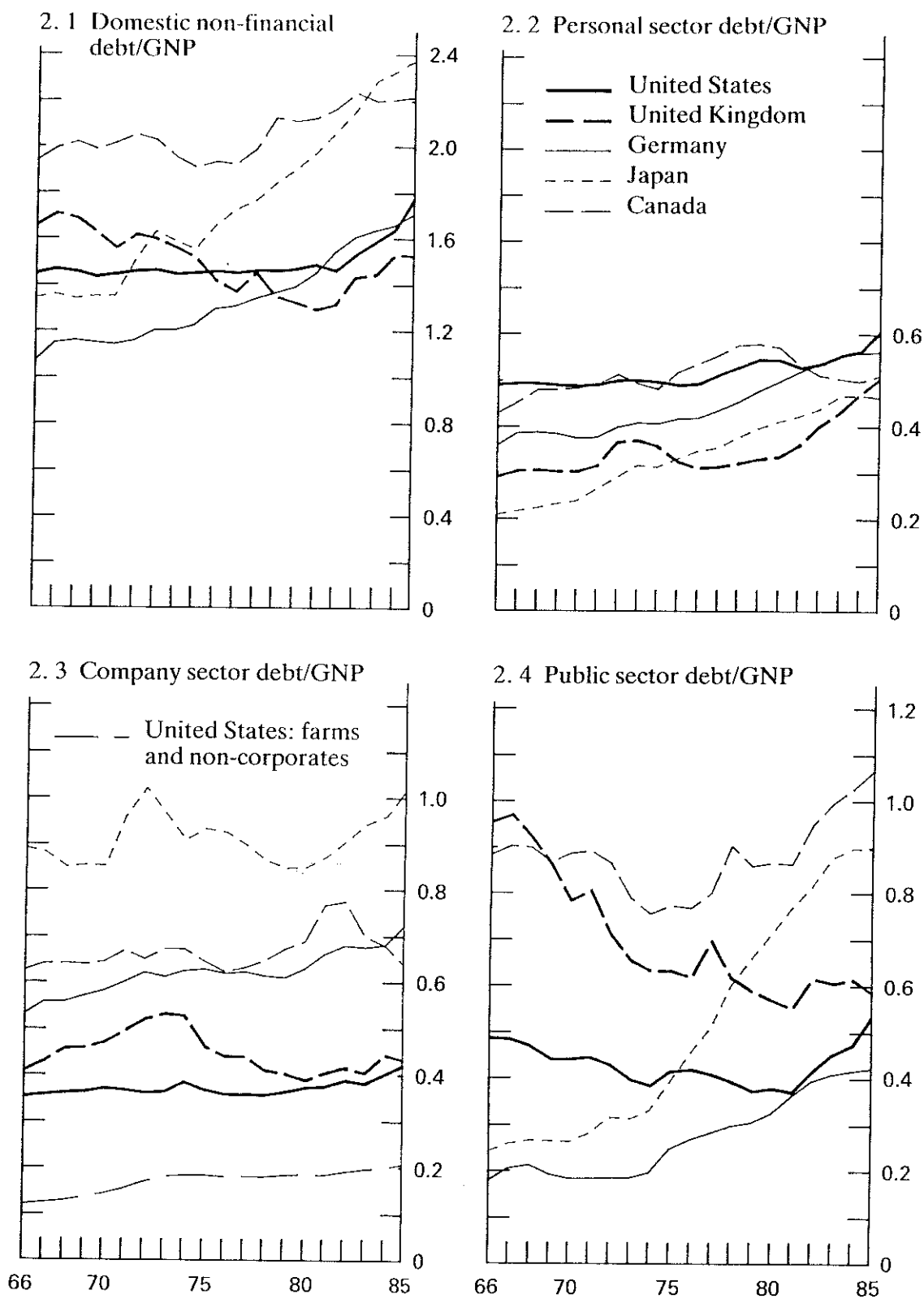
Graphs 2.1 to 2.9, from Davis (1986), show the debt ratio and its sectoral⁶ components for the United States, the United Kingdom, Germany, Japan and Canada. Trade credits are excluded; debt is measured at book value except in the United Kingdom, where only market values are available.⁷ The recent growth in the US total debt ratio is apparent from Graphs 2.1 and 2.5. However, the ratio has grown to a far greater extent in Japan and Germany, while in the United Kingdom it has also shown a rapid growth since 1980 and in Canada it did so in 1975–82. The United States is thus not atypical in its recent experience with the growth of public and private debt. In Japan and Canada a much higher level of total debt has been reached, of over twice annual GNP, while for the other countries the ratios in 1985 were all between 1.5 and 1.7.

Graphs 2.2 to 2.9 reveal the underlying sectoral components of the aggregate debt ratios for each country in turn. The United States is shown to have had a stable aggregate debt ratio as a result – at least until 1981 – of particularly stable sectoral debt ratios. Such trends as are observable over the period 1966–81 are a roughly

⁶ We note that these data do not indicate the proportion of debt which is long or short-term, or fixed or variable rate, swapped, etc. These distinctions can have important economic implications; for example, holders of short-term or variable rate debt are more vulnerable to changes in market interest rates than are holders of long-term fixed rate debt. Evidence suggests that the fall in interest rates in recent years has led firms, particularly in the United States, to switch to long-term debt.

⁷ It may be noted that market values of long-term fixed rate debt may have an economic importance independent of book values, for example, when a firm buys back its debt in the market below book value in order to carry out restructuring of the balance sheet. See Peek (1986).

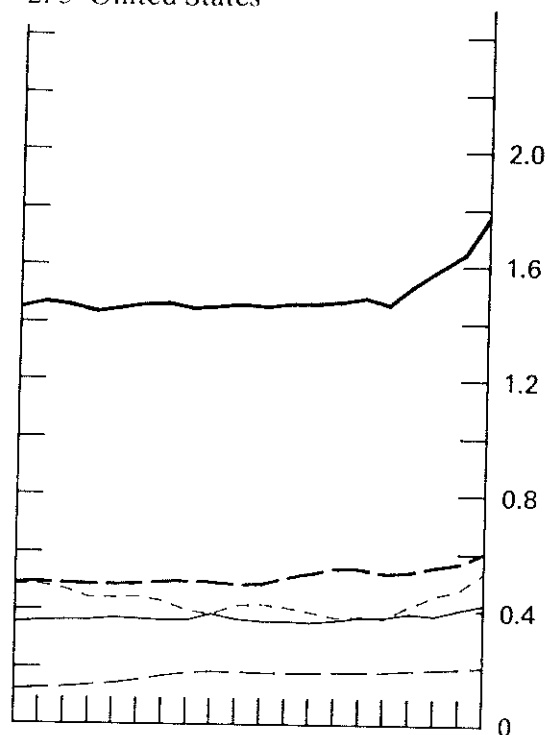
Debt/GNP ratios by sector



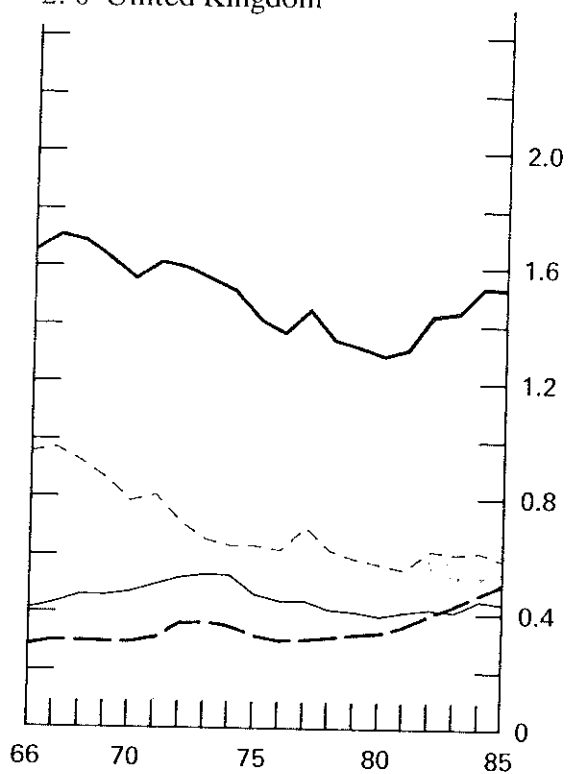
Debt/GNP ratios by country

— Total
 - - Personal
 — Company
 - - - Public
 — Farms and non-corporate business

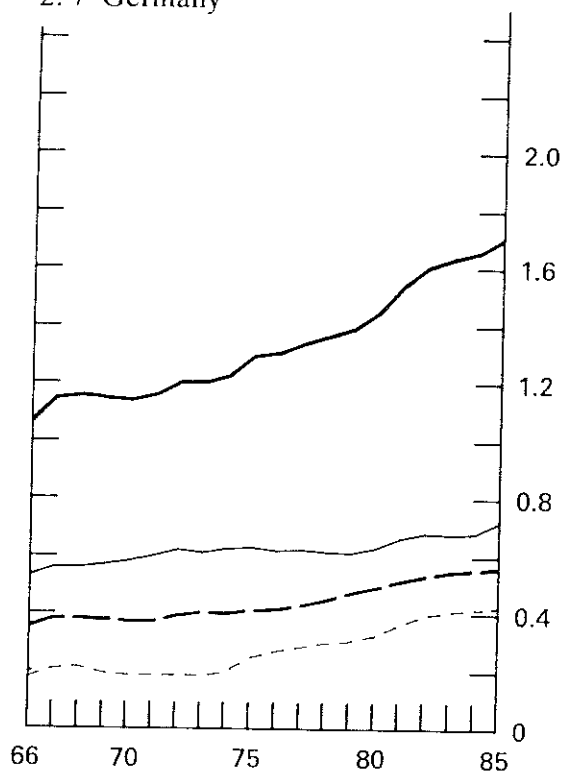
2.5 United States



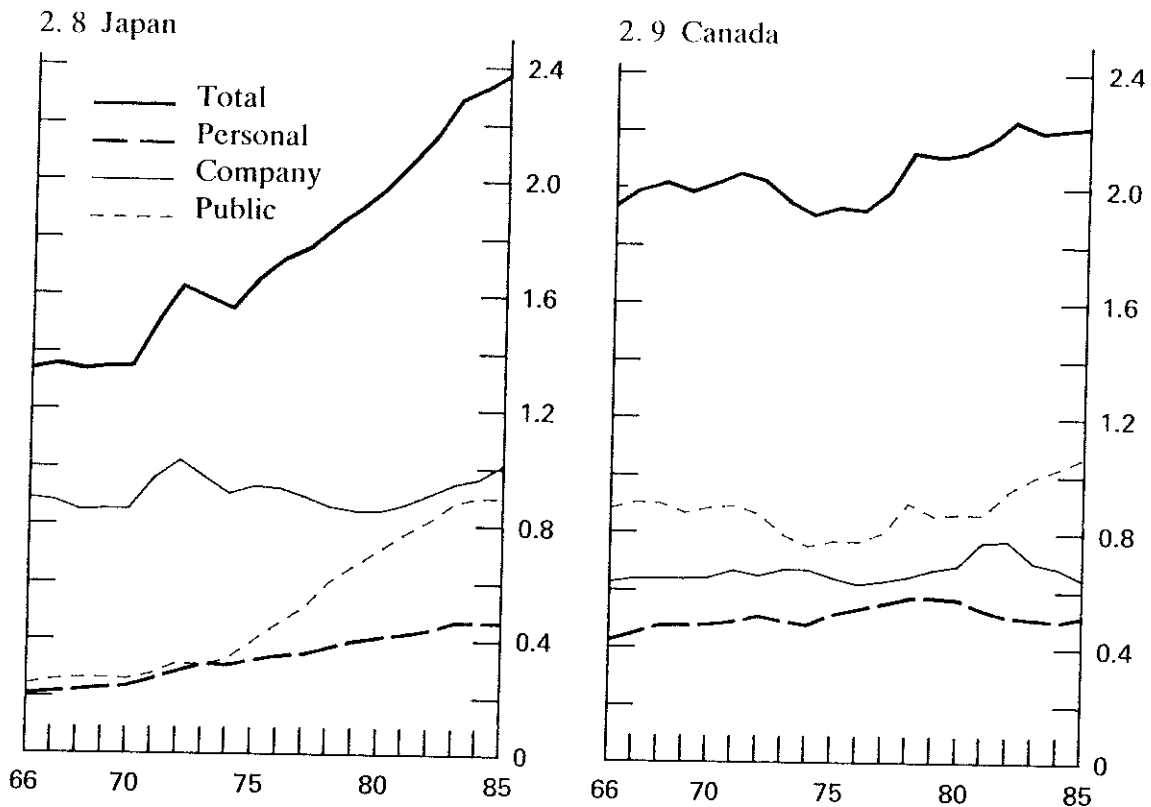
2.6 United Kingdom



2.7 Germany



(continued)



continuous increase for the personal sector, offset by a decline over most of the period in the public sector debt ratio, and also during the 1970s in the company sector.⁸ Since 1981 the patterns have changed – personal and public debt/GNP ratios have grown, which, combined with a weaker increase for the company and non-corporate business sectors, has given rise to the observed increase in the *aggregate* ratio.

The experiences of other countries differ widely from those of the United States. In particular, their debt ratios have been considerably *less* stable. Thus in the United Kingdom the aggregate debt ratio declined over the period 1966–80, principally owing to a continuously declining public sector debt ratio, though aided by the slow growth of company sector debt since 1974. Like the United

⁸ Friedman (1982, 1984) discussed some equilibrating mechanisms that may have been responsible for these patterns.

States and Canada, the United Kingdom accumulated much public sector debt during the Second World War. Unlike that of Japan and Germany, this debt was not dissipated (by inflation or currency reform) in the immediate aftermath of the war. The declining public debt/GNP ratio reveals the gradual unwinding of public debt incurred during the war, aided by relatively small government deficits in relation to GNP for much of the post-war period and by higher inflation over the last twenty years than in the other countries. The company sector has accumulated fewer liabilities since the mid-1970s owing to declining real growth and low rates of return on fixed investment. Meanwhile the personal sector has been increasing its debt ratio since the mid-1970s. Initially this occurred despite inflation's erosion of the real value of the outstanding stock, but the trend became even more pronounced after 1980, when inflation declined. The ratio rose from 30 per cent. of GNP in 1980 to 50 per cent. in 1985. Over the earlier period credit was cheap as a result of low real interest rates (see Graph 4.4), while more recently the removal of controls and credit rationing has encouraged borrowing. It is largely the personal sector's debt which underlies the recent growth in the aggregate debt ratio.

In Canada the aggregate debt ratio rose rapidly after 1975, before growth slackened in 1982. This pattern was largely a consequence of large and continuing public sector deficits, although after 1982 this has been offset by a decline in the company and household sectors' demands for credit.⁹ The Canadian company sector accumulated large amounts of debt in 1978-82, partly as a result of the expansion of economic activity in the West, based on energy production, and partly as a result of the buy-outs of foreign firms (effectively substitution of debt for equity) after the "National Energy Program" was implemented in 1981. Both of these incentives to issue debt were compounded by assumptions of continuing

⁹ It should be noted that some of the public sector debt resulted from investment by nationalised industries and would thus not be included in "general government debt". This is also true of the United Kingdom and Japan.

inflation, and more recently by “distress borrowing”¹⁰ to avoid default (as is seen in Section 4, Graph 4.10, debt expansion led to a sizable increase in income gearing and bankruptcies as inflation fell). A similar but more muted pattern of sharply rising debt followed by distress and retrenchment for households led them, too, to reduce debt in relation to GNP in the early 1980s. These patterns may be in line with the concerns expressed in other countries.

Germany and Japan both show growing aggregate debt ratios, reflecting growth in every sector’s debt relative to GNP, though the main contrast with the Anglo-Saxon countries lies in the behaviour of the public sector. These countries ended the war with their public debts effectively written off, and thus public sector deficits over the post-war period have tended to raise the debt ratio. This rise in debt ratios in Germany and Japan has tended to accelerate recently, owing to low inflation and high budget deficits. This is particularly the case for Japan, where the public sector accounts for most of the growth in the aggregate debt ratio since 1974. The personal sector in both countries has experienced a steady growth in its debt ratio, as in the Anglo-Saxon countries. The debt of the Japanese company sector shows a somewhat irregular pattern relative to its German counterpart, but has remained far higher in relation to GNP.¹¹

Several general comments may be made regarding these patterns; firstly, the contrast between the US and other economies may result from the fact that until recently the size of external trade vis-à-vis GNP was so small in the United States that it could be characterised as “closed”. This would mean that a domestic equilibrium of supply and demand for “loanable funds” would obtain, expansion of debt being limited by the domestic supply of loanable funds, which in turn grows in line with GNP. In support of this suggestion it may be noted that in recent years increased

¹⁰ Macro-economic data cannot, of course, distinguish “distress borrowing” from debt resulting from other motives.

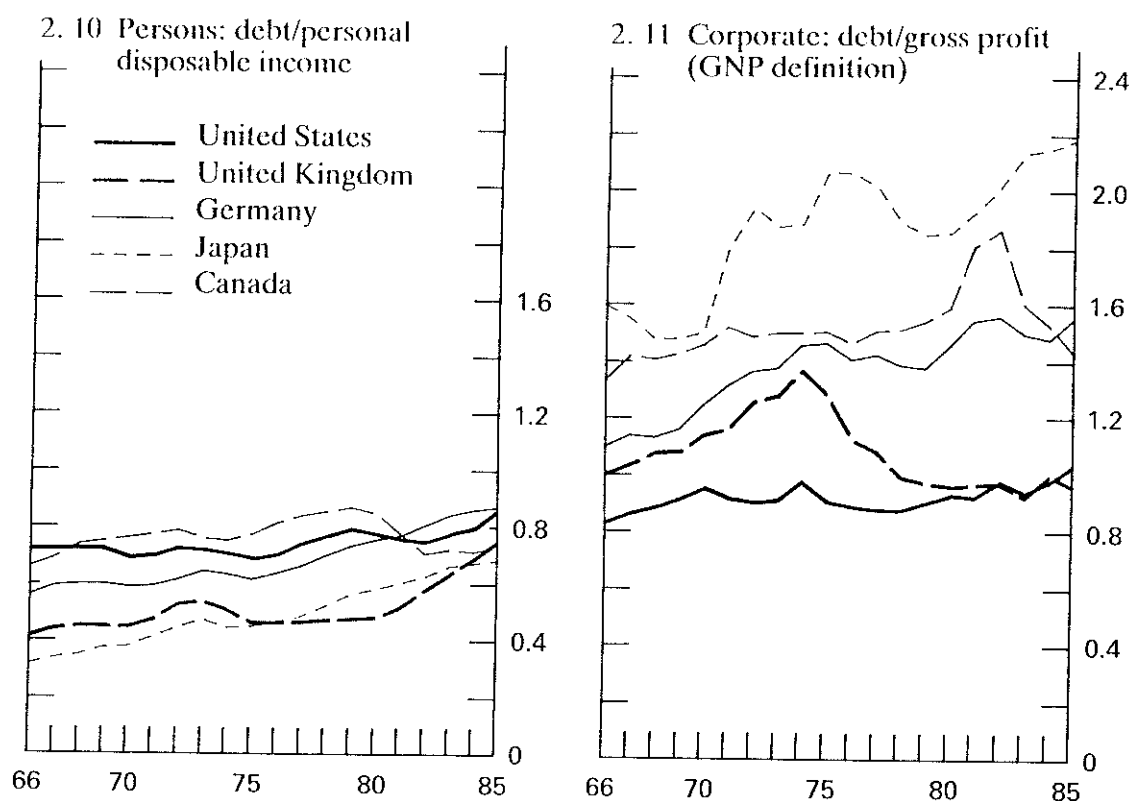
¹¹ This may be a result of the “compensating balance” system for bank loans and traditionally higher debt/equity ratios.

openness has given access to supplies of saving abroad, and this has coincided with the instability of debt ratios. Other countries were not "closed" to the same extent over the historical period shown, which may help to explain the relative instability of debt ratios. Secondly, the fact that debt ratios in other countries have grown, while the financial systems in those countries are not obviously any less stable than that in the United States, suggests that growth of the debt ratio alone will not necessarily lead to instability, especially if there are offsetting factors such as parallel growth in asset values, as illustrated in Sections 4 and 5. It may, at least, be necessary to distinguish trend growth from *abnormal* growth, where there is an underlying change of behaviour, release of constraints on borrowers and lenders or a deterioration in other financial conditions. Recent growth in the US and UK ratios and the experience of Canada in 1980–82 may indicate just such abnormal growth.

Thirdly, it should be noted that the implication of a given debt/income ratio for stability may depend on the proportion of debt which bears variable interest rates, the proportion which is short-term and the current instability of interest rates. For many countries these factors have tended to worsen in recent years. Fourthly, however, the role of the financial markets and private debt in the growth of total debt should not be exaggerated. The graphs also suggest that the major force underlying changing debt ratios in most countries has been the public sector, which entails a different set of concerns.

The debt/GNP ratio may also not give an accurate representation of a sector's position if the income distribution changes. Graphs 2.10 and 2.11 show sectoral debt for persons and companies deflated by personal disposable income and profits respectively. Comparison with Graphs 2.2 and 2.3 in fact reveals relatively minor differences in patterns, except to some extent in Japan, where the flatter personal and steeper company traces in Graphs 2.10 and 2.11 reveal the shift from profits to wages that has come about since the 1960s. This similarity is taken as justification for concentrating largely on GNP as a denominator in the empirical work below.

Sectoral debt/income ratios



Having shown the historical changes in sectoral debt ratios, we now examine some economic theory for predictions of the causes and likely consequences of recent patterns of debt accumulation.

3. Is increased debt a problem? A theoretical analysis

In this section economic theory is examined in a selective manner for an explanation of the causes, and prediction of the consequences, of rising sectoral debt. Aspects of the theory of the supply of debt, bankruptcy and the demand for debt by each non-financial domestic sector in turn are covered.¹² Analysis of the economic theory of debt in the light of the patterns and concerns discussed above offers the following key insights.

Firstly, the assumptions of perfect capital markets and fully rational individuals, as detailed below, would lead one to conclude that rising debt has no effect either on the corporate cost of capital or on GNP via fiscal policy. However, it is suggested that the required conditions are too stringent to be met in the real world; hence rising debt may have real effects. Fiscal deficits may raise the level of output in the short term in a situation of under-employment and/or raise interest rates. Corporate debt may lead to a rising cost of capital and eventually to an increased risk of default. Household indebtedness may equally increase vulnerability to bankruptcy.

Secondly, the extent to which the risk of default is realised for a given level of debt depends on the behaviour of the other components of a sector's budget constraint, notably income, the value of assets and real and nominal interest rates.

Thirdly, in a free market the interest rate on private debt relative to a risk-free rate provides a measure of the market's perception of the riskiness of lending.¹³ However, the theory of credit rationing suggests that the mechanism may only operate, for example, where risk is easily observable to lenders and when interest rates are not fixed at non-market-clearing levels. When these conditions do not hold, interest rates may not indicate the degree of default risk, which in such cases can only be observed directly via realised defaults.¹⁴

These considerations, which arise for each sector in different ways, provide theoretical support for concerns regarding debt ratios

¹² It should be noted that an analysis such as is presented here, largely based on the "efficient markets hypothesis" (i.e. that all currently available information is reflected in the prices of assets and liabilities in financial markets), would not be accepted by all commentators. In particular there appears to be accumulating evidence of the lack of market efficiency in such markets as those for foreign exchange.

¹³ To the extent that this risk is *non-diversifiable* in the sense of modern portfolio theory, as discussed on page 26, i.e. it cannot be removed by holding a diversified portfolio of assets.

¹⁴ It is suggested in Section 4 that credit rationing for the household sector in several countries obscured the relationship between spreads and risk in this way until recent years. This also accounts for the failure of some of the econometric tests in Section 5. It is emphasised that more recently a decline in credit rationing has led to the re-establishment of a more normal spread-risk relationship, as well as being an important cause in itself of the growth of debt.

as well as testable propositions regarding the relationship between debt and stability, which are developed in Section 5 into an econometric specification.

We first analyse the demand for, and supply of, debt in general as well as the nature of bankruptcy before focusing on the implications of growing debt for the individual sectors. (Considerations differ for the various sectors as they vary in their objectives and means of finance.) The following simplified matrix may be used to structure the discussion.

Balance-sheet components and income sources of the domestic sectors

	Assets	Income	Debt	Other liabilities
Government	–	Taxes	Bonds	Money ¹⁵
Non-financial companies	Capital, liquidity	Profits, interest	Bonds, loans	Equity
Households	Housing, debt claims, equity claims	Wages, interest, dividends	Loans, mortgages	–
Memo: financial companies	Loans	Net interest, fees	Deposits, bonds	Equity

(a) Issue of debt: general comments

Debt is generally incurred by an agent in order to finance current or capital expenditures that is not financed by the current stream of income. A pledge is made to repay the interest and principal from future income.¹⁶ In the case of fixed rate debt the nominal income forgone is known, while with variable rate debt it is uncertain. There is an important difference between finance of consumption and

¹⁵ In some countries constitutional or legal provisions restrict the ability of governments to finance themselves by money creation.

¹⁶ However, in practice the principal is often rolled over at the end of the contract. Such a process takes the additional risk that interest rates may be high or credit unobtainable when rollover becomes necessary.

investment,¹⁷ as the latter usually provides the income to repay the loan, while repayment of the former implies forgoing some future expenditure, i.e. consumption is shifted over time.

Many debt contracts require collateral, which must generally come from the assets of the agent incurring debt.¹⁸ These assets may vary in their liquidity, likelihood of valuation losses, etc.; hence their assessment is an important task for the lender. To the extent that collateral retains its value, financial difficulties of a borrower need not also affect the lender. By contrast, declines in the value of collateral, as in the recent case of North American farmland, can be an important component of financial difficulties of both borrowers and lenders. A decline in the value of collateral is, of course, most likely during a financial crisis when many borrowers wish to liquidate their assets at the same time. Not all assets may be used as explicit collateral, as a result of legal or physical constraints, for example households' pension rights and human wealth. Finally it should be noted that some classes of borrowers have available sources of funds other than debt (money, equity, etc.). In such cases somewhat different considerations are required than are applicable to those for whom debt is the only possible liability.

The borrower may be expected to weigh the costs of debt, viz. the cost of forgone future consumption or net income, the cost of possible loss of assets and the relative costs of alternative finance, against the benefit of the current or capital expenditure to be financed. These considerations suggest that demand for debt is likely to rise as the interest rate declines and the cost of alternative finance (equity) increases. It will also increase if any non-price rationing is eased, or, if borrowing is limited by availability of collateral, as the valuation of collateral assets increases. Finally, it will increase should costs of default fall (as occurred with the changed US bankruptcy law of 1978).

¹⁷ Residential investment is intermediate; it does not provide income directly, but does release a household from the obligation to pay rent.

¹⁸ An exception is when another agent makes a guarantee. However, *sectoral* wealth is then still relevant.

(b) The supply of credit, portfolio theory and the determination of spreads

This section analyses the determinants of market interest rates on debt in cases where the risk of default on debt may be assessed fairly easily (for example, for large firms), and shows why in other cases factors such as controls on interest rates or the inability of the lender to assess risk (for households and small firms) may lead to rationing of credit by quantity rather than by price. (We define “rationing” as a situation where among loan applicants who appear to be identical some receive a loan and some do not.)

The analysis offers the following key insights into the relationship between debt and financial stability: firstly, in a free market without rationing the spread of the interest rate on a private sector debt instrument over a risk-free rate reflects the market’s perception of default risk. This offers a complementary hypothesis to test alongside the basic hypothesis of this paper that higher debt leads to the likelihood of increased defaults; one can test for a causal relationship between debt and spreads. However, if rationing obtains, one would not expect spreads to be a good indicator of risk, so the debt/default relationship can only be tested directly. Secondly, the default risk is conditioned not merely by debt and income but also by assets in the balance sheet and macro-economic variables such as the trade cycle, the level of interest rates and prices of factors of production. Thirdly, credit markets for households and small firms have often been characterised by non-price rationing of credit, a mechanism for which strong economic justifications may be adduced. This analysis implies in turn that increased issue of debt to households and small firms is likely to result from a reduction in credit rationing. Various reasons are suggested as to why this may have occurred in recent years.

Debt must be held by another agent as an asset. Portfolio theory suggests that the return demanded by that agent will depend on the risk and the expected return on the asset. For example, an unsecured consumer loan will command a higher rate of interest than a Treasury bill of the same maturity owing to its relative risk

characteristics. A consumer may default on interest and principal, while the government can keep its promises via its power to tax and print money.¹⁹

These considerations may be formalised into a theory of the structure of interest rates (as summarised in Robinson and Wrightsman (1980)). The spread between the yield on a private issue of debt and a risk-free public bond in the same national market depends on six factors: the risk of default as discussed above, the call risk that bonds (or loans) may be liquidated early at a possibly inconvenient time for the lender; tax exemption status; the term or period to maturity; any screening costs; and market liquidity. In the current analysis the major focus is on default risk, because bankruptcy or default is often the main focus of the monetary authorities' concern. However, it is important to bear the other factors in mind because observed changes in spreads may arise from any of them.

Default risk refers to the possibility of not collecting interest and principal as promised in the debt contract, even if a loan is collateralised.²⁰ The lender receives a higher expected return to compensate for the extra risk. An indicator of the market's assessment of default risk is the differential between the yield on a private bond and public bond of the same maturity, callability and tax features.

The overall default risk on a debt instrument varies with the risk position of the borrower and the economic environment. The risk position of the borrower is obviously conditioned by the ability to generate enough cash flow to cover interest and principal (the coverage ratio, or its inverse, income gearing), the variability of cash flow and the availability of liquidity or other assets to repay the debt.

¹⁹ Even government debt is not free of the risk of monetisation via inflation, and, for foreign holders, of the additional risk of exchange rate changes.

²⁰ One may distinguish illiquidity risk – that the collateral may cover the value of the loan, but be hard to sell – and insolvency risk – that owing to changing relative prices the collateral no longer covers the value of the principal. Many of the recent worries concerning rising debt concentrate on this aspect.

There may also be changes in the incentive to default, which may arise from changes in the bankruptcy law.

Traditional theory suggests that for an individual agent default risk may be broken down into three elements. Firstly, the risk position varies “internally” with the ratio of debt to equity for firms (there is no contractual obligation to pay equity holders) and for households with the ratio of debt to income. These ratios are choice variables arising from the budget constraint. Secondly, “business risk” is defined to depend largely on the type of business the agent is in and is thus partly beyond his control. Thirdly, default risk for all firms depends on the state of the economic cycle and other macro-economic variables such as interest rates and factor prices; most defaults occur during recessions.

In the sense of modern portfolio theory, the first two types of risk may be characterised as *diversifiable* by the holder (see Malkiel (1985) for a non-technical discussion), as they can in principle be minimised by holding a diversified portfolio of bonds or loans. These types of risk should be reflected in the mark-up of a firm’s securities in relation to the market return, to an extent dependent on the covariance of such risks with corresponding risks for other firms. On the other hand, risks that affect the aggregate economy are *non-diversifiable* by the holder and should be reflected in the spread of corporate debt yields over the risk-free yield offered by government bonds.

Studies confirm these insights. For example, coverage, earnings variability and other measures of capital structure have been shown empirically to influence relative market default risk premia between firms (see Hickman (1958)). In the case of bonds these risk elements may be assessed by bond rating agencies; for loans it is the responsibility of the bank or other financial institution. As an example of magnitudes, the average differential between BAA and AAA bonds in the United States was about 50 basis points in the 1960s, 100 in the 1970s and 150 in the 1980s. This may partly reflect changes in the perceived quality of the obligations. As suggested, average default risk premia also vary over the cycle; the premium

widens during recessions for all firms, but especially for lower rated bonds, which are more vulnerable to default (see Jaffee (1975)). One might expect default premia to fall during periods of intense competition between financial markets and institutions when lenders offer ever-finer terms on loans in order to gain market share. If this is anything more than a temporary phenomenon, and it is not accompanied by a significant fall in realised defaults, then accurate pricing of risk may be eroded, a process which may lead to increased vulnerability of financial institutions. The graphs in Section 4 below suggest that this may also be the case now. A further factor may be “socialisation” of risks. If it is assumed that the central bank or government will rescue certain debtors via bailouts (or monetisation), the perceived risk of lending may decline.

Default risk premia are, of course, *ex ante* concepts reflecting the market’s judgement of the probability of future defaults. Although it would be a cause for concern if risk pricing were totally inaccurate, it should not be a surprise that there are discrepancies between spreads and *ex post* bankruptcy experience, which reflect, obviously, a lack of perfect foresight.²¹ Studies do indeed suggest that prediction of bankruptcy by observed spreads is rather inaccurate. For example, Fons (1986) suggested that risk was being overpriced in US corporate bonds in the 1980s, though the risk premium did track the *sign* of the change in defaults. Research to date has suggested that prediction of default may be best carried out by fundamental ratio or discriminant analysis (see Altman (1968) and the quotation reproduced on page 42). Obviously, such key ratios may include the debt/income and debt/equity ratios.

Risk pricing may, of course, be inaccurate in a more fundamental sense in the case of an unanticipated shock to the system, such as disinflation and the associated changes in relative prices since 1980.

²¹ This is even more true for bond ratings, which are only intended to measure the internal financial strength of the firm at the time of issue. Even at the time of issue, firms may find it costly to improve their rating, for example, because of the high liquidity demanded.

It can be argued that this shock underlies both the LDC debt crisis (via falling commodity prices) and the farm debt crisis in the advanced countries (due to changing relative prices of commodities and land vis-à-vis other goods). Recent experience has shown that such inaccurate ex post risk pricing, where realised defaults far exceed those which were anticipated, may lead financial institutions into severe difficulties. Some would go further and suggest that quantity-rationing of credit (as discussed below), with some potential borrowers being refused credit on any terms, was the approach that institutions should have adopted.

The above description of the determination of free market interest rates offers several insights into the relationship between debt and stability. They indicate that, given the qualifications noted above, the spread is a function of the ex ante probability of default, and that ex post bankruptcies have often followed excessive debt accumulation. As is seen in Section 4, this analysis can be used to interpret many aspects of the recent growth in debt, particularly for companies. However, other aspects of the supply of credit may also be important when analysing the supply of credit to the public and household sectors.

Firstly, the portfolio analysis discussed so far has implicitly assumed that a borrowing sector faces an infinitely elastic supply of credit for a given level of risk. In fact any sector that increases its borrowing may eventually face higher interest rates regardless of risk. Two mechanisms come into play. A rational asset holder is likely to hold a diversified portfolio of assets which maximises return for a given level of risk. Holding a diversified portfolio rather than a single asset helps to reduce risk to the extent that the returns on the various assets are imperfectly or, ideally, negatively correlated. Thus, when a sector increases its borrowing it needs to offer a greater return to offset the increased risk to asset holders from holding a less diversified portfolio. One example is an investment institution such as a pension fund, which will demand higher returns when constrained to hold a larger proportion of its portfolio in any one asset, such as government bonds. However, there are also

elements of this mechanism in the case of money held by households which may not be reduced beyond a certain minimum for transactions purposes, whatever the returns offered by other assets. Similarly banks may face constraints on the proportion of their assets lent to a particular sector, either for legal or prudential reasons (implicitly the authorities prevent the banks from pursuing return at the expense of risk beyond a certain point). Eventually a second factor also comes into operation, when a sector's demand for credit drives up interest rates across the board. In a closed economy this leads to the crowding-out of other sectors; in an open economy it may also lead to an inflow of funds from abroad. These mechanisms may be of particular importance to the supply of funds to the public sector.

Secondly, in some cases the normal market equilibrium of supply equalling demand at a market-clearing price may not operate. There may be rationing of credit at a non-market-clearing price with excess demand (or supply) of loanable funds, in the sense that among loan applicants who appear to be identical some receive a loan and others do not. A brief survey of credit rationing paradigms is essential in the context of this paper for several reasons. Firstly, it facilitates an assessment of the causes and consequences of the recent growth of household debt, which has been viewed as partly resulting from a release of rationing constraints. It is also important to an understanding of the historic behaviour of spreads between mortgage rates and government bond yields. As shown in Graphs 4.1–4.10, these have at times been zero or negative in several countries despite the higher default risk on mortgage loans, thus contradicting the theory of the determination of spreads in a free market discussed above. The paradigms also offer insights into the recent growth of corporate debt.

Most authors have characterised credit rationing as a disequilibrium²² phenomenon resulting from a market failure such

²² In this case a situation in which lenders are artificially prevented from offering the price for loans that will clear the market.

as interest rate controls. However, Stiglitz and Weiss (1981) have shown that credit rationing *can* still arise in equilibrium²³ when there is imperfect and asymmetric information (i.e. the borrower knows more about his characteristics than the lender) and lenders cannot control all aspects of the borrower's behaviour. This equilibrium paradigm is used below to provide several useful insights into the recent growth of debt.

Stiglitz and Weiss's analysis entails some imperfect substitution, i.e. the agent has access only to banks and not to the bond market. In general, it is thus applicable to small firms and households and not to large firms or governments. The key is that the interest rate offered to borrowers influences the riskiness of loans in two main ways. Firstly, borrowers willing to pay high interest rates may, on average, be worse risks. They may be willing to borrow at high rates because the probability that they will repay is lower than average. This is a problem of *adverse selection*,²⁴ i.e. a reduction in the average quality of the mix of applicants for loans due to the increased price. Secondly, as the interest rate increases, firms which were previously "good risks" may undertake projects with lower probabilities of success but higher returns when successful – a problem of *moral hazard*, that the *incentives* of higher interest rates lead borrowers to undertake riskier actions.

These considerations suggest that under such conditions there may exist an optimal interest rate on loans beyond which the return

²³ In this case a situation in which lenders are unwilling to change the conditions under which loans are offered. Thus rationing is not *necessarily* a consequence of market disequilibrium resulting from sticky prices or government regulation, though obviously these may also lead to rationing.

²⁴ Akerlof (1970) illustrated the concept of "adverse selection" by reference to the market for used cars. He assumes that there is asymmetric information – sellers know the quality of their cars, but buyers only know the average quality of cars on the used car market, and will only offer a single price that reflects this average. At this price, potential sellers of high quality used cars stay out of the market, thus reducing the average quality of second-hand cars as well as the price. The market is likely to reach an equilibrium where cars of low average quality are sold at a low price. The asymmetric information has resulted in an externality which causes a degree of market failure. Traders on both sides of the market would be better off if the informational asymmetries were removed.

to the bank falls despite excess demand for loans at that rate,²⁵ because at a higher interest rate increased defaults more than offset any increase in profits. The bank maximises profit by denying loans to individuals who are observationally equivalent to those receiving them. They are unable to obtain loans at *any* interest rate at a given supply of credit.²⁶

The authors also argue – perhaps less convincingly – that increasing collateral requirements (or reducing the debt/equity ratio) may reduce bank profits in a similar way, because wealthier individuals may be less averse to risk than poorer individuals²⁷ and so those who can put up most capital would be willing to take the greatest risk with the lowest probability of repayment. The analysis can be generalised to any number of control instruments – rationing is possible so long as the bank cannot directly control the choice of project under every possible contingency (see Stiglitz and Weiss (1986) and Hart (1986)). The analysis also applies in the case of several observationally distinguishable groups; a group may be excluded although there is excess demand for credit, and its expected return on investment is highest.

Other explanations for credit rationing besides asymmetric information have been proposed. For example, credit rationing might arise from the desire of banks to share interest rate risks with customers, especially with a system of short-term or variable rate loans which imply a continuing relation in the future between lenders and borrowers (Fried and Howitt (1980)). This leads banks and their customers to enter into informal agreements or “implicit

²⁵ Implicitly the bank is using the interest rate as a screening device, to help identify “good” borrowers.

²⁶ This is distinct from the question as to why an individual faces an upward sloping interest rate schedule – primarily because the default probability rises as the amount borrowed increases.

²⁷ “Wealthy individuals may be those who, in the past, have succeeded in risky endeavours. In this case they are likely to be less risk averse than the more conservative individuals who have in the past invested in relatively safe securities, and are consequently less able to furnish large amounts of collateral.” (Stiglitz and Weiss (1981), p. 402.) Obviously, collateral also has positive incentive effects.

contracts” to guarantee stable loan rates, which allow the bank to deny credit to a predetermined fraction of (newer) customers when market interest rates are high. Alternatively banks might wish to charge a uniform rate to ensure equitable treatment between broad classes of heterogeneous borrowers, fully accommodating the demand of the most preferred borrowers in each class but rationing credit to the least preferred members (Jaffee and Modigliani (1969), Cukierman (1978)). Finally, Stiglitz and Weiss (1986) note that government controls on loan rates may also lead to rationing, as may quantitative controls on banks’ balance-sheet growth.²⁸

These analyses, highlighting credit rationing, appear to contradict the theory of market interest rate spreads discussed above. In fact it is likely that there is a distinction between small agents such as households and unincorporated businesses, who may often face credit rationing, and large firms and government for whom risks are easily assessed, and to whom the former scenario of rationing by price applies. The boundary will not be fixed; more firms may be rationed in a recession, while large firms may become rationed if they lose their credit rating.

²⁸ At first glance, these explanations fit more accurately than that of Stiglitz and Weiss (1981) the most widespread form of credit rationing observed until recently in some countries, mortgage rationing. This rationing basically arose from shortages of funds on the deposit side, given a mortgage rate below the market-clearing level. Why were mortgage interest rates not increased? Stiglitz and Weiss (1986) show that US mortgage rates never reached their “usury” ceilings, while UK rates, despite being uncontrolled, fell as low as 4 percentage points below rates on government bonds (see Graph 4.4). These facts suggest that an explanation of rationing based solely on government controls of loan rates is not completely satisfactory. Although “risk sharing” and “equitable treatment” could be the correct explanations for mortgage rationing, one can equally put forward an “optimal loan rate” explanation partly based on Stiglitz and Weiss’s analysis. Firstly, a higher rate (especially with variable rate loans) may lead to defaults by borrowers sufficient to lower profits, perhaps because borrowers already have debt that they have not declared to the lenders, or because their incomes are highly variable. Secondly, even if such defaults are not sufficient to lower profits, the social opprobrium of some foreclosures may lead to less deposits, government action to lower tax benefits or increased profits taxes. Thirdly, if the loan rate had been increased, the institutions concerned may have feared the disintermediation of loan supply.

The analyses are important, firstly, because they show that for some agents rationing may occur in equilibrium, and hence spreads in such cases may not always reflect lenders' ex ante predictions of default. For such agents, in the context of a time series including periods of such rationing, the relation between debt and stability can only be analysed directly by assessing the effect of rising debt on default. Evidence for this perhaps counter-intuitive hypothesis is given in the table on page 37 and the econometric results in Section 5.

Secondly, if one accepts the hypothesis that credit rationing has been a frequent phenomenon for households and small to medium-sized firms in certain countries in recent decades, the theory of credit rationing may be able to provide insights into the causes of the rapid increase in credits to these sectors in recent years. Although it is conceivable that part of increased debt results purely from an increase in credit demand in equilibrium – i.e. a pure “free market” story can be told – it seems likely that a key factor in the credit boom has also been a loosening of rationing constraints on the supply side which were previously binding (i.e. there has been a shift from a situation of excess demand for credit at the current price towards a market equilibrium where credit is rationed by price).

The survey of credit rationing paradigms above has outlined several channels which could lead to a loosening of rationing. Among the factors highlighted are risk of lending, the importance of information, the degree to which markets are segmented and government regulations. Risk aversion of lenders will clearly also be important.

It seems unlikely that the risk of lending has fallen (see Graphs 4.1 to 4.10). Although in some cases information may have improved, or new and more restrictive contracts or covenants been introduced, generally the contrary appears to be the case.²⁹ There does, however, appear to have been increased entry into lending to the relevant sector (e.g. UK mortgage lending, bank lending to finance takeovers in countries such as the United Kingdom and Germany, US investment banks willing to underwrite junk bonds) –

or at least high-cost credit has become available to those previously refused credit completely. Removal of quantitative controls on the growth of banks' balance sheets was often an important factor. There has also been an increase in the supply of marketable debt, often at a fixed rate. This has reduced the degree to which agents have access only to banks and not the bond market, i.e. "imperfect substitution" between types of credit, which Stiglitz and Weiss pinpointed as a necessary condition for their paradigm to operate. This is the case for the recent growth of commercial paper in many countries outside the United States and for US junk bonds.^{30, 31} These types of securities may have been instrumental in causing many firms to shift from a quantity-rationing to a price-rationed credit system, though it should be emphasised that costs of rating

²⁹ We note, however, that some authors such as Jensen (1986) argue that debt finance (for example, via "junk bond" issue) has the effect of a restrictive contract or effectively increased information in the sense that managers are forced to meet a market test in their investment, because the return has to cover interest payments. This argument largely contrasts debt issue with the use of retained earnings for investment (in the situation of a leveraged buyout or takeover) rather than arguing that contemporary forms of debt have an increased information content over traditional forms such as bank loans. On the other hand, it can be argued that the development of junk bonds was necessary in the United States in order for the system of leveraged buyouts and takeovers to operate, and hence the rise of such a market for high-yield, high-risk securities has led to an improvement in information and control. In other countries, bank lending has sustained the recent takeover wave. This view of the effects of debt issue contrasts with that shown in footnote 36 below.

³⁰ Elsewhere, however, the opening of markets to small firms has led to greater equity rather than debt issue, for example in the United Kingdom Unlisted Securities Market. As well as easing credit rationing for small firms, the development of these securities markets may also have reduced the price of funds to firms which were previously price-rationed.

³¹ It is of interest to note that Cable and Turner (1985) have argued that differences in the information available to banks regarding their client firms have an important influence not only on credit rationing within a country for different firms and across time, but also on the relative cost and availability of debt between countries. This may thus explain higher equilibrium debt/income ratios in Germany and Japan than in the United Kingdom and United States. Superior information is available in Germany via the representation of banks on the supervisory boards of industrial companies, and in Japan via the intermarket business units of the "Zaibatsu" type. This analysis thus suggests that credit rationing may be eased by a shift to closely-knit links between firms and banks, as well as a shift from bank to market credit.

and underwriting may still make bond issue too costly for small firms.

For households, the loan rate (for example on mortgages) has been forced up relative to free market rates by the deregulation of the deposit rates (as in the United States), leading to some degree of replacement of quantity-rationing of credit by price-rationing for households, too. (Increases in the loan rate may have been cushioned by reductions in non-price competition between lending institutions or reductions in margins due to increased competition.) Obviously, some restrictions on household borrowing remain, as discussed in Section (d)(ii) below. Conversely, for companies, the higher and often floating loan rates offered recently by banks, due to deposit deregulation, higher capital ratios or the burden of non-performing loans, have accelerated the shift from bank to market-based funding and hence aided the reduction in quantity-rationing of credit.

Finally, it appears that in many cases banks and other financial institutions have become more tolerant of risk. Several underlying factors can be suggested. Risk tolerance by lending institutions might have increased because, for example, they can pass on the debt in securitised form to other institutions (so there is less incentive to monitor the debt). Alternatively, the implicit government guarantee on their assets may have become stronger as suggested by Wojnilower (1985), their "safe" customers have often been lost to the bond market and competition may have reduced their margins so much that profitability can only be maintained by rapid growth.

Institutional investors, too, appear to be more ready to hold high-risk, high-yield securities, perhaps because the market-making investment bank is ready to supply a ready market, while the risk associated with individual securities can be reduced by appropriate portfolio diversification. Use of such securities can provide large quantities of credit at prices that banks could not match, owing both to credit risk and to the cost factors noted above. However, on the other hand, this process of securitisation may mean that market

liquidity in these instruments is vulnerable to failure of the market-maker or desire of certain holders to disinvest.

These tendencies differ in importance between countries, though in several of them a shift can be discerned from quantity-rationing to price-rationing of credit and towards use of marketable debt. To the extent that credit rationing was based purely on market failures such as interest rate controls, rising debt may merely reflect a shift by agents to equilibrium levels of debt, and as such may not entail a cause for concern. However, to the extent that previous credit rationing was based on objective assessments of risk, several of these suggestions back up the concerns summarised in the introduction, i.e. that recent increases in debt threaten to lead to greater instability. Some authors, such as Wojnilower (1980, 1985), would go further and suggest that demand for credit is so interest-inelastic that a loosening of rationing leads to a permanently increasing level of debt at any interest rate. The only way this situation may be resolved is a supply blockage, with either credit control imposition or a default crisis.

Detailed empirical support for the hypotheses offered in this and the following theoretical sections is given in Sections 4 and 5. However, indicative support for the argument of this section is given in the table on page 37. For the corporate sector in most countries there is a fairly strong correlation between spreads and defaults, as predicted by the theory of free market interest rate determination. By contrast, for households the relationship is weaker and often negative. This may be attributed to the greater importance of credit rationing for the household sector. However, it is notable that the correlation for households is generally stronger if one includes the period 1981–85. This is in line with the hypothesis of a weakening of quantity-rationing in recent years, with a shift towards price-rationing of credit.

To summarise, this section has outlined two basic paradigms of the supply of credit, the free market approach, where supply and demand are equilibrated by the interest rate, and an approach based on quantity-rationing of credit. It has been suggested that the former

Correlations between changes in spreads and
changes in default rates, 1966–85

	Corporate sector	Household sector	Household sector (1966–80)
United States	0.41	0.27	0.22
United Kingdom	0.52	–0.31	–0.47
Canada	0.30	0.51	–0.30
Germany	0.24	–0.03	–0.24
Japan	0.05	–0.05	–

typically applies to the public sector and large firms, the latter to households and small firms. However, recent years have seen a decline in quantity-rationing, a trend for which various reasons can be adduced, notably deregulation and financial innovation. This shift away from rationing may be an important factor underlying the growth of credit for households and small firms in recent years.

Besides offering explanations of the causes of the recent growth of debt, the analysis of this section offers insights into the relation between debt and financial stability. In particular, default risk is dependent not merely on debt or income but also on the other assets in the balance sheet of the borrowers, and macro-economic variables such as interest rates and the trade cycle. In addition, the spread between the interest rate on a private sector debt instrument and the government bond yield offers a measure of the markets' expectations of default risk. However, this mechanism only operates when interest rates equilibrate supply and demand for credit (i.e. there is no quantity-rationing), and even then the discrepancies between offered spreads and realised defaults have often been large. Historical examples include the LDC and farm debt crises; some commentators fear that the current intense competition for loans in domestic markets, too, is leading to the offer of spreads which are too small in relation to the risk of default.

(c) *Bankruptcy*

Broadly speaking, bankruptcy occurs when a company or household does not pay interest or repay principal due to its creditors. (The precise circumstances under which bankruptcy arises vary from country to country.) It may arise because the market is unwilling to advance more credit, i.e. because it feels that the present value of returns on such a loan is negative, and profit is maximised by realising the assets of the debtor. (In this crude sense, default can be said to be caused by *inadequate* growth of debt. However, much debt issue must have occurred before a debtor reaches this situation.) Default may also occur when shareholders declare themselves unable to pay their debts, even if further credit is available, leaving the creditors to recover such assets as they may.

The nature and consequences of bankruptcy are important to this paper, because the underlying assumption of many of the concerns expressed in Section 1 is that widespread default on debt will have severely adverse consequences for the economy. One argument against this is the common observation that a rapid turnover of small businesses is often a feature of a dynamic economy. Some economists, for example Warner (1977), would go further and argue on the basis of empirical evidence that even for large firms (bankrupt railroads) the legal and administrative costs of default are in fact so low as to be trivial; hence even if increased debt leads to bankruptcy, the only effect is distributional, debt claims being effectively changed to equity. On the other hand, other economists have suggested that the legal and administrative costs of bankruptcy *are* significant and form a sizable deadweight loss. Gordon and Malkiel (1981) estimated corporate bankruptcy costs as a proportion of market value to be between 2½ and 9 per cent. but felt that these estimates were biased downwards, while Baxter (1967) estimated costs as 20 per cent. of assets in the case of households.

We would argue further that, especially when default is widespread and involves households and large businesses rather than only small businesses, all of these analyses may be guilty both of taking a partial view (of an agent or firm in isolation), and of

ignoring certain costs which arise even in a case where such an approach is legitimate. Thus it can be argued that distributional shifts may often be socially undesirable and involve costs of portfolio readjustment; that debt issuers who default may face difficulties in issuing debt later (“loss of reputation”); that banks may face problems of illiquidity or declining valuation in disposing of collateral; also imminent bankruptcy may change a firm’s stream of cash flow, for example owing to inability to obtain trade credit or retain key employees; finally there may be significant *externalities* to widespread loan default.

If defaults in the non-financial sector affect banks too, these effects may include declining confidence in the financial system, bank failures – for example the recent growth of US bank failures in line with defaults in the non-bank sector – and in extreme cases a disruption of credit intermediation and significant macro-economic effects on aggregate consumption and investment (see Bernanke (1983) for an analysis of the 1930s depression based on similar arguments). Such externalities may amplify themselves, because in a world of imperfect information the failure of one company, especially in the financial sector, raises doubts about the liquidity and solvency of others³² – the so-called problem of contagion.

It should be emphasised that the relationship between default and financial instability is unlikely to be linear. Rather, there is likely to be a threshold level of defaults, beyond which bank failures and instability in securities markets increase sharply. The height of the threshold will depend on such factors as capital ratios of financial institutions, and the degree to which their sources of income are diversified. The degree to which these externalities arise for individual financial institutions is likely to depend also on the relative size of the lenders and borrowers and the precise nature of the debt contract. Thus, for example, the recent downturn in

³² The interdependence of agents may be greater in the case of some financial innovations which, for example, “unbundle” risk (see Bank for International Settlements (1986a), p. 204, (The Cross Report)).