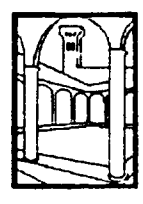


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EUROPEAN UNIVERSITY INSTITUTE
Department of Economics

**An Analysis of Recent Trends in Corporate Sector Gearing
Ratios using Company Accounts Data
from the Bach Data Bank**

Fabia G. Jones

Thesis submitted for assessment with a view to obtaining
the Degree of Doctor of the European University Institute

Florence, August 1993

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PREFACE

This thesis undertakes a comparative investigation of recent trends in corporate sector gearing ratios. Other studies in this area have tended to use national accounts data as their basis for empirical work. This can cause problems in cross-country comparative studies because of differences in national accounting procedures and modifications in these procedures over time. This thesis takes an alternative approach using the harmonized BACH data bank to analyze and characterise behaviour.

The BACH bank contains harmonised company accounts data for European Community countries, the US and Japan. It allows cross country comparisons to be made avoiding many of the problems encountered in studies based on national accounts data. Although the data bank was only set up in 1986, it has yielded useful and interesting information concerning the comparative financial behaviour of the corporate sector in some of the major industrialised nations. Its usefulness should improve over time as more observations become available and a greater data set is generated.

The data bank is analyzed in some detail allowing the presentation of a number of important stylised facts. This allows us to consider the reasons behind trends observed. We then draw out a number of implications, including possible

consequences for investment and the conduct of monetary policy. The role of financial liberalisation and the link between the corporate and financial sector are found to be important determinants of corporate sector financial behaviour. As a consequence, it is possible that these factors influence investment and monetary policy.

The thesis is organised in six parts. An introduction is followed by a detailed presentation of recent trends in corporate sector financial structure. Chapters three and four are devoted to theoretical and empirical analysis of the determination of corporate sector financial structure. Empirical estimation is carried out in chapter five, with chapter six concluding the thesis.

Acknowledgements

I wish to thank Jean-Claude Chouraqui, Jean-Paul Fitoussi and Mario Nuti for their advice, support and encouragement throughout the preparation of this thesis. I am indebted to Phil Davis for a large number of useful and though-provoking comments. Helpful and interesting comments from Jenny Corbett and Robert Waldmann were also gratefully received.

I INTRODUCTION

The use of debt to finance activity has displayed a tendency to rise in a number of industrialised economies over the past few decades.

For much of the last fifteen years there has been a general trend towards greater issuance of debt than equity in many industrial nations ... Most analysts agree that leverage ratios are higher today than in 1970.

Bank for International Settlements, 1986: p 198

Concerns have however, been expressed that borrowing may be reaching excessive levels in certain sectors (e.g. Business Week 1988¹; Kaufman 1986). In this study we have investigated potential causes of recent trends in corporate sector indebtedness and gone on to consider certain possible consequences of the trends observed.

Studies involving international comparisons of corporate sector financial behaviour run into problems concerning differences in sectoral definition, coverage and accounting procedures. Empirical studies based on national accounts data

¹ 'Special Report on Leverage,' Business Week, 7th November 1988.

suffer from quite severe problems in this regard. In this study an alternative approach has been adopted. To this end information from the BACH data bank has been presented and analyzed. The BACH bank contains harmonized company accounts data for the EC countries, the USA and Japan. As such, a number of the problems encountered when using national accounts data are avoided.

Information from the BACH data bank is used to identify recent trends in corporate sector financing. Explanations underlying these trends are then considered and possible consequences of the patterns observed.

There are many aspects of financial behaviour that could be considered. For example, increasing numbers of private sector agents would appear to be experiencing difficulty in servicing and redeeming ever-increasing outstanding debts, and concern has thus been growing that the risk of financial fragility may have risen as a consequence. A great deal of attention has hence been devoted to analyzing debt-income ratios, which appear to have displayed a general tendency to rise in many industrialised countries. See e.g. Davis (1987) for a thorough and wide-ranging presentation of possible causes and implications of rising sectoral debt-income ratios. Debt-cash flow is another ratio that has been monitored. Even firms that stand to receive very healthy profits in the future on projects currently being undertaken can get into difficulties if cash flow is not sufficient to meet short-term needs. This is an important consideration especially given that, with the exception of the US, and more recently Germany, the proportion of short-term debt in the

financial structures of the corporate sectors in the major economies far outweighs more long-term debt. The relationship between increasing use of debt and the risk of bankruptcy has also been considered, although mainly from a theoretical point of view - to date there has been relatively little empirical investigation of this topic. Other aspects have also been considered, each with their own implications. Again see Davis (1986) who looks at many different debt ratios in a study of recent portfolio behaviour in the non-financial corporate sector of the major industrialised countries.

In this study, however, we have investigated the implications for physical investment of an increase in the relative use of corporate debt. The firm can draw on essentially two broad classes of finance to carry out investment: debt and equity. The holders of these liabilities attempt to control the managers of firms in different ways, and give them different incentives to behave in certain ways. Changes in the proportion of financing deriving from debt could well change the incentives and controls facing managers and their behaviour. This could in turn affect their investment decisions. In this study we have chosen to investigate precisely how debt-liability ratios, commonly known as gearing ratios or leverage (US), have changed in recent years, and the consequences of this behaviour for corporate investment.

We have not only looked at the behaviour of corporate gearing over time but also across countries. A thorough study able to explain both these features appears to be lacking. There are a number of studies that analyze the behaviour of

gearing ratios in one country. The models are often country-specific, however, and cannot be used as general models for cross country comparison (see Marsh 1982 for the UK; and Taggart 1977 for the US for example). On the other hand there are a number of studies that explain cross country differences (Corbett 1987), but which do not provide models capable of satisfactorily explaining the behaviour of corporate gearing ratios over time within a country. Finally, there are those that combine these two features, but within a static framework (Mayer 1987b; 1989). The aim of this study has been to develop a general model combining all these features capable of explaining the determination of aggregate corporate gearing ratios and their evolution over time.

In chapter II, the recent behaviour of gearing ratios in the French, German, US, UK and Japanese corporate sectors is outlined. To date much of the empirical work on international comparisons of trends in corporate financial structure has been based on national accounts data. These studies suffer from problems of sectoral definition, and because of differences in definition and coverage of the relevant data. There are also differences in national accounting procedures. In this study many of these problems are avoided by using company accounts data contained in the BACH data bank provided by the Commission of the European Communities. The data in the bank is harmonised across the EC countries, Japan and the USA according to a common accounting framework. Even within the BACH data bank, however, the quality of aggregated corporate sector data varies across the countries studies and we have therefore concentrated on

manufacturing where cross-country discrepancies seemed the smallest. In the countries studied, gearing ratios displayed a general upward trend until the early 1980s, with the exception of Japan. The increase over this period was to be expected given the conditions favourable to the use of debt existing at the time: relatively low real interest rates and high levels of inflation. Since that time, however, inflation has tended to fall and real interest rates to rise in the countries studied. The continued rise of gearing ratios in the 1980s (with the exception of Japan and more recently France) is thus rather puzzling.

Over time, the corporate sector gearing ratio could be expected to move broadly counter-cyclically (Bernanke, 1981; Lévy-Garboua and Maarek, 1985). During a recession, the rate of growth of profits and internal equity slows or falls. When profit growth is low, managers are likely to be reluctant to make equity issues for risk of under-pricing. As firms turn to debt to meet financing needs, the gearing ratio rises. A general tendency for gearing ratios to rise in the major industrialised economies was thus witnessed following the oil-shocks and recessions of the 1970s.

Since the early 1980s, however, there has been a general upswing in economic activity. We would generally expect managers to prefer to issue equity when firms are enjoying healthy profits and when demand is strong. However, with the exception of Japan, and more recently France, there appears to have been no tendency in the countries investigated in this study for the pace of increase of gearing ratios to slow down

or even decrease during the 1980s despite significantly improved economic performance in this period.

Whilst gearing ratios have been rising, the ratio of investment to GDP in the manufacturing sector of the countries under consideration has been displaying a general decline over the past twenty years, again with an exception being found in Japan. An increase in gearing would thus appear to be associated with a decline in proportion of investment in GDP. However, countries enjoying the highest gearing ratios - Japan, France and Germany - have also enjoyed greater investment as a proportion of GDP than the US and the UK, suggesting that increasing gearing ratios should be associated with increasing investment. The link between gearing and investment is thus far from clear.

To properly assess the implications of recent rises in corporate gearing ratios we must be able to explain precisely how the gearing ratio is determined. Accordingly, we turn in chapter III to a discussion of the theory explaining the determination of corporate gearing ratios. The analysis begins with basic relationships at the microeconomic level, and is progressively developed through increasingly sophisticated models. Macroeconomic elements are also taken into account allowing an analysis that embraces both micro and macro considerations.

In the simplest models, an optimal gearing ratio is determined where the average cost of capital is minimised, subject to certain risk constraints. The least costly combination of the various forms of finance in the capital structure is sought, given prevailing exogenous influences such as

taxation, inflation and interest rates. In 1958, however, Modigliani and Miller (MM) published their theory proving that there was no optimal gearing ratio. Since then, successive of the very strict assumptions underlying the MM model have been relaxed, and these developments in corporate financial theory are traced through.

The effects of risk and return on financial structure are discussed in the various theories. It is necessary to consider both real and nominal rates of return. As a result, the effects of inflation and price uncertainty on financial behaviour are then considered in detail.

An increase in the rate of inflation is likely to encourage managers to issue more debt if the burden of outstanding corporate debt falls allowing them to increase debt issues, and because future reductions in the burden of current issues may be anticipated. At the same time, however, the holders of fixed rate debt suffer real losses, paying for any inflationary gains earned by the corporations. Thus to increase debt issue in inflationary periods, firms would have to offer a premium compensating holders for anticipated losses, the cost of which should cancel out any potential gains to be made, providing there are no asymmetries of information. Moreover, not all corporate debt used in the countries studied is fixed rate. On variable rate debt, higher rates of return will be required to compensate for reduced real yields in the face of inflation, and in anticipation of possible further reductions. Furthermore, if the real burden of outstanding debt does change in the presence of inflation, the value of equity is also likely to be

affected through changes in investor's preferences. In a discussion of the effects of inflation, it is important to specify whether debt and equity liabilities are measured at book or market values as the two can lead to quite different conclusions. There are thus many factors to be taken into account when considering the effects of inflation on the gearing ratio.

Another major determinant of corporate financial patterns, according to the literature at least, is taxation. The relative tax treatment of debt and equity should be significant in helping determine corporate gearing ratios, favouring debt over equity as interest payments are considered as fixed costs and therefore deductible against corporation tax. The bias implied by fiscal effects may be further enhanced when considered in conjunction with inflation as taxes are levied on nominal amounts. However, in this study we are interested in a comparative analysis of the behaviour of corporate gearing ratios over time, not in discrete changes in gearing ratios following modifications of national tax laws. Furthermore, the explanation of gearing in terms of fiscal considerations, although extremely important according to the literature, appears to behave rather poorly in empirical tests (see e.g. Coates and Woolley 1975; Mayer 1987b). Our efforts have not therefore been concentrated in this direction.

Instead, the traditional separation of finance and investment is then relaxed as more modern theories are considered. The idea of non-neutrality of corporate financial structure and policy lays behind the most recent theories of corporate finance which outline the role played by transactions, information and

agency costs in the determination of gearing ratios. Signalling theories are also considered in which the firm itself can affect the way it is viewed and priced, and the terms it is offered. Good profit performance, for example, could cause the firm to be more highly valued in the market, making profits another determinant of financial structure. At the aggregate level, we see that the position of the corporate sector as a whole may dictate the terms offered to individual firms.

Another factor that appears to help explain recent movements in corporate gearing ratios is the trend towards liberalisation of capital markets. Since the late 1970s, financial markets in the major industrialised economies have been subject to increasing competition, innovation and deregulation. Availability of existing instruments has increased, and many new instruments have been introduced, enhancing liquidity and generating both equity and credit. Increasing competitiveness and lower regulatory costs have allowed reductions in required rates of return, and deregulation has broadened access. Mechanisms allowing the hedging of interest rate risk, and the transfer of price and credit risk have been introduced. At the same time, a general rise in the indebtedness of the corporate sector has been witnessed. Increased availability and lower required return on credit should allow higher investment. It might appear that measures to encourage increased corporate gearing ratios should therefore be encouraged. We see, however, that the benefits of financial liberalisation may be offset by a number of potentially damaging side effects.

Although deregulation, innovation and increased competition should help bring down the cost of financial capital, uncertainty surrounding the liberalisation process may drive up required rates of return. In pricing new assets, for example, it is possible that markets fail to anticipate risk correctly and could demand too high (or low) a rate of return. Although it is unlikely that excessive yields would be earned for long in competitive financial markets, during the period in question, the high required rates of return on finance could deter firms from investing. On the other hand, yields could be driven down so far that risk is not properly accounted for: financial distress and bankruptcies might then ensue following, for example, an increase in interest rates due to demand pressures.

In this case, monetary policy itself may be affected. Governments in highly indebted economies might not be prepared to raise interest rates when necessary to curb inflation, for fear of provoking bankruptcies and potentially widespread financial instability. In this case, stability is maintained at the cost of rising inflation.

In chapter IV empirical evidence concerning the determinants of corporate financial structure is presented and analyzed in an attempt to find an explanation for the recent deviation of movements in corporate gearing ratios away from counter-cyclicality. Interest rate behaviour would not appear capable of explaining recent trends. We would expect the relationship between gearing ratios and real interest rates to be broadly negative. A fall in interest rates and the required rate of return on debt should, *ceteris paribus*, encourage corporations

to take out more debt. Low and often negative real interest rates in the 1970s were accompanied by rising gearing ratios. Since the early 1980s, however, real interest rates have been historically high. Very high required rates of return on debt should therefore discourage its use but, as mentioned above, there is no clear evidence of a slow down or reversal of the rate of growth of corporate gearing ratios.

The behaviour of inflation does not appear able to offer a satisfactory explanation for this phenomenon either. If inflation reduces the burden of fixed rate debt more than it increases rates of return required on variable rate and new fixed rate debt, we would expect inflation and gearing to be roughly positively correlated at least in the short run. During the 1970s gearing ratios in the countries studied rose steadily in a decade of high inflation rates. Inflation has, however, slowed considerably since the late 1970s, but not the rate of increase in the gearing ratio. However, in the 1980s, increased use has been made of variable rate debt suggesting that the advantages deriving from the reduction in the burden of outstanding fixed rate debt in the face of inflation have been declining. The link between gearing and inflation could thus well have changed.

Empirical evidence of the effects of financial liberalisation on gearing ratios is then considered. We see that financial liberalisation has probably brought about an increase in the availability of credit and reduced credit rationing. It is also likely to have affected the cost of capital. Costs should have fallen in the face of deregulation, and as a result

of increased competition. However, it is difficult to assess risk on new instruments and existing instruments being traded in new conditions. Risk could be underestimated driving down yields further, or overestimated. These effects are only likely to be short term however, with 'correct' rates of return being demanded once risk position has been established. Nevertheless, in the short run at least, financial liberalisation could have a strong impact on risk premia. Risk premia could also be expected to move countercyclically, rising in recessions as creditworthiness deteriorates and vice-versa. So falling risk premia could have been expected in the 1980s as the industrialised nations moved out of recession. However, risk premia in the countries under consideration have risen in the 1980s. Moreover, they have been highest in the countries enjoying the greatest degree of financial innovation i.e the US and the UK.

In chapter V some very simple empirical tests are carried out. Attempts were made to estimate the determination of corporate gearing ratios over time, and the relationship between gearing and investment and gearing and monetary policy was investigated. We were unable to find any clear evidence to suggest that corporate sector financial behaviour has been influencing monetary policy in the way described above in the countries studied during the last two decades. There was, however, evidence suggesting that financial structure influences investment behaviour in a number of the countries. Finally, we saw that financial liberalisation appears to play an important role in the determination of corporate sector gearing ratios in

the countries where the liberalisation process has been most highly developed: the USA and the UK.

The thesis ends with a presentation of conclusions including an assessment of implications for policy.

II CORPORATE SECTOR FINANCIAL STRUCTURE: EMPIRICAL EVIDENCE

Over the past twenty years gearing ratios in Japan, France and Germany have been much higher than in the US and the UK. Investment as a proportion of GDP has also been higher in the former three countries than elsewhere. High gearing ratios would thus appear to be linked to higher investment. However, time series data shows that gearing ratios and investment have tended to move in opposite directions over the past two decades. Empirical evidence indicates that there has been a general rise in the outstanding stock of debt in the non-financial sectors, both public and private, of the major industrialised economies. Corporate sector gearing ratios have increased significantly over the last twenty years in the UK, the USA, France and Germany, while Japanese gearing ratios have fallen. At the same time investment as a proportion of GDP has fallen in all of the countries studied, again with the exception of Japan. Trends in gearing ratios and investment would appear to be negatively related over time.

Detailed presentation of these results follows in the rest of this chapter.

A INTRODUCTORY REMARKS

Studies involving international comparisons of corporate sector behaviour run immediately into definitional problems: firstly, over what constitutes the corporate sector in each country¹, and secondly, concerning the definition and coverage of the relevant data². There are also differences in national accounting procedures (Nobes and Parker 1985) and modifications in these procedures over time. Much of the empirical work on international comparisons of trends in corporate financial structure has been based on national accounts data affected by these problems (Davis 1987; Borio 1990). The differences in definition can be fairly considerable. Any results derived must therefore be treated with a certain degree of caution. In this study information from the BACH³ data bank provided by the Commission of the European Communities has been used (Sananes 1989). The BACH data bank contains harmonised data which avoids many of the problems involved in comparisons of national accounts

¹ The SNA definition of the non-financial enterprise sector includes both public and private corporations, with unincorporated enterprises classified as belonging to the household sector. None of the countries considered here follow this definition however. Both Japan and France exclude large public corporations from the non-financial enterprise sector, and the US and the UK exclude all public corporations. The US also includes unincorporated enterprises along with Germany.

² See, for example, the Methodological Supplements of OECD Financial Statistics.

³ Bank for the Accounts of Companies Harmonized.

data.

The BACH data, which covers the EC, Japan and the USA, comes from a sample of company accounts intended to be representative of the enterprise sectors of these countries⁴. A study of this data source was considered an important contribution to the field. As such, information yielded by the BACH data bank is considered in some detail below.

The data in the BACH bank is assembled according to a standard accounting framework laid out in the Fourth Council Directive of 1978⁵. In this way

the bank will provide the best available estimates of a range of accounting variables, assembled on a comparative basis, because, as far as is known, no systematic attempt has been made, in the past, to place time series of company accounts for different countries on a basis that permits inter-country comparisons of balance sheets and profit and loss accounts.

Green and Sananes 1988: p 2

In this study we are interested in trends in corporate sector financial structure both over time and across countries. Balance sheet data covers the world wide activities of companies, including issues of securities on both domestic and foreign

⁴ There are breaks in both the French and UK series in the early 1980s due to changes in accounting procedure.

⁵ Directive number 78/660/EEC of 25 July 1978 (OJ L222/78).

markets. As such it contains comprehensive data on how companies fund themselves. This compares to flow of funds data which only records the domestic activities of companies and is more suitable for an analysis of domestic financial systems (Mayer 1989). However, we are also interested in the consequences of observed funding patterns. One of the possible consequences investigated has been the link between observed corporate financial behaviour and investment. A thorough study of this area would ideally contain an analysis of financial flow data. However, while there are plans to extend the BACH data bank in the future to cover flow of funds data, at present only stock data is available. Investigation of the link between gearing and investment has therefore been somewhat limited.

The data on debt stocks has been aggregated across the companies sampled in each country in the data bank. As a result information on the nature of debt stocks is restricted: nothing may be indicated about the nature of debt i.e. whether it carries fixed or variable returns, whether it is transferrable, index-linked or carries roll over facilities, whether any simultaneous conditions have had to be fulfilled to obtain the debt, whether it is secured or unsecured, etc. For example, although secured loans are less risky than unsecured loans, they are far from risk free. Property lenders have had their fingers badly burnt in the current recession in the face of declines in property prices resulting in much reduced returns in the event of borrower

default. These characteristics should be explicitly considered wherever possible as they yield important information concerning the implications of the debt in question.

The framework outlining the format of the BACH data set permits variations in accounting practices between countries, for example with regard to depreciation and the valuation of assets and stocks, limiting the degree of harmonisation to a certain extent. However, when using ratios, this problem is reduced to the extent to which the numerator and denominator are affected to similar degrees. As a result, we concentrate in this study on the behaviour of financial ratios.

Full details of definitions involved and data problems encountered are described as they occur throughout the text.

The corporate sectors of the US, the UK, Japan, France and Germany have been compared and contrasted. The members of this group have very diverse financial systems and characteristics, although there are sub-groups with a number of striking similarities. The degree of diversity among the countries in the sample can only enhance the validity of any conclusions reached. For these countries, the BACH data bank contains valid and comparable data on the corporate sector financing patterns over a reasonable length of time. It should be noted however, that the framework outlined by the Fourth Directive has had to be applied retrospectively and the extent to which conversion could be achieved has been limited.

Selection of the time period to be investigated is of major importance. In the introduction we outlined theoretical reasons why the corporate gearing ratio should move counter-cyclically. Ideally, a fairly long time period should be covered if this hypothesis is to be assessed empirically. However, in order to enhance the validity of empirical results in a study involving international comparisons, where feasible all quantitative analysis has been based on the harmonised data found in the BACH data bank. Unfortunately the BACH data bank contains observations starting only in 1971 or even later (1975 for Japan and 1983 for the USA). Various other sources have been used to extend the very short BACH series for the US, none of which are strictly comparable with the BACH data. Care must thus be used in interpreting the relative magnitudes of trends observed in the US as opposed to the other countries in the sample.

Thus although the trend increases in gearing ratios that would be expected following downturns in economic activity are clearly in evidence between 1971 and the early 1980s in France, Germany and the UK, this is not the case in the US and Japan. However, other studies (e.g. Taggart 1985; Davis 1987) indicate that US gearing ratios during the 1970s had increased significantly from those prevailing in the 1960s. The same evidence cannot be found for Japan. We will shortly see that this is due both to circumstances specific to Japan, and to differences with the rest of the group concerning classification, measurement and

characteristics of instruments used (see White 1984) which have not been completely eradicated despite the use of a harmonised data set such as the BACH data bank. With the exception of Japan, then, if a long enough time period is considered, corporate gearing ratios would indeed appear to have moved counter-cyclically in the countries studied until the early 1980s.

We will shortly see that since this time, however, the pattern would appear to have broken down.

B GEARING RATIOS

The BACH data bank contains balance sheet data at historical costs⁶. Although the BACH data yields many advantages over other sources in terms of coverage and comparability of sources, the use of book value data at historical costs can be problematic. While historical cost book values are considered by accountants

⁶ Harmonized data on the US is only available from 1983. In order to provide longer series on the financing of US industry, data has been taken from OECD Financial Statistics. The data is measured at current values and is not thus strictly comparable with the BACH data. Furthermore, the OECD data covers the non-financial corporate sector. The stock of debt with respect to equity would appear to be lower in the more broadly defined OECD sector and thus ratios derived from OECD data with equity in the denominator will be consistently lower than the BACH ratios. However, on the whole both measures indicate similar behaviour with regard to the trends of the various ratios considered in this chapter.

to be objective and verifiable by an independent third party (i.e. an auditor), and anecdotal evidence suggests they are often used by banks and corporate managers when making financial decisions, they can get seriously out of line with current market values (Parker 1983). This is especially true in times of inflation when problems in the interpretation of equity values are particularly acute. Ideally, we should correct for this by using data at market values. However, we have not been able to obtain a (consistent) set of data at market prices of anything like the quality and extent of the BACH data. Moreover, market values include the discounted value of expected future dividends which can give a misleading picture of cash flow and solvency positions.

Although we are interested in aggregate corporate sector behaviour, there are gaps in the coverage of certain industries in the BACH data bank. Data on the manufacturing sector is the most extensive and of superior quality to the data on other sectors in the bank. We have thus limited ourselves to using data on the manufacturing sector⁷. The trade-off of using the superior data is that the results produced may not represent aggregate corporate sector behaviour entirely accurately, and in

⁷ The OECD data for the US covers the non-financial corporate sector. The stock of debt with respect to equity would appear to be lower in the more broadly defined OECD sector and thus ratios derived from OECD data with equity in the denominator are consistently lower than the BACH ratios. However, on the whole both measures indicate similar behaviour with regard to the trends of the various ratios considered in this chapter.

particular do not take account of the behaviour of the services sector which has displayed substantial growth and development during the 1980s. Nevertheless, many of the financial choices and decisions facing companies in the manufacturing sector are common to all industries. It should be noted, however, that certain subsectors have specific problems. Small businesses, for example, are generally not able to obtain finance on the same basis as larger companies. Larger companies enjoy economies of scale when raising finance, paying lower proportionate fixed costs such as fees, accountancy costs etc. Small and medium-sized companies can often face particular problems when trying to obtain credit. They may not have the track record of larger firms, or the negotiating power. As a result, credit can be both relatively expensive and difficult to obtain. Although the BACH data bank does contain some information on financing by company size, the data are very limited and it has not therefore been possible to carry out an analysis of financing behaviour by size.

Given that the BACH data is at historical book value, and that it comes from only a subset of firms, any attempt at inter-temporal or inter-country analysis using the absolute values contained in the bank would not be recommended. However, comparisons of the behaviour of ratios can be usefully made. The usefulness of the BACH data bank is further enhanced in a study such as this where trends are compared not only across time, but also across countries since the data have been harmonised as much

as possible. Using this source, we outline below the behaviour of gearing ratios over time in the various countries considered.

B.1 *Corporate Gearing Ratios*

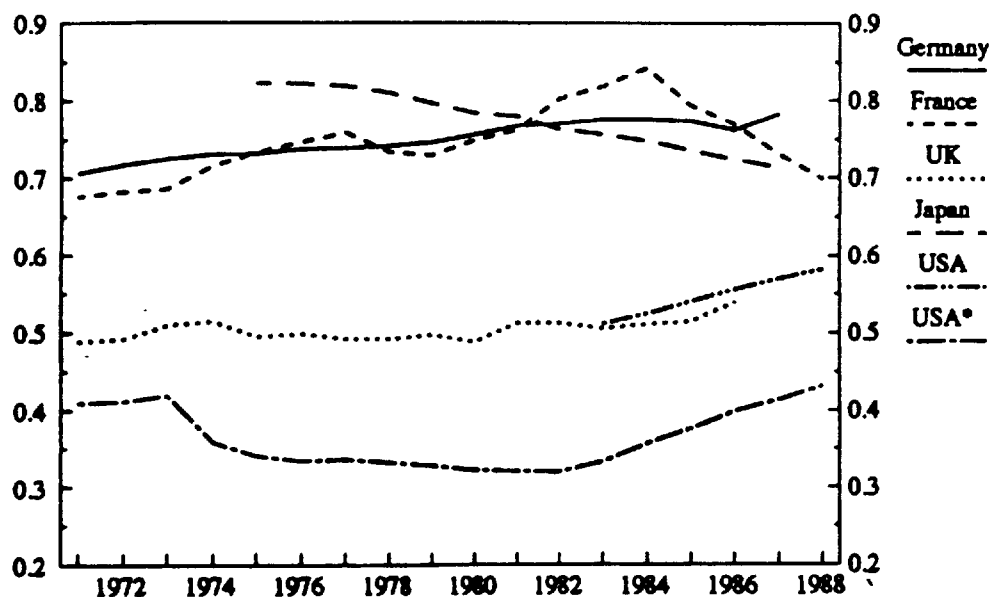
Corporations may choose between three sources when deciding how to fund industrial investment: retained earnings, equity issue or debt issue. The retained earnings of the firm are owned by the shareholders and therefore represent internal equity. The basic choice to be made is thus between the use of debt or equity. In figure II.1 measures of total debt as a proportion of total liabilities (total debt plus equity) in the five countries studied are presented.

In this study, total debt liabilities are measured by short-term debts including bank loans and overdrafts, and trade and other creditors of less than one year, and long-term debts including bank loans and other creditors of more than one year, provisions for liabilities and charges, accruals and deferred income. The definition of debt instruments is not always straightforward. It should be mentioned, for example, that there is some debate as to the appropriate classification of provisions. White (1984) measures provisions as equities. He suggests this is appropriate in studies involving international comparisons since provisions are viewed in significantly different ways in different countries. In Japan for example many

provisions may be offset against taxable income⁸, and there is therefore an incentive for Japanese corporations to declare higher sums for these provisions than is the case elsewhere, and thus to understate equity. When provisions are classed as debts, the gearing ratio thus appears much higher in Japan as compared to other countries than it would if they were not classed as debts. For this reason, White chooses to class all provisions as equity. However, the majority of provisions for e.g. pensions, deferred taxation, etc. are liable to be incurred and should thus be considered debts. Hence, although the problem of classifying provisions is recognised, we choose not to follow White.

⁸ For example, inventory price fluctuations, doubtful receivables, development costs, etc.

II.1 The Ratio of Total Debt to Liabilities



Source: BACH, Commission of the European Communities and OECD Financial Statistics (USA*)

Another problem lies with the category 'trade creditors', which is defined in different ways in different countries (for example, in Japan, the UK and the US consumer credit extended by retail businesses is included, but not in the other countries). These differences are compounded by differences in sectoral definitions - for example, the more wide-ranging the definition of the corporate sector is, the greater is the likelihood that the various credits extended will cancel each other out. Thus there is usually great variation in this measure. Some scholars choose to leave this measure aside in the search for greater accuracy at the cost, however, of a less representative measure.

In our case, although the problem has not been completely eradicated in the BACH data bank, the high degree of harmonization achieved allows us to include this data as well.

In figure II.1 two features in financing trends over the past twenty years become immediately obvious: first, there has been a general rise in debt ratios over the period, with the exception of Japan, and more recently, France; and second, there have been significant differences in gearing levels, with the rates in the USA⁹ and the UK being much lower than elsewhere.

The decline in the Japanese ratio may be explained by the relative strength of the Japanese economy. After the second world war, the Japanese economy grew very quickly as attempts were made to catch up with the West. A high saving rate provided substantial funds for industry and Japanese managers were able to engage in high levels of capital spending thanks to various incentives, such as very high rates of depreciation. Along with the rest of the industrialised world, Japanese industry also benefitted from the very low real rates of interest prevailing in the 1970s. As a result, Japan alone of the countries studied did not enter recession in the early 1980s. Relatively high levels of corporate profits were thus earned, boosting equity

⁹ Although there is a significant difference between the two measures of US gearing, both measures are much lower than ratios found in the other members of the group, and both measures display the same trend during periods of co-existence. From now on, separate consideration of the two measures is not carried out explicitly unless necessary to the issues being discussed.

capital and reserves¹⁰, and encouraging new equity issue.

Although in the BACH data bank both debt contracts and shares are measured at nominal historical values, the book value of new issues is of course the market price at the time of issue (less any discount offered on issue). In inflationary periods a firm enjoying high nominal profits and earnings could expect to enjoy an increase in the market value of its securities and find new issues highly valued. Unless the value of new issues of debt exceeds the value of new internal and external equity, gearing ratios decrease. In this situation, signals given by the data are clearly biased, since outstanding stocks are not measured at the same price as the new issues. The extent of the bias increases with the proportion of stocks that are not revalued. Thus the greater the proportion of short-term debt in total debt, and the more short-term the contracts are, the less serious the bias becomes, as unanticipated inflation can then be accounted for when old contracts are renewed, or new contracts are drawn up.

A more serious problem with regard to measurement of longer term debt is that no indication is given in the BACH data bank of the proportions of fixed and floating rate debt. If monetary policy is tightened in the face of high inflation, the real

¹⁰ In this study, reserves include: share premia, legal, statutory and other reserves, minority interests, and profit for the financial year. Given that the data are at historical costs, reserves arising from the revaluation of assets are not included.

burden of fixed rate liabilities falls, while required rates of return on floating debts are increased in line with higher interest rates. Although the use of floating rate debt has tended to increase in recent years, the lack of information in the BACH data bank makes it rather difficult to interpret the impact of inflation on long term debt.

In figures II.3a and II.3b below we see that in the period under consideration 60-70% of Japanese corporate debt was classified as short-term (less than one year), and the potential bias outlined above with regard to debt was thus likely to have been relatively small. The same is true of the French and particularly the British corporate sectors, where high proportions of short-term debt have also been used. The problem may be slightly more serious in Germany, and particularly the USA, where proportions of short-term debt used are rather low. It is thus possible that gearing ratios in Germany and the USA are somewhat understated with respect to the other countries in the sample, the true value of debt being relatively more understated than elsewhere.

In the 1980s, the trend decrease in Japanese corporate gearing ratios would not appear to have been reversed. There are a number of reasons for this. Firstly, real interest rates in Japan (as elsewhere) have been historically very high (see chapter IV, section B.2), making the use of debt relatively unattractive. Financial developments and reforms have helped

increase the supply of finance, including equity. At the same time, real equity yields have been falling (see chapter IV, section B.4). Thus both the absolute and relative real return required on debt has been rising in Japan over the period studied, encouraging companies to increase the relative use of equity in financing activity¹¹.

In France, on the other hand, rather unusual behaviour may be observed in the 1980s. A significant rise in the corporate gearing ratio occurred in the early 1980s followed by a much greater fall after 1984. A number of factors specific to the French economy may help explain this behaviour.

Between 1981 and 1984 the French economy was subjected to 'stop-go' policies which ended up giving France the highest rates of inflation in the group during this period (see chapter IV, figure IV.10). At this time, the corporate gearing ratio was already following an upward trend due to the low real interest rates enjoyed during the 1970s. Moreover, inflationary expectations are likely to have encouraged the use of debt, significantly reinforcing this trend. Since the early 1980s, however, there has been a substantial increase in real interest rates in France, as elsewhere. Real long-term rates of interest have been second only to those in the US since 1984 and the highest since 1986. These high required rates of return would appear to have

¹¹ Evidence on the relative cost of finance may be found in chapter IV, section B.5.

begun to outweigh the inflationary benefits of debt at a certain point, causing the use of corporate debt relative to equity to fall. Huge increases in the issue of equity have occurred since 1984. Very tight monetary policy was introduced in 1984 successfully reducing inflation, and the relative supply of corporate debt thus decreased as real returns increased and inflation was expected to continue to fall. Improving corporate sector performance and business confidence consequent upon the subsequent world boom helped boost equity values, allowing the market in equity to become buoyant. A sharp increase in the index of share quotations in France has even exceeded Japanese increases since 1984. Since that time, firms have continued to boost equity holdings and reduce debts as disinflation reduces the extent to which the real burden of debt declines (OECD, 1988/89).

In the UK, the USA and Germany, however, a steady increase in the corporate gearing ratio was witnessed during the 1970s during a period of high inflation and low real interest rates. These factors would appear to have been two of the main determinants of corporate financial behaviour in the past, but their influence during the past decade would appear to have weakened significantly. In the 1980s, gearing ratios have continued to increase despite falling inflation and very high real interest rates. A further major determinant of corporate financial behaviour would thus appear to have come into play during the

1980s: a common explanatory factor would appear to be financial liberalisation. In the UK and US where liberalisation has been particularly strong steady increases in gearing have been experienced, whereas in Germany where the liberalisation process has been more hesitant increases in the corporate gearing ratio have been more erratic.

We could expect gearing ratios to rise in line with greater financial liberalisation for a number of reasons. Innovation arising from the liberalisation process should bring about increased availability of credit through the introduction of new instruments, and through increased use of existing instruments. Financial deregulation should reinforce this trend. These factors are likely to reduce the incidence of credit rationing, with a shift in allocation from quantity to price rationing. At the same time increased competition is likely to reduce non-profit maximising behaviour, and the shaving of margins should bring about a decrease in required rates of return. Increased uncertainty surrounding the liberalisation process might cause risk premia and debt yields to rise in the short term, but competitive forces are unlikely to allow excessive yields to be earned on new instruments for long. On the other hand, margins could be shaved too finely, not taking adequate account of risk. Again, this is only likely to be a short term phenomenon with required rates of return subsequently rising as evidence arises that risk has not been sufficiently taken into account.

To sum up, in the face of financial liberalisation, increased availability and reduced rates of return required on credit is likely to encourage firms to increase gearing ratios, all other things remaining unchanged. In the short term, there may, however, be a degree of over- or under-shooting in pricing new instruments until risk position is established.

The rising trend in the US has been reinforced by substantial debt issue used to retire equity (illegal except in very rare circumstances in the UK¹²), and by the substitution of debt for equity in leveraged buy-outs, the scale and prevalence of which may themselves be largely due to the liberalisation process. Greater financial competition encouraging extended use of existing or creation of new financial resources has allowed the build up of powerful, profitable corporate empires through various means e.g. mergers, takeovers and buy-outs. This puts increasing pressure on companies to behave in a predatory way. Failure to do this may be interpreted by the markets as a sign that they are *not able to*. To avoid becoming prey to acquisitive corporate behaviour, firms have thus had to behave increasingly aggressively simply to survive and not be taken over. Furthermore, during the 1980s members of the financial sector would appear to have been encouraging this trend in order to compete for the heavy sums to be made through various fees and

¹² Redeemable preference shares made be bought back by UK corporations.

commissions. A great deal of this activity was financed by debt.

This suggests that the demand for the finance necessary to carry out this activity has increased, but it also implies that finance obtained is going less to physical than to financial investment. This would certainly appear to hold in the manufacturing sector. In figure II.9 below we see that despite rising gearing ratios gross fixed capital formation as a proportion of GDP has been in steady decline over the past twenty years in the countries under consideration, with the exception of Japan. However, in the countries studied manufacturing investment has also been in relative decline over the past twenty years, so a falling share of manufacturing investment in GDP is not surprising.

With regard to the large differences in the levels of gearing ratios pointed out above, there are a number of possible explanations.¹ Firstly, there are some problems with the data. As mentioned above, figures in the BACH data bank are at historical costs, and therefore the value of company assets and equity etc. are generally undervalued in real terms, especially in periods of high inflation. This problem affects all countries, but there are certain accounting differences between the countries that remain despite attempts to harmonize the data. For example, French and British companies periodically revalue their assets whereas the companies in the other countries in the sample do not. Furthermore, a large number of provisions, which

are generally classed as liabilities, may be used to offset corporation tax in Japan, much more so than elsewhere. There is therefore an incentive for Japanese companies to use these widely. Japanese equity is thus probably understated. Another significant difference may be found in the fact that French, German and Japanese company accounts are not consolidated. Debt in these countries will thus appear much higher than in the US and the UK where accounts are consolidated and inter-company debt is netted out¹³. Obviously, the greater the proportion of inter-company debt, the more serious the problem. However, although gross trade credit appears substantial in a number of the countries studied, when inter-company debt is netted off, net trade credit is negligible (Mayer 1989).

There are also a number of theoretical explanations. It would not appear that the traditional determinants of corporate gearing e.g. taxation, inflation and cost of capital are sufficiently similar between the US and the UK and different from the rest to explain the results observed. Coates and Woolley (1975) thus conclude that these differences in behaviour are due to institutional or attitudinal reasons. On the other hand, Hu (1975) (see chapter III.A.8 below) provides an historical explanation of the gap between the low-g geared US and UK corporate

¹³ Even US and UK accounts are not perfectly compatible on this point since the UK accounts are consolidated on a world-wide basis, whereas in the US most domestic parents and subsidiaries are consolidated, but foreign operations are treated on an investment basis.

sectors as compared to the rest. When we analyze the nature of these gearing ratios more closely, the picture becomes a little more comprehensible.

Corbett (1987) states, for example, "the structure of corporate finance in Japan creates a type of contract between banks and clients which is neither conventional debt nor equity holding but a blend of the two"¹⁴. High debt levels in Japan do not thus have the same implications as elsewhere. Whereas in the UK and the US banks will look carefully at the value of firms in terms of the security they provide against loans advanced, in Japan the banks tend to be more interested in the value of the firm as a going concern rather than simply its ability to satisfy short term obligations. They are thus prepared to take a longer term view, being prepared even to sustain short-term losses if necessary, and to actively step in and help the firm in the event of financial difficulties. Similar links are also to be found between German banks and corporations. High gearing ratios in these countries do not thus have the same implications in terms of risk that ratios of similar size in the US or the UK would.

In an attempt to look more closely at the debt-liability ratio, a breakdown between long- and short-term debt was subsequently made.

Looking at the results produced (figs. II.2a to II.2e), we see that the proportion of short-term debt in the gearing ratio

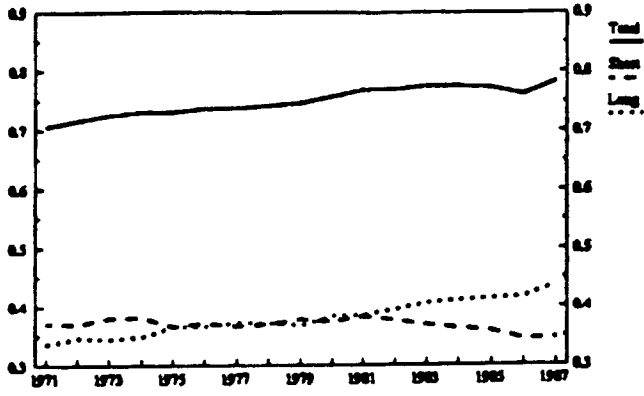
¹⁴ p 31.

tends to be much higher than the proportion of long-term debt with respect to total liabilities. An exception is to be found in Germany, where the ratios were more or less evenly matched until the early 1980s after which time the proportion of long-term debt actually began to exceed the proportion of short-term debt, and the USA, where long-term debt exceeded short-term debt throughout the period. An analysis of the breakdown is important in this study as it has significant implications for corporate investment.

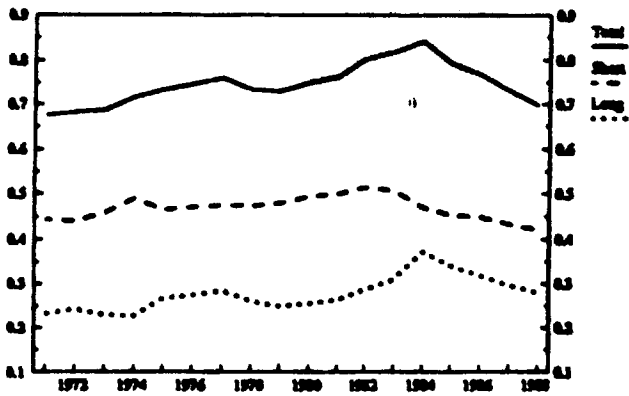
Longer term debt may give greater freedom to invest than short term debt as returns do not need to be earned so quickly. With access to long-term debt, short-term losses can even be made in the anticipation of long-term gains: a likely occurrence with projects that require heavy initial outlays and that generate returns only after a considerable delay. Predominate use of short-term debt may mean that some potentially profitable projects are not undertaken. A tendency to undertake smaller projects that do not require large capital borrowing or that can be financed from retained earnings, or projects that yield short-term profits may arise. It is also possible that investment in areas that do not yield tangible returns, such as advertising and research and development may be curtailed.

Debt - Liability Ratios

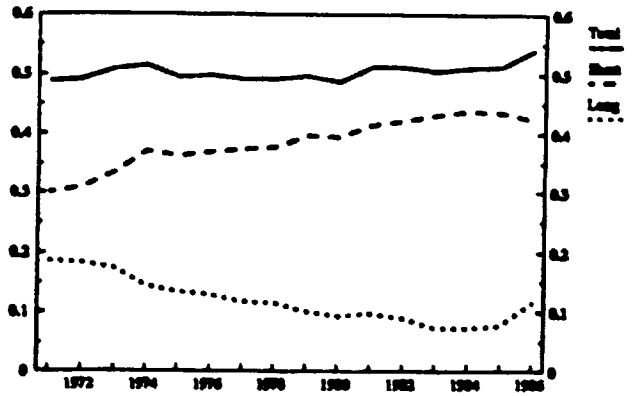
II.2a Germany



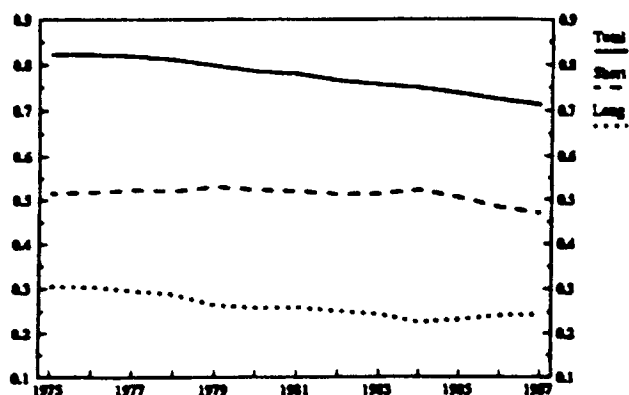
II.2b France



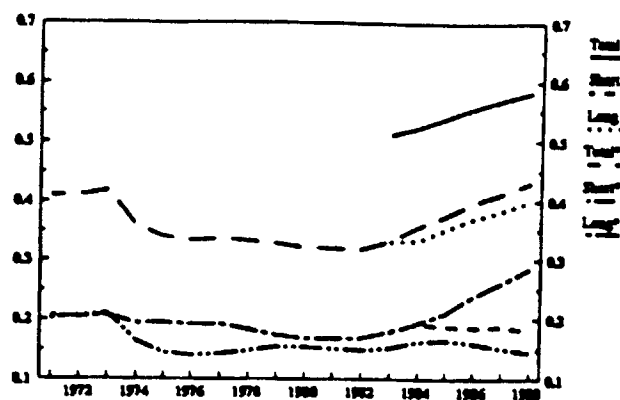
II.2c UK



II.2d Japan



II.2e USA

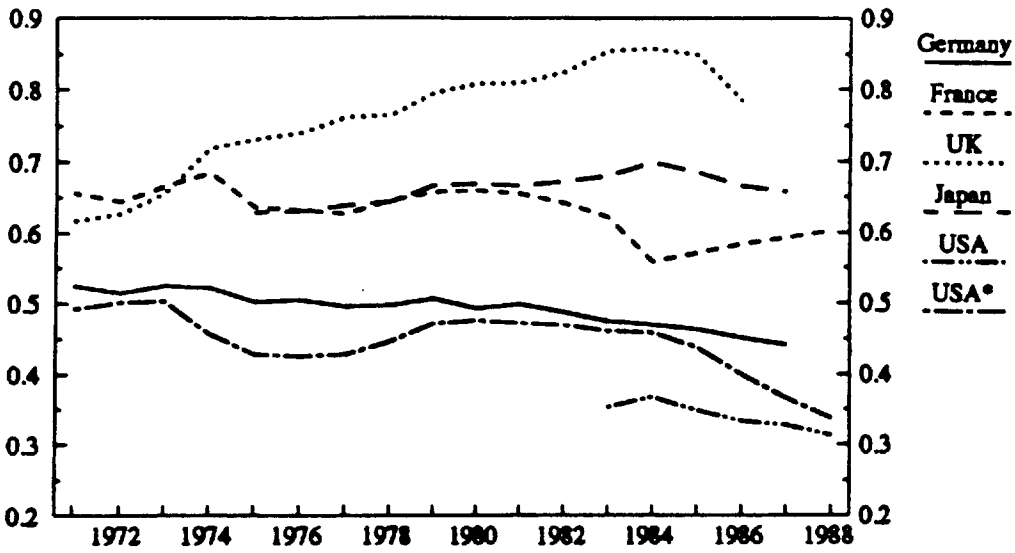


Source: BACH, Commission of the European Communities and OECD Financial Statistics (USA total* short* long*)

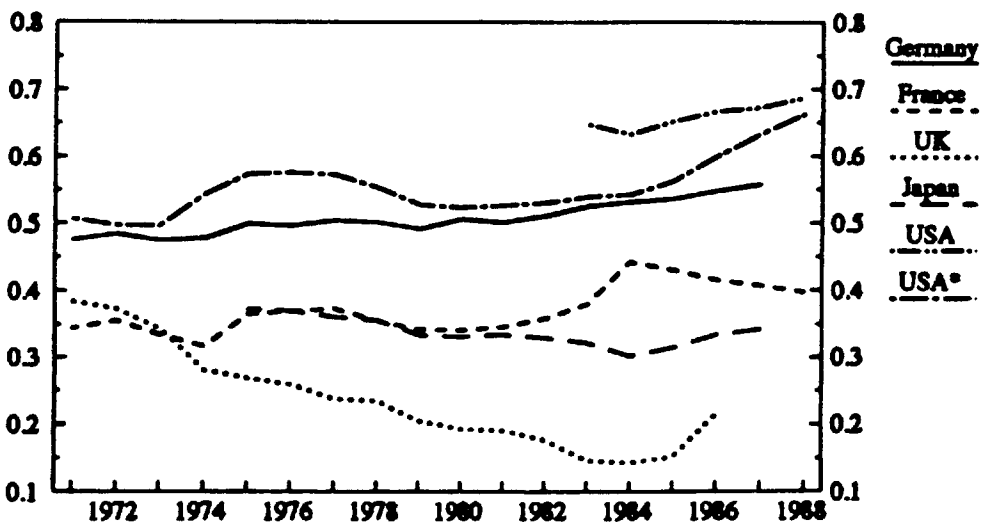
However, short-term debt can often be rolled over and it is generally relatively cheaper than long-term debt. Where firms feel secure of roll-over facilities, short-term debt can have similar characteristics to long term debt, but with a lower required rate of return. Thus in figs. II.3a and II.3b we see that although the UK has the lowest proportion of long-term debt with respect to total debt, as well as the lowest level of investment in the group (see section D below), and that Germany at the other end of the scale enjoys the second highest proportion of long-term debt in total debt and the second highest level

of investment, the relationship between these variables is far from straightforward. Japan has the second lowest proportion of long-term debt but the highest level of investment in the group, whereas the US has the highest proportion of long-term debt but the lowest level of investment.

II.3a Short-Term Debt as a Proportion of Total Debt



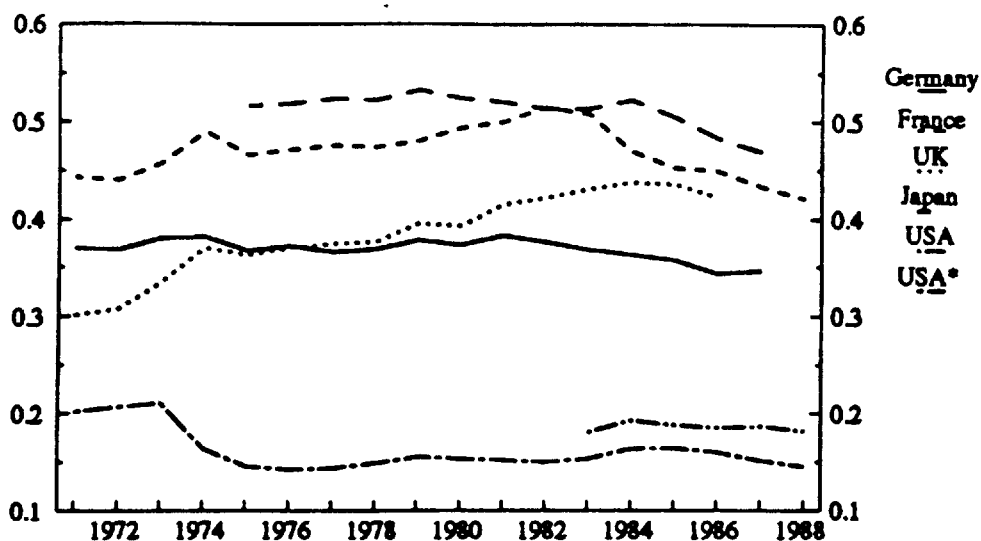
II.3b Long-Term Debt as a Proportion of Total Debt



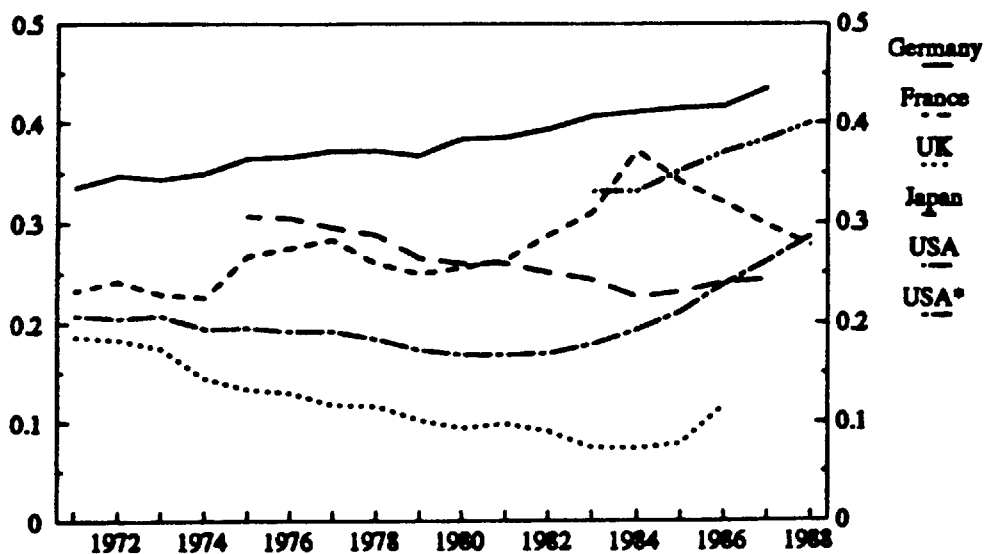
Source: BACH, Commission of the European Communities and OECD Financial Statistics (USA*)

We saw above, however, that Japanese companies are able to take a longer term view than would be implied by length of financing used, helping explain their successful investment performance. Thus clearly the nature of the relationship between the corporate and financial sectors is of major importance to both financing patterns and the transformation of corporate finance into physical investment. Further discussion of these points follows in chapter III below.

II.4a Short-Term Debt to Liability Ratio



II.4b Long-Term Debt to Liability Ratio



Source: BACH, Commission of the European Communities and OECD Financial Statistics (USA*)

In figures II.4a and II.4b we see a cross-country comparison of short and long-term debt to liability ratios. Although the UK has by far the highest short debt-total debt ratio, its short term debt-liability ratio is lower than the French and Japanese ratios due to its much lower total gearing ratio. The US short term debt-liability ratio is thus the lowest in the group in line with it having the lowest short debt-total debt ratio and the lowest gearing ratio. The positions are reversed in the comparison of long-term debt-total debt ratios and long-term debt-liability ratios. Here the UK has the lowest ratios in both graphs II.3b and II.4b, whereas although the US has the highest long debt-total debt ratio it comes down in the ranking of long debt-liability ratios because of its low gearing ratio.

There do not appear to be any other significant differences between the behaviour of debt-equity and debt-liability ratios, and we turn now to a discussion of further empirical observations relevant to the study in hand.

B.2 *Debt-Income Ratio*

We are interested in the effects of financing on investment and have therefore concentrated on the behaviour of debt as a proportion of liabilities used to fund that investment. However, it is interesting to see how patterns in corporate sector financing compare to financing patterns in other sectors of the

economy. Behaviour in the corporate sector is determined by both sector specific influences, such as the relationship between the corporate sector and financial markets, and the effect financial liberalisation has had on this, and more general influences affecting the economy as a whole. Comparing the behaviour of the corporate sector with other sectors of the economy can yield insights into the relative importance of the different influences. We briefly present in this section trends in sectoral gearing ratios over the past two decades.

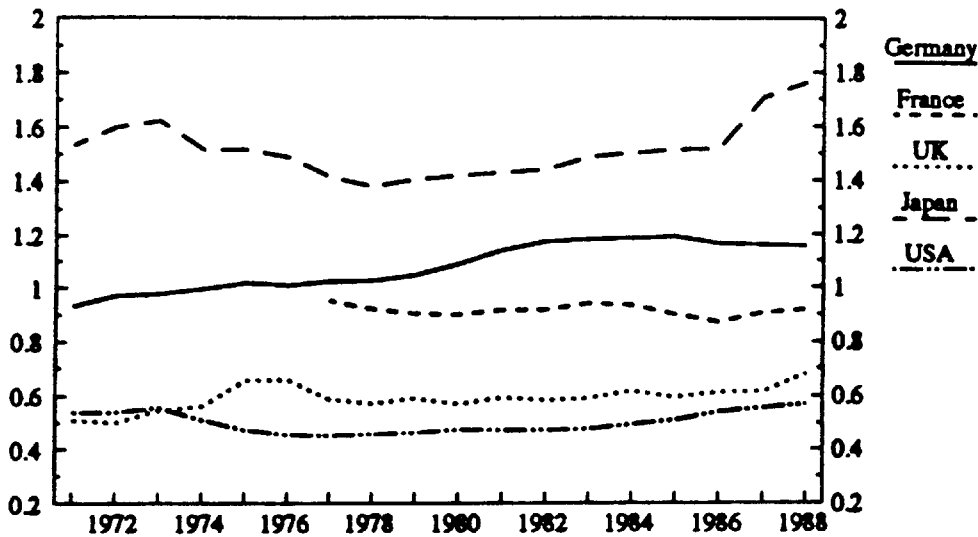
The use of borrowing to finance the activities of the non-financial sectors of the economies is considered below. Clearly, a denominator comprised of debt and equity liabilities is no longer suitable when comparisons with the household and public sector are to be made. A general measure of economic activity has therefore been used: GDP. In this section, the data is from national accounts published in various issues of OECD Financial Statistics. The UK data for the corporate sector and households was not, however, available over the entire period in the OECD publications and has therefore been taken from CSO Financial Statistics.

Given that the data comes from national accounts, there are great variations between the countries regarding measurement, sectoral classification, accounting procedures etc. For example, methods of valuation vary from country to country, with the US and French data being measured at market value, the UK and

Japanese data at book values, and the German data comprising a mixture of the two. Because of this and for reasons mentioned earlier, we preferred to use data from the BACH data bank in our detailed comparative analysis of corporate financial behaviour. A bank containing harmonized data allowing international inter-sectoral comparisons to be made is not available, and it was thus necessary to use national accounts data. The results produced in this section are thus not strictly comparable across countries.

We begin by outlining the behaviour of corporate sector debt-income ratios. Once again a general upward tendency in the use of corporate debt is to be witnessed in the countries under consideration over the past two decades. Indeed, over the period as a whole, even the Japanese ratio now appears to have increased, implying that corporate sector liabilities have grown faster than economic activity in Japan as a whole.

II.5 Corporate debt as a proportion of GDP



Source: OECD Financial Statistics; CSO (UK)

The ranking of the ratios also remains basically unchanged, with the US and UK corporate sectors displaying significantly lower gearing ratios than the others.

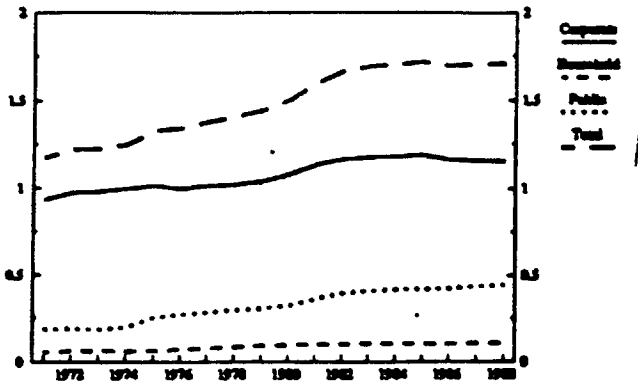
The behaviour of debt/income ratios is somewhat different in the other sectors of the countries under consideration, however. Trends in non-financial sector debt-income ratios are presented in figures II.6a-II.6e below. The following sectoral breakdown is considered: the corporate sector, households and the public sector.

For a long period the aggregate non-financial debt-income

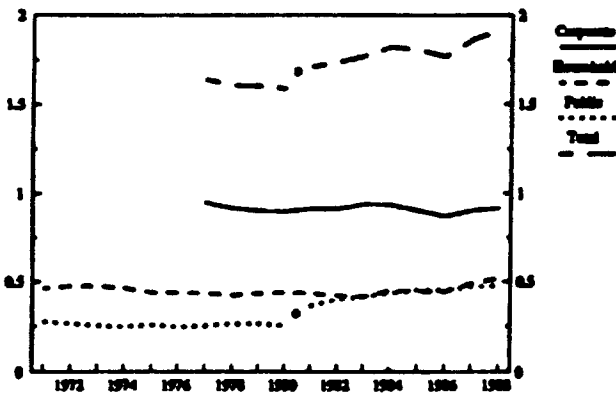
ratio was more or less constant in the US causing much debate and investigation (e.g. Friedman 1982, 1985a; McDonald 1983). After 1982 it displayed a marked increase however. This ratio was always much less stable elsewhere. In the UK it showed a trend decrease during the 1970s due mainly to a decrease in the public debt-income ratio before beginning to rise again in the early 1980s along with the French ratio, whereas the Japanese and German ratios displayed a general increase over the period. Following recent increases, the German and US non-financial debt-income ratios had almost caught up with the UK and French ratios by the end of the 1980s. The Japanese ratio has, however, remained considerably higher than all the rest.

Debt - GDP Ratios

II.6a Germany

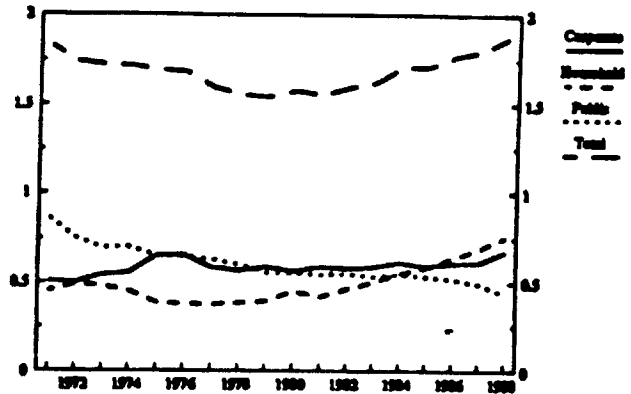


II.6b France



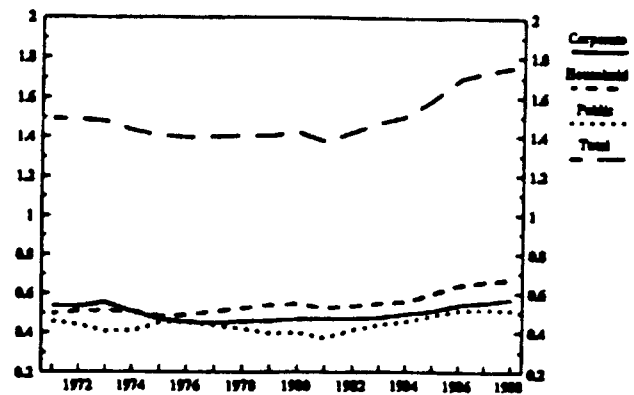
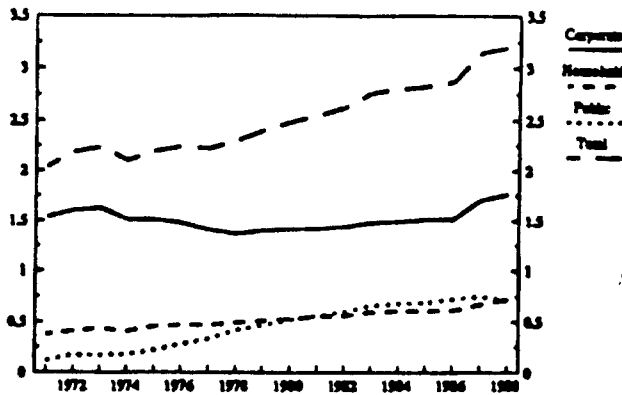
* denotes break in the series

II.6c UK



II.6d Japan

II.6e USA



Source: OECD Financial Statistics;
CSO Financial Statistics (UK).

Similarly to the corporate debt-income ratio, household sector gearing has also shown a general increase in all countries considered over the period. This rise has been especially marked in the US, and even more so in the UK in recent years. The level of this ratio has remained highest in the US and UK¹⁵. Financial

¹⁵ Although the differences between the countries are too numerous to mention in this brief description here, it is worth mentioning a particularly large difference between German accounting and the other members of the group with regard to the definition of the household sector. In the German case, housing is not included with the household/personal sector. The measure of household debt used here thus significantly understates the extent of German personal sector gearing, relative to the other countries.

liberalisation was particularly marked in these countries, allowing households much increased access to credit in the 1980s. Deregulation allowed increased competition in the supply of certain products e.g. mortgages; increased competition helped drive down the rate of return required on credit e.g. the margin of borrowing rates over risk free rates was shaved in an attempt to compete for business; innovation allowed the development of new forms of finance such as junk bonds, swaps, options, floating rate instruments (with or without caps or collars) etc. Financial liberalisation could thus be a significant factor behind recent trends in both corporate and household sector financial behaviour.

With regard to public debt-income ratios, however, quite different patterns are to be observed. Over the period in question the ratio has increased in all the countries in the sample, with the exception being found this time in the UK, where it has fallen significantly. In the US the ratio displayed a trend decrease until the early 1980s, after which time substantial increases have occurred. In Japan, the increase over the period has been particularly spectacular. During the 1980s, the UK has been replaced by Japan as the country with the most highly geared public sector. The German ratio has remained lowest, and the US ratio, despite large recent increases, is still lower than the French ratio. Thus despite much concern over the actual size

of the US public debt ratio, it is in fact relatively low¹⁶.

Thus although there appears to have been a general increase in debt-income ratios in the countries studied during the period in question, some notable exceptions exist. Furthermore, the ranking of gearing ratios in different sectors has varied greatly between the countries in question. It should be remembered that the differences observed stem to a certain extent from the lack of comparability of the data used. The results generated should therefore be treated with caution.

Nevertheless, it would appear that increases witnessed are not all due to general factors which may have emerged to encourage the use of debt by all sectors of the economy, e.g. increased availability of credit. There must be further sector- and country-specific explanations.

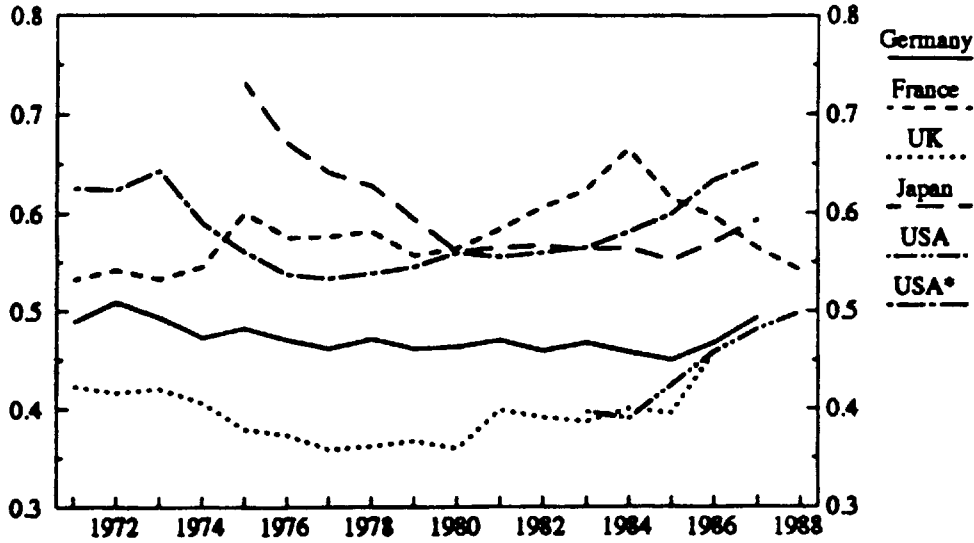
The denominator used so far in this section has been a measure of national income. This was selected as a common denominator for the purposes of sectoral comparison. However, measures of sectoral income would be more appropriate since they take account of changes in income shares etc. Unfortunately, it has proved impossible to find sufficiently comparable data to carry out a meaningful inter-sectoral analysis. We have thus

¹⁶ Indeed, R.J. Eisner in 'How Real is the Federal Deficit?' (The Free Press, New York, 1986) claims that more accurate measurement of US public debt would indicate that real levels have been much lower than suggested recently, and fairly small budget deficits, or even surpluses, have been experienced in recent years.

concentrated on the behaviour of the corporate sector alone. Turning once more to the BACH data bank, measures have been constructed for the corporate sector using gross corporate income as recorded in company accounts as the denominator of the debt-income ratio.

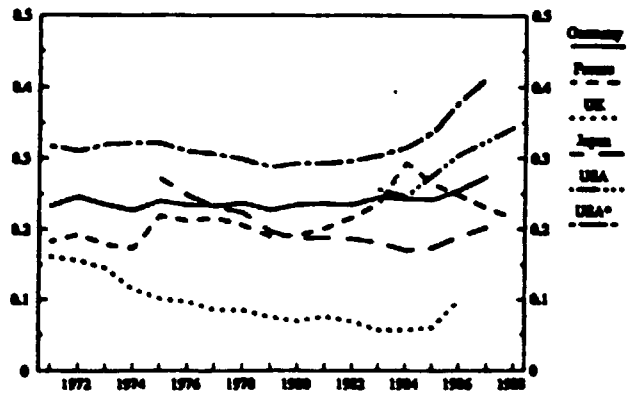
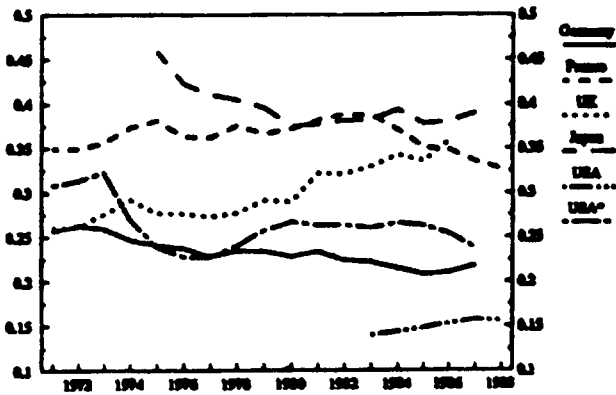
Debt-Income Ratios

II.7a Total Debt-Gross Income Ratio



II.7b Short-Term Debt to Gross Income Ratio

II.7c Long-Term Debt to Gross Income Ratio



Source: BACH, Commission of the European Communities, OECD Financial Statistics (USA*), Economic Report of the President (US income)

Except in France, rather different behaviour in debt-income ratios as compared to the measures of corporate gearing outlined at the start of this chapter (debt-equity and debt-liability ratios) is to be seen. In the other countries in the sample, the debt-income ratio fell at differing rates between the early 1970s and the mid-1980s, after which time sharp increases were witnessed. However, except in the cases of the USA and the UK, in the late 1980s the ratios had not reattained the levels of the early 1970s.

It would thus appear that although corporate indebtedness has risen significantly since the early 1970s, there has also been a substantial rise in corporate sector income. This has prevented corporate debt-income ratios from exceeding early 1970s levels at the end of the 1980s everywhere except in the USA where a staggering rise is to be witnessed despite income reaching record levels at the peak of the boom. There may thus indeed be cause for concern in the US about rising gearing ratios (see Bernanke 1989).

B.3 *Summary*

In this section various measures of the corporate gearing ratio have been considered. Over the past twenty years, gearing ratios in France, Germany and Japan have been higher than in the US and the UK. At the same time, we have seen that with the

exception of Japan and more recently France, the ratio of debt to total liabilities appears to have been increasing in the countries under consideration since the early 1970s. The upward trend has persisted during the 1980s despite a general upturn in economic activity. The same broad trends have also been witnessed in debt-national income ratios in both the corporate sector, and other non-financial sectors of the economy. Moreover, although since the early 1970s debt-corporate income ratios appear to have risen significantly only in the USA, there have been significant increases in all the countries concerned with the exception of France since the mid-1980s. This is surprising given that the increases followed the ending of recession in the early 1980s and subsequent move into a period of sustained growth and rising income accompanied by high real interest rates.

A general rise throughout the 1970s and 1980s in the debt-liability ratio in the countries in our sample has been established above; we will now consider the behaviour of the weight of this debt in the capital structure, i.e. the debt burden.

C DEBT BURDEN

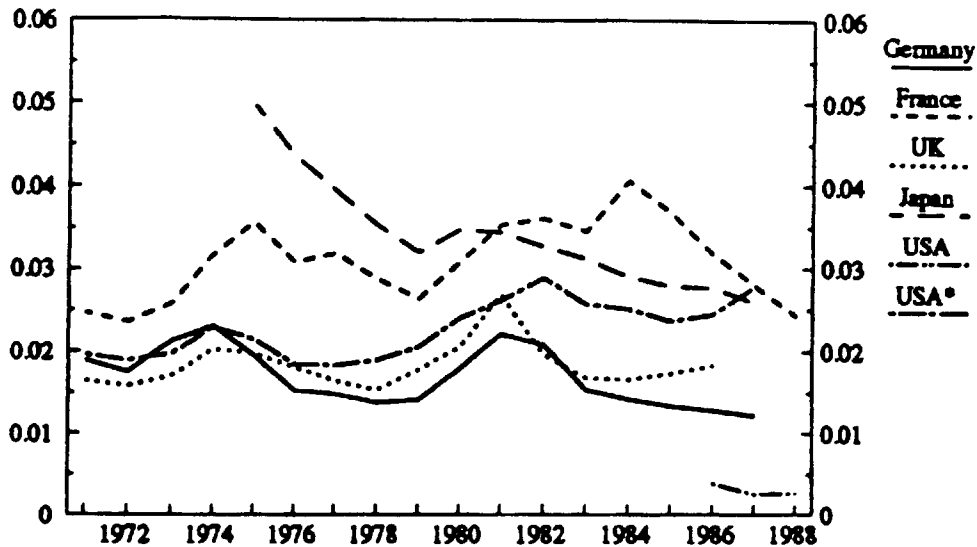
The total weight of outstanding debt interest payments is a measure of the burden of debt. We could expect the burden of

debt as a proportion of corporate income to move counter-cyclically, in the same way as the gearing ratio. During recessions the burden of debt must weigh more heavily on firms as income or profits fall and debt service takes up an increasing proportion of available finance. In expansionary periods, on the other hand, rising income and profits should automatically reduce the debt burden. We see below that this indeed appears to have been the case.

C.1 *Income Gearing*

This indicator is defined here as the burden of interest payments and other charges of debt as a proportion of income. In chart II.8 below, we see that this ratio appears to have behaved in a similar way to the gearing ratios described in section B up till the early 1980s.

II.8 Burden of Debt



Source: BACH, Commission of the European Communities and OECD Financial Statistics (USA*)

However, after peaking in 1981 (slightly later in France) at the height of the recession it has since been falling and values would not now appear to be disturbingly high, except perhaps in the US. The wider US measure based on OECD data (USA*) remains well above 1970s levels and exceeds ratios in all the other countries in the sample by 1987. Furthermore, the continued fall back in the ratio from the peak in the early 1980s enjoyed elsewhere was subsequently offset in the US due to large increases in corporate debt holdings since the late 1970s (chart II.2e) and high yields (see chapter IV).

Although the US evidence is conflicting, both charts II.7a

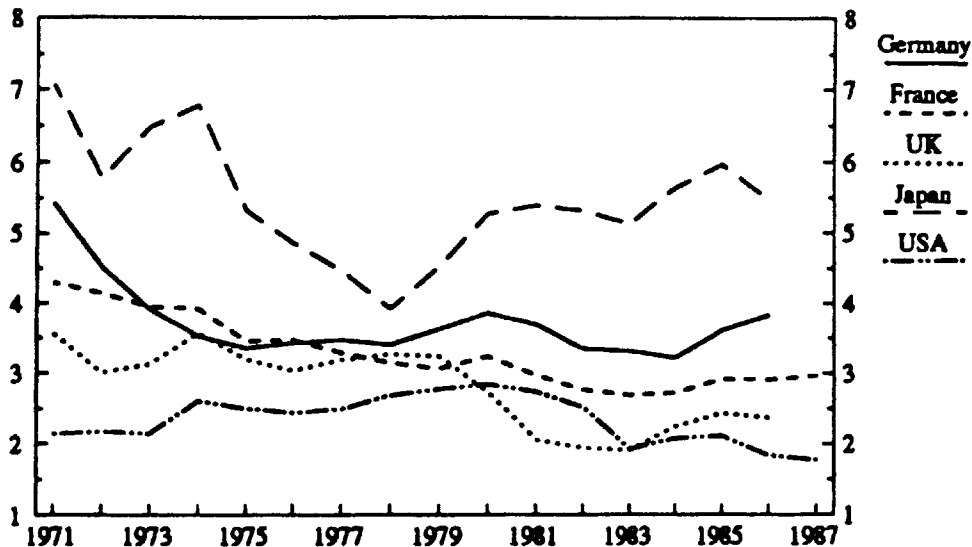
and II.8 indicate that income has risen sufficiently in the late 1980s to cope with increases in debt. As a result, some commentators suggested that fears over increasing financial fragility were exaggerated or even misplaced (Modigliani and Poterba 1989), although the subsequent slow-down and fall in income following the onset of recession will have changed the picture more recently. These tendencies could well affect investment decisions both directly, and indirectly, through the interaction of financial structure with yields and behaviour in the financial markets. We go on now to look at the behaviour of investment in recent years.

D INVESTMENT

As a proportion of GDP, manufacturing investment has generally been in decline since the mid-1970s in the countries studied with the exception, once more, of Japan.

In Japan the investment ratio has picked up significantly since the late 1970s, following a substantial decline during the 1970s. There is evidence of a slight upturn in German and UK manufacturing investment since the mid-1980s, but on nothing like the Japanese scale.

II.9 Investment as a Proportion of GDP



Source: BDS data bank, Commission of the European Communities

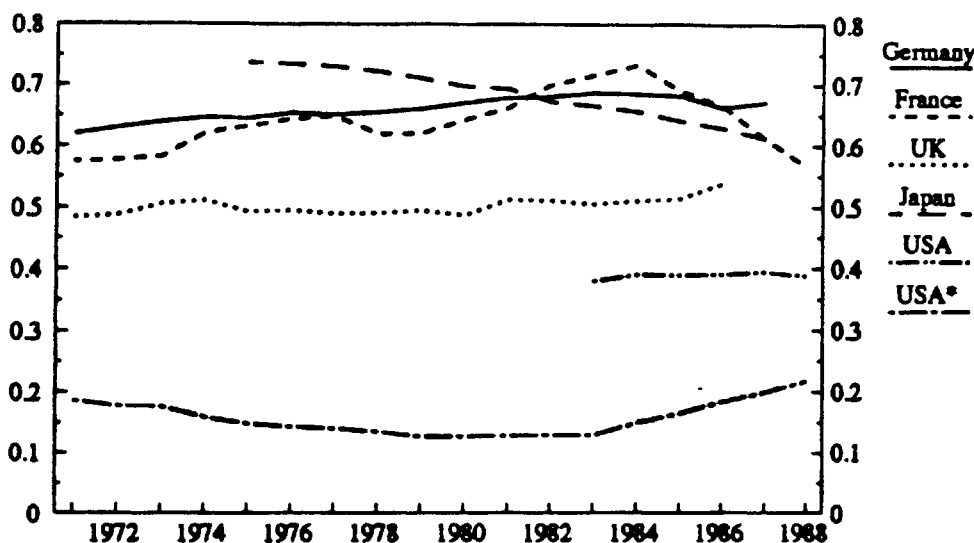
Another feature to be noted, is the great difference between the level of investment carried out in Japan as compared to the rest. The rate of investment as a proportion of GDP in Japan has significantly exceeded rates in the other countries over the entire period.

Thus again Japan stands apart from the other countries studied here. In section B we noted that the fall in the gearing ratio during the 1970s and 1980s was unique to Japan. Here, we note that relatively strong investment performance is also unique to Japan.

We explained earlier how these features were both largely due to characteristics prevailing in Japan. After the second world war the Japanese economy grew very quickly as attempts were made to catch up with the West. A high saving ratio provided substantial funds for industry, and Japanese managers were able to engage in high levels of investment thanks to various incentives such as very high rates of depreciation. High profits in turn helped boost equity values and issues. At the same time, we discussed earlier how Japanese debt tends to be relatively understated. Rising investment has thus been accompanied by falling debt-equity ratios in Japan. The picture in the other countries is, however, rather different.

When considering the relationship between gearing and investment, the gross ratios outlined in section B are not the necessarily the best bench mark. A more appropriate measure to consider is gearing net of financial assets since we are then considering only the liabilities available for physical investment (Corbett, 1987). We have presented a measure of net gearing in chart II.10. Although once investment in financial assets such as shares has been netted off the ratios are clearly lower than the gross gearing ratios presented at the beginning of this chapter, trends displayed and the ranking of the countries remain unchanged.

II.10 Ratio of Total Debt Net of Financial Assets as a Proportion of Total Liabilities



Source: BACH, Commission of the European Communities and OECD Financial Statistics (USA*)

Comparing financial and investment behaviour, we see for example that Japanese gearing ratios are high relative to the other countries in the group, and so is the level of investment. On the other hand, US investment and US gearing ratios are both relatively low. High gearing ratios would thus appear to go hand in hand with high levels of investment. However, over time gearing and investment would appear to move in opposing directions. Whilst gearing ratios have generally been increasing since the early 1970s in Germany, France, the UK and the US, investment has tended to fall over this period. In Japan, on the

other hand, where gearing ratios have been falling, investment as a proportion of GDP has grown strongly since the recession of the mid-1970s.

Hence, although it was suggested above that rising gearing ratios probably do not pose a serious threat to financial stability, they may have damaging real effects. Although high gearing ratios in Japan have been associated with high investment, increased gearing does not seem to be associated with increased investment. It is therefore of the utmost importance that the gearing - investment link be thoroughly investigated and as precisely established as possible.

E SUMMARY OF STYLISTED FACTS

- 1) Over the past twenty years gearing ratios have been much higher in Japan, France and Germany than in the UK and the US.
- 2) Investment as a proportion of GDP has also been higher in Japan, France and Germany than in the UK and the US.
- 3) There has been a significant increase in gearing ratios over the last twenty years in the countries investigated with the exception of Japan.
- 4) While gearing ratios have been rising over the past two decades, corporate investment as a proportion of GDP has been steadily falling, again with the exception of Japan.

5) Thus although higher gearing ratios would appear to be associated with higher investment, over time investment and gearing would appear to be negatively related.

In an attempt to discover more precisely the link between patterns in corporate finance and investment, we turn in the next chapter to a theoretical examination of the determination of corporate financial structure, before presenting an empirical analysis of the determinants in chapter IV.

III THE DETERMINANTS OF CORPORATE FINANCIAL STRUCTURE: THEORETI- CAL CONSIDERATIONS

In this section, we begin our description of corporate financial behaviour with a simple model based on some rather restrictive assumptions. We then proceed to gradually relax these assumptions and extend the analysis, with the aim of formulating a realistic and far-reaching description of the role of the corporate gearing ratio.

We begin by presuming that managers acting in shareholders' interests aim to maximize the market value of the firm. Shareholders have the power to impose sanctions on managers to behave in this way through the possibility of takeovers and/or the threat of dismissal. Managers must thus try and find investment projects which yield shareholder wealth maximisation. When deciding how to finance these investments, presuming unlimited availability of finance¹, the required return and riskiness of the various sources of funds available must be assessed. These basic and simple assumptions underlie the traditional theory of corporate finance. We will look first at this before moving on to more sophisticated developments.

¹ This is a very strong assumption that we will see is unlikely to hold in many cases, particularly in the short run.

A THE TRADITIONAL THEORY OF CORPORATE FINANCE

Firms are obliged to pay some specified return on corporate bonds and loans. Corporate debt is thus safer and with a lower required rate of return than equity which does not guarantee any specific return. Increasing the gearing ratio should lead to a reduction in the average cost of capital as lower yield debt replaces higher yield equity. However increasing amounts of debt in the financial structure of the firm lead to increasing risk of financial distress and bankruptcy as the proportion of fixed obligations to be paid with respect to capital (or income or profits) rises. Creditors then demand higher returns on their loans to compensate them for the increased risk faced as the gearing ratio rises.

The required rate of return on equity also rises as equity holders face increased uncertainty with respect to dividend income and to the value of their shares.

Furthermore, if investors are already satisfied with the volume of securities on the market, higher returns must be offered to them if they are to be persuaded to take up the increased supply.

At a certain point, the above costs associated with increased gearing ratios begin to outweigh the advantages gained from increasing the proportion of relatively less expensive debt

in the capital structure and cause the initially falling weighted average cost of capital to start rising.

In this way, the optimal combination of the various sources of funds in the capital structure, the gearing ratio, can be determined. The gearing ratio here is a measure of the proportion of debt, D , to all sources of funds. For the sake of simplicity, funds are divided into two broad groupings: debt, including bonds and other forms of borrowing, and equity, E^2 .

The gearing ratio, G , is then:

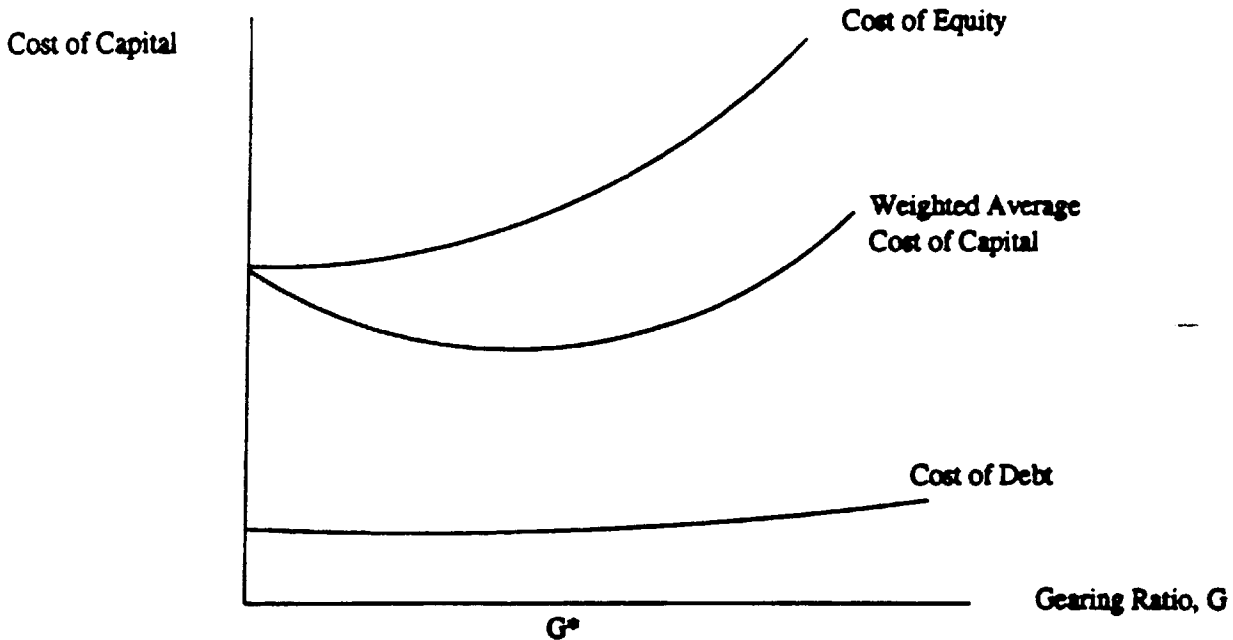
$$G = \frac{D}{(D + E)}$$

To recap then, according to the traditional theory of corporate financial behaviour, there exists some optimal gearing ratio towards which managers aim, where the cost of capital is minimised subject to a chosen acceptable level of risk. As gearing rises, the financial advantages of debt relative to

² It is sometimes difficult to decide what group a liability should fall into, especially recently with a proliferation of financial instruments on the market whose characteristics increasingly defy more traditional categorization. There exist some liabilities which simply defy classification e.g. 'mandatory redeemable preferred stock' which is classified **between** equity and a liability by the Securities and Exchange Commission. There exist others that, although they appear to be debt, have the characteristics of equity thanks to the nature of the loan and/or of the financial system in which they are traded, see e.g. Corbett (1987), or 'How to Juggle Numbers so the Debt doesn't Show', Business Week, 7th November 1988, p. 52.

equity outweigh the additional risk entailed and the weighted average cost of capital falls. This process continues up to a certain point after which rising required rates of return on both debt and equity cause the cost of capital curve to rise. The curve is thus U-shaped.

Figure 1. The optimal gearing ratio according to the traditional theory of corporate finance.



This can be seen in figure 1 where G^* represents the optimal gearing ratio. The equity yield curve is shown to be consistently above the debt yield curve. One might expect equity to be less expensive than debt since once flotation costs have been laid out, the only remaining charges are the dividends set at the discretion of the managers of the firm. Moreover, the nominal interest payable on debt - which may also involve an initial fee when arranged - is usually fixed and does not rise as profits increase as could be the case with dividends.

However, equity holders demand a premium for holding liabilities that are more risky. Moreover, interest payments on

debt are considered to be fixed costs. They are hence deductible against corporation tax³. As a result the cost of equity tends to exceed the cost of debt. At the same time, the real return on equity involves some further charges than immediately apparent. According to the dividend model the real return on equity capital is equal to current yield (dividends divided by share price) **plus** the growth rate of future dividends. Even if no dividends are paid, real returns are still positive and could be represented by earnings yield (earnings per share divided by share price) plus the growth rate of earnings. Alternatively, the real return on equity according to the Capital Asset Pricing Model is equal to the long-term risk-free rate of return (on e.g. government bonds), plus overall risk weighted by the covariance of the stock with market fluctuations (beta value).

Thus in general the real return on equity is likely to be higher than the required rate of return on debt. This assumption is supported by empirical evidence (see chapter IV section B.5).

However, the above analysis does not constitute a theory of corporate finance. It is a rationalisation of average capital structures witnessed in western economies. A full theory describing the dynamic relationship between the cost of capital and financial structure, and their interaction with market forces

³ The weighted average cost of capital thus becomes:

$$[(D/D+E) * r_D * (1-t_c)] + [(E/E+D) * r_E]$$

where t_c is the rate of corporation tax.

has yet to be formulated. In theoretical terms, it has in fact been argued that the traditional model with its U-shaped cost of capital curve may not be valid. In 1958, Modigliani and Miller described the conditions under which the weighted average cost of capital curve may be flat. They showed how corporate financial policy may be irrelevant, in which case an optimal gearing ratio does not exist. Although their arguments are based on some very strict assumptions which if relaxed may allow differing results - a point duly noted by the authors in their seminal paper - this was nevertheless the first rigorous formalisation of corporate financial theory and serves as a useful departure point for a discussion of this area.

Studies in this field to date have usually departed from the basic Modigliani-Miller model and improved realism through extension of the model, or through relaxation of one or more of the assumptions. This procedure is followed throughout this chapter, serving as the basis for the ensuing discussion of the development of the theory of corporate finance. First the basic Modigliani-Miller model itself must be outlined.

B THE MODIGLIANI-MILLER THEOREM - NO TAX, NO BANKRUPTCY

Although investment decisions may have real effects, the way in which investment is financed - by debt, equity issue or

retained earnings - need have no real effects as far as the market value of the firm is concerned according to the Modigliani-Miller theorem. Investors in this case are indifferent to variations in the gearing ratio and to whether returns on equity are in the form of dividends or capital gains.

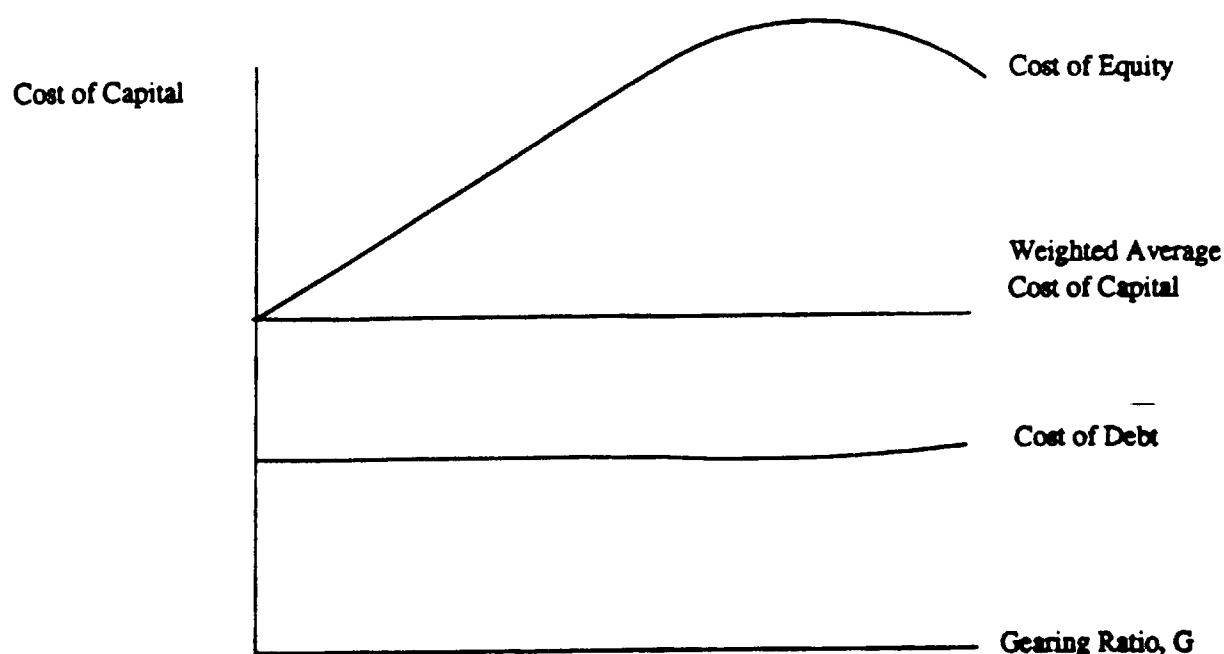
The Modigliani-Miller position is argued from the basis of some very strict assumptions. It is presumed that individuals and companies can borrow at the same rate of interest. Corporate and personal borrowers are presumed to have identical risk characteristics i.e. firms do not enjoy limited liability unless it is presumed that individuals do as well. Expectations are homogeneous. Capital markets are perfect: there are no transactions, bankruptcy, agency or information gathering costs, there are no borrowing constraints and there is no taxation. In the light of these assumptions, the Modigliani-Miller position is derived in the following way.

As already noted, corporate debt pays a known return whereas returns to equity are variable, depending on e.g. firm profitability. Individuals are thus prepared to accept a lower return for holding debt than they would require to hold equity. From the point of view of cost of finance, debt is the preferred method of financing for the managers of the firm.

If the gearing ratio rises as a consequence of increased debt issue however, a larger share of firm income is obliged to go to debt service. As returns to equity look less certain, or

even liable to decrease, equity holders demand higher yields. Gamblers with a preference for risk may find equity more attractive the more uncertain returns are. At very high gearing levels, the required rates of return on equity could well begin to fall as a result of this effect. At the same time, however, required rates of return on debt are liable to start rising along with the gearing ratio as the risk borne by debt holders increases. Even when there is no bankruptcy, returns to debt are not guaranteed if the value of assets falls below the value of the liability.

Figure 2. Cost of Capital in a Modigliani-Miller No-Tax World.



Modigliani and Miller argue that at any 'reasonable' level of gearing, the advantage of the lower required rates of return on debt relative to equity are exactly offset by the increasing returns demanded by equity-holders as the gearing ratio rises. At very high gearing levels, returns to equity are extremely risky. It may be that equity in such companies is held only by risk preferers. Beyond certain gearing ratios, required rates of return and the cost of equity to the firm could then fall. However, this is likely to be offset by increases in the cost of debt at high gearing levels mentioned in the previous section.

Thus if a firm varies its gearing ratio, the market value of the firm is not affected - only investment counts. The way it is financed is irrelevant as in figure 2 above. This is

because of the existence of arbitrage, which operates in the following way.

Let us consider for example two firms with identical risk characteristics and the same market valuation. One firm increases its gearing ratio. Debt is relatively cheaper than equity. Increasing the proportion of debt in the capital structure results in a lower average cost of capital and a higher stock market valuation. Although the price of this firm's shares is now higher, its shareholders are however, facing increased risk. They thus sell shares in this firm and buy in the lower geared firm in order to re-attain their desired risk position. The normal laws of supply and demand apply, so the sale of shares in the more highly geared firm causes their price to fall and the price of the shares being bought rises. This process continues until the market values of both firms are once again equal.

Furthermore, this ability on the part of investors to undo the effects of changing corporate gearing means that firms need not be concerned with providing income streams that match the desired consumption patterns of debt and equity holders. Firms can thus concentrate on selecting the best investments and maximizing market value. If the ensuing income streams do not match desired consumption patterns, investors can indulge in home-made gearing - borrowing and lending in the capital market until maximum utility is attained. So dividend policy is also

irrelevant. Even if some of the assumptions of the above model are relaxed, it can still be shown how the firm's financial policy can be irrelevant. We will first consider the assumption concerning no bankruptcy.

C MODIGLIANI-MILLER - NO TAX, COSTLESS BANKRUPTCY

If it is presumed that bankruptcy exists, but simply as a transfer of ownership to creditors entailing no costs, and creating no moral hazard problems, then as long as there exist perfect substitutes for the firm's securities in other available securities, the firm's financial policy can still be irrelevant (Gordon and Malkiel 1981). The existence of perfect substitutes in a perfectly competitive capital market allows investors to match the combination of the division of the firm's returns between debt and equity by combinations of alternative securities. Since the sum of the prices of debt and equity in a perfect capital market must equal the price of that proportional share in the firm, no gains can be made by varying the gearing ratio. These conclusions are yielded by the assumptions of the capital asset pricing model: perfect markets with no information or transactions costs, a fixed quantity of perfectly divisible marketable assets and risk-averse utility maximizing individuals who have unlimited access to markets at the risk free rate of

interest which is equal for both borrowers and lenders⁴. In this case, securities are characterised completely by their covariance with the overall market return, and a firm's financial policy does not affect the market return i.e. firms - like investors - are considered to be small and numerous. Hence the value of the firm is unaffected by how returns are divided between debt and equity: it is determined by expected returns and the degree of covariance of these with the market return. The existence of complete contingent commodity markets, and intermediaries willing to costlessly repackage the firm's financial structure are also necessary for the conclusions of the Gordon and Malkiel model to be attained. Clearly, all these assumptions are very restrictive. We will see that relaxation of some of these assumptions can lead to very different results. For example, it was first presumed that bankruptcy did not exist, then it was allowed to exist but presumed to entail no costs. The question of whether bankruptcy does indeed entail any costs is now examined, prior to an investigation of how relaxing this assumption can affect the conclusions drawn above.

⁴ A discussion of these assumptions and the derivation of the Capital Asset Pricing Model may be found in any good textbook on corporate financial theory e.g. Copeland and Weston (1983).

D MODIGLIANI-MILLER - NO TAX, COSTLY BANKRUPTCY

As the proportion of debt in the firm's capital structure rises, the probability of financial distress and bankruptcy increases. Firms are obliged to pay interest on debt commitments and may not usually withhold payments if faced with adverse circumstances - as they can with equity dividends. As the proportion of fixed obligations rises, the risk of the firm not being able to honour commitments rises, and hence its susceptibility to financial distress. In a financially distressed position, firms may have to direct funds away from potentially profitable investment opportunities into satisfying debts. In the extreme case of bankruptcy, considerable further costs may be involved. The most obvious are substantial administrative and legal costs. However, there is some debate as to the empirical relevance of these costs. In the US in the 1960s, for example, Baxter (1967), and Stanley and Girth (1971) estimated these costs to be of the order of 20% of assets. However the cases investigated were only of individuals and small companies. Warner (1976) in subsequent studies of larger companies found the direct costs of bankruptcy to be very small (average 1%), and decreasing with increasing firm size. However it must be emphasised that these are the direct costs which may only be a fraction of the total costs involved. Other costs arise in the sense that assets have to be sold off hastily and may realize less than their real

value. They also lose their going concern/synergy value. Managers themselves are likely to face very high costs in the event of bankruptcy. Unlike investors who generally hold diversified portfolios, managers hold completely undiversified portfolios as far as their labour is concerned. For an investor, bankruptcy of one firm may mean the loss of a very small proportion of their portfolio; managers, however, lose all their income. The threat of bankruptcy is also costly in the sense that it causes an increase in the uncertainty of the already uncertain real returns to investment. These indirect costs are difficult to define clearly let alone measure. Altman (1984) in a study of US industrial firms calculates a proxy by comparing the difference between expected profits prior to bankruptcy with actual profits. As would be expected, he finds total bankruptcy costs higher than direct costs alone. However it is difficult to get any real feel for the costs involved. Apart from the few studies mentioned here, empirical evidence on the bankruptcy cost question is rather scant and it is difficult to reach any conclusions on this basis.

A possible alternative to bankruptcy is re-organisation (see Gordon and Malkiel (1981) for a thorough discussion of this topic). This can, however, be a very complicated and lengthy business involving negotiations with each individual investor. It may even be an impossible task, and will certainly be costly, maybe even as costly if not more so than bankruptcy. Creditors

may anyway insist on liquidation even when it is less efficient than re-organisation. They have priority over equity holders and may be concerned only about their own claims being satisfied, not about making the effort to ensure that the amount left over for equity holders is maximised when this may entail putting themselves in an even more uncertain situation. Also, bondholders would be paid the par value on their bonds in the event of liquidation (presuming there are sufficient funds available), so if market conditions were unfavourable to bondholders at the time e.g. rising interest rates eroding the market value of bonds, it would be in their interest to press for liquidation as they would suffer a loss in the event of re-organisation. It may also be that bankruptcy is preferable to re-organisation for the firm itself. Any new loans to a bankrupt firm get automatic priority, whereas new loans to a re-organised firm do not necessarily. Thus although re-organisation may be less costly, it may be that bankruptcy is the only way in which the firm can obtain new funds.

A moral hazard problem may also arise in the event of the threat of bankruptcy. Managers acting in the interests of stockholders may be tempted to follow an inefficient financial policy. If they issued more debt in order to repurchase equity, managers would be aiding the stock holders at the expense of existing creditors. This process can involve complications however. For example, if repurchases mirror dividend payments then they may

be taxed as such, or there may be accusations of insider trading. Furthermore, in some countries e.g. Great Britain, the repurchase of stock via debt issue is illegal. Alternatively, managers could accept more risky investments in an attempt to improve returns to the stockholders at the expense of increased risk faced by the debt holders. If new debt issued to finance these schemes has the same priority in the event of bankruptcy as the existing debt, then existing debt holders face increased credit risk with no compensating increase in returns. Creditors could try and anticipate these problems by demanding higher interest rates when they first agree to take the debt. Nevertheless, once the price is set and accepted, it cannot subsequently be varied in the face of a change in risk position.

Individuals could instead indicate a preference for indexed debt and variable and floating rate corporate debt, which has become much more widely used in recent years. Variable rate debt is however, subject to both increase and decreases in return, and fixed rate debt may be preferred where a known nominal return is considered important, for example for cash flow reasons. Alternatively, creditors could try insisting on covenants giving existing debt priority over new debt. These are not always recognised by the courts however, and covenants designed to control the types of investments undertaken by managers are very limited in their scope. Hence, when debt is risky, it is probably impossible to completely eliminate the moral hazard

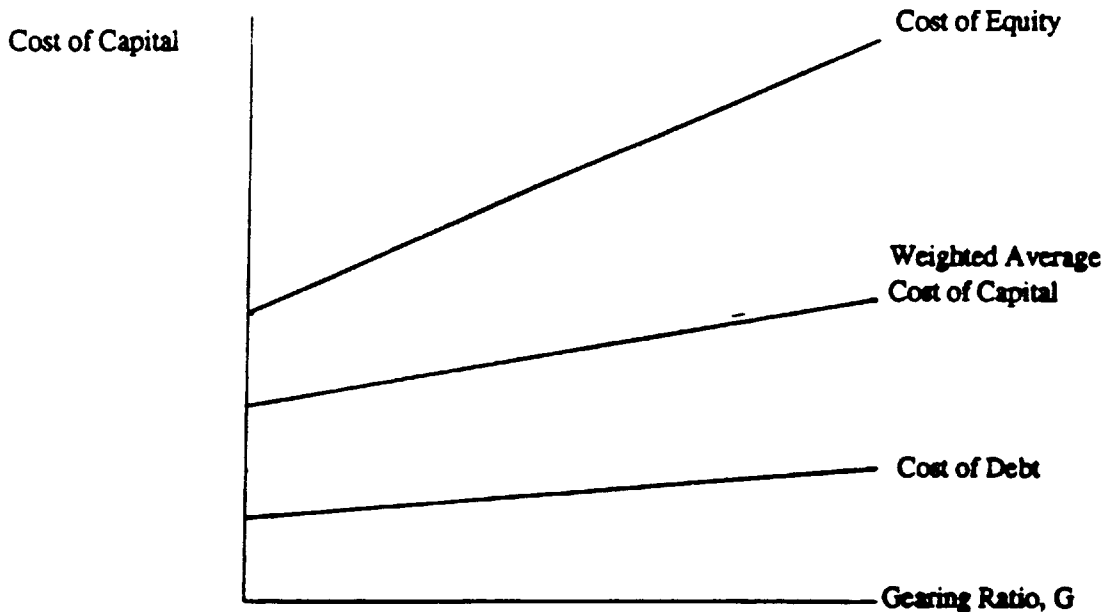
issue.

In a Modigliani-Miller world where costly bankruptcy exists, corporate debt carries a risk premium. This implies that managers would try to finance the firm as much as possible by equity capital. As the gearing ratio falls towards zero, any outstanding debt remaining becomes essentially riskless and the risk premium falls away.

In this situation, the dividend pay out rate would still be irrelevant however, unless individual investors had preferences between dividends and capital gains. In this case, the firm would have an incentive to take these preferences into account.

For example, those investors who use their returns for consumption prefer the firm to pay profits out as dividends in order to avoid the transactions costs involved in selling the securities needed to achieve this desired level of consumption. However, if by paying all earnings out as dividends the firm was obliged to make new issues of liabilities in order to finance new investments, it would be faced with underwriting and selling fees. So the firm might find it advantageous to retain at least some of its earnings. Furthermore, those individuals that would reinvest anyway prefer earnings to be retained, allowing them to avoid brokerage fees and commissions on new investments. Thus consumers prefer to invest in firms with little need for new funds since they are more likely to receive dividend payments, and re-investors prefer those firms in greater need of funds.

Figure 3. MM without tax with costly bankruptcy



To recap then, the conclusions reached so far in a Modigliani-Miller world, but allowing for costly bankruptcy, are that the firm aims for a gearing ratio tending towards zero as depicted in figure 3, and that dividend policy depends largely on investors preferences.

However, at least in the countries under investigation, corporations tend to have significantly positive gearing ratios. It is therefore necessary to consider the reasons why a firm might indeed issue a certain amount of debt, given the assumptions laid out above.

Bernanke (1989) describes how use of debt may provide incentives to increase efficiency. For example, an entrepreneur who begins a solely equity financed firm has an incentive to make profits that will be shared out amongst the entrepreneur and the shareholders. If a proportion of the finance required comes from debt, however, once the fixed debt obligations have been satisfied, the pool of claims on the remaining profits is smaller. In the second case, the incentive to work harder and more efficiently is clearly greater as this entrepreneur enjoys greater returns for his efforts. This is in addition to the incentive for the manager to perform well to avoid the possibility of bankruptcy or takeover.

Underwriting and selling fees generally tend to be lower for debt than for equity.

Debt is more flexible than equity funding in the sense that it can be raised more quickly and easily in order to meet short term and seasonal needs.

There may be signalling and agency costs associated with debt issue. Recognition of this fact has led to a very fruitful literature that will be discussed in more detail later.

Furthermore, equity issues tend to be made when the market value of the firm is very high, even excessively so. Investors recognizing this either bid the price down or buy debt.

Finally, according to the theory at least, probably the most important explanation for the existence of debt in the firm's

financial structure is taxation. For example, King and Fullerton (1984) find the effective tax on new equity to be just over 100% higher than that on new debt in the United States, and just under 100% in the UK.

Modigliani and Miller also recognised the theoretical importance of taxation in determining financial structure and produced a correction to their original theory incorporating this element in 1963.

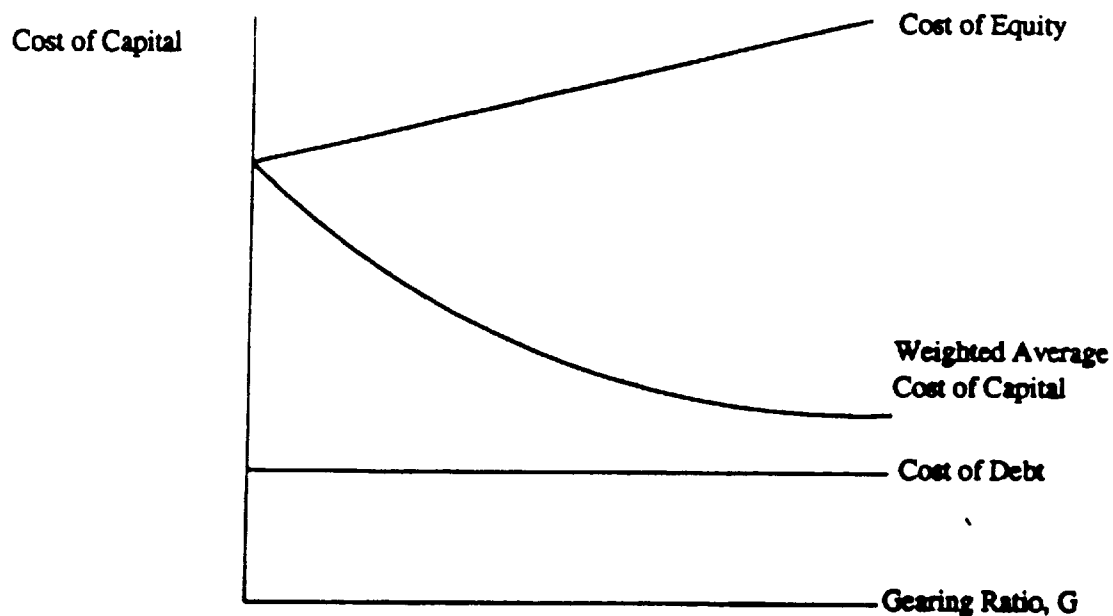
E MODIGLIANI-MILLER - TAX, COSTLY BANKRUPTCY

Firms' profits are liable to corporation tax. If profits are retained and the value of the firm rises, equity holders are liable to capital gains tax on any gains realised. Alternatively, if profits are distributed, equity holders have to pay income tax on dividends received. Thus equity holdings are liable to be taxed twice - at the firm and at the individual level, regardless of whether profits are retained or not⁵. Interest payments on debts are however considered as fixed costs and can be offset against corporate tax liability. In terms of taxation, debt is cheaper than equity capital.

⁵ This is the case in an economy using a classical system such as the US. In all the other countries studied, some attempt is made to lessen or remove this double taxation of equity making systems more neutral by using either an imputation system or shareholders relief schemes.

Thus it could be expected that firms would gear up as much as possible. This scenario is depicted in figure 4. Replacing equity with debt brings down the average cost of capital. As the gearing ratio increases, the weighted average cost of capital falls towards the required rate of return on debt. However, just as gearing ratios do not tend to zero, as mentioned above, neither do they tend on average to 100% in the corporate sectors of the countries investigated in this study. There must therefore be some further costs attached to debt finance that have not yet been considered.

Figure 4. The Modigliani-Miller Model with Tax



One cost involved with increased gearing ratios may arise through tax exhaustion. Beyond a certain amount of debt, firms may find they no longer have sufficient tax liabilities to take advantage of tax relief on debt interest payments. The tax advantage then disappears and the cost of debt to the firm rises significantly.

If we begin to relax and modify some of the assumptions underlying the Modigliani-Miller theorem, a number of further possible explanations come to light. We begin by considering a major contribution to the theory published by Miller in 1977.

Here he analyzes corporate finance in a world with differential tax treatment of investors.

F RELAXATION OF THE ASSUMPTION OF NO DIFFERENTIAL TAX TREATMENT

In this analysis, it is still maintained that an optimal gearing ratio for the individual firm is indeterminate, but that an optimal equilibrium corporate gearing ratio does indeed exist in the aggregate. The assumptions on which the model is based are the same as those in the Modigliani-Miller tax world, except that differential tax treatment of different classes of investors is now allowed.

When deciding how to distribute earnings, the firm is faced with a number of alternatives. The earnings remaining after outstanding debt has been serviced can be used for new investment, dividends, or to repurchase equity and/or debt. In the perfect markets of the Modigliani-Miller world, the firm invests until the marginal return on investment is equal to the market rate of interest. If the marginal return on investment exceeds the market return, the firm increases investment finding an advantage to be gained, or if it is less than the market rate it switches from capital investment to investment in financial assets yielding a higher (the market) rate of return. The same

must also be true when making a decision about the choice between repurchasing securities or purchasing other financial assets. Although repurchase of debt leads to a reduction in interest outlays, it also reduces tax deductions allowable against firm income. On the other hand, as mentioned before, repurchase of equity is in some cases illegal, and in others may involve quite serious complications. Hence it is presumed that the firm concentrates on the choice between investment and paying dividends when deciding how to dispose of earnings.

Miller presumes that capital gains are not taxed and therefore the firm chooses to retain all earnings, paying no dividends which are subject to tax. When Miller developed his theory, dividends in the US were indeed taxed more heavily - at rates up to 50% - compared to capital gains on which a maximum rate of 20% was paid. However, the 1986 Tax Reform Act has since brought taxation rates on dividends and capital gains into line (Brealey and Myers 1991). Nevertheless, although the assumption of zero capital gains tax may seem absurd on the face of it, the rate can in fact be very low, below the income tax rate, and may indeed be zero in certain circumstances. The tax is due only when the asset in question is sold. Payment of this tax can thus be postponed indefinitely by simply not selling the asset, and there is no penalty for behaving in this way. Indeed, if investors die before selling an asset that has earned capital gains, they pay no capital gains tax. Furthermore, capital

losses can be realised selectively, earlier than capital gains: in a well diversified portfolio, the payment of capital gains taxation can be completely offset. Certain countries make positive allowances for capital gains, e.g. in the US 60% of long term capital gains are excludable from taxable income; the first £5500 p.a. are exempt for individuals in the UK, and much greater sums for those nearing retirement age (who tend to hold a greater proportion of assets than younger generations).

So it is clear then that the capital gains taxation rate may be substantially lower than the rate of tax levied on dividends. The investor is thus faced with the choice of holding shares and receiving income in the form of capital gains which attract little or no tax, or bonds where income is taxed. Thus the personal tax system favours equity finance. The bias of the personal taxation system in favour of equity increases as the proportion of equity earnings deriving from capital gains increases. The corporation tax system, on the other hand, favours debt finance as we saw earlier.

Faced with a choice between purchasing corporate bonds and shares, investors are indifferent only if the marginal personal tax rate is equal to the corporate tax rate. If the personal tax rate is in excess of the corporate tax rate, a higher before tax rate of return on bonds must be offered to investors to persuade them to hold bonds rather than equity. Presuming the firm has sufficient excess tax liabilities, it can simply offset this

increase against them.

The lower the gearing ratio of the firm, the more likely it is to have excess tax liabilities, and the more able it is to offer higher rates of return to bondholders.

Thus investors in the highest tax brackets should prefer to hold bonds in firms with the lowest gearing ratios, since it is only here that they can get returns high enough to offset their own personal tax liabilities. These firms are both more capable of offering the highest returns, having only a low proportion of fixed obligations on their income streams; and more willing, since more likely to have unused tax liabilities against which they can offset these higher costs. Thus personal tax liabilities influence the amount of gearing in the corporate sector from the demand side. The rate of return on tax exempt securities such as some forms of National Savings in the UK and State and Local Government Bonds in the US also has an important influence. In the presence of tax exempt bond income, before tax returns on income tax liable bonds must be sufficiently high to persuade individuals to hold them. Thus the rate of return on tax exempt bonds represents the minimum return at which investors demand corporate bonds. Presuming progressive income taxation⁶, the before tax rate of return needed to attract investors from higher and higher tax brackets must rise progressively, if they are to

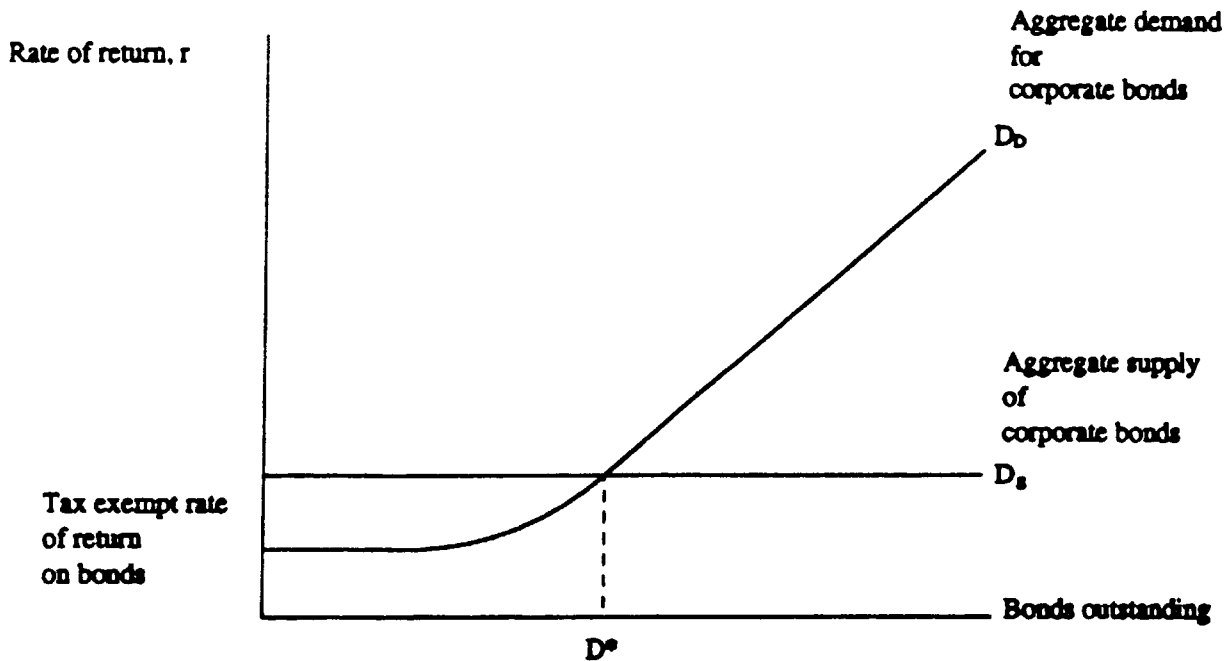
⁶ See King and Fullerton (1984) for a detailed description of the tax systems in the United Kingdom, the United States and Germany (and Sweden).

be persuaded to hold tax-liable rather than tax exempt bonds.

Thus the demand for bonds can be depicted by an upward sloping curve, D_b , in figure 5, showing the tax exempt rate of return plus the marginal personal tax rate.

The supply of corporate bonds is determined by the tax exempt rate of interest plus the rate of corporation tax which is typically a non-progressive flat rate tax in the countries studied here, and is thus horizontal, D_s . The optimal level of corporate bonds outstanding, D' , is determined where demand is equal to supply, i.e. where the marginal income tax bracket is equal to the corporate tax rate. If, for example, the marginal income tax rate were lower than the corporate tax rate, there would exist unsatisfied demand for corporate debt. Firms could take advantage of this and issue relatively more debt, using the proceeds to retire equity and thereby gain a net advantage. This process would continue until the relatively lower return on debt rose sufficiently in an attempt to attract the shrinking unsatisfied demand for debt outstanding that no further gains could be made.

Figure 5. The Optimal Stock of Corporate Bonds.



Thus, there is an equilibrium stock of corporate bonds, and hence an equilibrium aggregate corporate gearing ratio. But, according to Miller, "there would be no optimum debt ratio for any firm⁷." His basic argument is very simple: the existence of corporate taxation should encourage firms to increase gearing ratios wherever possible since there is a net advantage to be gained, as demonstrated in the original Modigliani-Miller formulation. There is no reason why debt should not follow the normal laws of supply and demand. So as firms' demand for debt

⁷ Miller (1977), p 269.

increases, rates of return offered must be raised and these increases exactly offset the tax advantages. This can be demonstrated by looking at tax clientele effects.

Firms with given gearing ratios and dividend policies attract a clientele of investors who find that this policy compared to others yields them the most favourable income stream in terms of tax effects - i.e. the largest after-tax income. Bond holders, as mentioned before, look at how the before-tax rate of return they are to receive compares with personal tax rates on income. If a firm increases its gearing ratio, investors in the higher marginal tax brackets may find that they no longer gain any advantage from holding bonds in this firm. They then sell their holdings and invest in firms with lower gearing ratios. But they are replaced by a new clientele of investors who find the firm's new policy more advantageous than any other on the market. The opposite behaviour occurs in the face of a decrease in the gearing ratio.

The same process occurs with equity holders, who consider the difference between taxes they must pay on dividend income, and capital gains that have to be paid if they sell shares in order to rearrange their portfolios. Again a change in gearing causes one clientele of investors to move elsewhere, but they are replaced by another.

Thus at the level of the firm, varying the gearing ratio simply causes clienteles of investors to change, but the

aggregate corporate gearing ratio - determined by the interaction between the effects of the personal and corporate tax systems - remains unaffected.

G FURTHER DETERMINANTS OF THE CORPORATE GEARING RATIO

It is clear then that the corporate gearing ratio plays a much more complicated role than that described in the simplistic outline of the traditional theory of the firm or in the basic Modigliani-Miller model. However, in general it would appear that although a unit of debt capital appears relatively less expensive than a unit of equity capital at least at low gearing levels, increasing levels of debt in the firm's capital structure weigh more and more heavily in terms of increased returns required and would appear at some point to begin to outweigh the advantages gained. Thus gearing increases as long as there is a net advantage to be gained up to a point where the value of the firm is maximised subject to some chosen degree of risk - the position suggested by the traditional rather than the Modigliani-Miller model.

The individual characteristics of each firm must define the particular position to be adopted regarding the price to be paid for finance and the associated level of risk to be borne - known as the risk-return trade-off - and hence the optimal gearing

ratio. Unfortunately, economic analysis has yet to provide a complete theory describing the determination of the optimal gearing ratio. There exists no rigorous model of this as there does of the Modigliani-Miller theorem. However we can try and model the way in which a number of the major factors affect corporate indebtedness.

We saw that the objective of managers need not necessarily be the maximisation of market value and hence the wealth of the owners of the firm - equity holders. Managerial motivation must thus be defined. The owners of small family firms, for example, may be more concerned with retaining control of their enterprise than maximizing wealth. There may be a reluctance to publicly issue shares in these firms, and gearing ratios are thus relatively high. Other alternative objectives to market value maximisation could include preferences for maximizing size, or growth. Or it may be that managers pursue objectives that do not coincide with the wishes of the owners. However, given the ever-present threat of takeover/buy-out in the presence of potential profits to be made, it is likely that profit maximisation will be the predominant objective of corporate managers. Hence it is probably not unreasonable to make this assumption as we have done throughout this study when looking at the aggregate corporate gearing ratio. Nevertheless, it should be noted that outside the US hostile takeovers are rare with the partial exception of the UK, although there have been a number of hostile takeover

attempts in France recently (Borio 1990).

The preferences of managers/shareholders as to the desired profile of debt in the capital structure - length of debt - could also be considered. Short term debt is generally more available than longer term debt and the required rate of return is generally lower, especially during periods of high inflation when investors are unwilling to tie up their funds for long periods of time in the face of high price uncertainty. The trade-off is however that short term debt is more risky to the borrower since due more quickly.

Fixed rate debts offer advantages to both lenders and managers who wish to know the nominal stream of interest payments to be paid into the future and can help with financial planning. In inflationary periods, however, further advantages are to be gained by managers as the real burden of outstanding fixed rate debt falls. But lenders may prefer variable rate debt for this reason and be prepared to accept a lower return in exchange for facing less risk. These factors should also be taken into account. Likewise, some measure of the narrowness of capital markets could be considered. Size of the institutional sector, for example is an important determinant of the narrowness of capital markets. In general, the narrower the capital market, the lower the demand for equity and hence the greater the chance of new issues being undervalued.

Government subsidies and other encouragements could also be

included here, and legal provisions concerned with firm finance.

Clearly the determinants of corporate gearing are many and varied. We turn now to a further determinant that is likely to have had a major impact of corporate gearing ratios both at the level of the firm, and at the aggregate level.

In the discussion so far, the only risk considered in relation to debt holdings has been credit risk. We have also noted, however, that even if bankruptcy is assumed away, debt is still subject to market risk if inflation affects real returns. In the next section, the effects of inflation and price uncertainty on corporate gearing ratios are considered in more detail.

H INFLATION AND PRICE UNCERTAINTY

The consequences of inflation and price uncertainty on corporate financial patterns are far from straightforward. Many effects come into play that influence actual and desired gearing ratios, and both the demand and supply of debt and equity. We begin with a discussion of the role of equity before going on to examine the behaviour of debt in more detail, and finish this section by investigating the interrelationship between both debt and equity, and inflation and price uncertainty.

Inflation and price uncertainty increase the uncertainty surrounding returns to equity as compared to periods of more

stable prices. In the presence of inflation and price uncertainty investors demand higher premiums to compensate for added risk, and the marginal cost of equity to the firm rises. With other things remaining unchanged, the gearing ratio desired by the firm increases if new equity appears relatively more costly to the firm than new debt. Furthermore, although in theory firms may pay whatever dividend they like, in practice managers committed to maximizing the market value of the firm do not usually reduce dividends. They must pay at least a fixed, if not rising, nominal return to shareholders on outstanding equity if they are to maintain confidence in the value of the stock⁹. In an inflationary period then, if managers want to prevent investors from switching out of equity and into e.g. short-term bills as a hedge against capital losses, they must match price increases with dividend increases. Thus both the marginal and average cost of equity is liable to rise in the presence of inflation. These various costs rise as inflation rises. If investors feel managers are acting according to the objective of maximisation of the market value of the firm and trying to maintain the real value of equity, they may even prefer to switch out of fixed, nominal rate (especially long-term) debt in inflationary periods and into equity. In this case, investors themselves help support

⁹ Despite sharply falling profits in the current recession, evidence of dividend cuts is sufficiently rare to warrant headlines.

equity prices and limit any decreases in capital gains due to inflation, therefore allowing real returns to be maintained without real increases in dividends. It is therefore impossible to state, a priori, what will happen to real returns to equity in inflationary periods. It is not sufficient to look at the behaviour of equity in isolation when considering changes in the gearing ratio. For example, rising equity prices during a period of inflation may cause the market value of the firm to increase so much that managers feel the capital structure of the firm can comfortably support more debt and a higher gearing ratio. It is now time to look therefore at the role of debt.

Corporate debt carries a premium to compensate lenders for the risk of default over and above the return necessary to compensate lenders for their subjective rate of time preference. Even if debt is free of default risk, however, it need not necessarily be entirely risk free.

In the absence of price uncertainty, the real yield on debt, r , is equal to its nominal yield, i . In this case, debt should sell at price P_b which is equal to its full face value, Y , where:

$$r = (iY)/P_b$$

The nominal yield negotiated should cater for any anticipated price changes in order to provide a certain desired real return. There are many different types of debt available,

e.g. convertible, index-linked, floating rate, etc. and more different types appearing on the market all the time (see Brealey and Myers, 1991, for a list of the major categories). Index-linked debt is designed to cope specifically with erosion of real returns due to inflation. However, definition of the rate of inflation to be used is not straightforward. A consumer or retail price inflation series could well differ significantly from asset price inflation and movement in stock prices. Use of index-linked debt is surprisingly limited, but floating rate debt is becoming more widespread. Although floating rate debt does not explicitly allow for inflation, as rates vary, they can be set to take into account the relevant rate of inflation according to the lender. In the case of debt where the nominal yield is fixed, unanticipated price changes cannot, by definition, be catered for. In this case, it is not the nominal return on debt that varies, but the real return. An unanticipated increase in the rate of inflation reduces the real burden of outstanding debt, and a fall in the rate of inflation increases the burden. On new debt, however, the nominal yield is once again varied so as to compensate for these price changes in order to provide desired real returns. Thus variations in the burden of fixed rate debt caused by unanticipated variations in the rate of inflation affect only the outstanding stock of debt, and are felt only until the outstanding debt matures. It is not possible for either firms or investors to make consistent gains from varia-

tions in the rate of inflation, unless there is asymmetric information. Managers can gain an advantage from this source on new issues of debt only if they correctly spot inflationary tendencies before investors do. It is unlikely however that investors suffer from money illusion for long, especially not the big institutional investors who probably do not suffer from this any longer than the managers themselves. So although the firm certainly gains in inflationary periods from the falling burden of fixed nominal returns on outstanding debt, it is unlikely that any great gains are made from this factor in the longer term.

In the presence of actual or unanticipated inflation, the variance of real returns on debt may increase. This is an additional risk over and above those so far mentioned for which borrowers and lenders try to obtain compensation when negotiating the nominal rate of return on debt. This additional premium causes the real return on new issues of both fixed and variable rate debt to be higher in inflationary periods than in periods of price stability. The less stable prices are, the greater the risk involved will be and the higher the marginal cost of debt. Although the total real burden of outstanding debt should fall in the face of unanticipated inflation if a significant proportion of outstanding debt is fixed rate, desired gearing ratios may fall as new debt becomes more costly to the firm. With regard to the demand for corporate debt in the presence of expectations of increasing or persistent price instability, if

higher and higher real returns on longer term debt are not offered, investors may prefer to switch into more short-term debt in order to be able to hedge against this risk or floating rate debt. Faced with the choice of shorter or more long term debt at the same price, the firm could be expected to prefer more long term debt in order to avoid the costs and uncertainties involved with renegotiating expiring short-term debt. The higher prices that must, however, be paid on longer term debt might deter firms from using debt, again bringing about a fall in desired gearing ratios.

Although it is clear that inflation and price variability have a number of opposing effects, the costs involved increase with uncertainty. Thus the greater and more persistent price variability is, the more likely desired gearing ratios will be to fall.

A further cost related to price instability may be demonstrated if we relax the implicit assumption so-far held that there exists only one risk-free rate of interest for both borrowers and lenders. In practise, borrowing rates usually exceed lending rates, and this asymmetry entails costs which rise as the gap between the rates rises. We saw above that inflation reduces the real burden of fixed rate debt. A disinflationary recession curbs this effect. In times of recession and financial uncertainty, credit risk rises. In the face of insolvencies, the confidence of lenders falls and rates of return required on loans

rise. In this atmosphere it is likely that greater efforts are made to gain information regarding the creditworthiness of the borrower. In incomplete financial markets the costs of intermediation and information gathering are non trivial. In times of recession and financial disruption these costs are likely to rise. When lenders are faced with increased risk, they may demand higher returns, not only explicitly, but also implicitly in the shape of more complex contracts, or demands for higher collateral. Thus the effective cost of borrowing for a given safe interest rate rises. The greater the risk, i.e. the worse the state of the economy, the greater the real cost of credit will be. At the same time, incomes fall, reducing the capacity of borrowers to service debts. Further insolvencies ensue, causing further loss of confidence on the part of lenders and further increases in the cost of credit. Many of these extra costs apply only to the borrower, and do not cause a matching increase in income on the part of savers. Consumption by borrowers falls, while the consumption of savers remains unchanged. The effect of this is to reduce aggregate demand. Bernanke (1983) argues that these increased costs of credit intermediation were the key cause of the propagation of the Great Depression. They made borrowing increasingly expensive and difficult to obtain, without an equivalent increase in the return to saving. As a result, investment was curtailed for lack of funds, further depressing aggregate demand.

In a recession, disinflation (or deflation in the case of the Great Depression) causes the burden of outstanding fixed rate debt to rise. At the same time, the cost of variable rate debt and new borrowing rises while the value of equity falls. As a result, gearing ratios measured at both book and market values could be expected to rise.

The reverse is true in times of recession when falling profits cause an erosion of reserves and a reduction in the value of the firm's equity leading to an increase in the market value gearing ratio. This may cause firms to feel over-indebted even though they have not necessarily changed their financial structures. Attempts may then be made to reduce indebtedness, bringing down book value gearing ratios. In this case, potentially profitable investment may be foregone and aggregate output from the corporate sector as a whole would be reduced, worsening the recession.

There have been a number of attempts to outline the role of corporate indebtedness in the business cycle. For example, Fisher's Debt-Deflation theory (1933) was an analysis of this phenomenon with respect to the Great Depression. The trigger here was deflation caused by over-indebtedness. In times of economic prosperity, a rise in the business confidence of agents is reflected in the use of increasing levels of debt to finance investments. Increased output and employment, and therefore demand, is accompanied by rising prices and inflation as the

economy moves towards full employment, thereby reducing real rates of interest and the real burden of outstanding fixed rate debt. Although in the face of a falling real burden of debt rational agents should be willing to increase nominal holdings to maintain the real value of debt-holdings at some chosen level, Fisher argues that at some stage agents may begin to act irrationally. For example, they may begin to feel over-indebted as nominal debt holdings rise above a certain level, and hence make attempts to liquidate debts, thus reducing demand and slowing inflation. The rate of growth of profits slows and further attempts are made to liquidate debts. As loans to the banks are paid off, the velocity of circulation falls causing prices to fall and the burden of outstanding debt to increase still further. Increasing numbers of agents go bankrupt, weakening the position of their creditors who may become bankrupt themselves, setting a domino effect in motion. This is accompanied by reductions in output and demand further aggravating the depression as the economy moves into a downward debt-deflation spiral.

Minsky (1982b), in his 'Financial Instability Hypothesis', further develops Fisher's argument. He suggests that the economy naturally tends towards this debt-deflation spiral as it also naturally tends towards a boom: the boom-depression cycle being an inherent characteristic of capitalist economies.

Minsky's argument is similar to Fisher's. Starting in an

economy which has recently emerged from a depression, gradually agents become more confident. Higher and higher amounts of debt to finance enterprise are used and the financial structure of the economy becomes increasingly fragile as time passes (see e.g. Friedman 1986). Improving economic activity is accompanied by rising gearing ratios. At some stage however, interest rates begin to rise triggering an increase in the burden of debt and the debt-deflation spiral. This arises because, for example, the supply of finance is not sufficient to keep pace with demand; or because the authorities, becoming alarmed at the levels of debt in the economy, engage in monetary tightening in an effort to discourage use of debt. The downturn is then accompanied by falling gearing ratios.

According to Minsky, the gearing ratios should hence move pro-cyclically. However, firms are unwilling to sell equity when profits are negative. Greater reliance on debt rather than equity for funding needs could then be expected, not less. Recession is thus likely to be associated with increasing gearing ratios, not falling ratios.

On the other hand, during a boom, gearing ratios are more likely to rise. In an upturn the income and profits of the average firm typically increase causing the value of the firm to rise. With renewed inflation the burden of outstanding fixed rate debt falls. In this period reserves tend to build up, and it is unlikely that they will be distributed in the form of

increased dividends until a considerable time has elapsed and managers are confident that increased income is permanent, not transitory. Moreover, it is precisely when the firm is in a strong position and well regarded in the markets that managers are most likely to make new issues of equity i.e. during a boom (Bernanke 1981). Gearing ratios could thus also be expected to fall. So falling gearing ratios are likely to be associated with economic upturns.

Minsky suggests that the debt-deflation spiral can only be halted by government intervention and argues that this is precisely why recent recessions have been much less severe than the Great Depression. Governments now are not only much more willing to pursue actively interventionist policies, but they are also a lot bigger - providing a far greater proportion of national income than in the 1930s and hence much larger and more powerful automatic stabilizers.

However, even in the absence of big and/or interventionist governments, a general desire to reduce indebtedness might not necessarily lead to a downward deflationary spiral. Deflation should certainly be contractionary as real interest rates and the burden of outstanding fixed rate debts rise, reducing output and demand on the part of debtors. But lower prices also have expansionary effects. Demand should rise in the face of lower prices, encouraging increased output and thus income. Furthermore, lower prices may cause the real value of assets and thus

wealth to rise. This positive real balance effect should also lead to increasing demand on the part of creditors. The net effect will depend on the relative propensities to consume of creditors and debtors. If debtors have a higher marginal propensity to consume than creditors, the reduction in demand on the part of the former is likely to outweigh increases engendered by the latter. In this case, the net effect on aggregate demand would be negative. However, it is possible that a period of mild recession might on average be beneficial for a highly indebted corporate sector. A long period of stability and prosperity may allow increasing numbers of inefficient and over-indebted firms to survive, causing the corporate sector to stagnate. In this case, injections of government expenditure fail to alleviate the stagnation as firms are too weak and inefficient to react positively. A mild recession should then weed out the inefficient, over-indebted firms, but allow the efficient competitive firms to survive. Improved average productivity may allow national income to increase as a result.

Greater use of index-linked or floating rate debt would remove a lot of the problems caused by price variability and instability. Surprisingly, until recently the use of index-linked debt has not been particularly widespread⁹. We saw above

⁹ The interested reader may consult e.g. the contributions in Dornbusch R. and Simonsen M.H. (eds.) (1983), "Inflation, Debt, and Indexation," The MIT Press, Cambridge, Mass, for suggested reasons.

that there are problems in selecting the relevant rate of inflation against which to index the debt. Moreover, whichever index is used, a time lag will occur before the relevant rate of inflation is known. Perhaps investors prefer to compensate for variations in the real burden of debt in other ways. They may prefer to switch into equity for example, if they believe that managers faced with the threat of take-over try and maintain the real value of equity; or they may prefer to switch into debt of a more short-term nature. The shorter the debt, the shorter the period during which undesired variations in real burdens sustained will be; and investors can more quickly re-negotiate conditions in order to obtain compensation for temporary losses, and prevent their continuation. Or more recently, increasing use has been made of floating rate debt instruments such as floating rate notes (FRNs). However, in the BIS reporting area, as late as the mid 1980s, corporate debt issue was predominately fixed rate - banks and governments were the main issuers of FRNs. Moreover, FRNs mainly replaced existing variable rate syndicated loans, implying that international variable rate debt did not necessarily increase (Bank for International Settlements, 1986: p 134).

Clearly, when considering this question then, it is not sufficient to look only at how the level of the gearing ratio moves in the presence of inflation and price uncertainty, but also at what happens to the nature of the gearing ratio.

To recap then, in periods of inflation and price uncertainty, the cost of new debt and equity could be expected to rise. The greater and more persistent price variability is, the greater the costs involved will be. Although the burden of outstanding fixed rate debt falls, required rates of return on new debt and existing variable rate debt rise. In the short run, gearing and inflation could be expected to move in the same direction. Over time, however, the inflationary advantages of fixed rate debt are increasingly outweighed by the disadvantages of higher returns required on variable rate debts and new fixed rate debt. As a consequence desired gearing ratios could begin to fall in the longer term.

I THE RELATIONSHIP BETWEEN GEARING AND INVESTMENT

It has so far been assumed that financing patterns are neutral; it is likely, however, that they have an effect on investment decisions (see Auerbach 1985; Gordon and Malkiel 1981; Mayer 1987a). The existence of corporate limited liability, for example, may not allow the complete separation of finance and investment. Managers of highly geared firms protected by limited liability may choose to undertake riskier investments if they believe these to be in the best interests of the equity holders. Thus varying the gearing ratio may lead to costly distortions of

the investment decision.

This may also arise when the assumption of perfect, or costless, symmetric information is relaxed, and the existence of transaction costs is allowed for.

When there is asymmetric information conflicts of interest between the agent (manager) and the principal (investor) may arise¹⁰. Up to now we have presumed that managers are motivated by the attempt to attain shareholder wealth maximisation. It is, however, possible that managers have other goals, for example maximisation of market share, power or prestige etc. They also have an informational advantage over investors concerning their own behaviour, and the firm's future returns. Investors therefore try and set up incentives or contracts forcing managers to act in the best interest of the investors. To ensure their wishes are carried out they must monitor managers' behaviour. These actions are costly, and costs arising from any divergence of management behaviour from that which is in the best interests of investors are known as agency costs (see Fama 1980).

Funds raised from borrowing may also entail agency costs. Debt holders may not have a vote as do equity holders, but they can still impose implicit restraints on corporate management. For example they could stipulate that the funds they provide may only be used for certain specified purposes. Or these costs may

¹⁰ This is sometimes alternatively referred to as an insider-outsider problem.

become explicit if debt holders allow management a free hand in the use of funds they provide, but demand a higher return to compensate for the increased risk they face due to loss of control.

Equity issues may involve moral hazard and agency cost problems too (see Jensen and Meckling 1977). This can be seen in the following example. Consider a firm that is initially run by one owner-manager who issues some shares to raise finance, thereby diluting ownership. In this case, the manager may try and maximize utility at the expense of the new shareholders. It is costly for the new shareholders, aware of this tendency, to monitor the actions of the manager and constrain him to act in their best interests. The greater the number and diversity of shareholders, the more difficult it is for them to organize any concerted action. Thus agency costs arising from equity issue increase with the proportion of equity in the capital structure.

If increased gearing is associated with a decrease in equity, shareholding is liable to become more concentrated unless existing shareholders choose to dilute their holdings. In this case owners are in a better position to discipline and control managers. Hence there is a reduction in the agency costs and moral hazard problems involved with equity issue. The net change in these costs must thus be considered.

According to this analysis, the financial policy chosen by managers is the one where the agency costs associated with the

various types of finance are minimised. Investors - who have the power to control and sanction managers - are aware of the tendency of managers to act in their own interests at the expense of the investors, and of how capital structure influences their behaviour. Managers, aware that investors possess this knowledge, therefore, try, to minimize agency costs in order to maximize market value.

Another idea that has developed from the work on asymmetric information is the theory of signalling (see Ross 1977). Borrowing may be perceived by investors as a signal regarding manager's perceptions of bankruptcy risk. Managers are unlikely to take on new debt if the risk of bankruptcy is very high since the return they would have to pay on it would also be extremely high. Furthermore, in the event of bankruptcy, managers are likely to be faced with direct costs in terms of the loss of their present job, or of harm to their future career prospects. Thus new borrowing may be taken on to signal to the market that the firm is in a healthy position. An optimal proportion of debt in the financial structure thus arises where the difference between the benefits from signalling and the expected costs associated with bankruptcy risk is maximised.

Asymmetric information can also lead to credit rationing. Credit rationing as a disequilibrium phenomenon can exist in the presence of constraints put on the market by the authorities, for example interest rate controls. However, it has also been shown

how credit rationing may exist in equilibrium due to the presence of imperfect information (Stiglitz and Weiss 1981). Imperfect information in capital markets derives from the fact that borrowers know their own position and risk of default better than lenders. The existence of imperfect information can cause the price of debt to affect the nature of transactions between borrowers and lenders, and may not necessarily clear the market. There can for example be adverse selection effects. 'Risky' borrowers who feel that their likelihood of default on a loan is high may be prepared to pay higher rates of interest to obtain a loan than 'safer' borrowers. Increases in interest rates charged by lenders might not lead to an increase in returns, but might in fact lead to a decrease in returns since their action has caused them to lend to more risky borrowers on average with a higher rate of default.

Varying the rate of interest charged may also affect the actions of borrowers and lead to moral hazard. Raising the interest rate required could cause the cost of finance to increase such that borrowers are no longer willing to invest in safer projects yielding a relatively low return, but prefer to invest in more risky projects with a smaller chance of success - but a far higher return in the event of success. If the project fails, the borrower defaults. In the event of success, however, far higher returns are enjoyed. Again, increasing the rate of interest may not lead to higher returns to the lender since

borrowers feel encouraged to take increased risks, and the increase in defaults may outweigh the extra income derived from increasing rates of interest.

There are a number of other explanations for credit rationing. For example, there may exist a system of commitments between banks and their customers. In an attempt to forge mutually satisfying long term relationships, there may be informal agreements between banks and customers establishing stable loan rates which are largely independent of market rates. When these two sets of rates diverge, it could be that potential new customers are denied credit at any price as regular customers must first be satisfied at the implicit contract price.

Or it is possible that banks function according to some equity ethic where one rate is set for all borrowers. In this case it is the preferred borrowers who obtain credit, while the least preferred borrowers - those who are new and therefore unknown¹¹, who are considered a poorer risk etc. - only get credit if any remains after more preferred demands are satisfied. Although historically ratings have only been common in the US,

¹¹ The lack of any credit rating can make borrowing even more difficult than a bad credit rating. An individual/company with a bad rating at least has a chance of improving their status and thus obtaining further loans by clearing arrears, whereas a zero-rated agent may not even have this opportunity. For example, there are often cases in the press of winners of very large amounts of money in lotteries being refused credit cards, hire-purchase facilities etc., since they have been careful not to live beyond their means and go into debt in the past, and now lack any credit rating at all.

attempts have been made in recent years to introduce a ratings system into the UK.

The theory outlined above is only really applicable to small firms and households. Bigger firms with established reputations against which lenders may attempt to estimate risk position are more likely to be rationed by price. This presumes however that there is unlimited availability of finance - another of the Modigliani-Miller assumptions. In fact it would appear that even the biggest firms do not necessarily have unlimited access to finance. It is possible that a proportion of the recent wave of takeovers and mergers has been by firms starved for finance (Jensen 1988). Carrying out the merger allows the acquirer access to the funds of the target firm, and to its sources of external finance.

With regard to cross country differences in gearing ratios, some further important insights are discussed by Mayer (1986). Two major criticisms of the more traditional theories are the failure to recognize that financing and investment decisions can not usually be separated, and the failure, to consider the importance of uncertainty and the lack of a complete set of contingent contracts allowing uncontracted outcomes.

In this case, different sets of financial instruments yield different allocations of control over returns. Suppliers of finance may have differing degrees of control over how their finance is used. Financing decisions may well affect investment

decisions. Thus how the market supplies funds, and the relationship between this and the corporate sector may be of great importance in determining corporate financial patterns, and investment.

For example, average gearing ratios observed in the UK and US non-financial corporate sectors are notoriously low and are sometimes blamed for the relative stagnation of industry in these countries; whereas the Japanese corporate sector is much more highly geared - and Japanese corporate investment is much healthier. But it is not necessarily gearing ratios per se that are directly related to investment: we saw in chapter II that rising gearing has not been associated with an increase in investment. It is how these gearing ratios arise that is of crucial importance.

For example, the UK and US financial markets are widely considered to be the most efficient and competitive in the world, and increasingly so in the light of recent innovations. One would thus expect that since the average cost of capital faced by the corporate sectors in these countries should be lower than in the less efficient markets - Japan, Germany and France, for example - external funding and investment levels should be higher. This is not the case. In the UK for example, Mayer (1986, 1987a) finds that only 30% of corporate funding came from external sources in the period 1970-84. When acquisitions of financial assets are netted out this figure falls to zero - in

this period non-financial corporate sector investment in the UK was 100% financed by retained earnings.

In Japan by way of contrast, external funding of the corporate sector is much higher, as is the average gearing ratio.

According to Mayer, these facts can largely be explained by the relationship between the financial markets and the corporate sector.

In the UK and the US, agents in the financial market are not as prepared to provide credit as they are in Japan, Germany and France. This is because of a lack of commitment. A firm seeking finance for a project approaches a bank who provides a loan in the hopes of gaining returns if the project is successful, and of maybe continuing business with the firm in the future.

However the bank is aware that the firm does not necessarily feel committed to staying with it. If the project is successful, the bargaining position of the firm changes: it attains the ability to shop around for better terms from other suppliers of funds. The more efficient and competitive the markets, the more alternative sources exist, and the more firms are likely to shop around. The bank being aware of the lack of commitment on the part of the firm is not prepared to commit itself either. This could lead to a reluctance on the part of banks to make long-term loans at attractive rates. There is thus likely to be a tendency in countries with more highly developed financial markets for loans to be either predominately short-term (UK) or

highly priced if longer term (US)¹² to compensate for potential future loss of business.

Furthermore, because of problems in financing investments and of uncertain returns, firms may not be prepared to offer very attractive repayment schedules to lenders. The more committed borrowers are to an attractive repayment schedule, the more likely they are to obtain a loan, the longer the loan is likely to be and the less expensive.

Short-term debt can of course be rolled over - at the discretion of the bank. Roll-overs are not, however, automatic: further constraints could be imposed as a condition of granting these facilities. So the length of funding obtained may have an important influence on the behaviour of the corporation. Short-term debt rolled over is not necessarily equivalent to long-term debt.

Potentially profitable investments may not be carried out if they require long term financing which the firm is unable to obtain. With only short-term finance obtained for specific projects the firm is constrained in its behaviour, and may not, for example, be able to invest in research and development with a view to the long term development of the firm. It is also possible that, given the limited liability status of the firm and

¹² Since the mid 1970s the UK corporate sector has had the greatest short debt-total debt ratio out of the group (see chapter II), and real long term interest rates have been the highest in the US since the early 1980s (see chapter IV).

the constraints placed upon it by financing, firms might tend to invest in riskier projects hoping to increase short-term expected returns with the aim of improving longer term financial resources. But if lenders suspect this tendency, they could well impose covenants restricting the use of funds, or demand collateral, pushing up costs still further.

In the framework outlined above, the immediate consequence of the lack of commitment in efficient markets is either predominant use of short-term funding, or constraints on behaviour and use of relatively high cost longer-term funding. Where there do not exist committed relationships between the corporate and financial sectors, corporate investment may be lower, and of a more short-term nature than in countries where these relationships exist.

It has been argued that government intervention is required to remove, or at least alleviate this problem of 'short-termism'. It must however be remembered that short-term debt can often be rolled over, allowing longer term projects to be carried out. Since on the whole it would not appear that companies borrow to finance specific projects, or that lenders extend credit for specific projects either - it is rather the overall profit position of the company that appears to be of concern - the short-termism problem may not be as serious as feared. It could rather represent a way of yielding a high degree of control - control that is otherwise lacking in economies where borrowers

do not feel 'committed' to lenders. Profitable firms are able to roll debt over without problem, but unprofitable firms have greater difficulties. Government intervention to allow provision of longer term debt could simply retard problems. In this case, the length (or rather shortness) of debt should not necessarily be seen as the cause of poor investment and profitability performance in the corporate sector. It may be, however, if markets and individual investors do not recognize profitability correctly, or if they only look at short-term profits.

A further constraint on investment is provided by the cost involved in shopping around when not committed to one supplier of finance. If a firm is unable to get the type of finance required, or feels that required rates of return are too high, they may choose to shop around. Against possible benefits gained, information and transactions costs must be offset. There are also adverse signalling costs. The more a corporation switches from supplier to supplier, the more its lack of commitment is reinforced. Furthermore, the signal may be interpreted as an indication that the firm is obliged to keep switching sources because it is having difficulty obtaining finance. Moreover, the firm does of course have the option of staying with the original supplier of funds. The costs of switching must thus be taken into account when calculating reductions in average cost of capital caused by more efficient markets and more competitive alternative sources of funds.

Another option is to use retained earnings rather than seeking external financing sources. The proportion of investment funded by retentions is higher in the US and the UK compared to the other countries in the study (Mayer 1989). This suggests that external finance is either harder to come by than elsewhere, or that its provision is laced with unacceptable restrictions, or that it is too expensive. Nevertheless, relying heavily on retained earnings may restrict the investment opportunities open to corporations.

Corporate investment as a proportion of GDP in the UK and the US has certainly been lower than in Japan over the past two decades (see chapter II), and numbers of bankruptcies have been higher (see chapter IV), especially recently as efficiency and competitiveness in the UK and US financial markets has been increasing.

The stagnation of the UK and US corporate sectors has been blamed on the lack of long-term investment. It has also been blamed on low gearing ratios. We have discussed at length why the cost of debt finance is likely to be below the cost of equity. An increase in the gearing ratio should thus be accompanied by a reduction in the average cost of capital thereby allowing increased investment. In countries where there is a lack of commitment between the corporate and financial sectors as described above, however, it may not necessarily follow that increasing corporate gearing ratios will bring about an increase

in investment levels. In the UK for example, the debt used to finance corporate investment is predominately short-term. An increase in UK gearing ratios thus implies an increase in the use of short-term debt by the corporate sector: we saw above that this will not necessarily lead to an increase in either the quantity or the quality of investment. In the US on the other hand, even though more long-term debt finance is used, the rate of return on long-term debt is very high. A rise in the gearing ratio in this case could actually lead to an increase in the average cost of capital and have detrimental effects on investment levels in this way.

In Japan, Germany and France, gearing ratios and proportions of external funding obtained are higher than in the US and the UK. Investment has also been higher - particularly in Japan and Germany - despite the relative lack of efficiency of financial markets in these countries.

These facts can easily be explained by the theory outlined above. There is a much closer relationship between the financial systems and non-financial corporate sectors in these countries. A possible reason for the development of these relationships is given in an historical explanation of the evolution of industry and of how financial systems developed according to their relationship with the industrial sector and the needs of industry in the major western economies provided by Hu (1975). Since Britain was the first nation to industrialize, nascent industry

faced no competition and could develop at an unhurried pace. The personal finance of wealthy private entrepreneurs was sufficient to fund industry. In other countries however, individual finance was no longer sufficient as investment had to be carried out on a large scale if new industries abroad were to compete against established structures in Britain. A system was needed in which the channelling of household savings could be organised, in order that they be transformed into funds for large-scale investment. These mechanisms never developed naturally in Britain and are still lacking today. Elsewhere, however, either banking structures, or state/semi-state bodies developed to fulfil this role. Hence although in Britain there are many competing traders in the financial market, in Japan, Germany and France the financial systems are dominated by the banks. Furthermore, in an attempt to defend their power and profits the banks themselves are likely to actively discourage competition in the financial markets in these countries.

Restricting the range of alternative institutions and instruments available to investors restricts efficiency and competitiveness. However, with fewer alternatives on the market, firms are much more likely to become committed to one lender with possibly beneficial effects. If a corporation and a bank establish a long-term commitment, then the bank is far more likely to provide long-term finance.

These commitments would appear to exist in different ways

depending on the particular characteristics of the country in question. In Japan and Germany, for example, many corporations are observed to stay with the same bank and there are exchanges of personnel between the two. The banks hold equity in the companies to which they lend. This stake increases the incentive to develop a long-term mutually profitable relationship. At the same time, the bank has a far greater say in what is happening to its money if it has members sitting on the corporation board, and conflicts of interest are reduced. The costs of shopping around are removed, and costs of monitoring and information decreased. The banks can therefore afford to be more flexible and take a more long term view. For example, they may be prepared to stand current losses with the expectations of more long term profits. Thus risk-taking is more evenly shared, with apparent benefits to both parties.

However, there are also benefits to be gained by firms not committing themselves to suppliers of finance, for example freedom from constraints on their behaviour. In this case, firms may deliberately choose to pay higher rates of return for finance so long as they obtain the freedom to invest as they choose as a result. There is also the problem of time inconsistency. Although there are clearly benefits to be gained from a system of commitments, in the future with multiple outcomes possible, greater benefits may be derived from switching around. Finally, in the US the Glass-Steagal act made the holding of corporate

equity by lending banks illegal, effectively banning one of the main planks of a commitment system.

Nevertheless, the benefits and reductions in costs yielded by committed relationships may be substantial if the relative performance of the corporate sectors in these countries is anything to gauge by. A reduction in the cost and an improvement in the quality of capital should lead to an increase in both the quantity and quality of investment.

Hence although the average cost of capital is presumed to be higher in countries with less efficient capital markets than those in the UK and the US, once the above factors are taken into account, it may be that the average total cost is not in fact any higher.

So we have identified a possible explanation for some of stylised facts observed in chapter II: namely, that high gearing ratios are associated with high levels of investment. We turn now to an attempt to explain how rising gearing ratios may be associated with poor investment performance.

A factor that may well be able to explain recent trends in corporate sector financial structure is financial liberalisation.

J FINANCIAL LIBERALISATION

In "Today's Institutional Environment" (Minsky 1982a), financial innovation is likely to have substantially reduced the perceived risk of borrowing.

Lenders and borrowers perceptions of risk may have lessened due to the appearance of new financial instruments, encouraging the former to lend more and the latter to borrow more. For example, the supply and use of variable rate debt instruments has significantly increased. Borrowers holding variable rate instruments see a reduction in the coupon they pay in a time of falling interest rates while fixed rate borrowers continue to pay the same fixed coupon. On the other hand, borrowers using variable rate instruments are worse off than the traditional borrower using fixed nominal rate securities in a period of rising interest rates. This is not to say that actual risk has decreased. With other things remaining unchanged, a shift from fixed to floating rate debt rather involves a shift from market risk to credit risk. So the mechanism by which interest rates and gearing ratios are related may be breaking down. The same is also true of the gearing-inflation link.

In order to hedge inflationary uncertainties the use of index-linked and variable rate securities has become more widespread. Other new instruments including swaps, securitizations, and third party guarantees appear to lessen the risks

faced by lenders by transferring credit risk, encouraging the provision of funds. This is also true of the growth of secondary markets where decreased perceptions of risk have encouraged more lending. Since debt is passed on, it is even possible for agents to lend in excess of their capitalization. Although total risk remains unchanged, it is more widely spread lessening the exposure of any one individual.

The liberalisation process has allowed risks to be separated and spread more widely. As a result, both price and credit risks can be transferred thanks to new instruments, and market participants can adjust desired risk profiles more precisely. In this sense, financial liberalisation has brought about an improvement in market efficiency.

At the same time there have also been developments encouraging the use of equity. In the UK, for example, following large increases in over-the-counter trading in unlisted securities permitted by the stock exchange, the Unlisted Securities Market was opened in 1980 allowing small firms unable to get a full listing to market their shares publicly.

The appearance of these new instruments is part of a general move towards opening financial markets and allowing them to function more according to the rules of free market competition (Bank of International Settlements 1986). New instruments providing substitutes for traditional sources of finance, and the development of secondary markets has been mentioned above.

Markets have become less segmented - for example building societies in the UK no longer have the monopoly over the provision of mortgages. Government regulation of financial markets has been reduced - interest rate controls, usury ceilings etc. have been reduced or abolished in many cases. This has brought down the cost finance. Loosening these constraints and opening markets and allowing increased access would also appear to have helped contribute to an easing of credit rationing.

There is evidence suggesting that credit has in fact been fairly widely rationed, particularly for small and medium sized firms (see Davis, 1987), although it would appear to have eased more recently, helping explain increases in gearing ratios. Larger firms with proven track records and stronger negotiating positions are less likely to face non-price credit rationing as defined by Stiglitz and Weiss (1981), but access to credit is still not likely to be unlimited, particularly in the short term. In the US (and UK to a lesser extent) this may be the cause of the recent wave of leveraged buy-outs by corporations desperate for credit. Highly geared firms that have used up all available lines of credit may target firms with unused credit lines, giving themselves access to new debt and increased collateral to pledge against further debts.

It may also help explain the phenomenon of 'short-termism'. Although the proportion of long-term to short-term debt has been rising in corporate sectors since the early 1980s (more recently

in the UK), corporate investment, with an exception being found in the US, and more recently Germany, is still predominantly funded by short-term debt (i.e. less than one year). Provision of (especially long) debt would appear to be rationed even for big corporations. Recent increases in the supply of credit are thus likely to have brought about a general easing of the incidence of quantitative credit rationing.

At the same time, innovation and deregulation has encouraged managers to borrow more in the face of increased availability, and to borrow a greater proportion of the potential sources they have available. In less liquid markets companies ideally leave some borrowing capacity in reserve where possible in case of emergency, but where supply seems unlimited, there is no need to maintain these reserves. Liquidity enhancing innovations include money market mutual funds and negotiable deposit accounts.

The cost of capital curve for the corporate sector as a whole could hence have shifted outwards, helping explain the increases in corporate gearing ratios observed.

So we have seen that financial liberalisation can lead to an increase in gearing through a number of different channels, and may help explain the continued rise in corporate gearing ratios observed in the countries in our sample during the 1980s.

At the same time, the cost of borrowing in financial markets may have fallen as a consequence of the liberalisation process. A rise in gearing ratios following a fall in the cost of capital

may be indicating that the corporate sector has been able to obtain more funds with which to finance increased investment. Increasing financial liberalisation, through increasing the supply of credit, should allow increased physical investment as well. Moreover, any fall in the cost of capital occurring through increasing competitiveness and deregulation of financial markets brought about by the liberalisation process should reinforce the positive boost enjoyed by corporate investment.

Many of the new instruments available transform risk and allow it to be spread more widely around the market, allowing closer matching of individual lenders and borrowers requirements, bringing about increased efficiency. However, it is far from clear that financial liberalisation will be accompanied by reductions in the cost of capital.

While competitive forces are liable to shave margins and reduce the cost of finance, liberalisation and innovation could well cause the volatility of asset price variations to increase, pushing the cost of finance up (Mayer 1986). Higher debt service costs reduce the funds available for physical investment. At the same time, new assets could be mispriced, at least in the short run. Excessive rates of return demanded would have further pernicious effects on physical investment. This is unlikely to last, however, with competitive forces driving down costs. On the other hand, risk could be underestimated on new instruments.

Moreover, many of the new instruments, such as swaps,

options, interest and foreign exchange futures, letters of credit, guarantees etc. are classified as 'off-balance sheet' items. They are not recorded as assets and liabilities on company balance sheets, although they clearly represent a potential credit risk in the event of default. Balance sheet gearing ratios in highly liberalised economies may not present an entirely accurate picture of gearing ratios, further clouding the true risks involved with the use of these new instruments.

As a result there are fears that use of debt is becoming excessive with respect to equity capital. If the markets persistently underprice risk then systemic fragility is a possibility in the event of adverse circumstances. We saw that mispricing of risk is unlikely to persist into the long term, but if underpricing is sufficiently severe and sufficiently widespread, problems could arise in the much shorter term. Moreover, it is possible that risks could be underestimated over a relatively long period, for example with respect to property lending. In many markets real estate was typically considered to be a rock solid form of collateral against which to borrow, as values could only increase. It is possible that risks were underestimated over a fairly long period judging by the size of the adjustment currently occurring in the wake of the collapse of property markets.

Increased access to credit occurring as a consequence of a relaxation of liquidity constraints allowing gearing ratios to

increase could have a number of important effects. A potentially crucial aspect that economists have begun to consider recently is the implications of trends in corporate financing patterns for the conduct of monetary policy (see e.g. Atkinson and Chouraqui 1986; Friedman 1990).

Monetary policy will have a greater impact on economies characterised by more competitive deregulated financial markets that use increasing amounts of debt, particularly floating rate. The dampening effects of higher interest rates on investment, output and aggregate demand are likely to be much severer and longer lasting than before. This is a particularly serious problem for the European countries as they move towards monetary union with irrevocably fixed exchange rates, and coordinated monetary policy aimed at price stability.

Furthermore, in the face of increased financial liberalisation, the effects of monetary policy could become unpredictable if the interest rate - credit availability link breaks down. The money supply could become increasingly difficult to define and control. Rising interest rates might not lead to credit restrictions as the potential supply of credit multiplies, either through increased use of existing sources or through innovation. It might then be that higher quality borrowers switch to less expensive new sources and are replaced with poorer quality borrowers using more traditional sources such as banks. In this case, the quality of bank portfolios would worsen, reducing bank

profitability and increasing fragility in the financial system.

Lines of unused credit held in case of inability to obtain credit in illiquid markets are held less in the wake of financial liberalisation with a greater apparent supply of debt available in the market. Should problems such as those mentioned above become at all widespread, apparent liquidity may prove illusory, sending yet more firms into distress.

Moreover, rising gearing ratios themselves may directly affect the conduct of monetary policy. The use of monetary policy by the authorities to achieve objectives such as price or exchange rate stability could be severely restricted. Interest rate hikes to support the currency, or control inflation, could have severe effects on a heavily indebted corporate sector causing investment to be reduced, or engendering defaults. Any subsequent loss in output and demand, and business confidence is likely to exacerbate problems in other parts of the economy. Furthermore, the monetary authorities may well become increasingly impotent over time. Corporations, aware that authorities cannot risk provoking a bankruptcy spiral may take on more debt than is prudent, and may even be prepared to pay for it at higher prices than normal, causing gearing ratios and the burden of debt to rise still further. Moreover, if the managers of corporations become aware of a diminished capacity on the part of the monetary authorities for controlling inflation, they may feel encouraged to increase debt issue still further, anticipating future

reductions in the real burden of outstanding debt through inflation.

Direct consequences of rising corporate gearing ratios - if due to increasing financial liberalisation - could thus be rising inflation, and an increasing risk of financial instability.

These ideas have serious implications for the conduct of monetary policy in the light of corporate sector behaviour consequent upon increasing financial liberalisation. New strategies may well have to be devised if transmission mechanisms have been distorted in the ways suggested above, and the potential consequences outlined do indeed begin to threaten economic performance.

K SUMMARY

According to the theory, corporate sector gearing ratios are determined largely by risk, return and taxation. The supply of corporate sector debt should be negatively related to risk and required rates of return. Taxation systems, however, tend to encourage the use of corporate debt. We also saw that aggregate gearing ratios could be influenced by the relationship between the corporate and financial sectors, and by developments in the financial sector, and in particular financial liberalisation. In countries where there is a close relationship between the financial and corporate sectors, the cost of finance could be expected to be lower and the availability of finance higher. Gearing ratios could then be expected to be typically higher than elsewhere. The process of financial liberalisation is associated with an increase in the availability of capital. As a result, gearing ratios could be expected to rise. However, it is unclear whether it will bring about a rise or fall in required rates of return. If rates of return increase, rising gearing ratios could well be accompanied by falling investment levels.

In the next chapter attempts are made to empirically estimate the importance of these determinants, and to see how well these theoretical explanations explain corporate financial behaviour in recent years. Empirical analysis of taxation as a determinant of corporate financial policy poses problems as we

saw above. However, studies to date indicate that, empirically, taxation does not appear to perform satisfactorily as a determinant of corporate finance despite its theoretical importance (Mayer 1987b). Furthermore, the burden of work involved in a comparative analysis of national tax systems over time is beyond the scope of this study. Hence, attempts are not explicitly made to empirically estimate the role of taxation.

Quantification of many of the other determinants noted above such as managerial motivation, agency costs and signalling costs is almost impossible, particularly in a way that will allow meaningful intertemporal or cross country comparison to be made. So although their theoretical importance is recognised, attempts are not made to empirically quantify their effects. We do, however, turn now to an analysis of the behaviour of risk premia, rates of return and inflation at some length.

IV THE DETERMINATION OF THE CORPORATE GEARING RATIO: EMPIRICAL EVIDENCE

In chapter II we saw that there has been an increase in a number of debt ratios in the major western economies. We looked in particular at the financing of the corporate sector over the past twenty years and saw that financial gearing ratios have significantly increased in all these countries with the exception of Japan. We also saw that investment performance has been poor over the same period, again with the exception of Japan. So over time gearing and investment would appear to be negatively related in the countries studied. However, at the same time we noted that gearing ratios have been relatively low in the US and the UK compared to Japan, France and Germany, suggesting that high gearing is associated with higher investment. In chapter III we looked at the theory of corporate financial structure in search of an explanation for these observations. In this chapter we examine how well the reasons discussed explaining observed financial patterns stand up to empirical analysis .

We begin by briefly summarising the determination of the corporate gearing ratio, before going on to consider the behaviour of the major determinants in more detail.

A INTRODUCTION

It is assumed that investment decisions are taken independently of financing decisions. Classical profit-maximizing behaviour on the part of managers is also assumed. An optimal gearing ratio is then established where the cost of finance is minimised, subject to certain risk constraints. There exist a number of empirical studies indicating that when setting financial policy managers do indeed appear to aim for a specific gearing ratio which they consider to be optimal (Marsh 1982; Taggart 1977).

Although there are many different types of finance available, the analysis here has been restricted mainly to considering two broad classes: debt and equity. The fundamental distinction between the nature of debt and equity plays an important role in this study. Equity holders enjoy an unspecified return on their holdings comprising a dividend - set at the discretion of management - and capital gains determined by the change in market value of their equity holdings.

On the other hand, when a loan contract is drawn up, nominal yields are specified (although we have seen that the real future yield on debt is uncertain): either in absolute terms in the case of fixed rate debt, or in terms of the circumstances in which nominal rates will vary, in the case of variable rate debt. Debt can either be unsecured, e.g. an overdraft, or secured

against some asset. It is also possible to include covenants in the loan contract specifying the use to which loaned monies may be put. The contract outlining the terms on which the loan is made is legally enforceable in the courts. Creditors can pursue their claims even to the point of forcing debtors into liquidation. In the event of liquidation, creditors have a claim on the firms' assets. This is contrasted with the position of the equity-holder who receives a share of the firms' assets only after all debts have been satisfied. Equity holders as a class face greater risk than debt holders with regard to return on their financial investments.

In order to be persuaded to hold equity rather than debt, investors must therefore be offered a risk premium. The cost of equity is thus higher than the cost of debt. From the demand side, investors must make decisions concerning the amount of risk they are prepared to accept as the price for earning the potentially higher returns. The firm is faced with the opposite situation. Although debt is less costly to the firm than equity, because of the legally enforceable obligations involved it is also more risky.

Furthermore, the corporation tax system generally favours debt issue. Interest payments on debt are considered as fixed costs and can therefore be offset against the corporate tax levied on firm earnings. The same is not true of dividend payments.

Moreover, it should be noted that recent tax reforms in the US and the UK have increased the tax advantages of borrowing. Although cuts in the rate of corporation tax in the UK have reduced the advantages of tax deductible debt interest, lower depreciation allowances and the abolition of stock relief have increased the incentive for debt finance. At the same time, reductions in the marginal income tax rate and increases in the marginal tax rate on capital gains have reduced the advantages of retentions for individuals as opposed to distributions, including in the form of debt interest (Wilson 1991). In the US, following the 1986 Tax Reform Act, although the rate of corporation tax was reduced, the rate of tax on dividends and capital gains was brought down into line with income tax rates which are significantly below corporation tax rates (Brealey and Myers 1991).

Thus debt financing is relatively less costly to the firm than equity financing, particularly in the presence of corporation tax¹. However, we do not see firms tending to use debt finance exclusively because it becomes increasingly costly as the gearing ratio rises. As the number of fixed obligations on the firm's earnings increases, so does the risk of financial distress and bankruptcy. Equity holders perceive this risk, and since in the event of bankruptcy debt holders have priority in settlement

¹ King and Fullerton (1984), provide empirical evidence in support of this statement, and attempt to estimate cost differentials in selected countries.

over equity holders, equity holders demand higher returns to compensate them for facing increased risk as the gearing ratio rises. The average cost of capital faced by the firm is thereby forced up. Debt holders also face increased risk as the number of fixed obligations competing with their own increase. So it can be seen that the firm faces a U-shaped average cost of capital curve (see Figure 1 Chapter III). At low gearing levels, it is in the interests of the firm to increase the issue of debt as a net advantage can be gained by replacing equity with relatively cheaper debt. After a certain point any further increases in debt cause the average cost of capital to rise again as the costs of increasing risk of financial distress and bankruptcy outweigh the savings made by using relatively cheaper debt. Beyond a certain limit, the cost of debt is also likely to start rising. The optimal gearing ratio then occurs where the difference between the tax advantages of using debt and the costs due to the risk of bankruptcy are minimised.

So we have seen that the major determinants of corporate gearing patterns include risk, the cost of capital and taxation. Despite its theoretical importance, empirical evidence concerning the explanatory power of taxation as a determinant of corporate finance appears weak (Coates and Woolley 1975; Mayer 1987b). Furthermore, the burden of work involved in a comparative analysis of the role of taxation is beyond the scope of this study and has not therefore been explicitly modelled.

Thus in the next sections we concentrate on the behaviour of cost of capital, including the evaluation of risk. We look first at interest rates before going on to investigate the role of inflation. Although they help explain differences in levels of gearing across countries, we find that these determinants are not sufficient to explain recent trends in corporate financial behaviour. A further factor that appears to be an important determinant of recent trends in corporate gearing is discussed in section D: financial liberalisation.

B RATES OF RETURN

The above analysis outlining movement along the cost of capital curve is based in a static framework, indicating optimal behaviour at a particular point in time. In an inter-temporal framework, however, the curve itself can move. We would expect gearing ratios to move counter-cyclically. In a boom high corporate income and profits increase the value of equity. In the absence of any issues of securities, the burden of debt could fall if increasing profitability raised the valuation of the firm. Moreover, higher income and profitability provide the firm with more funds for investment and service of obligations, reducing the need to borrow. In this case, market value gearing ratios would fall. At the same time, it is precisely when the

firm is in a strong position that it is likely to make new equity issues. Book value gearing ratios might also be expected to fall in this instance. The opposite is true in times of recession. When the profits of the corporate sector fall and profitability is squeezed, the stock of internal equity begins to fall. In general it is likely that firms prefer not to compensate for this by issuing external equity because any new flotations made in these circumstances are likely to be under-valued. New financing needs are more likely in this case to be met from debt. At the same time, the burden of outstanding debt which has to be serviced from a shrinking income rises. In this case both book and market value gearing ratios could be expected to rise. Gearing ratios should thus tend to move counter-cyclically.

Real interest rates, however, would appear to move pro-cyclically. Thus we should see higher interest rates accompanying lower gearing ratios in a boom, and the opposite in a recession. Increases in the corporate gearing ratio were to be expected during the 1970s as a consequence of the oil shocks and recessions experienced in the economies under consideration. The continued increase in corporate gearing ratios throughout the 1980s during a period of sustained growth is, however, puzzling.

We have seen that gearing ratios are influenced by both the average cost of capital faced by the firm, and the relative cost of the various sources of finance. This section is devoted to a detailed discussion of these various costs. We begin by

looking at various ways of measuring the cost of debt. The cost of equity is then investigated allowing comparison of the two categories of finance. Finally, the average cost of capital faced by the corporate sectors in the countries studied is considered.

B.1 *Nominal Rates of Interest*

We begin by considering 'risk-free' rates of interest. Risk free rates of return are usually assumed to be represented by the yield on government debt. In reality, not even government debt is entirely risk free. Real returns on government debt are always subject to inflationary effects. During periods of inflation, holders of government debt risk sustaining capital losses on non index-linked debt.

Although far from common, there is also always the risk of default. A rare example has occurred in UK local government recently. The credit rating of UK local authorities has been severely damaged following the High Court decision retroactively banning local authorities from carrying out swap transactions. All outstanding deals have become illegal, leaving local authorities unable to service their debts. The desire in UK local government for an attempt to regain credibility and reputation is so great that a means will most likely be found

before long allowing local authorities to satisfy outstanding obligations, even if they may not enter into any more of these kinds of deals in the future.

Reputation is so severely damaged in the event of default that governments are likely to try and avoid this outcome at all costs. Although not zero as we have seen, the risk of default is thus very small, at least in the countries considered in this study.

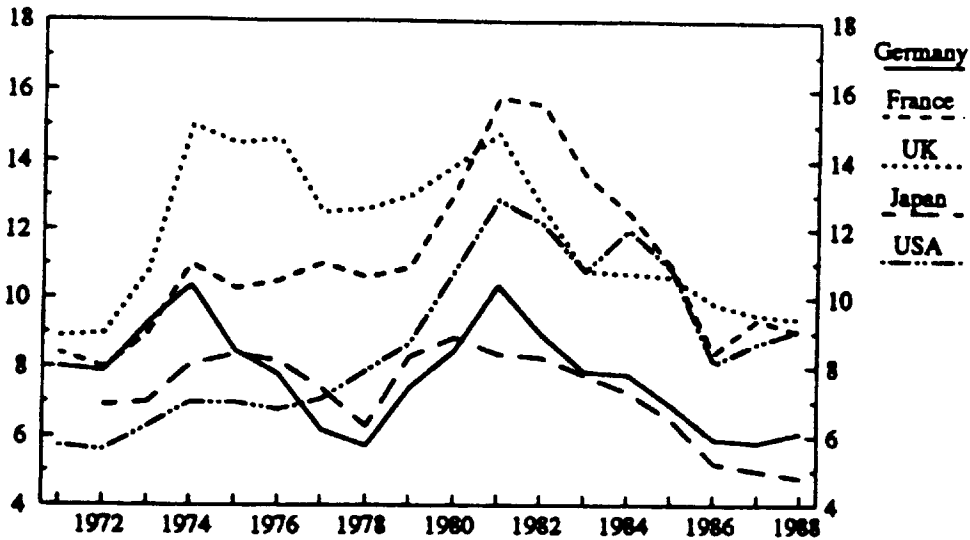
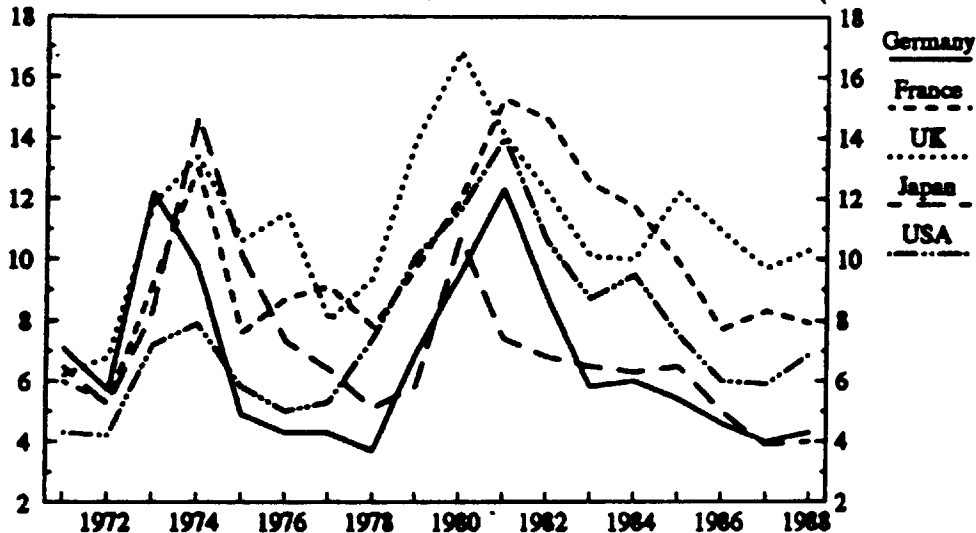
Trends in short and long-term public sector yields are presented below.

Clearly, the cost of debt to the corporate sector may exceed the cost of debt enjoyed by the public sector. We see shortly, however, that it is very difficult to calculate actual cost of debt faced by the corporate sector, particularly since we are interested in some 'representative' measure that allows us to compare behaviour across the countries in our study. Although not exactly equal, the definitions of the public sector yields are much more comparable than private sector rates. It was thus considered worthwhile first examining the behaviour of 'core' interest rates before going on to consider further elements involved in the cost of corporate sector debt.

B.1.i Long-Term Interest Rates

In the absence of money illusion, we would expect real rates of interest to have a greater impact on financing decisions than

nominal rates. Both the outstanding level of real rates and expectations of future rates are important factors. Given that expected real rates must involve predictions of both inflation and nominal interest rates, movements in nominal interest rates could themselves also have an influence on behaviour, at least in the short term. Outstanding nominal interest rates are always known, whereas inflation is only known with a lag. Inflationary expectations are hence based on less up to date information than interest rate expectations. Thus when a change in nominal interest rates is made, it is possible that inflationary expectations do not adjust instantaneously, in which case *perceived* real interest rates change. Managers may hence decide to adjust financing patterns. It is thus possible that movements in nominal interest rates have some influence on desired gearing levels.

Nominal Rates of InterestIV.1a Long-Term Rates²IV.1b Short-Term Rates³

Source: European Economy, Commission of the European Communities

² Germany: yields on public sector bonds outstanding; France: 1971-79 public sector bonds, 1980-88 State bonds over 7 years; UK: State bonds 20 years; Japan: 1971-78 State bonds, 1979-88 over the counter sales of State bonds; US: Federal bonds over 10 years.

³ Germany: 3-month interbank loans; France: 1971-81 1-month sale and repurchase agreements on private sector paper, 1982-88 3-month sale and repurchase agreements on private sector paper; UK: 3-month interbank deposits; Japan: bonds traded with 3-month repurchase agreements; USA: 3-month Treasury bills.

During the 1970s, it would appear that movements in nominal interest rates had little if any influence on financing decisions since gearing ratios rose in the countries under consideration (with the exception of Japan) despite significant long-term interest rate hikes over the period. During the 1980s, however, although inflation rates generally fell much more quickly than nominal interest rates, gearing ratios continued rising. Before concluding that movements in nominal interest rates must have begun to have a significant affect on financing patterns, the behaviour of interest rate variability over the period should be considered.

During the 1970s, nominal interest rates displayed a great deal of variability and two very high peaks in 1974 and 1981. Since then, the tendency has been for rates to trend fairly smoothly downwards. The resultant decline in variance and thus uncertainty may have caused perceived risk to have fallen and encouraged short term borrowing as opposed to long term borrowing or the use of equity. Over the period as a whole, interest rates in Germany, for example, displayed relatively low variance and German corporate gearing ratios have indeed been rising and remain relatively high. In the UK, on the other hand, where variance is more pronounced, particularly in the 1970s, the gearing ratios has been relatively low, again particularly in the 1970s. However, nominal interest rate variance is relatively low in Japan, yet here gearing ratios have been falling, albeit

from a relatively high level. And in the USA, where rates have been particularly erratic in the 1980s, one of the greatest increases in gearing has been witnessed.

Information yielded by a study of long-term nominal interest rates is clearly limited.

In the countries under consideration, corporate investment is typically financed by a mixture of short- and more long-term finance. The behaviour of short-term interest rates was thus also investigated. Again we see below that an examination of potential influences from this source is of only limited use.

B.1.ii Short-term Interest Rates

Short-term rates of interest have generally been lower than long-term rates, but have shown more variability. We saw above that we would expect low variance to be associated with high gearing. We would thus expect higher gearing ratios to be associated with more long-term debt. However, although the lowly geared UK corporate sector does indeed have a low proportion of long-term debt in the gearing ratio, and the proportion of long-term debt in the high German gearing ratio has exceeded the proportion of short-term debt since the late 1970s, in the countries considered here it is not generally true that gearing ratios and use of long-term debt are positively related.

Any influence the behaviour of nominal interest rates may have on financing decisions is far from straightforward. The

same is also true of real interest rates.

B.2 Real Rates of Interest

There is considerable debate about the precise nature of real interest rates, and how they should be measured (see e.g. Atkinson and Chouraqi 1985). However, it is beyond the scope of this paper to go into this area in detail. Moreover, the aim here is not to measure real rates with great precision at particular points in time, but rather to broadly outline how real rates have moved in the period considered, both over time and relatively between countries. We thus confine ourselves to considering widely used conventional measures of real interest rates i.e. nominal rates less the rate of inflation.

B.2.i Long-Term Interest Rates

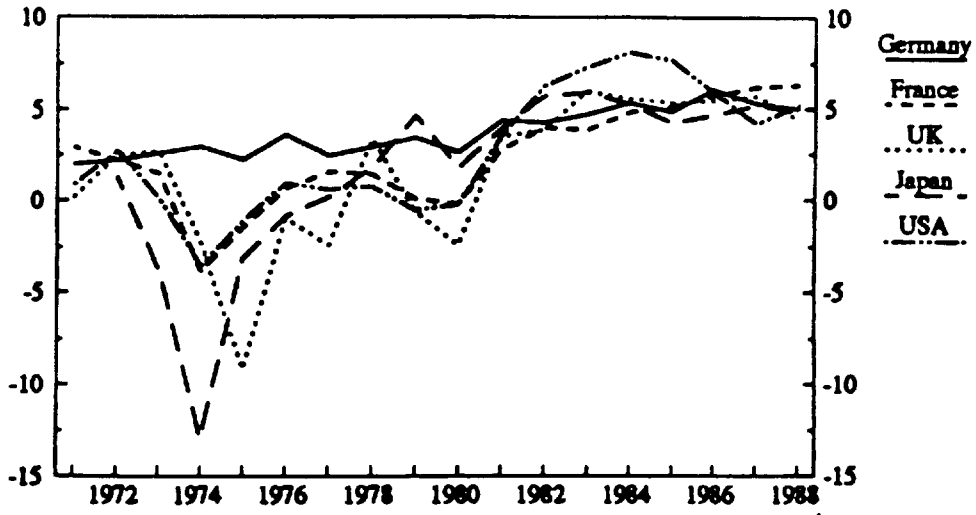
In the mid-1970s, periods of negative long-term real interest rates were experienced in all the countries in the sample with the exception of Germany. However, these rates displayed a great deal of variability. The high level of uncertainty surrounding borrowing costs may have discouraged corporations from exploiting the negative rates, and very large increases in gearing ratios were not thus witnessed in this period: increases were relatively slow but steady in the UK and

the US, and rather erratic in France. In Germany, on the other hand, the unique stability of real long-term interest rates during this period probably helps explain the significantly faster increases in gearing witnessed.

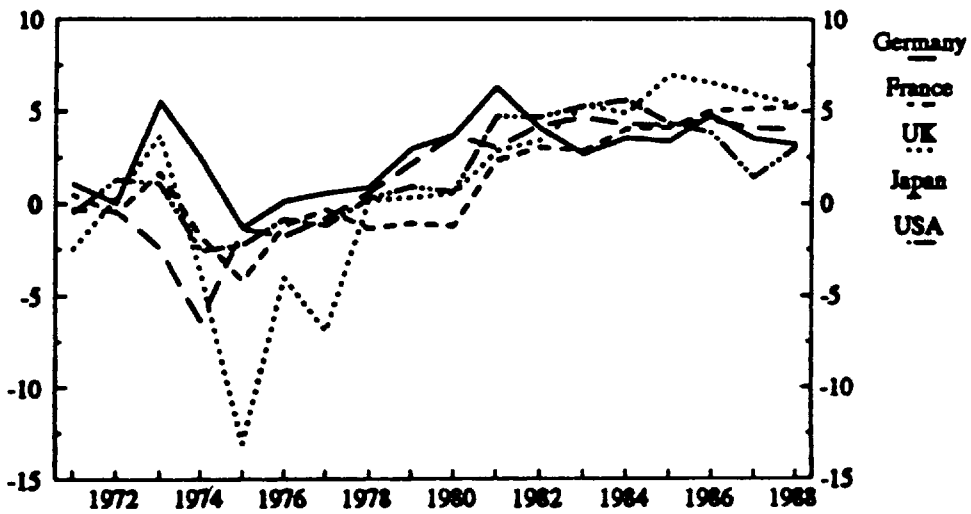
In the late 1970s and early 1980s concerted efforts were made to bring inflation under control via tight monetary policy. This tended to take the form of interest rate policy rather attempts at quantitative or qualitative restrictions. As a result, interest rates in the countries under consideration rose sharply in this period. Rates in the US were significantly higher than the other countries in the group in the early 1980s, whereas Japanese rates have been significantly lower since the early 1980s. Rates in the EC countries have tended to converge during this period, but to a very high level. The continued increase in gearing ratios in the EC countries is thus rather strange. In the US as well, although rates did drop back after 1983, they began to rise again after 1986, and thus cannot explain the continued rise in gearing ratios.

Real Rates of Interest

IV.2a Long-Term Rates



IV.2b Short-Term Rates



B.2.ii Short-Term Interest Rates

Although generally lower than more long-term rates, the shorter rates display similar behaviour. There are, however, some significant differences to be noted.

With respect to the longer rates, greater variability was experienced in all countries until the early 1980s, at which time short-term interest rates began to display greater convergence.

Another factor to point out is that since the early 1980s, rates in the UK have significantly exceeded the rates experienced elsewhere, whereas in the US they have been notably lower. The similarity of financial behaviour between the corporate sectors of these two countries has been noted above on a number of occasions: the behaviour of real interest rates has, however, been very divergent.

The rates of interest described above are commonly used indicators of the cost of debt. However, although the nominal rates have been corrected for inflation, the real rates of interest subsequently derived are unlikely to represent the actual cost of debt to the firm.

We noted above that the corporate sector is unlikely to enjoy the same rates as the public sector. Moreover, when considering interest rates, we must be careful to distinguish between borrowing and lending rates. In the non-perfect markets of the real world, where there are transactions and information

costs etc., the cost to the borrower and the return enjoyed by the lender could well diverge. The yield on financial instruments would not, in this case, represent the true cost to the borrower of those financial instruments.

Furthermore, the relevant cost of debt to the firm is not the current actual cost but the expected cost, since when planning investments managers should compare expected returns to expected costs. However, it is difficult to quantify these various costs, some of which are not directly observable, for example expected rates of interest. We have seen that there are many other factors affecting the required rate of return on corporate debt, such as agency, information and transactions costs. Satisfactory evidence quantifying these costs is not available to us.

These problems are exacerbated in this study since ideally any rate used should include allowances for different types of debt instruments: loans, bonds, variable rates instruments etc. Hence it is probably not possible to directly calculate an accurate measure of the true cost of debt to the firm.

An alternative way of trying to analyze the behaviour of the cost of corporate debt is to consider the risk premium of some representative corporate sector rate over the cost of risk free debt. The real cost of corporate debt can be seen as comprising two elements: a risk free return required to compensate lenders for the use of their money during the time period in question

measured, for example, by the rate of return on public sector bonds; and a risk premium needed to compensate lenders for the various costs specific to the corporate sector mentioned above, and in particular the risk of default. The extent to which corporate interest rates exceed risk free rates of interest is thus an important indicator of the risk associated with the corporate sector, and hence an indicator of movements in the true cost of capital faced by the corporate sector. The magnitude of the difference between returns on corporate and government debt should therefore give some indication of the risks and thus costs involved with holding corporate debt. Although the level of the risk premium calculated in this way is unlikely to allow us to construct a perfect measure of the cost of corporate debt because of the problems mentioned above, the trends observed are an important indicator of tendencies in the cost of corporate debt.

B.3 *Relative Real Rates of Interest*

We would expect the gap between the required rate of return on risk-free debt and more risky debt (risk premium) to rise in periods of increasing uncertainty and risk - such as during the 1970s when the economies in question suffered both periods of recession and rising inflation⁴ - and fall in more stable

⁴ As the present recession continues, there is again evidence of high risk premia with much adverse comment in the UK Press concerning the very high margins charged by the banks on loans to industry, particularly to the borrowers considered to

expansionary periods. Risk premia could thus be expected to move in line with corporate gearing ratios. Empirical tests appear to support the idea of a positive relationship between measures of spread and gearing ratios. For example Davis (1987) in a study of the US, the UK, Japan, Germany and Canada found the two generally moving together, at least until the early 1980s. We see below that the relationship between gearing ratios and risk premia continued to hold during the 1980s.

The measures of corporate sector risk premia presented in chart IV.3 below are calculated as the cost of corporate sector debt less public sector debt. The cost of public sector debt is measured by the yield on long term fixed interest government bonds. The cost of corporate sector debt has been assumed to be given by the yield on fixed interest long term corporate bonds⁵. It should be noted, however, that despite a revival in bond finance in recent years, bonds do not contribute significant finance for investment in any of the countries studied except the USA (Mayer 1989). Moreover, increasing amounts of corporate sector debt are not fixed rate. Nevertheless, the securities considered are fairly comparable across countries, and the yields investigated, while not necessarily entirely accurate measures,

be most risky, i.e. small and medium sized enterprises.

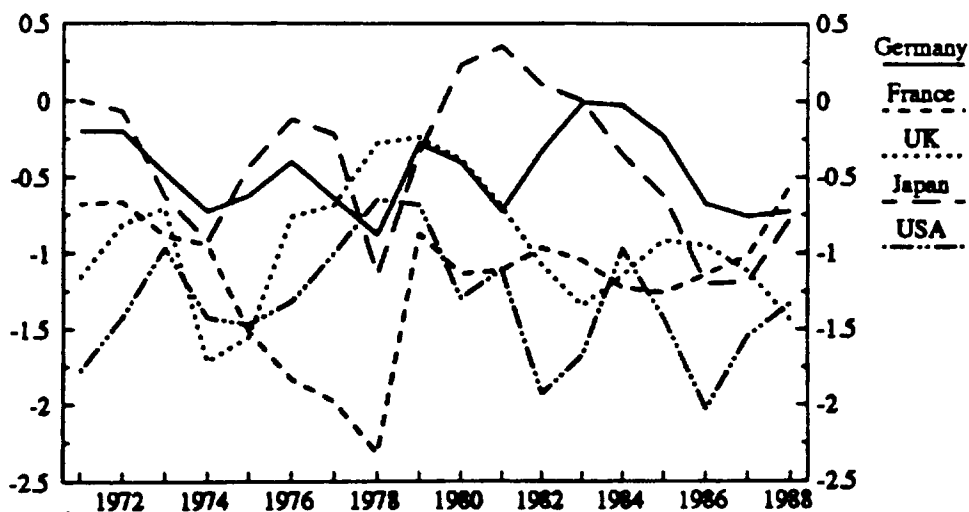
⁵ Germany: yield on domestic, fixed interest industrial bonds; France: yield on private sector "premier signature" bonds; UK: secondary market yield on company bonds; US: capital market rates on all industry selected long-term bonds; Japan: secondary market yield on industrial bonds. Source: Cronos.

are likely to move in line with the cost of corporate sector debt in these countries.

We would expect risk premia to move countercyclically. In a recession, as aggregate creditworthiness deteriorates, risk premia demanded could be expected to rise, and vice-versa.

The yield on long term fixed interest corporate bonds has generally been a couple of points higher than government bond yields - as would be expected. During the period under consideration, the minimum spread in the size of risk premia between the various countries occurred in the early 1970s. Following the oil shocks in the mid and late 1970s, large variations are to be witnessed with the risk premium in France increasing sharply (in absolute terms) whereas the gap actually reversed itself in Japan for a few years, becoming slightly positive. Since that time risk premia have tended to converge again, but at a higher level.

IV.3 Risk premium: Safe versus Risky Debt



Thus the mark-up of corporate sector over risk-free government debt has continued to rise during the 1980s despite a long period of growth and stability. The relationship between risk premia and gearing ratios noted by Davis hence appears to continue to hold.

We have seen that financial liberalisation may help explain the increases in gearing witnessed in the 1980s: it may also have influenced the recent behaviour of risk premia. Deregulation and increased competition should cause the mark-up on private sector debt to fall. At the same time the markets could well misprice new instruments. It is possible that an insufficient return is demanded, helping drive down mark-ups further. On the other hand, risk could be overestimated, driving yields

up. Lower grade debt such as junk bonds has also been introduced to the markets, increasing risk in the markets and average yields.

We saw in the previous section that the real cost of 'risk-free' debt has risen since the late 1970s following sharp increases in interest rates in the late 1970s and early 1980s by the monetary authorities keen to bring inflation under control. Since the late 1970s the mark-up of corporate over public sector risk-free debt has also risen. Risk premia in the countries with the highest degree of liberalisation, i.e. the UK and the US, have typically exceeded rates in the other countries in the sample, with the exception of France in the late 1970s. In the presence of increasing internationalisation of financial markets, upward pressures on required rates of return would appear to have spread to the other countries in the sample. Initially large variations in the mark-up are to be seen, as mentioned above. Although the spread between risk premia in the various countries studied subsequently fell during the 1980s, a definite upward tendency in the size of mark-ups is to be witnessed. Higher risk premia are being demanded from corporate borrowers as gearing ratios increase.

Not only has the risk free rate of interest been higher during the 1980s than during the 1970s, but so has the risk premium attached to corporate debt. Increasing use of debt by the corporate sector can not thus be explained in terms of income

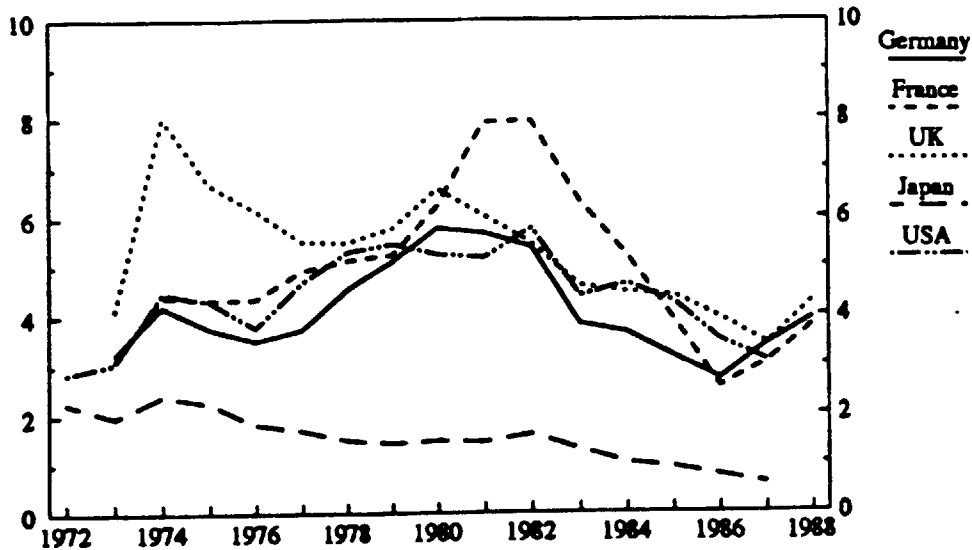
effects. We need then to consider whether trends observed may have arisen as a result of substitution effects. In the next section we discuss the cost of alternative means of finance as a prelude to investigating the recent behaviour of the relative cost of debt.

B.4 *Cost of Equity*

When calculating the return on equity it is not sufficient to look only at dividend yield - expected growth in earnings via either increased dividend yields or capital gains should also be included if we are to obtain an accurate measure of the real return on equity. The real rate of return should thus be measured by dividends plus expected growth in the value of the share. However, future expected growth rates are not directly observable. Thus although the dividend yields presented in chart IV.4 - dividends as a percentage of the price of equity - give an idea of the relative behaviour of the cost of equity in the countries in our sample during the past two decades, they do not give particularly accurate measures of the real cost of equity.

In chart IV.4 we see that peaks have occurred in recession years, followed by a steady decrease in dividend yields since the early 1980s - a trend that has been especially marked in France.

IV.4 Dividend Yield



Source: Cronos

Japanese dividend yields have been significantly below those enjoyed in the other countries since the early 1970s, and more stable, displaying a steady downward trend. In the other countries, yields have been considerably less stable but have converged since the early 1980s, with UK rates being slightly above the rest.

By the late 1980s, dividend yields were generally below their values of the early 1970s. We saw above that the real cost of debt to the corporate sector has been rising during the 1980s. If it is true that the cost of equity has been falling at the same time, then both the absolute and the relative cost

of debt would appear to have risen during the 1980s. Reaching this conclusion makes the task of explaining rising corporate gearing ratios during the 1980s even more difficult. However, before investigating movements in the relative costs of debt and equity to the firm it is important to ensure that the measures of costs used are comparable.

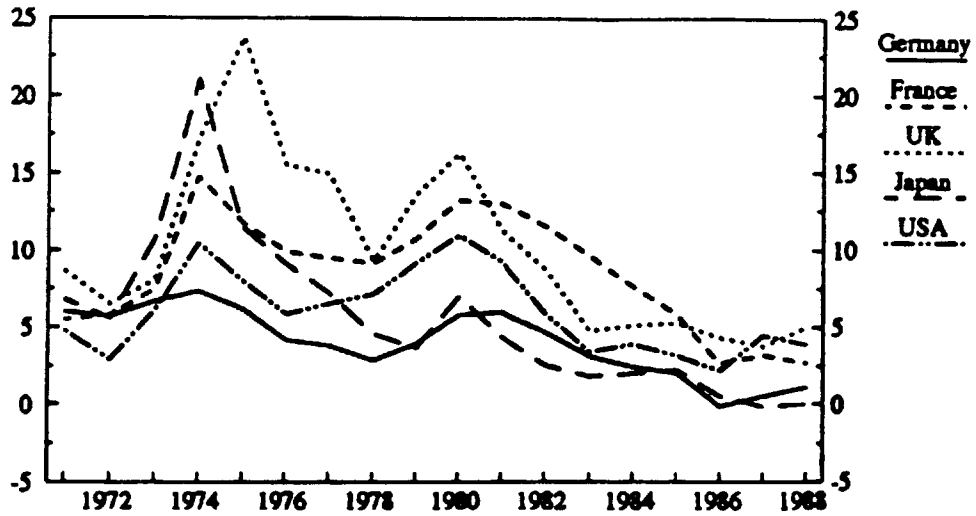
Commonly used measures of financial instrument yields do not necessarily accurately represent the true cost to the firm of using these instruments. Furthermore, it is not improbable that equity yields enjoyed by equity holders differ from the return on equity earned by the firm, i.e. the true cost of equity, for reasons mentioned above such as transactions costs, asymmetries of information, etc.

The dividend yields presented above are generally considered to be 'real' rates of return. However, it is not strictly correct to compare them with the measures of real interest rates presented in the previous section unless it is presumed that share prices mirror the behaviour of the interest rate deflator used above - the consumer price index. A glance at charts IV.5a and IV.5b indicates that this assumption cannot safely be made.

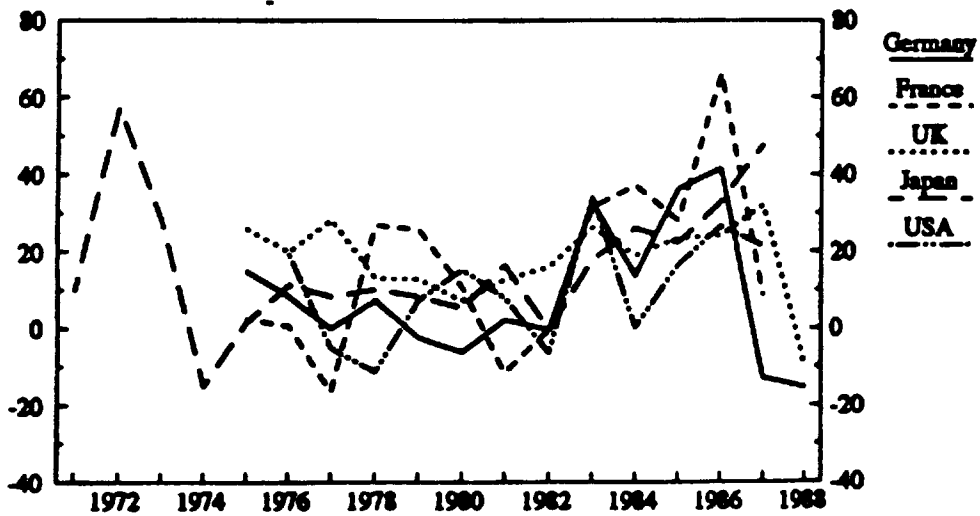
Whilst the rate of consumer price inflation in the countries concerned has generally been decreasing and converging since the early 1980s, the behaviour of share prices has been extremely erratic and does not appear to display any trend at all, at least in the period under investigation.

Price Indexes (Annual percentage change)

IV.5a Consumer Price Index



IV.5b Share Price Index

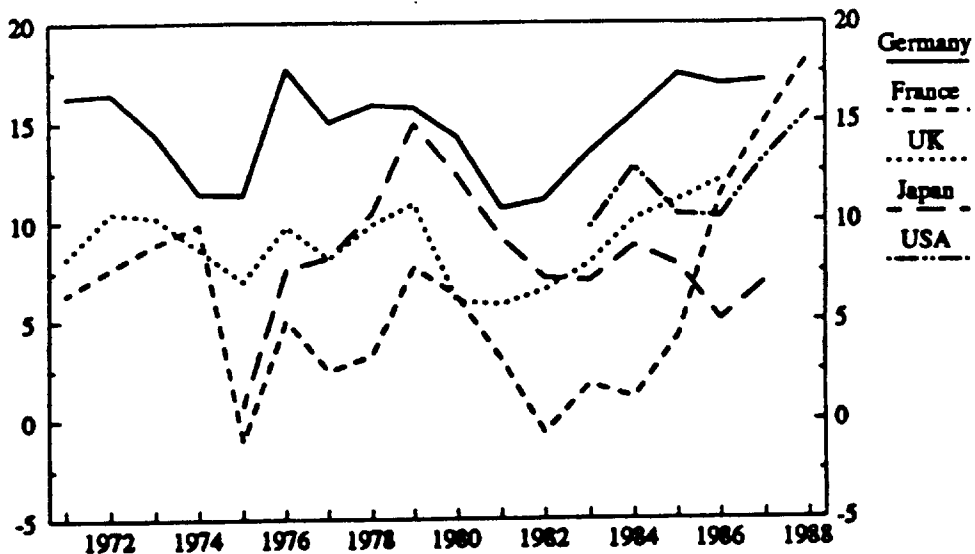


Source: Eurostat

An alternative measure of the real cost of equity to the corporate sector has thus been presented in chart IV.6. Here return on equity is measured by the profitability of equity⁶. The behaviour of the two indicators of the cost of equity has been quite different. In the second case, returns have been much more variable, and the ranking of the countries no longer remains the same. The rate of return on equity in Germany was persistently the highest according to the profitability indicator, and France the lowest until recently when it increased significantly to become the highest.

⁶ Net after tax profits divided by the stock of equity.

IV.6 Rate of Return on Equity



Source: BACH, Commission of the European Communities and OECD Financial Statistics (USA*)

UK rates have also increased significantly in recent years, and are now higher than at any other time during the period. The Japanese rates on the other hand after increasing significantly in the late 1970s, have since been falling steadily. No particular time trend appears to exist during the time period investigated, but there does seem to be some evidence of cyclicity in the countries in the sample with troughs occurring in the mid-1970s and early 1980s. Returns to equity according to this second measure appear to have picked up significantly since the early 1980s, in line with the ending of the recession

and subsequent improvements in corporate income and profits. The persistently falling trend seen in chart IV.4 is no longer witnessed. Further investigation is thus required to establish the behaviour of the relative costs of both types of capital.

It should be recalled at this point that the demand for corporate finance is not determined solely by the rates of return offered on the instruments in question, but also by the returns offered by alternative sources, both within the corporate sector, i.e. debt versus equity, and in competition with the corporate sector, i.e. corporate sector instruments versus government and foreign securities. It is beyond the scope of this study to go into the relative behaviour of foreign securities and we have already considered the risk premium attached to private over public sector debt in section B.3 above. The behaviour of the relative cost of debt and equity is thus considered in more detail below in an attempt to see whether this can help explain recent behaviour in gearing ratios.

B.5 Risk Premium: Debt versus Equity

As indicated in the introduction, equities pay a premium over debt holdings because their returns are relatively more risky. This measure of the risk premium could also be interpreted as indicating the difference between safer and more risky assets, i.e. as an indicator of the magnitude of the risk premium

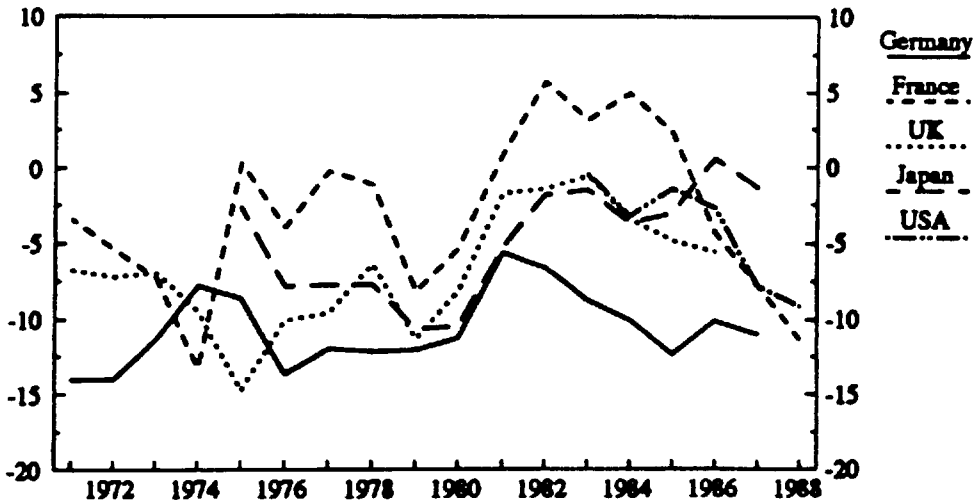
from the investors point of view. As mentioned above, we could expect risk premia to move counter-cyclically, falling in periods of stability and growth, and rising in recessionary periods. We have also shown why we would predict gearing ratios to move counter-cyclically. We should therefore expect gearing ratios and risk premia to move together. We saw above, however, that the counter-cyclicality of gearing ratios no longer appears to hold. We also found this to be the case for the risk premia between the cost of public and private sector debt. We now examine whether this is also true of the debt-equity risk premium.

Attempts to measure this value should be treated with extreme caution and only be interpreted as a very rough indicator of the relative cost of capital, not an accurate measure. The measure of the cost of debt used above is unlikely to be an entirely accurate measure of the true cost of debt, and although the return on equity measure calculated is probably more accurate than more commonly used measures of equity yield given by dividends divided by share price, it is probably not an entirely accurate measure of the true cost of equity either. We must presume a fairly large margin of error in the results presented in chart IV.7.

The series indicate that debt-equity yield differentials have been significantly negative over the period in question, except during the early 1980s in France. This supports theoretic-

cal assumptions. We saw in chapter III that although there exist many different models concerning the cost of capital to the firm, it is generally agreed that the cost of equity to the firm exceeds the cost of debt.

IV.7 Real Private Bond Yield Less Return on Equity



Over the period the yield differential has been largest in Germany, where high corporate gearing was also to be witnessed. German financial markets are relatively underdeveloped and highly regulated. Here, equity is scarcer with a significantly higher required rate of return. The risk premium in the UK, where financial markets were more highly developed and the use of equity more widespread, was also high until the late 1970s. It subsequently fell sharply during a time in which strong liberalisation of the UK markets got under way. As liberalisation in the other countries began to catch up and internationalisation

of financial transactions increased, risk premia in the UK started to rise again in the mid-1980s.

French risk premia were persistently the smallest until the mid-1980s. The continued increase in gearing in France over the period is hence puzzling, especially in the early 1980s when the differential appears to have even reversed itself, with the real cost of debt exceeding the cost of equity in certain years - if the data is to be believed.

In general, the gap between the cost of equity and debt would appear to have fallen after the late 1970s before beginning to rise in the early 1980s, i.e. the relative cost of debt with respect to equity rose and then fell after the early 1980s. With the exception of Japan, gearing ratios have, however, displayed an upward trend throughout the period. There does not, therefore, appear to be a clear cut relationship between debt-equity yield differentials and gearing ratios.

The lack of concord between the movements of gearing ratios and the relative cost of capital may of course be due to problems with the measurements used, so it is perhaps unwise to put too much reliance on this evidence.

We turn our attention now to the relationship between gearing and what is, according to the theory, its most important determinant: the average cost of capital.

B.6 Cost of Capital

When deciding how to finance a desired amount of investment, it is presumed that managers attempt to obtain finance at the lowest possible cost, subject to the risk attached to the available instruments. In the previous section substitution effects associated with the relative cost of capital were considered. We now turn our attention to considering income effects associated with the behaviour of the average cost of capital faced by the corporate sector.

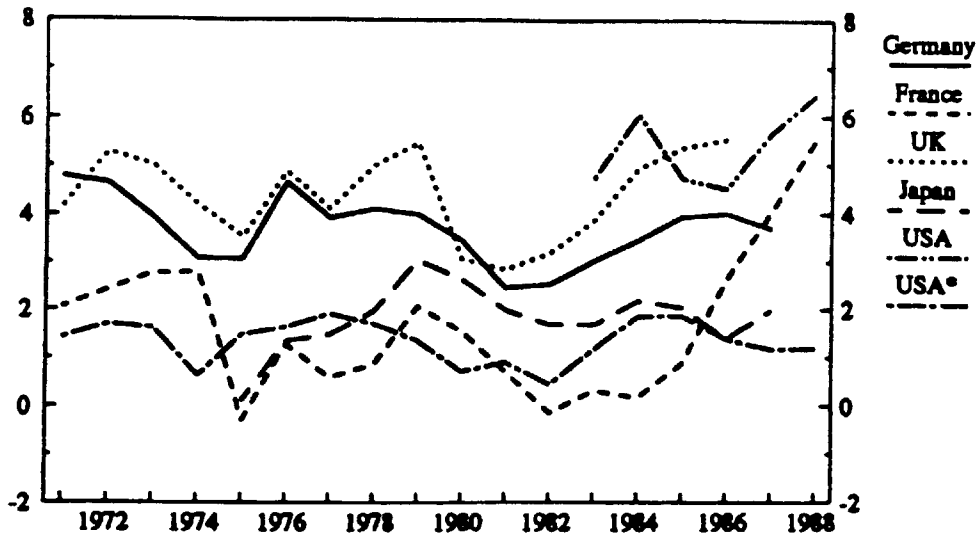
In this study we have limited the analysis to the consideration of two broad categories of corporate financial instrument: debt and equity. The cost of finance to the corporate sector must then be a weighted average of the two, i.e:

$$C = [(D / D+E) * r_D] + [(E / E+D) * r_E]$$

where D and r_D are the stock of debt and returns to debt, and E and r_E equity stock and returns. At a microeconomic level in perfect markets with no tax, transactions or bankruptcy costs etc., this measure could be calculated directly. However, in the real, non-perfect world many of these costs are not observable, and the measure must be estimated in some other way. A similar method can be adopted to the one used above to calculate the real cost of equity to the corporate sector. We have calculated the

profitability of corporate financial capital by measuring net profits after tax divided by stocks of both debt and equity. This indicator of the cost of finance is presented in chart IV.8 below.

IV.8 Cost of Capital



Source: BACH, Commission of the European Communities, OECD Financial Statistics (USA*), Survey of Current Business (US physical capital stock)

The cost of capital has been highest in the United Kingdom, slightly exceeding the measure in Germany. BACH data for the USA also indicates a very high cost of capital⁷. The cost of capital in France was lowest over the period, and even negative in 1975 and 1982, until significantly increasing after 1985 and becoming one of the highest. Rates have significantly increased everywhere since the early 1980s in line with higher real

⁷ See footnote 2 in chapter II for reasons why the level of the OECD ratio is much lower than the BACH ratios, and not strictly comparable.

interest rates, except in Japan where rates are now the lowest in the group and well below rates experienced in the late 1970s. Over the period as a whole, there has been much fluctuation in rates but no clear time trends emerging.

According to standard financial theory, the optimal gearing ratio occurs where the weighted average cost of capital is at a minimum point. In a static setting, once the optimal gearing ratio has been exceeded, two implications of further increases in gearing ratios arise immediately - rising average cost of capital faced by the firm, and an increase in the risk of default.

Before the minimum point on the cost of capital curve is reached, this need not necessarily be the case, however. Up to a certain point increases in gearing are likely to be associated with a fall in the average cost of capital. In the downward sloping region of the curve, debt is relatively less costly than equity, and increasing the proportion of debt in the financial structure brings down the average cost of capital. Indeed, increasing debt issues may not even cause the gearing ratio to rise at all if the funds so obtained are sufficiently profitably invested. The returns on new investments may be so great as to cause the value of the firm to rise sufficiently that the gearing ratio does not rise and may even fall. If the increased debt obtained is invested in such a way as to improve the value of the firm's assets or net worth, for example, the burden of debt need

not even rise in which case the risk of default would not be any higher than before. Hence when examining the implications of rising gearing ratios, it is important to try and establish in which section of the cost of capital curve the movement takes place.

In an inter-temporal setting, we saw above that the curve itself may shift. Movements along and off the curve could have quite different implications, and an attempt should be made to distinguish between the two by examining the relationship between the cost of capital and the gearing ratio.

During the period under consideration, with the exception of Japan where the average cost of capital has fluctuated around 2% since recovering from its trough in 1975, the minimum average cost of capital appears to have occurred in 1981-82 in the countries considered. A rising gearing ratio up until 1982 would be predicted in line with a falling weighted average cost of capital. During the 1980s, however, the cost of capital has generally been increasing, but so have gearing ratios, as noted in chapter II. We thus have two possible outcomes: either there has been a movement away from optimal gearing and into the upward sloping area of the curve; or the curve itself has shifted outwards. In the latter case, the levels of gearing could still be optimal, but at a higher level. In the former case, however, exceeding the optimal gearing ratio implies there has been an increase in the risk of default.

Increasing default risk may lead to bankruptcy. Indeed, it is precisely since the early 1980s that most concern about the indebtedness of the corporate sector has been expressed. Total bankruptcies in the countries under consideration are outlined in table 1. Comparison of the absolute numbers is not recommended because of differences in sectoral definition and the definition of bankruptcy. It is, however, worth considering the growth of these numbers as an indicator of trends in bankruptcies. Index numbers are thus also presented. The turning point of the last recession occurred on average in 1982 in the countries studied according to measures of industrial production and the volume of GDP growth. This year was thus selected as the index base.

Table 1 BANKRUPTCIES

A. Numbers

| | Germany | France | UK | Japan | USA |
|------|---------|--------|-------|-------|-------|
| 1970 | 2069 | | | 2702 | 10748 |
| 1975 | | | 5398 | 2898 | 11432 |
| 1977 | | 4112 | | | |
| 1980 | 2122 | 5147 | 6890 | 3203 | 11742 |
| 1981 | | 6303 | 8596 | 2974 | 16794 |
| 1982 | 3433 | 5955 | 12067 | 3092 | 24908 |
| 1983 | 3226 | 6475 | 13406 | 3284 | 31334 |
| 1984 | 3259 | 7146 | 13721 | 3455 | 52078 |
| 1985 | 3653 | 7137 | 14898 | 3043 | 57078 |
| 1986 | 3461 | 7051 | 14405 | 3217 | 61616 |
| 1987 | 3160 | 7707 | 11439 | 2395 | 61111 |

B. Index 1982=100

| | Germany | France | UK | Japan | USA |
|------|---------|--------|-----|-------|-----|
| 1970 | 60 | | | 87 | 43 |
| 1975 | | | 45 | 94 | 46 |
| 1977 | | 69 | | | |
| 1980 | 62 | 86 | 57 | 104 | 47 |
| 1981 | | 106 | 71 | 96 | 67 |
| 1982 | 100 | 100 | 100 | 100 | 100 |
| 1983 | 94 | 109 | 111 | 106 | 126 |
| 1984 | 95 | 120 | 114 | 112 | 209 |
| 1985 | 106 | 120 | 123 | 98 | 229 |
| 1986 | 101 | 118 | 119 | 104 | 247 |
| 1987 | 92 | 129 | 95 | 77 | 245 |

Sources:

Germany - companies, *Statistisches Jahrbuch*; France - commerce, *INSEE*; UK - companies, *CSO*; Japan - manufacturing, *Japan Statistical Yearbook*; USA - industrial and commercial companies, *Statistical Abstract of the United States*.

The countries displaying the biggest increases in the cost of capital since 1982 - US and France - are also those that have displayed the biggest increase in corporate bankruptcies. The cost of capital in the UK has also risen strongly, beginning

somewhat before 1982: again a correspondingly large increase in numbers of bankruptcies is to be witnessed when a longer time period is considered. There is however a break in the UK series in 1986. The Insolvency Act of that year introduced legislation allowing the appointment of administrators to firms in financial difficulties to hold off creditors. This could both delay insolvencies, and reduce them permanently as companies are given the time and the possibility of reorganisation. Recent reforms in the US have also lessened the likelihood of bankruptcy, allowing firms facing financial difficulties to file for protection from creditors under chapter 21 for example. Moreover, the US data prior to 1984 exclude agriculture, forestry and fishing, finance, insurance and real estate, and services. They are therefore not strictly comparable with data for 1984 and later which are based on a larger sample. The rate of growth between 1983 and 1984 has been significantly overstated.

In Japan and Germany where the cost of capital in the 1980s is not particularly high compared to past experience, there has been no significant increase in bankruptcies over the period. In perfect frictionless markets, bankruptcy should simply lead to a transfer of ownership to bondholders without entailing any costs. However, it is likely that costs are involved in reality, and redistribution is not neutral but has damaging real effects. Thus a possible consequence of increasing gearing (above optimal levels) in the corporate sector and the subsequent rise in the

risk of default is a loss of welfare.

If, on the other hand, gearing ratios have risen as a consequence of less binding liquidity constraints, default risk need not necessarily have increased. Since the late 1970s, there has been a marked trend towards improved competition, deregulation and innovation in the capital markets. The private sector has enjoyed greater access to credit as financial markets have been liberalised and a greater amount of debt is available for a given rate of return.

Financial liberalisation is likely to have been accompanied by changes in required rates of return as perceived risk could well have changed, actual risk has been transferred and risks on new instruments and existing instruments in new circumstances are not yet known. Increasing numbers of bankruptcies also accompanying financial liberalisation suggest the risk of default has increased. A study of precisely which companies are going bankrupt could yield important insights into this question. For example, if the majority of bankruptcies relate to smaller companies who are not very active in the financially liberalised markets and defaulting rather on loans from more traditional sources such as banks, then we could not necessarily conclude that financial liberalisation brings about an increase in the risk of default. However, we do not unfortunately have a breakdown of bankruptcies by size.

In the countries where the process of financial liberalis-

ation has been the fastest and most wide-ranging - the US and the UK - the cost of capital has been both highest and increasing at the fastest rate (chart IV.8). Very significant steps have been taken in the French financial markets in recent years towards the UK and US systems and, after a slow start, cost of capital has also been rising very rapidly in France in the last few years. In Germany and Japan, however, where the liberalisation process has been more hesitant the cost of capital during the 1980s has also been rising in the case of Germany while falling in Japan. Again behaviour in Japan differs from behaviour in the other countries in the sample.

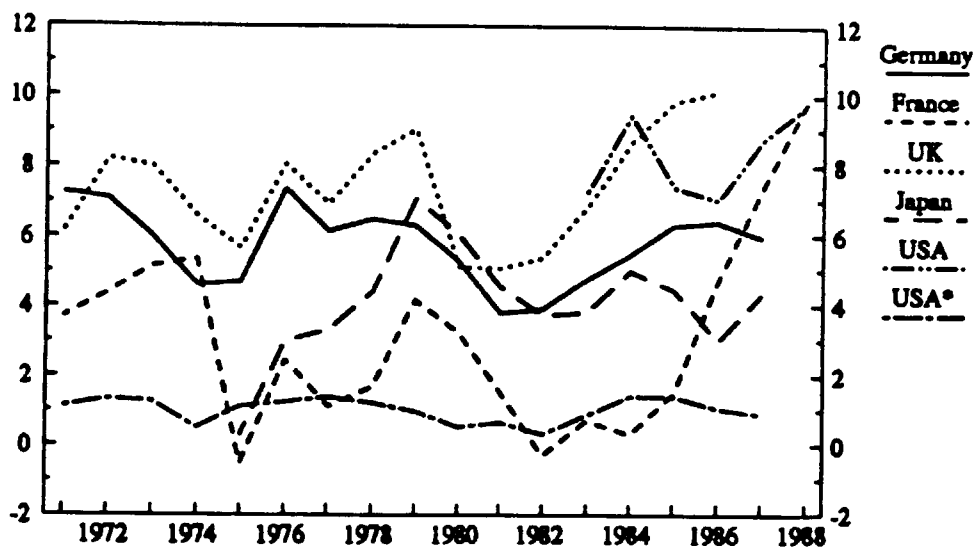
In theory the return on financial capital to the firm should be equal to the return on physical capital, at least at the margin. Physical investment is carried out until the returns earned are equal to capital market returns. The returns on physical and financial capital should hence tend towards equality. Thus returns on physical investment are a way of proxying the cost of financial capital to the firm.

Divergences between these two measures are an important indicator of the incentive to (dis)invest. Clearly, if returns to investment exceed the cost of investment there is an incentive to invest and vice-versa. Given our interest in the relationship between gearing and investment, in chart IV.9 we have produced an alternative measure of the cost of capital to the firm: the

rate of return on invested capital^o. The time paths of the two measures behave in a very similar way. The figures for the French corporate sector are again the lowest and displaying slightly negative rates in 1975 and 1982. The rates in the USA are the highest, and rates in the other countries follow the same ranking as before. The only real difference is that the rate of return on physical capital generally exceeded the cost of financial capital over the period. However, where the denominator of the first measure of the cost of capital comprised total financial capital available, in the second measure it comprises only invested capital e.g. it is net of corporate investment in marketable securities, cash etc. Return on invested capital could thus be expected to exceed the cost of financial capital.

^o Profits net of taxes divided by the stock of physical capital.

IV.9 Return on Invested Capital



Source: BACH, Commission of the European Communities, OECD Financial Statistics (USA*), Survey of Current Business (US physical capital stock)

Comparison of these two rates is the basis for Tobin's 'q'. However, Tobin's valuation ratio compares return on investment as calculated by the profitability of the physical capital stock measured at replacement cost to the profitability of the financial capital stock, i.e. debt plus equity, but this time measured at market values. In order to make cross-country intertemporal comparisons possible we have been obliged to use the BACH data bank in which all measures are at book values.

Calculation of a ratio along the lines of 'q' would therefore probably be significantly overvalued since financial securities are constantly being revalued through replacement

after expiry, roll-overs, and issues, whereas the physical capital stock is rarely revalued, if at all. Chan-Lee (1986), for example, finds that although values of 'q' in the countries under consideration have indeed been rising over the period, they are still below one.

It would probably be very unwise for us to compare our book value measures of cost of capital and return on investment and try and draw any valid conclusions concerning incentives to invest. We can, however, make some predictions concerning the relationship between the cost of capital (according to either of the measures provided above) and investment.

We could expect the two troughs witnessed in the mid-1970s and the early 1980s in the cost of capital to be followed by a pick up in the level of investment. There is indeed some evidence of this although investment has declined over the period in general.

Empirical evidence indicates that real interest rates were low and often even negative during the recessionary periods in the 1970s. They have increased considerably since the beginning of the period of growth in the early 1980s and are now historically high. At the same time, corporate sector investment has generally been in decline over the period, with the exception of Japan where it has picked up markedly since the mid-1970s. We also saw that there was a general increase in gearing ratios throughout the 1970s, which continued during the 1980s (with the

exception of the Japanese corporate sector gearing ratios which have been falling steadily over the past twenty years). Hence, either the relationship between gearing ratios and rates of return has broken down during the past decade, or other factors have begun to outweigh them as determinants of financial structure. We thus now look at some further determinants of corporate financial structure before investigating the gearing-interest rate link further.

A major determinant to be considered here is inflation.

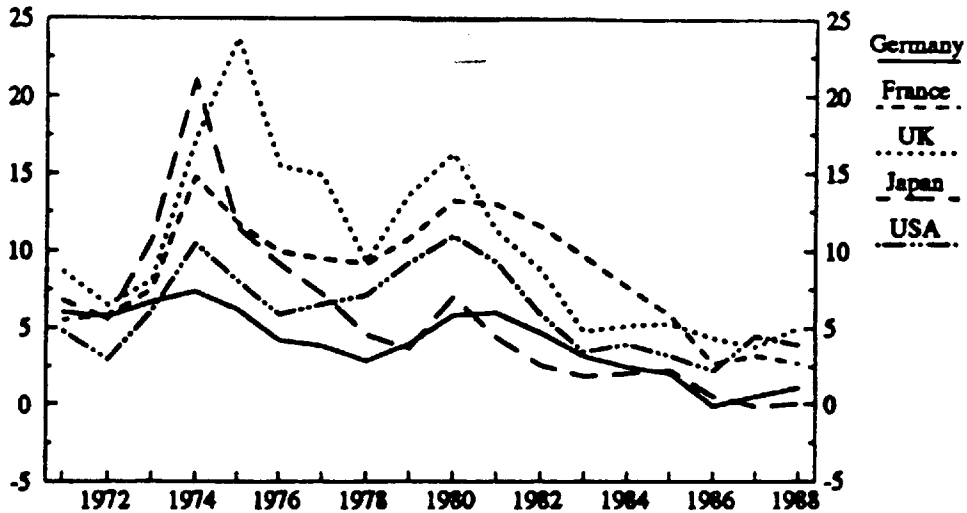
C INFLATION

Inflation erodes the real burden of outstanding debt fixed in nominal terms. The greater the proportion of corporate debt that is fixed rate, the stronger the effect will be. At the same time, price uncertainty increases the marginal cost of debt, but tends to reduce average costs through boosting the market value of equity. In a period of high inflation and especially when there are expectations of continuing inflation, if increases in the marginal cost of debt are exceeded by reductions in the real burden of outstanding fixed rate debt, companies should prefer debt financing to equity and hence try to increase their gearing ratios. Furthermore, in the presence of inflation the bias towards encouraging the use of debt as opposed to equity

engendered by the tax system increases since taxes are levied on nominal amounts.

During the 1970s gearing rates rose in a period of high inflation, suggesting that reductions in the average cost of debt and increases in the value of equity did indeed dominate any potential increases in the marginal cost of debt.

IV.10 Annual Inflation Rates



Source: Eurostat

High rates of inflation experienced in the mid and late 1970s have not however been followed by falling gearing ratios. It would appear that inflationary advantages have outweighed the disadvantages with regard to corporate debt. These conclusions may be reinforced if we consider the behaviour of market interest rates further.

The monetary authorities may choose to manipulate interest rate movements to meet policy objectives other than anti-inflationary, for example exchange rates. In this case, short term interest rates set by the authorities could be insensitive to inflation. Or rates might not be raised immediately to curb

inflation if it is only considered to be transitory. An increase in inflation could then bring about a fall in the real rate of interest. In section B above, we saw that during the 1970s rising inflation was indeed accompanied by falling real interest rates, which even became negative at times as unanticipated inflation rose sharply as a result of the oil shocks. In the late 1970s, however, a shift towards monetary targeting using interest rates occurred, and nominal rates were increased to bring inflation under control, causing real interest rates to rise sharply.

The mark-up of corporate debt over risk-free public sector debt rose during the 1970s. Although this mark-up is affected mainly by the credit risks associated with corporate debt as opposed to public sector debt, in the face of high inflation credit risks associated with the corporate sector may seem even greater if for example a hike in interest rates by the monetary authorities is feared. Increases in the marginal cost of debt and in the mark-up of corporate sector over public sector debt would appear to have been offset by reductions in the average burden of debt during this period. Since the early 1980s, however, with real interest rates rising as inflation fell gearing ratios have continued to increase. It would appear that higher average cost of corporate debt is now being offset by lower marginal costs and/or lower mark-ups. We saw, however, that both the real cost of risk-free debt and the mark-up of

corporate over public sector debt appears have continued to rise during the 1980s. Low inflation in the 1980s has not been accompanied by a fall in the real cost of corporate debt.

An increase in the real rate of interest should discourage borrowing, reducing the funds available for investment. In this case, potentially profitable new investments may not be carried out, and outstanding projects may be delayed or abandoned. Corporate profits would then fall. However, rising real rates of return caused by falling inflation, although contractionary to the corporate sector, should cause a transfer of income from the corporate sector to households. At the same time, high real rates of return are likely to encourage households to save a greater proportion of present income along with the new increased income, thereby postponing consumption. Moreover, households also carry debt. Chart II.6 in chapter II shows household debt to have risen steadily in all the countries studied over the past two decades. The depressing effects of higher rates of return on household debtors will to a certain extent offset the expansionary effects of the higher incomes enjoyed by creditor households. The greater the burden of household debt, the greater the offsetting effects will be. The net overall effect on aggregate demand will depend on the magnitude of the interest elasticity of investment versus that of the marginal propensity to consume. Boutillier and Villa (1985) found that in France, for example, during the early 1980s the reduction in profitabi-

lity and investment of the corporate sector exceeded the increase in consumption on the part of households. The overall effects of rising real interest rates were contractionary in this case. They would also appear to have been in the other countries where investment as a proportion of GDP continued to fall during the 1980s, with the exception of Japan.

Where rising real interest rates adversely affect corporate profitability sufficiently, a fall in the market value of equity may arise, absent any new issues or redemptions of debt or equity. Moreover, managers are likely to prefer not to issue equity from a position of low or falling profits if they wish to avoid the issue being undervalued. In the presence of increasing real interest rates, the real burden of debt rises while the value of equity remains the same or falls, other things remaining unchanged. This may help explain the continued rise in the gearing ratio that has been observed during the 1980s in studies using market value data (Bank of International Settlements, 1986: p 198). Later studies (Davis 1987; Borio 1990) have however found market value gearing ratios to have fallen in the 1980s, despite increases in the use of debt, thanks to sharp increases in equity values accompanying a strong upturn in economic activity.

However, we have seen that book value gearing ratios have continued to rise over this period. On bonds which offer a fixed return, as the real interest rate rises the price of new bonds

must fall in order to raise their real yield if a given supply is to be placed. The real cost of new fixed rate borrowing will also rise in the face of higher real interest rates. Where outstanding debt is variable rate, it is the outstanding burden to the firm that is likely to rise. In the longer term, when fixed rate debts have either to be rolled over or replaced, higher required rates of return apply to an increasing proportion of the debt stock.

Thus although desired gearing ratios may have fallen since the late 1970s in the face of high required rates of return, actual gearing rates have continued to rise.

Malinvaud (1986) suggests that desired gearing ratios in Europe did indeed fall during the recession of the early 1980s. A slow down in the rate of growth of European corporate profitability beginning in the early 1970s - a trend which accelerated in the early 1980s - was accompanied by a general increase in the indebtedness of the European corporate sector. The corporate sector relied increasingly on debt finance due to the very low and at times even negative real rates of interest prevailing during the 1970s. The financial situation of the corporate sector subsequently began to appear rather precarious, as evidenced by a spate of bankruptcies caused by collapsing stock prices following the oil shocks in the mid and late 1970s. Furthermore, by the early 1980s real rates of interest were increasing fast. The decline in profitability of the corporate

sector meant that the share of value added going to service debts was increasing, while, at the same time, increasing real interest rates were causing the burden of debt to weigh more heavily on the firm. Thus the actual burden of debt was exceeding desired debt levels, leading to a slow down in output, and hence in employment and national income. So although actual gearing ratios have continued to increase despite falling inflation and high real interest rates, desired gearing ratios have probably fallen since the late 1970s.

Widespread and largely successful anti-inflation policy experienced in the countries under consideration during the 1980s should have made the use of debt less attractive to the corporate sector. Since that time, however, falling inflation in the major economies has not been accompanied by a general reduction in corporate gearing ratios, except in Japan.

So although the behaviour of inflation and average and relative real cost of debt helps explain observed differences between countries in gearing ratios, these determinants do not seem sufficient to explain recent trends in financial structure.

Other determinants of the rises in gearing ratios during a period of generally falling inflation rates and high real interest rates must be sought (see e.g. Volcker 1986). A significant factor in the development of these trends would appear to be the recent changes in financial markets - financial innovation, deregulation and international financial market

integration (Atkinson and Chouraqui 1986, Hodder 1988).

D FINANCIAL LIBERALISATION

Innovation has led to the supply of a whole new range of financial instruments with a wide variety of characteristics: liquidity may have eased and perceived risk fallen. Increased efficiency, competitive forces and deregulation may have caused the cost of debt to fall. Lack of experience in pricing existing instruments in new conditions, and new instruments could well however, result in mispricing. Risk could be underestimated with insufficient returns demanded, or it could be overestimated driving yields up.

Increased use of debt by the corporate sector of the countries studied suggests that the availability of debt has indeed increased in the wake of financial liberalisation. The cost of debt, however, would also appear to have risen over the past decade. Interest rates rose sharply in the late 1970s and early 1980s as the monetary authorities brought inflation under control, pushing up real required rates of return on all debts.

Since that time, despite significant falls in the rate of inflation, real rates of return have remained historically high. Introduction of low grade high risk debt such as junk bonds will have increased average yields and the uncertainty in financial

markets surrounding the whole process may also help explain the historically high real interest rates that have accompanied the opening-up of financial markets. Although there have been major regulatory changes in the financial markets of all the countries studied, the US markets and institutions have played a pioneering role in many of the innovations allowing increased debt. Moreover, although most of the new instruments are traded to a certain degree in the majority of financial centres, the US and the UK are the principal locations of the international market places and the domestic markets have been strongly influenced by developments as a result (Bank for International Settlements, 1986). Rates of return and risk premia in the US and the UK where the degree of financial liberalisation has been the highest in the sample under consideration have tended to be higher than in the other countries, at least in the earlier stages of the process. In France, where significant steps towards the US and UK financial systems have been taken recently there has also been a rapid increase in the cost of capital. We saw in the previous chapter that we would expect financial liberalisation to help bring down the cost of capital. This suggests that risk is being overestimated.

Mispricing of new instruments, or of existing instruments in new conditions, is unlikely to last beyond the short term. If required rates of return are too high, competitive forces will soon shave margins removing excessive yields. On the other hand,

if risk is underestimated, once financial difficulties and even defaults occur, required rates of return will soon rise⁹. If these high rates persist, their negative consequences on investment and production could be severe and a long run reduction in productive capacity is a serious possibility. The possible costs involved with increasing financial liberalisation are thus far from trivial.

In the previous chapter we saw that financial liberalisation may have a number of important implications for corporate finance and investment. We also saw how financial liberalisation and the consequent financial behaviour of corporations could impinge on the authorities room for manoeuvre in setting monetary policy.

In the next chapter we attempt to estimate some simple models of the determination of corporate gearing ratios, and carry out some tests of the relationship between gearing and investment, and monetary policy.

⁹ This appears to be happening in the UK property market at the moment. In the late 1980s, lending for construction and house purchase grew very rapidly. Since the subsequent collapse, much higher rates of return have been demanded on lending, more stringent checks of creditworthiness have been carried out, and stricter controls have been imposed. For example during the boom households could borrow up to 100% of value of property they wished to purchase; this is no longer possible as lenders are concerned that collateral values remain sufficient in the face of falling prices.

V EMPIRICAL ESTIMATION

In this chapter some very simple empirical tests of ideas discussed previously have been carried out. The following avenues were explored: firstly a general equation explaining movements in gearing ratios using pooled time series data from all five countries was estimated; separate gearing equations were then estimated for each of the countries individually; a brief examination of the relationship between gearing and interest rates was carried out; and finally the relationship between gearing and investment was considered. We begin with a presentation of the gearing equations estimated.

A THE DETERMINATION OF CORPORATE SECTOR GEARING RATIOS

The data set available for carrying out empirical estimation is extremely limited. For the purposes of meaningful international comparison the analysis in the earlier part of the paper relied mainly on information contained in the BACH data bank rather than more copious series culled from a variety of disparate sources. The first observations in the bank date from 1971, so analysis of long periods of time covering a number of cycles is precluded. Moreover, the data is only annual, further limiting the number of observations available for study. It was thus not possible to estimate valid long-run equations and the results presented here must be treated with caution.

The data sets for the various countries cover slightly different time periods. Once leads and lags are used, the number of observations common to all countries is very restricted indeed. Panel data analysis would appear a useful avenue to explore in this case with pooling the time series of the five countries studied here greatly increasing the degrees of freedom available for estimation. (See eg Hsiao (1992) for an extremely useful textbook on panel data analysis). However, earlier in this thesis we saw that patterns of corporate sector behaviour in the countries studied here have greatly differing characteristics, suggesting that a general model might not be the most suitable approach to this problem. In fact, estimating a satisfactory general equation using the pooled data proved far from straightforward, and the results generated were very difficult to interpret. Although the panel data results are reported below for the sake of completeness, in this section we concentrate on estimation on a country-by-country basis.

We have seen that the potential determinants of gearing ratios are many and varied. Moreover, many of these determinants e.g. those involving asymmetric information, agency and signalling costs etc. are not easily quantifiable. Given this and the data problems mentioned above, it was decided to keep the model as simple as possible.

Throughout this study we have been interested in trends in corporate gearing ratios over time and across countries. Attempts were thus made to estimate a very simple model of the major influences explaining the determination of the gearing ratio.

Achieving a desired financial structure is unlikely to occur instantaneously. It takes time to make new issues, redemptions etc. and partial adjustment was therefore presumed. Thus lagged variables were included, both dependent and exogenous to the model. However, given that we are only using annual data, adjustment could take place within one time period and lags might not necessarily be significant.

In the absence of fiscal changes, movements in gearing ratios in the countries in question were considered to be driven mainly by average and relative real cost of capital, inflation and financial liberalisation.

Average cost of capital is given by weighting the rate of return on debt and equity by the proportion of each in the financial structure. However, it is not possible to directly calculate the weighted average cost of capital to the corporate sector at the aggregate level. An alternative indicator of the cost of finance at the aggregate level was presented in the previous chapter: profitability of financial capital calculated by dividing net after tax profits by total liabilities.

A measure of the cost of debt relative to equity posed a problem. In chapter IV, we saw that it is very difficult to accurately measure the cost to the firm of either of these instruments. The potential errors included in any attempt to calculate the relative cost of capital directly could thus be so large as to render any measure derived meaningless. Inclusion of terms for both debt and equity yields would have led to problems of collinearity. Thus only the debt yields were included. In the partial adjustment model used here, the

coefficient of the return on debt element is an indicator of the influence this variable has when all other determinants remain unchanged. Movements in the relative cost of capital thus enter the regressions implicitly as the return on debt varies in relation to the other fixed determinants.

If equity is not seen as an alternative source of finance to debt the relative cost of capital should be irrelevant to financial decision making. In countries with limited access to equity and relatively high gearing ratios e.g. Germany and Japan, substitution effects may have only a small role to play in corporate financial decision making. The variable used to capture this effect may not thus be large in all countries. Where it is significant, we would expect the gearing ratio to rise as the cost of debt relative to other sources of finance falls and have a negative coefficient.

A variable to test for income effects was also included. In the graphical analysis presented in chapter IV no relationship between gearing and average cost of capital was to be discerned. Previous attempts at empirical estimation of the relationship between gearing and cost of capital were also unable to find a relationship between cost of capital and gearing ratios (Coates and Woolley, 1975; National Economic Development Office 1975). The determinant was nevertheless initially included in the general model because of its theoretical importance.

We saw that the financial liberalisation process may have brought about changes in both the availability of credit, and the cost of corporate debt. Deregulation and innovation are likely to have helped both broaden access and increase the supply of

credit. Increased supply could be another factor behind the rise in the use of credit. It is difficult to find variables adequately capturing financial liberalisation. In the UK, recent studies have used numbers of current accounts, numbers of credit cards and numbers of automated teller machines (ATMs) to measure financial innovation¹. These innovations relate more to individuals than the corporate sector, with credit cards offering alternative means of payment, interest bearing current accounts and more price competitive liquid deposit accounts offering incentives for individuals to use bank accounts, and ATMs improving efficiency in cash holdings. For the corporate sector, given a lack of similar data, a time trend was included to capture this aspect of the effects of liberalisation on corporate gearing ratios.

Dummies were also used representing specific events such as 'Big Bang' in the London stock market in 1986. This saw the abolition on minimum commission helping reduce the cost of finance. At the same time new instruments were introduced into the market such as commercial paper, options and swaps. As a result, UK companies had access both to more sources of credit, and the possibility of hedging interest rate risks more effectively, encouraging the use of more debt.

Finally, capturing the effects of liberalisation via its influence on the risk premium were also considered. We saw in chapter IV that the premium has tended to be highest in the

¹ See e.g. Hoggarth, G. and Pill, H. (1992), 'The Demand for MO Revisited,' Bank of England Quarterly Bulletin, Vol 32, No 3, pp 305-313.

countries enjoying the greatest degree of financial liberalisation, i.e. the US and the UK. Uncertainty accompanying deregulation and innovation, and greater speculative, destabilizing behaviour could thus have driven risk premia and the cost of corporate debt up.

On the other hand, financial liberalisation may also have exerted downward pressure on corporate debt yields through increasing competition, innovation and as a result of deregulation. More efficient competitive markets should bring about reductions in arbitrage gains, reducing variance and spreads and hence risk premia.

Thus although financial liberalisation is likely to have affected the return required on corporate debt via its effects on the risk premium, it is impossible to gauge the overall effect on purely theoretical grounds, and hence to state a priori the sign of the coefficient on this variable.

A simple model of the following form was estimated:

$$G_t = a + \sum_{n=1}^T b_n G_{t-n} + \sum_{n=0}^T c_n \text{REALP}_{t-n} + d \text{PREMIUM}_t \\ + \sum_{n=0}^T e_n \text{COK}_{t-n} + \sum_{n=0}^T f_n \text{CPIINF}_{t-n} + g \text{TREND} + e_t$$

where:

G_t = gearing ratio as measured by total debt as a proportion of total liabilities at time t ;

REALP = real return on corporate debt (rate of return on long-term private sector bonds minus the rate of inflation);

PREMIUM = rate of return on long-term government securities

less the rate of return on long-term corporate sector bonds;

COK = average cost of capital;

CPIINF = annual rate of increase in the consumer price index;

TREND = time trend.

The following results were generated (t statistics in parentheses; the F statistic is to test the hypothesis that the coefficients of all explanatory variables are jointly equal to zero):

POOLED EQUATION

$$G_t = 0.009 + 1.254 G_{t-1} - 0.301 G_{t-2} + 0.003 REALP_t + 0.007 PREMIUM_t + 0.002 CPIINF_t + 0.0002 TREND_t$$

(0.55) (9.39) (-2.32) (2.44) (1.80) (2.19) (1.26)

$$R^2 = 0.99, \bar{R}^2 = 0.99, DW = 1.93, F(6,65) = 1449.39, SER = 0.016$$

The term included for the cost of capital did not prove statistically significant and was eliminated at an early stage in the testing down procedure. This supports earlier observations concerning the apparent lack of a relationship between gearing and the cost of capital, and work by other authors unable to find any meaningful empirical relationship between these two variables.

Although the cost of debt and inflation are statistically significant determinants of the gearing ratio, the coefficient

on the term for the real cost of debt is positive and does not accord with theoretical priors. This suggests that rising gearing ratios have been associated with an increase in the relative cost of debt. This could be evidence of a financial liberalisation effect, where uncertainty surrounding the process has driven up the cost of credit. However, it could also be evidence of an excess demand for credit in the face of rationing, or may be indicating that financial structure is independent of the cost of debt. Interpretation of this coefficient is far from easy in a pooled equation based on corporate sectors in countries with very differing characteristics.

It is disappointing to note that the two terms included to capture the effects of financial liberalisation - the risk premium and the time trend - are not statistically significant. Dropping these terms, however, causes the equation to collapse. Evidence of the role of financial liberalisation is thus at best very weak in the above equation. This is not surprising given the different degrees to which this process has occurred in the various countries studied, and the differing effects it may have had.

Clearly, it is very difficult to interpret the panel data equation described above. An individual country-by-country analysis would thus appear a more valid approach to the problem in hand. The latter strategy is adopted for the rest of this section.

The general model described above was tested using the data from each country separately. Where it proved impossible to achieve a meaningful specific model containing (at least some of)

the above variables, the general model was respecified using alternative determinants and the testing down procedure carried out a second time.

Although statistically significant in the pooled equation, we were not able to reject the null hypothesis that inflation alone does not influence gearing ratios in any of the countries studied except the USA. Once the term in CPIINF was dropped, however, real interest rates were not found to play a statistically significant role anywhere except France. In chapter IV we saw it is possible that nominal interest rates could have a direct influence on financial behaviour. This is particularly so in countries with a high rate of inflation and price and expectations uncertainty. Nominal interest rates were thus included in the regressions in the place of real interest rates where the latter did not prove significant.

The following results were obtained:

GERMANY, 1972-87

$$G_t = -0.11 - 0.029 \text{ COK}_t + 0.010 \text{ PREMIUM}_t + 0.078 \text{ LN}(\text{PROFIT})_t$$

(-1.76) (-14.02) (2.17) (14.52)

$$R^2 = 0.96, \quad \bar{R}^2 = 0.95, \quad \text{DW} = 2.38, \quad F(3,12) = 97.33,$$

$$\text{SER} = 0.005$$

where:

COK = cost of capital measured by net profits after tax as a proportion of total liabilities (see chart IV.8 in chapter

IV);

$\text{LN}(\text{PROFIT}) = (\text{natural log of}) \text{ net after tax profits.}$

A lagged term in gearing was not found to be statistically significant, even as other potential determinants of gearing were added to the equation. It was thus dropped. Lagged values of the other determinants did not prove statistically significant either, indicating that adjustment to changes in the determinants discussed above occurs relatively quickly.

A variety of measures of the rate of return on debt were considered. Neither real nor nominal interest rates proved statistically significant. A measure of the real return on equity was also considered but failed significance tests. In Germany, the use of equity to finance activity is low compared to the UK and the US, and would not appear to play a major alternative role in financing German corporate investment.

Although we were not able to reject the null hypothesis that relative cost of capital did not influence gearing ratios over the period investigated, average cost of capital did prove highly statistically significant, and negatively related to gearing ratios as would be expected according to the traditional theory of corporate finance.

As the risk premium on corporate bonds over government bonds falls and becomes less negative (i.e. increases), we could expect the use of debt and thus the gearing ratio to rise. This suggests that the coefficient on the risk premium term should be negatively signed. However, in the above equation it is positive.

Rising gearing ratios in the face of increasing cost of corporate debt could be evidence of financial liberalisation as described earlier. On the other hand, they may be a consequence of the interest rate used to indicate the required rate of return on corporate debt. For reasons of international comparability, the required return on corporate debt in the various countries studied was taken from a single source: Eurostat's yield on long-term fixed interest corporate sector securities, intended to be a representative and comparable measure of the required rate of return on corporate sector debt. In the case of Germany, this is given by the rate on fixed interest industrial bonds. The proportion of funding of the German corporate sector that comes from this source is, however, very small compared to long-term loans provided by the banks. The rate of interest used may not thus be exactly representative of average aggregate corporate sector borrowing rates.

A time trend to capture the effects of increased availability of credit did not prove statistically significant. On the other hand, a strong positive relationship was found between profits and gearing. No particular downward trend in the cost of capital faced by the German corporate sector was indicated in chart IV.8 in chapter IV. The empirical evidence thus appears to indicate that rises in German corporate gearing ratios have been largely due to strong German corporate profitability.

FRANCE, 1972-88

$$\hat{G}_t = 0.10 + 0.87 G_{t-1} - 0.005 \text{ REALP}_t + 0.045 \text{ DMITT}$$

(1.09) (6.85) (-2.64) (4.77)

$$R^2 = 0.91, \quad \bar{R}^2 = 0.89, \quad \text{Durbin's } H = -1.95, \quad \text{DW} = 2.51,$$

$$F(3,13) = 41.97, \quad \text{SER} = 0.015$$

where:

REALP = rate of return on long-term private sector bonds less the rate of inflation;

DMITT = dummy covering the years 1981-84 during which stop-go policies were carried out.

Long-term solution:

$$\hat{G} = 0.769 - 0.038 \text{ REALP} + 0.346 \text{ DMITT}$$

It proved very difficult to estimate an equation for France because of the many changes in regime over the period considered. The high coefficient on the lagged dependent term suggests that an equation in changes may be more appropriate: this was found impossible to estimate with the data set available. The levels equation outlined above was therefore maintained.

Various measures of the return on debt and capital were investigated and this time the real return on debt was found to be statistically significant. It is negatively signed, as would be expected. The dummy intended to capture the stop-go period

and consequent credit explosion during the early years of the Mitterrand administration also proved highly statistically significant.

JAPAN, 1976-87

$$\Delta G_t = -0.032 + 0.004 \text{ PRIVIR}_{t-1} - 0.003 \text{ COK}_{t-1}$$

(-3.20) (3.09) (-1.83)

$$R^2 = 0.65, \bar{R}^2 = 0.57, DW = 2.96, F(2,9) = 8.35,$$

$$SER = 0.004$$

where:

$$\Delta G_t = G_t - G_{t-1}$$

Again attempts to estimate an equation involving expected determinants of corporate financial behaviour were not particularly successful. The very short time series severely restricted the degrees of freedom available. The above results should thus be treated with particular caution.

In the case of Japan, a specification in differences did appear more appropriate. Adjustment would thus appear to take place relatively slowly in Japan.

The coefficient on nominal interest rates is positive. Low and falling nominal interest rates did not encourage gearing ratios to rise in the face of significantly positive real interest rates in the 1980s. Over the very short time period investigated rising nominal interest rates were associated with

a falling corporate sector gearing ratio. However, we saw earlier that provision of debt is strongly dictated by the special relationship between the banks and the corporate sector in Japan, and the use of debt may well be largely independent of the required rate of return on debt.

Average cost of capital is negatively signed, as would be expected. But again terms used to capture the influence of financial liberalisation did not prove statistically significant.

UK, 1972-86

$$\begin{aligned} \hat{G}_t &= 0.484 + 0.003 \Delta \text{PRIVIR}_t - 0.009 \text{PREMIUM}_t \\ &\quad (81.05) \quad (2.14) \quad (-1.94) \\ &\quad + 0.001 \text{TREND} + 0.028 \text{D1986} \\ &\quad (2.63) \quad (3.39) \end{aligned}$$

$R^2 = 0.79, \bar{R}^2 = 0.71, \text{DW} = 2.36, F(4,10) = 9.52,$
 $\text{SER} = 0.007$

where:

D1986 = a dummy to capture the 1986 'Big Bang' in the London Stock Exchange.

In the UK there is strong evidence that corporate sector financial behaviour has been affected by financial liberalisation over the last twenty years: both the time trend and the dummy variable were highly statistically significant. This could help explain the signs on the coefficients of the remaining variables. The change in nominal private sector interest rates is positively related to gearing ratios, whilst the risk premium is negatively

related.

The negative association between debt yields and gearing implied by traditional theory would not appear to hold in the UK during the period covered by the upheaval resulting from the liberalisation process. Increasing gearing ratios occurring as a result of increased credit availability may have begun to influence the rate of interest required and pushed up the cost of capital. Uncertainty surrounding the liberalisation process may also have driven up the rate of return required on debt. We saw in chapter IV that the risk premium paid by the corporate sector appears to have risen in line with financial liberalisation in the UK. Increased gearing is thus likely to have occurred more as a result of increases in the availability of credit rather than decreases in cost and risk premium.

USA, 1974-88

$$\begin{aligned}
 \bar{G}_t &= 0.148 + 0.821 G_{t-2} - 0.005 \text{REALP}_t + 0.035 \text{PREMIUM}_t \\
 &\quad (3.31) \quad (7.76) \quad (4.48) \quad (3.47) \\
 &\quad - 0.015 \text{COK}_t - 0.004 \text{CPIINF}_{t-1} \\
 &\quad (1.87) \quad (6.23)
 \end{aligned}$$

$$R^2 = 0.95, \bar{R}^2 = 0.93, \text{DW} = 1.96, F(5,10) = 38.41, \text{SER} = 0.01$$

The US equation is closest to the general model outlined at the start of this section. Terms included for both average and relative cost of capital, and inflation all proved significant. And although the time trend did not enter in the preferred equation, the risk premium indicator of financial liberalisation

proved highly statistically significant. It should be noted that the coefficients on both the real cost of debt and risk premium variables are positively signed, suggesting that gearing ratios in the US have risen despite increases in the cost of debt. We saw earlier how this might be possible in the presence of financial liberalisation.

It must be recalled however that the US results are likely to have been distorted by the break in the data occurring in 1984, after which time the series was based on a larger sample.

Summary

Strong evidence concerning the role of financial liberalisation as a determinant of corporate financial behaviour appeared in the UK and the USA. In the first three countries considered, however, no real evidence of the effects of financial liberalisation were to be found.

The role played by the cost of capital also varied between countries. Statistical evidence of income effects was to be found in Germany, Japan and the USA. The coefficients on the average cost of capital terms were all negatively signed as would be expected. Substitution effects appeared to be significant determinants of corporate sector financial behaviour in all the countries studied except Germany. However, in France alone relative cost of debt was negatively related to the gearing ratio, as the theory would predict. In the remaining three countries, the relationship was positive. Financing in the Japanese corporate sector is often determined by special

relationships and could be largely independent of the market cost of corporate debt. In the US and the UK, on the other hand, it is possible that uncertainty surrounding the financial liberalisation process, whilst increasing availability of credit also led to an increase in cost of debt. Alternatively, increased demand for limited sources of credit may have driven up required rates of return. In the UK possible evidence of this appears in the positive coefficient on the risk premium. In the US, however, the risk premium has fallen as the gearing ratio has risen.

The higher returns on debt in the UK may have reined back excessive issue of new debt and the increase in the UK gearing ratio during the 1980s has thus been much slower than the increase in the US corporate gearing ratio. The rate of growth of bankruptcies in the UK has also been slower than in the USA during this period (see chapter IV.B.6). It is possible that in the face of financial liberalisation the yield demanded in the US has not always been sufficient to cover the risks associated with (new) corporate debt. The growth in US corporate gearing in the face of financial liberalisation may thus be less sustainable than patterns emerging in the UK and some downward adjustment might be expected. The boom in merger and takeover activity would appear to be slowing in the late 1980s and early 1990s, and there is indeed evidence in the press of efforts on the part of many US companies to reduce gearing ratios.

Fears thus expressed in previous chapters that distortion of transmission mechanisms resulting from the financial liberalisation process may be leading to a reduction on the part of the

monetary authorities of their room to manoeuvre in the face of rising gearing ratios may have some foundation in the case of the US at least, given recent bankruptcy experience. We have thus carried out a series of tests examining this relationship.

B CAUSALITY TESTS: GEARING AND INTEREST RATES

In chapter III.D we saw how it could be possible that authorities in countries with highly geared corporate sectors may feel constrained in their ability to raise interest rates to carry out desired monetary policy. We have thus run a series of regressions using Sims' methodology in an attempt to test the direction of causality between gearing ratios (G) and interest rates (IRS). The interest rates used are the short-term rates manipulated by the monetary authorities to indicate monetary stance; the gearing ratios are defined as in section A above.

The results reported in section A indicate that long lags are generally not appropriate in estimating the determination of corporate financial structure. Moreover, we are working with only a very restricted data set. Only one lead and one lag were hence used in the tests below.

The results are as follows (t statistics in parentheses):

Table V.1 THE RELATIONSHIP BETWEEN GEARING AND INTEREST RATES

Dependent Variable: Gearing Ratio (G_t)

| | <u>Germany</u> 1972-86 | <u>France</u> 1972-87 | <u>Japan</u> 1976-86 | <u>UK</u> 1973-85 | <u>USA</u> 1972-87 |
|-------------|---------------------------|--------------------------|-------------------------|----------------------|-----------------------|
| constant | 0.759 (35.49) | 0.655 (17.07) | 0.673 (9.16) | 0.514 (21.85) | 0.438 (13.99) |
| IRS_t | 0.001 (0.47) | 0.002 (0.52) | 0.3E-03 (0.04) | 0.001 (0.71) | 0.4E-03 (0.06) |
| IRS_{t-1} | -0.002 (-0.93) | -0.003 (-0.78) | 0.008 (1.25) | -0.002 (-0.99) | -0.005 (-0.92) |
| IRS_{t-2} | 0.4E-04 (0.02) | 0.011 (3.18) | 0.007 (1.07) | -0.5E-03 (-0.34) | -0.006 (-1.24) |

Dependent Variable: Short-Term Rate of Interest (IRS_t)

| | <u>Germany</u> 1972-86 | <u>France</u> 1972-87 | <u>Japan</u> 1976-86 | <u>UK</u> 1973-85 | <u>USA</u> 1972-87 |
|-----------|---------------------------|--------------------------|-------------------------|----------------------|-----------------------|
| constant | -29.042 (-0.99) | -22.035 (-2.47) | 7.309 (0.47) | -14.584 (-0.29) | 25.539 (3.70) |
| G_t | 297.737 (2.04) | 21.472 (0.60) | -196.645 (-1.40) | 65.685 (0.69) | 5.998 (0.10) |
| G_{t-1} | 83.917 (0.83) | 53.904 (2.55) | 169.832 (1.56) | 3.918 (0.06) | -24.345 (-0.68) |
| G_{t-2} | -335.812 (-2.67) | -33.091 (-1.37) | 27.966 (0.26) | -17.837 (-0.21) | -31.078 (-0.83) |

In the first set of regressions, if interest rates are a determinant of gearing ratios but causality is not reversed, the coefficients on the lagged terms should be statistically significant with those on the lead terms remaining insignificant. Should both prove significant, there is evidence of possible dual causality.

In the first set of results with gearing as the dependent variable, with the exception of the constant terms only one determinant proves statistically significant at either the 5% or 1% levels: according to this methodology, lagged nominal interest rates are statistically significant determinants of gearing ratios only in France. In no other country is the relationship between these two variables in isolation sufficiently strong to warrant any statistical conclusions.

The French result is supported by the second set of regressions with interest rates as the dependent variable: this time it is the lead value of gearing that proves statistically significant, while the lagged term in gearing remains insignificant, confirming the results reported of the first set of regressions for France.

An interesting result now appears for Germany as well with the lagged gearing term proving a statistically significant determinant of nominal interest rates. It could thus be that the German authorities carry out monetary policy with a strong eye to the indebtedness of the corporate sector. The implications of this are potentially important. Following economic and monetary union the German budget deficit has grown rapidly to finance the costs of unification. Interest rate increases have

already been necessary to curb inflationary tendencies building up in the German economy. The above results imply however that unless German corporate gearing falls and the authorities feel there is no danger of overburdening the corporate sector, the fear of provoking financial distress or bankruptcies may deter the authorities from raising interest rates sufficiently to curb these tendencies. If this is indeed the case, the German Mark may no longer be the safe low inflation currency of the past. Given the pre-eminence of the DMark in Europe, German inflation could quickly spread to the remaining ERM countries. According to this scenario, the capacity of European governments to achieve domestic policy objectives and the credibility of the ERM mechanism itself could be severely damaged as a consequence of rising German corporate sector indebtedness.

However, the above scenario does not seem very likely given the Bundesbank's strongly credible anti-inflationary policy and historical behaviour. There may be other reasons for this result. We saw in section A that German corporate gearing ratios are strongly determined by profits. A cyclical upswing engenders inflationary tendencies only with a lag, however, following which required nominal rates of return begin to rise to maintain real returns and/or the authorities raise nominal interest rates to curb inflation. The reverse holds in a recession: falling interest rates follow falling profits and thus gearing ratios only with a lag. Cyclical movements in gearing ratios are thus likely to precede cyclical movements in interest rates, particularly if rising corporate profits slightly precede an economy-wide boom. It would be wrong to conclude that movements in

gearing ratios cause movements in interest rates in this case.

Care must clearly be taken in interpreting the results of these tests if pitfalls are to be avoided. Although Sims' methodology provides us with a useful indicator of potential causality, the evidence provided should not be taken as conclusive.

In the other countries the lack of clear statistically significant, demonstrable relationships appears to confirm the idea that the link between interest rates and corporate financial behaviour is far from straight-forward. In Japan the continuing close relationship between the banks and industry in an economy where steps toward financial liberalisation have been behind the UK or the US tends to dominate the terms on which corporate sector credit is extended. Market rates would not thus appear to accurately reflect true debt yields paid by the corporate sector.

In the UK on the other hand, we saw above that liberalisation would appear to be associated with increases in debt yields. As a result, the relationship between gearing and debt yields would appear to have broken down. Increasing UK interest rates in an attempt to halt the credit increases of the 1980s could thus be unsuccessful. Marginal borrowers, such as new businesses and small and medium sized enterprises with limited access to credit might be forced to reduce gearing, or indeed be driven out of business, but the aggregate gearing ratio could well remain largely unaffected. Moreover, lack of access to new credit because of high marginal rates could squeeze investment.

We have thus carried out an investigation into whether

movements in gearing ratios affect investment levels. The results are presented below.

C CAUSALITY TESTS: GEARING AND INVESTMENT

According to the traditional theory of corporate finance, decisions concerning finance and investment may be made separately. Theoretically and empirically, we have seen that this separation may not always hold. Below we present the results of attempts to test this statistically.

When considering investment, the gross measures of gearing used in the previous two tests are no longer appropriate. Given that we have concentrated on the manufacturing sector, we are interested in physical investment in the capital stock. We have looked at the relationship between gearing net of financial assets (GN) (see chart II.10 in chapter II) and investment as a proportion of GDP.

The Sims' methodology outlined in section B.2 was again used and the results are presented below.

Table V.2 THE RELATIONSHIP BETWEEN GEARING AND INVESTMENT

Dependent Variable: Investment (INV_t)

| | <u>Germany</u> 1972-86 | <u>France</u> 1972-87 | <u>Japan</u> 1976-86 | <u>UK</u> 1972-85 | <u>USA</u> 1972-87 |
|------------|---------------------------|--------------------------|-------------------------|----------------------|-----------------------|
| constant | 9.19 (2.57) | 9.57 (10.23) | 15.65 (3.73) | 21.40 (2.74) | 3.77 (11.51) |
| GN_t | -9.61 (-0.61) | 0.09 (0.02) | -19.22 (-0.75) | -12.68 (-0.79) | 3.44 (0.30) |
| GN_{t-1} | 5.68 (0.46) | -2.46 (-0.95) | 10.99 (0.46) | -17.66 (-1.60) | -14.21 (2.38) |
| GN_{t-2} | -4.54 (-0.42) | -7.45 (-2.42) | -6.85 (-0.26) | -6.79 (-0.48) | 1.54 (0.23) |

Dependent Variable: Net Gearing (GN_t)

| | <u>Germany</u> 1972-85 | <u>France</u> 1972-86 | <u>Japan</u> 1975-85 | <u>UK</u> 1972-85 | <u>USA</u> 1972-86 |
|-------------|---------------------------|--------------------------|-------------------------|----------------------|-----------------------|
| constant | 0.76 (10.53) | 0.93 (18.29) | 0.91 (12.54) | 0.53 (42.84) | 0.29 (9.24) |
| INV_t | 0.01 (0.36) | -0.03 (-0.69) | -0.03 (-1.52) | 0.01 (0.51) | -0.01 (0.49) |
| INV_{t-1} | -0.01 (-0.51) | -0.03 (-0.65) | -0.02 (-1.12) | -0.10E-02 (-0.13) | 0.24E-03 (0.02) |
| INV_{t-2} | -0.02 (-1.40) | -0.03 (-0.68) | 0.01 (1.04) | -0.02 (-2.30) | -0.05 (-2.85) |

Here the evidence is mixed. The table indicates that although we cannot reject the null hypothesis that gearing and investment may move independently in Japan and Germany, there is statistical evidence of a causal relationship in France, the UK and the USA.

Only in France is the lagged net gearing term statistically

significant. However, the coefficient is negatively signed suggesting that rising gearing ratios are liable to bring about falls in the investment ratio. In the USA, on the other hand, it is the lead net gearing term that is statistically significant implying reverse causality. This is confirmed by the results of a regression of lead and lagged investment on net gearing. The US lagged investment term is a statistically significant determinant of net gearing. However, whereas the first regression implied that rising investment would be followed by increases in gearing, the second regression suggests the opposite, implying that improvements in investment could bring about a fall in the gearing ratio. The same is true of the UK.

In the USA the evidence may once more be interpreted in terms of cyclical factors. It should be remembered that the long US series is measured at market values, whereas gearing ratios in the other countries are measured at historical book values. Thus, in a cyclical upturn, rising investment should be associated with rising equity values bringing about a fall in the gearing ratio, ceteris paribus. Subsequently, rising profits could encourage firms to borrow more and thus increase their gearing ratios. Rising gearing then follows rising corporate investment.

So there is no statistical evidence at all that rising gearing ratios will bring about improved investment performance. Moreover, in the case of France there is statistical evidence that they bring about falls. So suggestions that companies should increase gearing levels to help industry would appear unfounded.

On the other hand, it would appear that in the US and the UK at least, investment may influence gearing ratios.

VI CONCLUSIONS

In this study we have looked at the behaviour of corporate sector gearing ratios in Germany, France, the UK, Japan and the US over the past two decades.

Gearing ratios could be expected to move counter-cyclically. During a recession, the rate of growth of profits and internal equity slows or falls. When profit growth is low, managers are likely to be reluctant to make equity issues for risk of underpricing. As firms turn to debt to meet financing needs, the gearing ratio rises. A general tendency for gearing ratios to rise in the major industrialised economies was thus witnessed following the oil-shocks and recessions of the 1970s.

Since the early 1980s, however, there has been a general upswing in economic activity. We would expect managers to prefer to issue equity when firms are enjoying healthy profits and when demand is strong. However, with the exception of Japan, and more recently France, there appears to have been no tendency in the countries investigated in this study for the pace of increase of gearing ratios to slow down or even decrease during the 1980s despite significantly improved economic performance in this period.

Whilst gearing ratios have been rising, the ratio of investment to GDP in the manufacturing sector of the countries under consideration has been displaying a general decline over the past twenty years, again with an exception being found in Japan. An increase in gearing would thus appear to be associated

with a decline in proportion of investment in GDP. However, countries enjoying the highest gearing ratios - Japan, France and Germany - have also enjoyed greater investment as a proportion of GDP than the US and the UK, suggesting that increasing gearing ratios should be associated with increasing investment. The link between gearing and investment is thus far from clear.

We have found that a plausible explanation for part of this story lays in the nature of the relationship between the corporate and financial sectors.

In the countries where there is a close relationship between the corporate and financial sectors - France, Germany and Japan - gearing ratios have been the highest. The relationship gives the lenders scope to monitor and control the use of their funds. As a result, they are prepared to lend more, and for longer periods. Companies can then carry out investment both in specific projects, and in such areas as research and development with a view to the long term future of the firm without being too tightly constrained to earning short term profits. In countries where there is a lack of commitment, finance is either short term or very costly if longer term.

Although the above model helps explain the relationship between gearing and investment levels, it does not explain the relationship between gearing and investment over time. We found instead a possible explanation for this and for the continued increase in gearing ratios at a time of economic upturn to lay in recent trends in financial liberalisation.

In recent years, there has been a general trend towards financial liberalisation in the industrialised nations. Steps

have been taken increasing the availability of finance, and deregulation and increased competition have brought down costs. At the same time, markets have become more efficient thanks to improved possibilities of closer matching of lenders and borrowers requirements and the spreading of risk. Increased availability and reduced cost of finance could be expected to bring about an increase in gearing and investment. However, we have seen that increased gearing in the countries where the liberalisation process has been most wide ranging has been accompanied by declining investment. This suggests that cost of finance has in fact increased. Uncertainty in the wake of financial liberalisation may well have caused new instruments to be mispriced where risk characteristics have not yet been established, at least in the short term, and volatility to increase.

It would appear that these latter effects have dominated, driving up risk premia and the cost of capital, with negative consequences for investment and/or the risk of default. We saw that risk premia have increased during the 1980s, and have tended to be highest in the countries where the liberalisation process has been most wide-ranging: the US and the UK. As a result the cost of capital has been increasing at the fastest rate in the US and the UK. It has also increased rapidly in France recently where significant steps have been taken towards opening up capital markets in the last few years. In Germany and Japan on the other hand, where liberalisation has been occurring at a much slower pace, cost of capital over the past two decades has been rising only very slowly in the case of Germany and actually

falling in Japan.

So although financial liberalisation has allowed greater use of debt, it has also been associated with declining investment, and increased bankruptcies, especially in the US and France. This is particularly worrying given the tendencies for many of the new financing instruments available to be classified as off-balance sheet, suggesting that gearing ratios and risk exposure are if anything underestimated.

However, the above problems could well prove temporary. In time, the true risk position associated with new instruments and existing instruments in a new financial climate should become clear. At that time, efficiency gains should allow increased use of debt accompanied by reductions in cost, helping investment and lowering default risk.

Nevertheless, in the short term at least some downward adjustment in US and French gearing ratios could perhaps be expected. We saw that French gearing ratios have already begun to decline, and evidence of attempts on the part of US corporations to reduce gearing has already begun appearing in the press. And damage could prove longer term if poor investment translates into permanent reductions in the capital stock.

At the same time, we saw that greater use of debt arising from the liberalisation process could have further pernicious consequences in the wider economy. Definition and control of the money supply is increasingly difficult in the face of a proliferation of new instruments. At the same time, the authorities may become afraid to adopt tight monetary policies in economies with heavily indebted corporate sectors for fear of provoking

widescale distress in the corporate sector. Inflationary tendencies could thus be engendered. Although we did not find any strong empirical evidence of this in the countries under consideration, in the period investigated inflation rates tended to follow a steady downward trend. More recently though, inflation rates have tended to pick up again. When the data becomes available a few years hence, it will be interesting to see whether there is any evidence that heavy corporate sector indebtedness does indeed have some influence over monetary stance, impinging on the capacity of the authorities to fight inflation.

Clearly, greater provision of funds to industry allowing increased investment is to be welcomed. To this extent the liberalisation process should be encouraged. However, we have seen that it could also entail potentially severe negative consequences both for the corporate sector and the wider economy. The authorities should hence carefully monitor the behaviour of financial markets if damage to investment potential or financial fragility is to be avoided. If the cost of credit is not sufficiently high, risk might not be properly accounted for and potential instability could result. On the other hand, yields could be driven up too far by the process, crowding out investment. The authorities could then step in and either force yields up in the former case through e.g. regulation, levies etc., or lower interest rates in the second case. Regulatory behaviour of this type would further avoid the threat to the authorities of having their capacity to carry out desired monetary policy restricted for fear of provoking financial distress or bankrupt-

cies in over-indebted economies. In this way the transition to a new equilibrium based on higher use of debt allowing increased investment and improved economic performance, could be made while avoiding the associated pitfalls.

In the absence of other major changes in circumstances, gearing ratios could then be expected to revert to counter-cyclical behaviour but incorporating greater use of debt.

An important continuation of this research would be an attempt to quantify the costs in terms of reduced investment of financial liberalisation. In the costs prove not to be excessive and relatively short term with long term benefits to be gained, then the liberalisation process should be encouraged. On the other hand, research might suggest that the costs are so great that policy should move in completely the opposite direction. We have seen that higher gearing and investment have tended to occur where close relationships are enjoyed between the corporate and financial sectors. If the costs of financial liberalisation are found to be sufficiently great then further moves away from this model might be discouraged. Reregulation might be recommended, with the authorities actively encouraging the adoption of committed relationships between corporate and financial sectors, in attempt to bring about higher investment and improved economic performance.

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