THE EVOLUTION OF CORPORATE FINANCIAL STRUCTURE: 1973-1990

Philip Lowe and Geoffrey Shuetrim

ABSTRACT

Increases in corporate debt in a variety of countries over the past decade have renewed interest in the relationship between leverage and the macro-economy. In general, the theoretical work on these links has outpaced the empirical research. This paper is an initial attempt to examine changes in corporate financial structure in Australia over the past two decades. It explores the evolution of debt-asset ratios, interest cover ratios, dividend pay-out ratios and the ratio of trade credit to total debt, for a sample of 110 Australian firms, over the years 1973 to 1990. It examines changes in the across firm distribution of the ratios as well as changes in the average ratios. It also examines the relationship between the cyclicality of industry output and earnings on the one hand and the evolution of financial structure on the other.

TABLE OF CONTENTS

THE EVOLUTION OF CORPORATE FINANCIAL STRUCTURE: 1973-1990

Philip Lowe and Geoffrey Shuetrim

1. INTRODUCTION

Increases in corporate debt over the past decade have increased interest in the determinants of corporate financial structure and the relationship between financial structure and the business cycle[1]. This increased interest follows a period in which issues related to corporate financial structure received little attention. On the micro-economic front, this lack of attention was due, in large part, to the work by Modigliani and Miller (1958). They argued that, under certain conditions, the optimal financial structure of the firm is indeterminate and should not influence the firm's real decisions. On the macro-economic front, there was little interest in the relationship between corporate finance and the business cycle following the work of Friedman and Schwartz (1963). Their results on the correlations between output and money led to a preoccupation with money as the financial factor responsible for the business cycle.

The view that financial structure does not matter has recently come under considerable attack. This, in part, reflects concern over the macro-economic effects of the increase in corporate leverage that occurred in a wide range of countries during the 1980s. There have also been considerable advances at the theoretical level. In particular, models emphasising management incentives and principal-agent problems have formalised links between financial structure and economic activity[2].

While there has been considerable empirical exploration of the links between financial structure and the business cycle in the United States, there has been little work done using Australian data. This paper is a first step towards filling the gap. It uses a recently constructed database to examine changes in the financial structure

---

[1] See Stevens (1991) and Dempster, Howe and Lekawski (1990) for earlier discussions of the rise in leverage in Australia.

[2] Gertler (1988) provides a useful summary of this work.

of Australian firms over the past two decades. The database consists of financial statement data for 224 firms over the period 1973 to 1990. The data derives from records kept by the Reserve Bank of Australia as part of its production of the Company Finance Supplement. In turn, the Reserve Bank of Australia's records are based on data published by the Australian Stock Exchange and data supplied by firms to State Corporate Affairs Bureaux.

The paper has two specific goals. The first goal is to document changes in the structure of corporate balance sheets and financing behaviour over the past two decades. We examine changes in the leverage of firms, their interest cover, their dividend payment policy and their reliance on creditors[3] as a source of debt finance. The second goal of the paper is to examine the variation in financial structure within different industries. In particular, we explore the issue of whether changes in financial structure have been concentrated in industries that are particularly sensitive to the business cycle.

While changes in the average leverage of firms may have important implications for the behaviour of the economy in response to a particular shock, it is also important to examine the distribution of leverage across firms. For example, the extent to which the macro-economy becomes more vulnerable to shocks, following increased indebtedness of the corporate sector, is likely to depend on the characteristics of the firms whose leverage rose. Increases in the debt-asset ratios of firms with stable cash flows could be expected to have less adverse effects than increases in the debt-asset ratios of firms with volatile cash flows. Similarly, the ability of the economy to rebound quickly from a recession may be adversely affected if increases in leverage are concentrated in firms that have highly cyclical output. For such firms, an economic downturn causes a significant deterioration in their ability to meet current obligations out of current earnings. This may make it more difficult for these firms to finance positive net value projects and may make risk-averse management unwilling to undertake risky investments. The result is a deeper recession and a slower recovery than would have been the case had leverage been lower. Lowe and Rohling (1993) discuss this issue in more detail.

---

[3] "Creditors" is defined as the sum of "trade creditors" and "other creditors" as reported in the Company Review Service.

In this paper, changes in the distribution of leverage across firms are explored using two different methods. First, for each year, we rank the firms by their leverage and then observe the leverage at specific percentiles of the distribution. We then examine changes in those percentiles over time. Applying the alternative method, we rank industries based upon the degree of volatility or cyclicality of their output and profitability. We then examine the relationship between the degree of cyclicality/volatility and the changes in leverage of the firms in particular industry groups. These techniques are also applied to the other ratios that have been used to describe financial structure.

The results in this paper indicate that leverage increased strongly throughout the 1980s, after having remained fairly constant during the 1970s. It shows that, at least until 1987, the increase was widespread throughout the corporate sector. From 1987 onwards, however, the majority of firms reduced or maintained their level of gearing. Of the firms that did continue with strong debt expansion, most were already highly geared[4]. Associated with the generalised increase in leverage during 1980s was an accelerated growth rate of firms' balance sheets. However, earnings growth did not fully cover the increased interest burden generated by the rise in debt. As a result, interest cover was much lower in the 1980s than in the 1970s.

Finally, the study of financial structure by industry shows that the rise in leverage was a characteristic of all industries, regardless of the degree of their volatility or cyclicality. However, the extent of the financial structure adjustment differed considerably across the industries examined. The results suggest that the adjustment was relatively pronounced in the manufacturing sector that is also the most cyclically sensitive sector examined. In contrast, the less cyclically sensitive retail and services sectors experienced smaller increases in leverage. They did, however, have higher initial leverage than did the manufacturing sector.

The remainder of the paper is structured as follows. Section 2 describes the database, defines the ratios examined in the paper and explains the statistics used to

---

[4] Extending the database to include data for 1991, a subsample of 66 firms showed a continuation of this pattern. Many firms appeared to be reducing their leverage while others experienced increased leverage. The limited data available for 1992 suggests that, during 1991/92, more significant and generalised reconstruction took place.

summarise movements of the ratios. Section 3 then discusses the evolution of the ratios over time and examines changes in the frequency distributions of the ratios. In Section 4, the relationship between cyclicality and volatility on the one hand and changes in financial structure on the other, is examined. Finally, Section 5 summarises and concludes.

2. THE DATA AND METHODOLOGY

2.1. The Database

The financial statements for a sample of 224 companies have been collected, where available, for the period running from 1973 to 1990 inclusive. The data from 1973 to 1986 was obtained from records used in the compilation of the Company Review Supplement published by the Reserve Bank of Australia until April 1988. The original sources for the Company Review Supplement were the Company Review Service published by the Australian Stock Exchange and annual reports released by the individual companies. The annual reports were only used for unlisted companies. For the period from 1987 to 1990, the database had to be extended using the Company Review Supplement sources directly.

For each company, in each year, the balance sheet and the profit and loss statement were summarised into a standard form. The number of companies that existed throughout the sample period is 110. Of the 114 for which incomplete data exist, 22 companies commenced operations after 1973, while the remainder ceased independent operations prior to 1990. Appendix 1 lists all companies; asterisks mark those with incomplete data. The remainder of the paper uses the constant sample of 110 firms although Appendix 2 presents selected results using data from all 224 firms[5].

---

[5] In 1989/90, the total assets of our sample of 110 firms equalled $207 billion. In comparison, the aggregate liabilities and equity for the combined private corporate trading enterprises (from the Australian Bureau of Statistics Flow of Funds) was $437 billion in 1989/90. This figure of $437 billion excludes intra-sector liabilities and thus understates the true total assets of the sector. Also in 1989/90 aggregate earnings before interest payments and taxation (EBIT) is $22 billion for our sample of firms which compares to the National Accounts net operating surplus of $45 billion in 1989/90. (Net operating surplus is defined as income after depreciation.)

Not all companies share the same reporting date and, on occasions, companies change their reporting dates. On average, slightly more than half of the companies have a reporting date in the June quarter. The bulk of these report as at the end of June. Over a quarter of firms report as at the end of December with the remaining companies reporting at various times throughout the year. These various reporting dates make it difficult to line up the yearly figures with year to year movements in macro-economic variables. When comparing changes in financial behaviour with developments in the macro-economy, we generally treat the figure for a particular year as representing the end of the financial year.

2.2. The Ratios

In this paper we examine four key ratios calculated from firms' financial statements. These ratios are the debt-asset ratio, the interest cover ratio, the dividend pay-out ratio and the ratio of creditors to total debt.

The debt-asset ratio is defined as the net liabilities of the firm divided by its total assets (A) where net liabilities are equal to total assets less shareholders' funds (E). That is, the debt-asset ratio (D/A) is given by:

$$\frac{D}{A} = \frac{A - E}{A} \tag{1}$$

Included in debt are all non-equity sources of finance. This definition of debt is quite broad. It includes both interest bearing and non-interest bearing debt. This ratio is often referred to as a measure of gearing or leverage. Another popular measure of leverage is the ratio of debt to equity. In this paper we use the debt to assets ratio as our measure of leverage principally because it bounded between zero and one (for firms with non-negative equity). In contrast, the debt-equity ratio is bounded between zero and infinity. If equity is relatively low, then small changes in equity will lead to large changes in the debt-equity ratio. This may make it more difficult to detect important economic changes. The debt-asset ratio is much less sensitive to small changes in equity and allows a more straightforward presentation of the data.

The interest cover ratio (C) is defined as gross profits (π) divided by interest payments (I). That is:

$$C = \frac{\pi}{I} \tag{2}$$

Gross profits are equal to profits before interest, depreciation and tax have been deducted. The interest cover ratio represents the number of times that interest can be paid out of gross profits. The ratio can range between plus and minus infinity. Sustained deterioration in interest cover makes the firm more vulnerable to earnings shocks. Unlike dividends, interest payments must be made regardless of the firm's operating profits. Given a constant volatility of operating profits, the lower is interest cover, the higher is the probability that the firm will be unable to meet its interest obligations out of current profits.

The third ratio that we examine is the dividend pay-out ratio. It is defined as total dividends divided by net profits. Total dividends include both ordinary dividends (D_O) and preference dividends (D_P). Net profits are defined as gross profits less interest payments (I), tax (T) and depreciation (d). Thus,

$$\text{Pay-Out Ratio} = \frac{D_O + D_P}{\pi - I - T - d} \tag{3}$$

One minus the dividend pay-out ratio gives the share of net profits that are retained by the firm. For many firms, these retained earnings are a major source of equity finance. Changes in the pay-out ratio reflect a variety of factors, amongst which taxation changes are perhaps the most important. Changes in the pay-out ratio by a firm may also reflect a desire to change the current share of debt on its balance sheet. For example, if a firm wishes to lower its debt-asset ratio or to improve its interest cover, it may elect to retain a higher proportion of its earnings than would otherwise be the case. For some firms retained earnings may be a more effective method of achieving balance sheet reconstruction than raising new equity directly.

The ratio of "trade creditors" plus "other creditors" to total debt indicates the relative importance of credit extended through sources other than financial intermediaries. The creditors to debt ratio shows how the increased availability of credit from financial institutions has impacted upon the usage of trade credit by firms. *A-priori*, one would expect trade creditors to become less important as financial liberalisation occurred.

It is a difficult task to summarise each of the ratios for all of the firms in a set of simple summary statistics. Amongst other alternatives, it is possible to use a simple average of the individual ratios, to take some form of weighted average or to use the median. Each statistic has its own advantages and disadvantages. We have chosen to examine a weighted average for each of the ratios across the individual firms. Using simple averages can lead to considerable volatility in the summary statistics when the individual ratios can take values approaching infinity. For example, if a firm has no debt then its interest cover ratio is infinite and the average across all firms becomes undefined. In calculating the weighted averages, each firm's ratio is weighted by the firms share in the sum of the individual firms' ratio denominators. For example, the weight for each firm in the debt to asset ratio is the firm's share of total assets.

It is possible that, in some cases, changing the weights could alter, in an important way, the behaviour of the average ratio. To ensure that our results are not driven by changes in just a few firms we also present graphs that show the "across firm" distribution of ratios. In particular, we graph the ratios for the 10th, 25th, 50th (the median), 75th and 90th percentiles of the distribution. This also allows some examination of whether changes in the weighted average reflect developments that are common to all firms or simply reflect large changes in small parts of the distribution.

## 3. BEHAVIOUR OF THE FINANCIAL RATIOS

3.1. Debt-Asset Ratio

Graph 1 presents the weighted average debt-asset ratio between 1973 and 1990. The time profiles of the 10th, 25th, 50th, 75th and 90th percentiles of the distribution of the ratio are presented in Graph 2. These graphs show that the ratio of debt to assets increased substantially during the 1980s after remaining relatively constant over the 1970s. In 1973, for our sample of firms, debt financed an average of 52 percent of firms' total assets. By 1980, this share had actually declined slightly to 51 percent. In contrast, the 1980s saw the share of debt on corporate balance sheets increase, with debt accounting for almost two-thirds of total assets in

## Graph 1: Weighted Average Debt-Asset Ratio
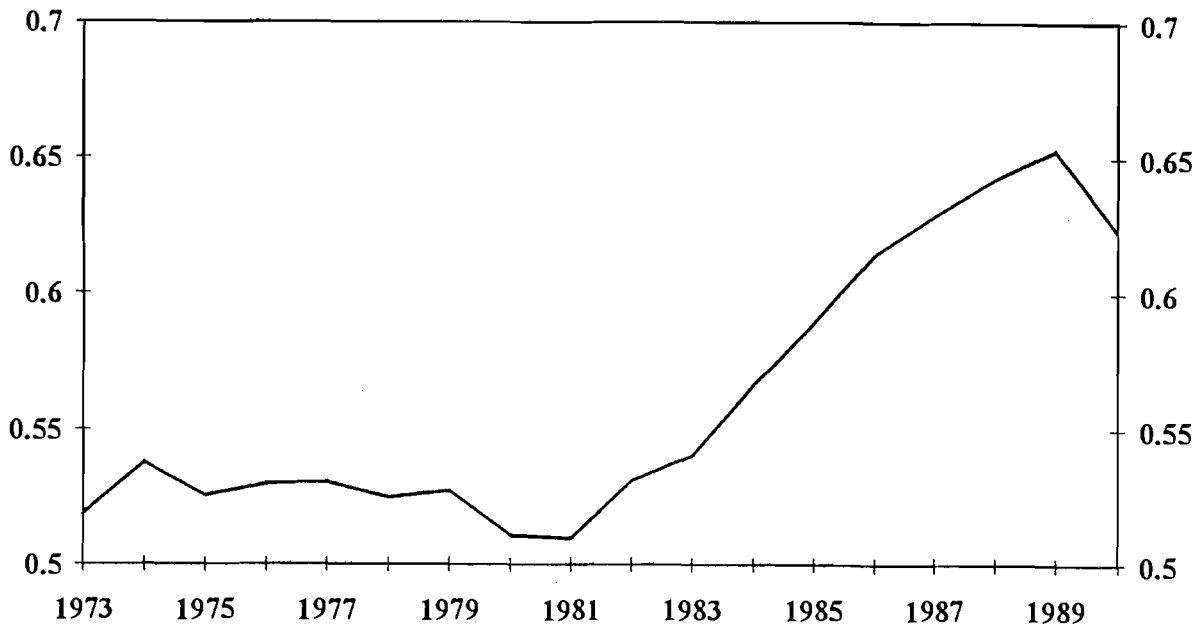
Graph 2: Debt-Asset Ratio Percentiles
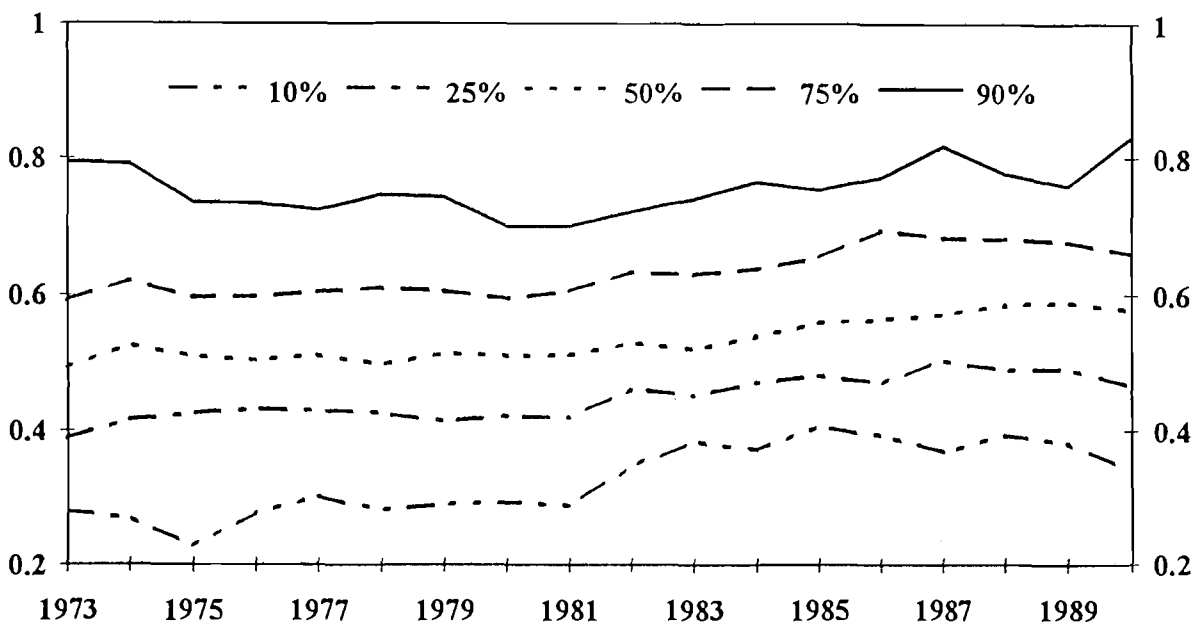
1989 and 1990. The percentiles of the leverage distribution show that the increase in the average ratio of debt to assets cannot be accounted for by an increase in the leverage of a minority of large or highly levered firms. All percentiles show an increase in leverage over the 1980s.

These findings match those of Dempster, Howe and Lekawski (1990), who observed consistent growth in the ratio of gross debt to the book value of equity between 1981 and 1988. However, Dempster, Howe and Lekawski (1990) also considered a measure of leverage based upon a firm's market value. Specifically, they found that the ratio of interest bearing debt to market capitalisation had not trended upwards over the 1980s. Unfortunately, given that our sample of firms includes listed and unlisted companies, we are not able to calculate the aggregate market value of the firms in our sample. As a proxy for the market value of firm equity, we use the market capitalisation of all firms listed on the Australian Stock Exchange. We then calculate a proxy for the aggregate debt equity ratio by dividing the total book value of debt for our sample of firms by our proxy for their market capitalisation. This is presented in Graph 3. It shows a similar time profile to the

Graph 3: Debt Over Market Capitalisation
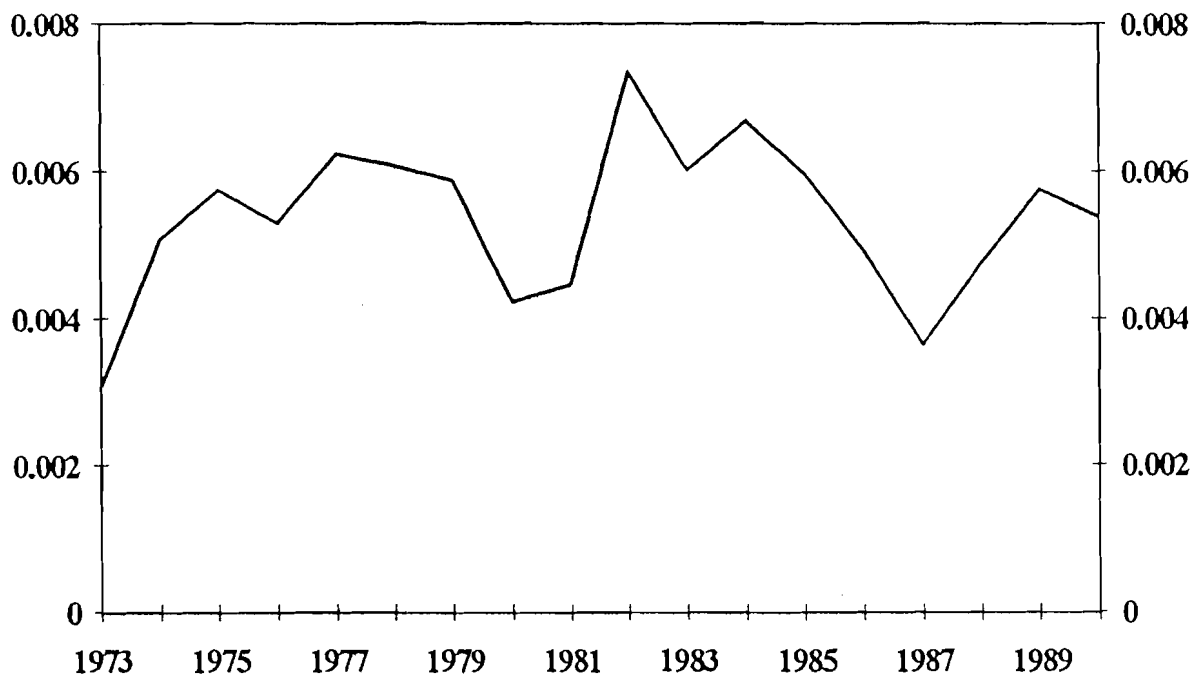
interest bearing debt over market value of equity chart presented in Dempster, Howe and Lekawski (1990, chart 10). Our market-value based measure of leverage is significantly more volatile than our book value measure of leverage. Perhaps more importantly, it does not show an upward trend over the 1980s. Sharp increases in 1982 and 1988 and 1989 were offset by falls between 1982 and 1987.

If in fact, share prices are always equal to the present discounted value of the future stream of dividends and if financial contracts are state-contingent or financial intermediaries are risk neutral and far-sighted, then the appropriate measure of leverage is that based on a firm's market value. For instance, if a firm discovers a new technology that greatly increases its expected future profits then that firm's market value will rise. As a result, while leverage based upon the firm's book value remains unchanged, leverage based upon the firm's market value falls considerably. Given appropriately structured financial contracts, a potential lender should only be concerned with the firm's future profitability and thus the market-value based measure of leverage.

Unfortunately, we do not live in such an ideal world. There is considerable evidence that asset prices can deviate from fundamentals for long periods of time. If firms and financial institutions mistake a non-fundamental increase in share prices for an increase in future profitability and then make lending decisions based upon this misinterpretation, firms may become over-geared. In turn, an increase in the probability of financial distress may result. In addition, when the inevitable correction to asset prices occurs, firm equity is further reduced and, as a result, some firms will fail. The deterioration in equity and losses by financial intermediaries may generate a sustained period of sluggish economic activity. Thus, when considering the implications of a change in market-value based measures of leverage, it is important to consider whether the share price movements are driven by rational expectations of changes in the future value of a firm's income stream or simply reflect non-fundamental forces.

To some extent, the rapid increase in asset prices documented by Macfarlane (1990) drove the movements in market-value measures of leverage over the 1980s. As Macfarlane (1989 page 27) notes, the relatively constant ratio of debt to market capitalisation, "does not, of itself contradict the proposition that there had been an upward shift in corporate demand for debt". The increased access to funds that accompanied financial liberalisation most probably led to an increase in the value of

financial assets. This increase is likely to have reflected two factors. The first is higher real earnings in response to the removal of some liquidity constraints. Higher earnings should have been translated into higher future dividends and thus higher current share prices. Second, the financial liberalisation, and the resulting increase in borrowing, facilitated speculative asset purchases that drove up the value of the share market. It is unlikely that all share price movements were driven by changes in expected future income streams and, thus, it remains important to examine changes in the book-value based measures of leverage.

In general, the ratio of debt to the book value of assets will increase if either equity is swapped for debt or if balance sheet growth is financed using a higher share of debt than the current share of debt on the balance sheet. While swaps of debt for equity, through management buy-outs, have been popular in the United States, they have been relatively rare in Australia. Anderson and Brooks (1991) report that, before October 1990, there had only been 55 buyouts in Australia, with a combined value in excess of two billion dollars. They attribute the relative lack of leveraged buyouts to the reluctance of Australian managers to move from manager to owner status and the unwillingness of institutional lenders to support such activity.

With these swaps playing a relatively minor role in changing the structure of corporate balance sheets, the increase in debt-asset ratios primarily reflected balance sheet expansion using a higher proportion of debt than had previously been the case. This increased reliance on debt was facilitated by the financial liberalisation that took place in the first half of the 1980s. The removal of controls on interest rates increased access to intermediated credit, and the increased competition associated with financial liberalisation meant that banks were keen to expand their market share by lending. This aggressive lending allowed corporations to expand their balance sheets at a much faster rate in the 1980s than they did in the 1970s. The strong growth of firm assets is illustrated in Graph 4 which shows the average value of real total assets for the 110 firms in our sample[6]. Between 1974 and 1979 real asset growth of firms averaged 1.6 percent per annum. In contrast, during the 1980s, real asset growth of the same firms averaged 9.4 percent per annum. Graph 5 shows the percentiles of the real total assets distribution over time.

---

[6] Real values were obtained by dividing the book value of total assets for each firm by the Consumer Price Index at 1984/85 prices, after it had been rebased to 1990.

It clearly indicates the widespread nature of balance sheet expansion over the 1980s.

From Graphs 1 and 2, it is difficult to distinguish any strong relationship between the degree of leverage and the business cycle. Changes in firm leverage appear to be dominated by trend components, with the business cycle playing a relatively minor role. There does, however, appear to be some weak link between economic activity and leverage arising from the fact that balance sheet expansion is typically slower in recessions. If balance sheet growth is financed using a higher share of debt than the current share of debt on the balance sheets then slower asset growth will see slower growth in leverage. This is evidenced by the declines in leverage in 1975 and 1990 and the slower rate of increase in leverage in 1983. Each of these declines is associated with a reduction in the aggregate real assets of the firms in our sample.

The situation in 1990 is particularly interesting. The size of the combined **nominal** balance sheets of the firms in our sample rose by only 2.6 percent, the smallest increase for any year in our sample. As Graph 4 shows, the 2.6 percent nominal growth represented a decline in the **real** value of assets of the firms in our sample. This very slow nominal balance sheet growth was associated with a fall in the nominal value of debt outstanding. This can be seen in Graph 6 that shows the percentage change in the aggregate value of nominal assets and the change in nominal debt as a percentage of total assets for the 110 firms studied[7]. It shows that 1990 was the only year in which the value of nominal debt actually fell[8]. This fall in debt, coupled with slight growth in the size of balance sheets, meant that the weighted average debt-asset ratio declined slightly in 1990.

---

[7] It should be noted that we cannot directly match fund sources with fund applications. Thus, the new debt of firms may be used to pay taxation, interest or dividends while their earnings may be entirely used to accumulate assets. From an accounting perspective, however, depreciation allowances, interest, taxation are deducted from earnings and the remainder is viewed as the contribution of earnings to the pool of funds available for net asset purchases.

[8] This fall in total debt precedes the decline in business credit which is apparent in aggregate credit statistics. In large part, this earlier fall reflects a major reduction in both the total debt and the total assets of a single firm in our sample.

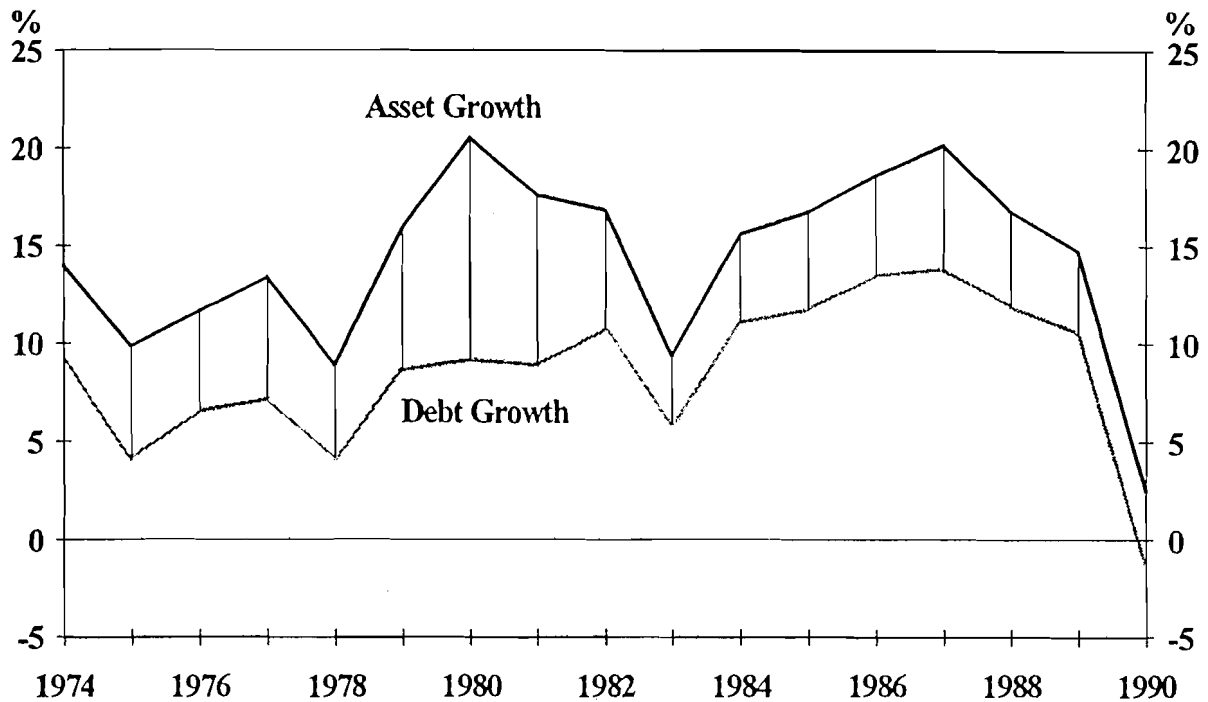## Graph 4: Average Real Total Assets
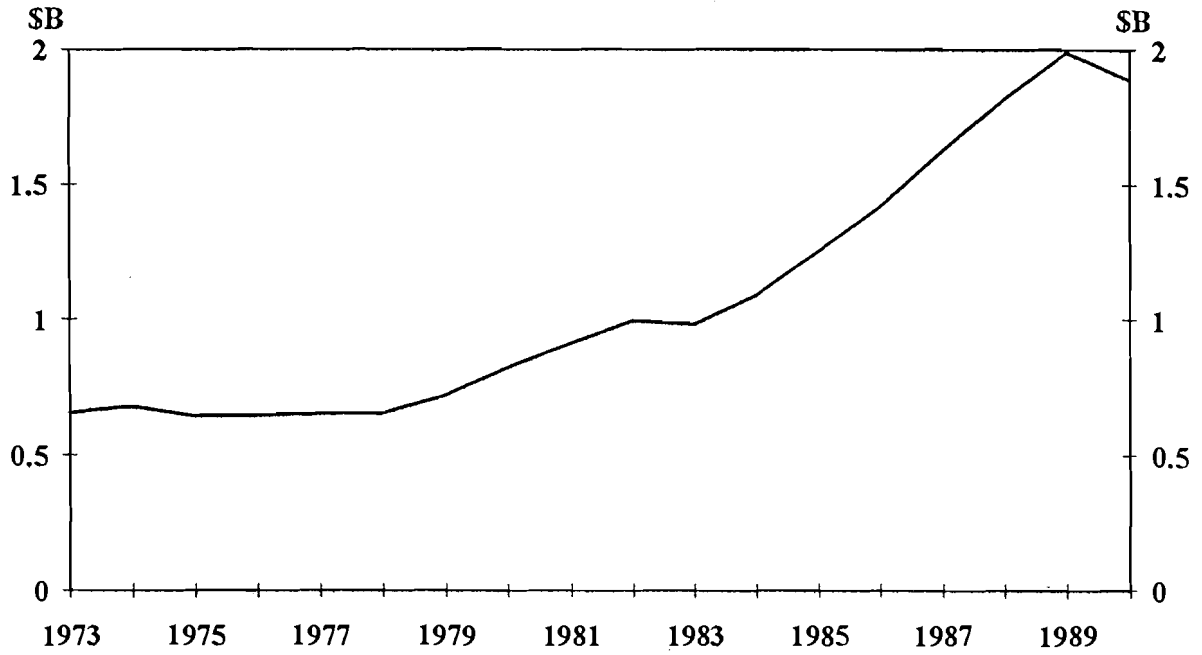
Graph 5: Real Total Assets Percentiles
(Logarithmic Scale)
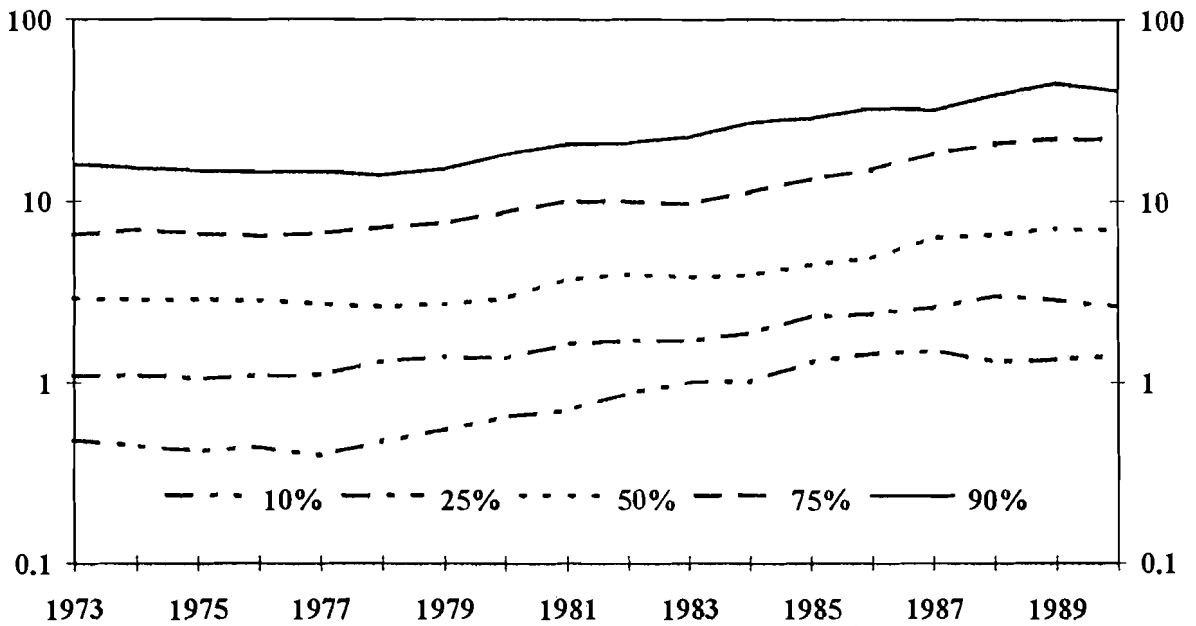
Graph 6: Debt and Asset Growth As Percentages of Total Assets

A counter-example to the positive relationship between balance sheet growth and leverage is evident in 1980 and 1981 where strong balance sheet growth was associated with a decline in leverage. During these years, mining companies raised a considerable amount of equity through new share issues. These equity funds were used to finance investment associated with the "minerals boom". The increased dependence on equity funds during 1980 and 1981 is illustrated in Graph 6 which shows that, during these two years, less than half of the balance sheet expansion was accounted for by the accumulation of new debt.

While, on balance, there is some evidence that the degree of leverage is a function of the business cycle, the relationship appears relatively weak and is dominated by other factors. This, however, does not exclude the possibility that leverage has some effect on the evolution of the business cycle. Large increases in leverage, as experienced in the 1980s, may leave the economy more exposed to adverse macro-economic shocks. As Seth (1990 page 6) suggests, "if highly levered firms are also cyclical, that is, if the firms' ability to repay is directly related to the level of economic activity, there is danger of positive feedback". Bernanke and Gertler (1990) reach the same conclusion by noting that high leverage reduces the collateral

of firms, making financial institutions less willing to fund positive net present value investment projects.

Whether or not an economy that experiences an increase in leverage is more susceptible to shocks, depends, in part, upon the type of firms that are responsible for the increase in leverage. For example, if firms with highly cyclical profits are responsible for the increase, the susceptibility of the economy to adverse shocks is likely to be higher than if firms with very stable profits were responsible for the higher leverage. If firms with highly cyclical profits increase leverage, the probability of some form of credit squeeze in a recession increases. Any such credit squeeze may prolong and intensify the recession. The relationship between the cyclicality of output and leverage is explored in Section 4. However, it is also useful to examine changes in the frequency distribution of firms' leverage. An increase in average corporate debt may stem from a small subset of firms or may result from across-the-board leverage increases. Different scenarios imply different consequences for macro-economic stability. We now explore this issue in more detail.

While Graph 1 shows some small decline in the debt-asset ratio between 1973 and 1981, the percentiles in Graph 2 show that this trend is driven by the upper tail of the distribution. The 10th, 25th, 50th and 75th percentiles all increased over this period, while the 90th percentile declined from 0.79 to 0.70. The reduced role of debt for the most highly geared firms coupled with the slight increase in leverage of the less highly geared firms meant that the dispersion of leverage across firms was reduced during the 1970s. From the perspective of the 1980s, however, evolution over the 1970s was relatively minor. In terms of the business cycle effect on leverage, a general decline in leverage in 1974/75 corresponded to the slowdown in activity in the same year. This is evidenced by the decline of all percentiles, with the exception of the 25th, in Graph 2.

The increase in corporate leverage between 1981 and 1987 was widespread; each percentile of the distribution increased over this period. The debt-asset ratio at the 10th percentile increased from 0.29 to 0.37 between 1981 and 1987 while the ratio at the 90th percentile increased from 0.70 to 0.83. The bulk of the increase in the 10th percentile occurred in the early 1980s. Increases in the other percentiles also occurred in the early years of the 1980s, however, they were smaller than that of the 10th percentile.

Most firms experienced little or no further increase in leverage after 1987. The 10th, 25th and 75th percentiles actually declined between 1987 and 1990 while the median increased marginally. The debt to asset ratio at the 90th percentile also increased marginally but was considerably more volatile over the four years from 1987 to 1990. While fewer firms were increasing their leverage after 1987, the weighted average measure shows rising leverage during 1988 and 1989. This reflects rapidly increasing leverage in a small number of firms in the late 1980s. While leverage at the 90th percentile increased by 2.0 percentage points between 1987 and 1990, the 98th percentile increased by 6.3 percentage points. In summary, the increasing weighted average debt-asset ratio in 1988 and 1989 reflects increasing leverage in a small number of outlying firms. The increase in leverage that took place between 1983 and 1987 was, however, more widespread.

3.2. Interest Cover Ratio

The above discussion of the relationship between leverage and the business cycle implicitly assumed that higher leverage increased the riskiness of the firm. While this assumption is true if all other things are constant, higher leverage does not necessarily imply a higher probability of insolvency or corporate failure. For example, if interest rates fall at the same time that leverage increases, the higher leverage may not leave the firm more susceptible to earnings shocks. Even if higher leverage does increase the probability of being unable to meet current commitments from current earnings, it does not necessarily imply an increased probability of financial distress. An increase in leverage may be accompanied by a more long-sighted relationship between the firm and the provider of finance.

Also, when interpreting the effects of increasing leverage, it must be remembered that many firms were adjusting in response to the removal of a credit constraint. To the extent that they were moving from a constrained optimum to an unconstrained optimum, their increased leverage should be beneficial. However, if firms overshot their new optimal financial structure they may have become exposed to undesired levels of risk. Notwithstanding these qualifications, one measure of the susceptibility of firms to adverse shocks is the interest cover ratio. In Section 2 this was defined as profits before interest, tax and depreciation divided by interest payments.

Graph 7 shows the weighted average interest cover for the 110 firms in our sample and Graph 8 shows the time profiles of the 10th, 25th 50th, 75th and 90th percentiles. Weighted average interest cover declined substantially between 1973 and 1990. Between 1973 and 1980 the interest cover ratio averaged 6.7. By 1982, the ratio had fallen to 4.1 and thereafter it followed a slow decline. By 1990, the weighted average interest cover ratio had reached 3.0. The percentiles in Graph 8 suggest that the decline in interest cover over the 1980s was characteristic of most firms.

The expression for interest cover, given in (2), can be re-expressed as:

$$C = \frac{\left(\dfrac{\pi}{A}\right)}{\left(i\dfrac{D}{A}\right)} \tag{4}$$

This expression shows interest cover to be a function of three variables: the earnings rate on assets (π/A), the average interest rate (i) and the debt to asset ratio (D/A). Ceteris paribus, interest cover declines if the rate of return on assets declines, or if the interest rate or leverage increases. The debt-asset ratio is presented in Graph 1 while the weighted average return on assets for our sample of firms is shown in Graph 9. Graph 7 shows two measures of the interest rate. The first is the overdraft rate on large corporate loans and the second is the sum of the interest payments of each firm divided by the sum of the firms' average total debt for each year. Average debt is used instead of debt as at the balance date to ameliorate the distortionary effects of changing debt levels over the financial period[9]. For example, if debt was rising over the financial period, the interest rate, calculated by dividing interest payments by balance date debt, would underestimate the actual average rate paid.

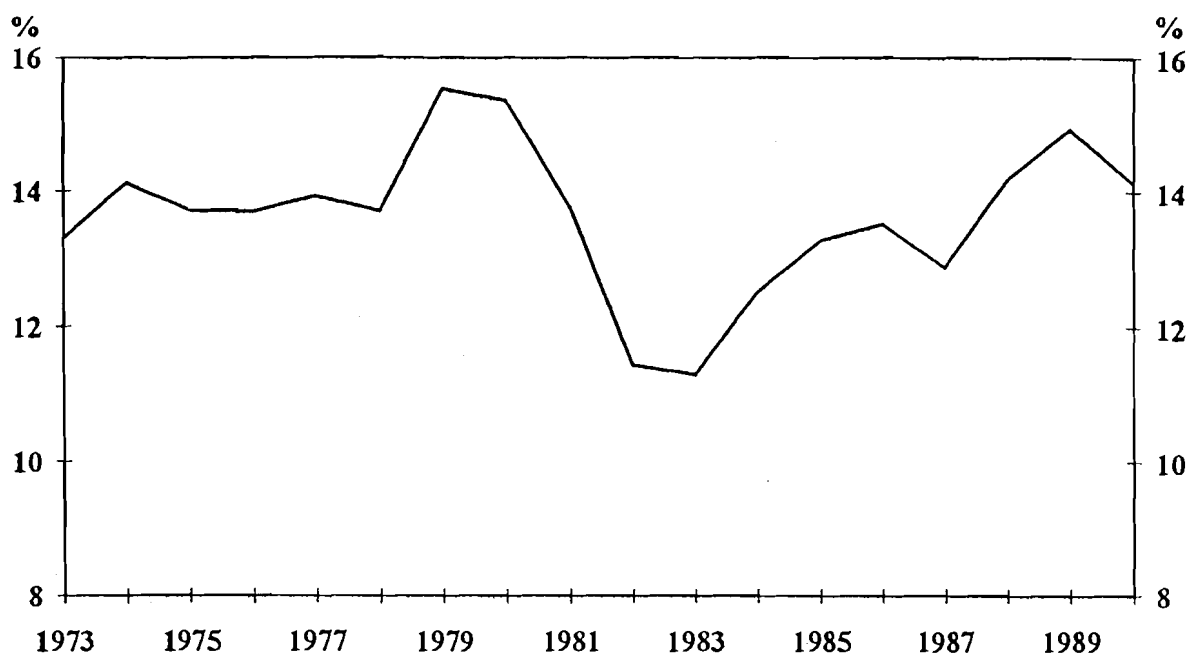[9] Average debt combines the debt at the beginning and end of the financial period using an arithmetic average.

Graph 7: Weighted Average Interest Cover Ratio
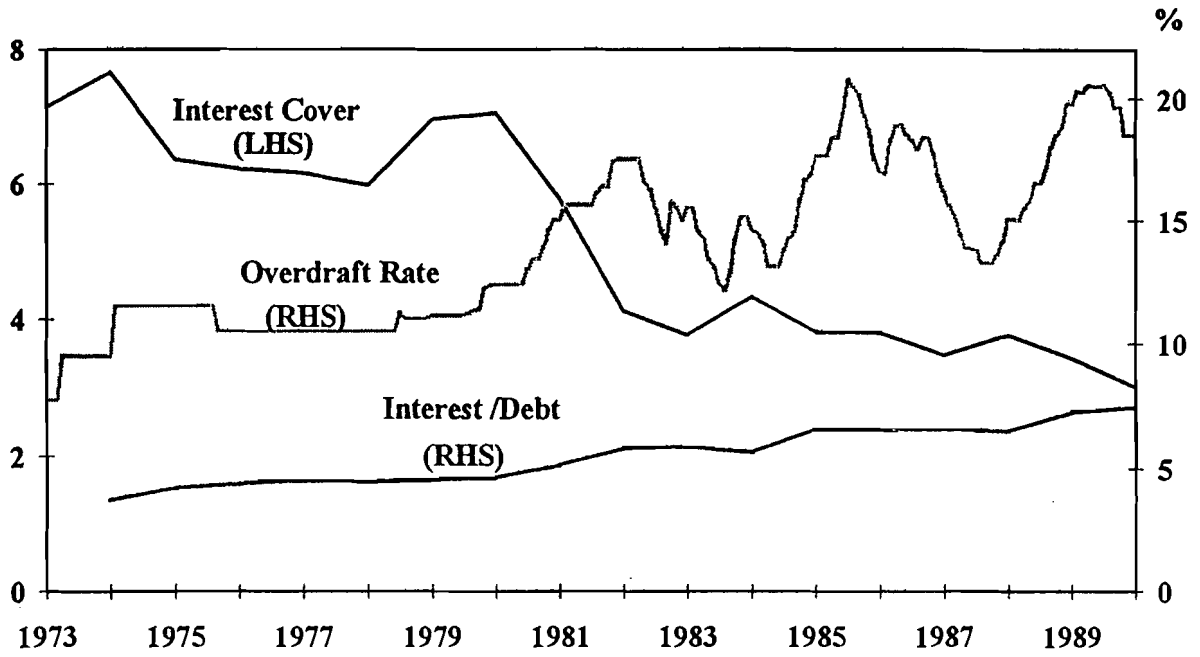
Graph 8: Interest Cover Ratio Percentiles
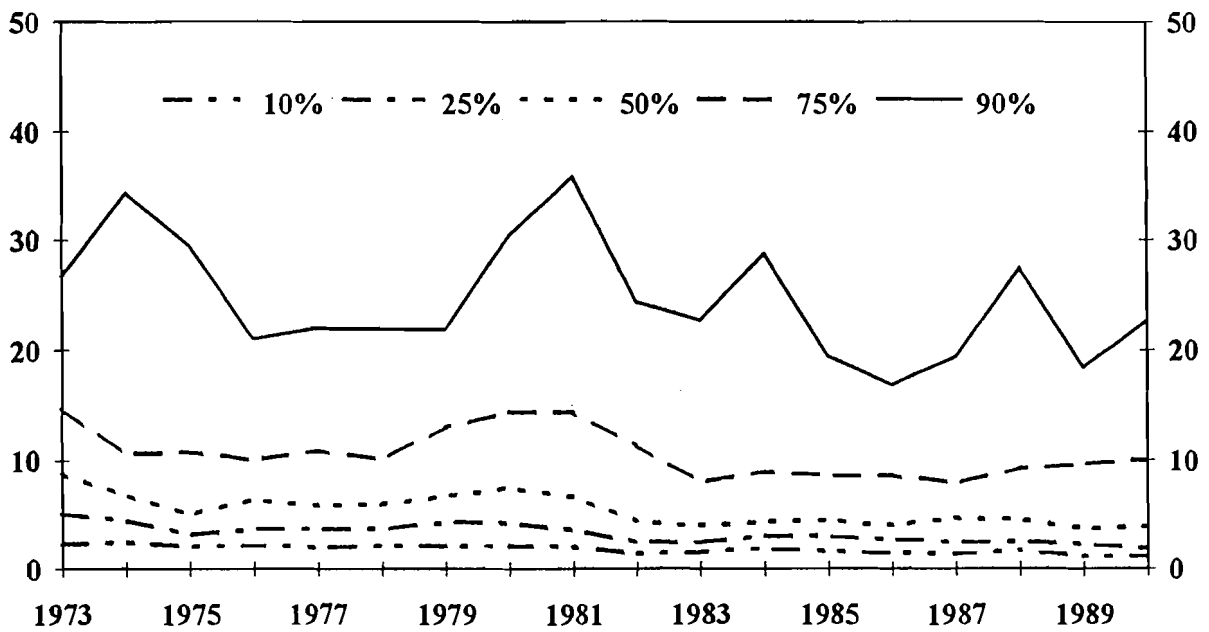
Graph 9: Weighted Average Earnings-Asset Ratio

%

16

14

12

10

8

1973   1975   1977   1979   1981   1983   1985   1987   1989

%

16

14

12

10

8

The average interest rate paid is less volatile than, and considerably below, the overdraft rate. Part of the large difference between the two "cost of funds" measures stems from the fact that a large share of corporate debt represents trade credit that often attracts low or zero interest payments. Firms may also borrow at fixed rates for long periods of time and thus their borrowing costs are not as volatile as the interest rate on overdrafts. Notwithstanding these complications, both interest rate series are higher in the 1980s than in the 1970s and both indicate lower interest rates in 1984 and 1988. These patterns are in keeping with the evolution of interest cover over the sample period.

The business cycle is a major determinant of company profits. When the economy is growing strongly, profits are typically increasing. Conversely, in recessions the return on assets is generally comparatively low. This pro-cyclical nature of company profits is reflected, at least to some extent, in the interest cover ratio. The buoyant economy in 1973/74 saw profits increase and interest cover rise. As the economy slowed in 1974/75, profitability and interest cover declined. In 1975 the decline in interest cover was exacerbated by an increase in interest rates. Strong profitability in 1979 and 1980, coupled with a decline in the debt-asset ratio and only a small increase in interest rates, saw interest cover rise again. These changes

in the 1970s were, however, relatively minor compared with those which took place in the first half of the 1980s.

Between 1980 and 1983 average interest cover fell from 7.1 to 3.8 for our sample of firms. This reflected both a significant fall in corporate profitability and higher interest rates. As the economy recovered into 1984, corporate profitability increased and interest rates declined. Previous experience would have suggested a corresponding substantial increase in the interest cover ratio. This did not occur. In fact, interest cover continued to decline, albeit at a much slower pace than had occurred in the early 1980s. This decline reflected the significant increase in leverage that occurred during the first half of the 1980s. The effect on interest cover of rising leverage was mitigated to some extent by an improvement in the rate of return on corporate assets. The higher rates of return were, however, insufficient to prevent a deterioration in interest cover. Graph 7 also confirms that interest rates played a role in the deterioration of the interest cover ratio. Interest rates were, on average, considerably higher in the 1980s than in the 1970s, making the burden associated with any given debt level, significantly higher. Movements in interest rates over the 1980s also appear to be reflected by the aggregate interest cover ratio; lower interest rates in 1984 and 1988 are matched by a higher aggregate interest cover ratio.

In a recent study comparing international trends in corporate leverage, Seth (1990) concluded that although leverage had increased in Australia in the 1980s, the corporate sector had not become more fragile because interest cover had not declined. That is, profits had grown in line with the increased debt. This conclusion was based upon a sample covering the period from 1982 to 1988. Over this period there was relatively little deterioration in interest cover compared to the declines between 1980 and 1982. However, the starting point (that is, 1982) is in a severe recession when corporate profits were being squeezed. As was argued above, interest cover would normally have improved as the economy recovered. However, the increasing debt and higher interest rates seriously limited this improvement. Instead of stabilising at a level comparable to that prevailing in the 1970s, interest cover remained at a traditionally low level. Contrary to the conclusion reached by Seth, the build up in debt caused a deterioration in the interest cover of Australian firms and, to some extent, increased their susceptibility to adverse shocks.

We now examine the frequency distribution of interest cover and its evolution through time. As Graph 8 shows, 50 percent of firms had cash flow 8.7 times their interest payments in 1973. By 1983 the median interest cover ratio had fallen to 4.0 times earnings. By 1990 the median had fallen only slightly further to 3.9. In comparison, the 90th percentile was 26.7 in 1973 and 22.7 in both 1983 and 1990.

Also from Graph 8, it is clear that the distribution of interest cover ratios is skewed. For firms with positive earnings, interest cover is bounded between zero and infinity. If profitable firms have little debt or if interest rates are low, their interest cover ratios will be high. While most firms have interest cover ratios under 10, the interest cover of some firms exceeds 20. Frequency histograms of the ratios in 1973 and 1990 are shown in Graph 10. In 1973, only 17 percent of firms had an interest cover less than 3. By 1990, this had increased to 46 percent of firms. At the other tail of the distribution, there appears to be relatively little change; roughly the same number of firms had very high interest cover in 1990 as had high interest cover in 1973.

The variation of the interest cover ratios over time is in rough proportion to their absolute levels. Because of the skewness in the distribution of the ratios, it is difficult to detect important economic influences from the percentiles in Graph 8. To overcome this problem we also present the percentiles using a logarithmic scale (Graph 11).

In Graph 11, it is clear that the large decline in interest cover between 1980 and 1982 is common to all percentiles examined. In contrast, subsequent variations are often peculiar to particular percentiles. The 75th and 90th percentiles, representing firms with high interest cover, showed slight net improvement in interest cover between 1983 and 1990 while the lower percentiles continued to display increasing interest burdens. Between 1987 and 1990, the 90th percentile rose from 19.4 to 22.7 while the 75th percentile rose from 7.9 to 10.0. Over the same period, the 50th and 25th percentiles fell to 3.9 and 1.9 from 4.6 and 2.4 respectively. The 10th percentile fell from 1.3 to 1.1.

These results are consistent with those for the debt-asset ratio. They show that for almost all firms, the period from 1980 to 1987 was associated with declining interest cover. After 1987, it was mainly those firms in the lower tail of the distribution that continued to experience deteriorating interest cover.

Graph 10: Interest Cover Ratio (1973 and 1990)
Relative Frequency Histogram
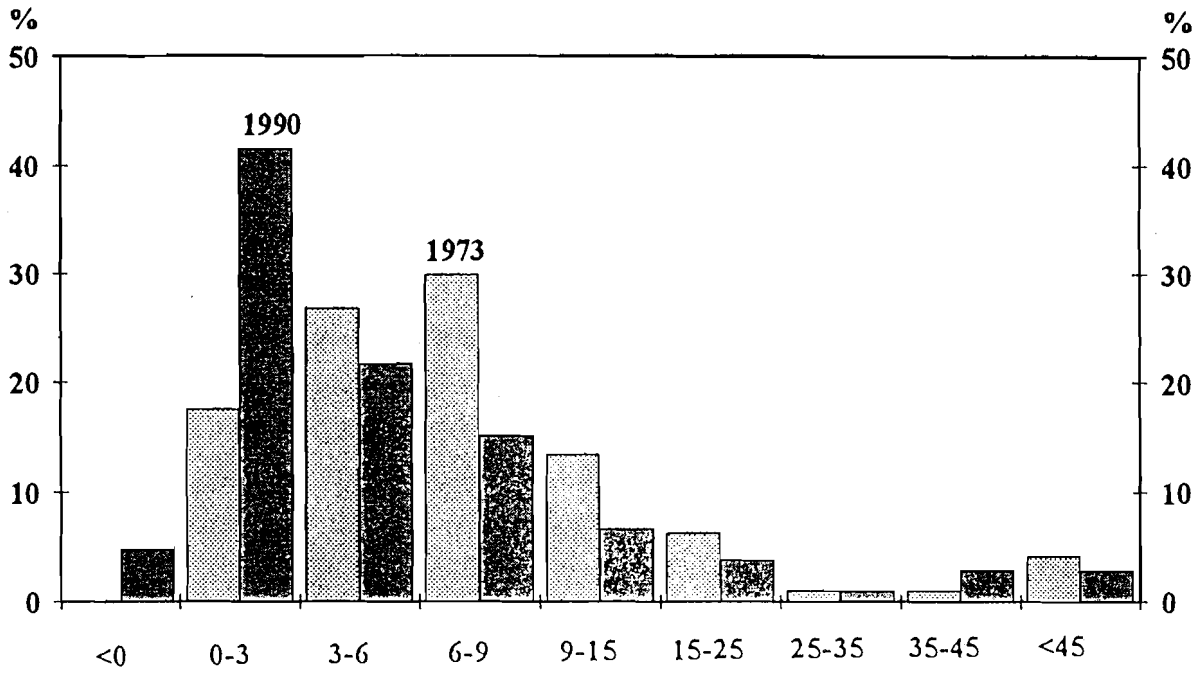
Graph 11: Interest Cover Ratio Percentiles
**(Logarithmic Scale)**
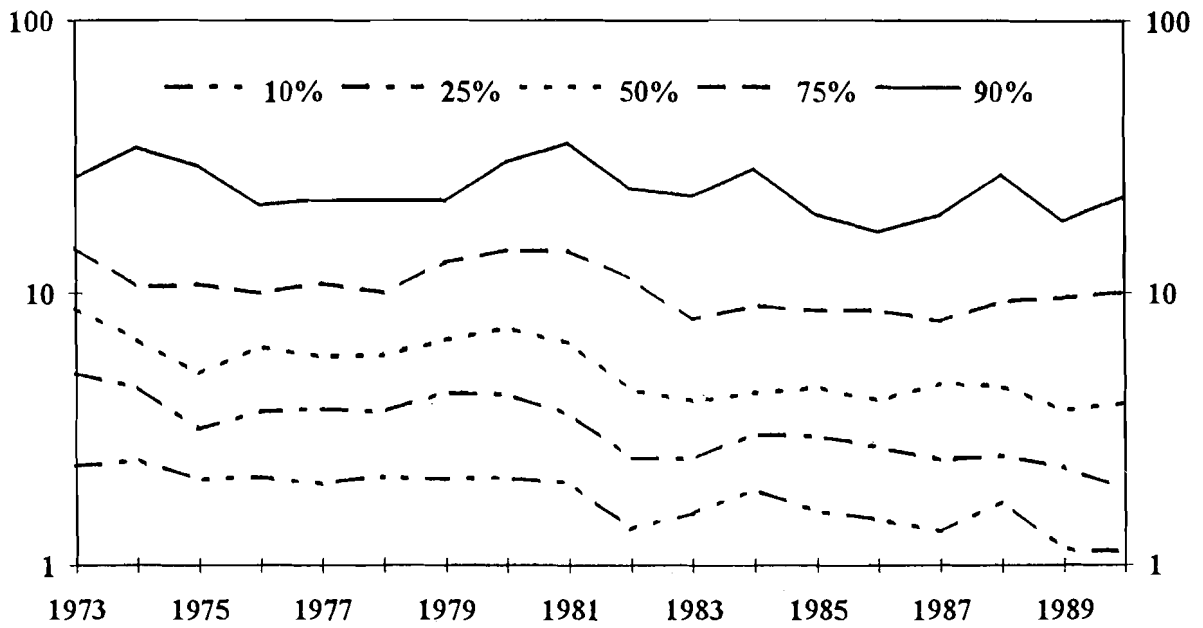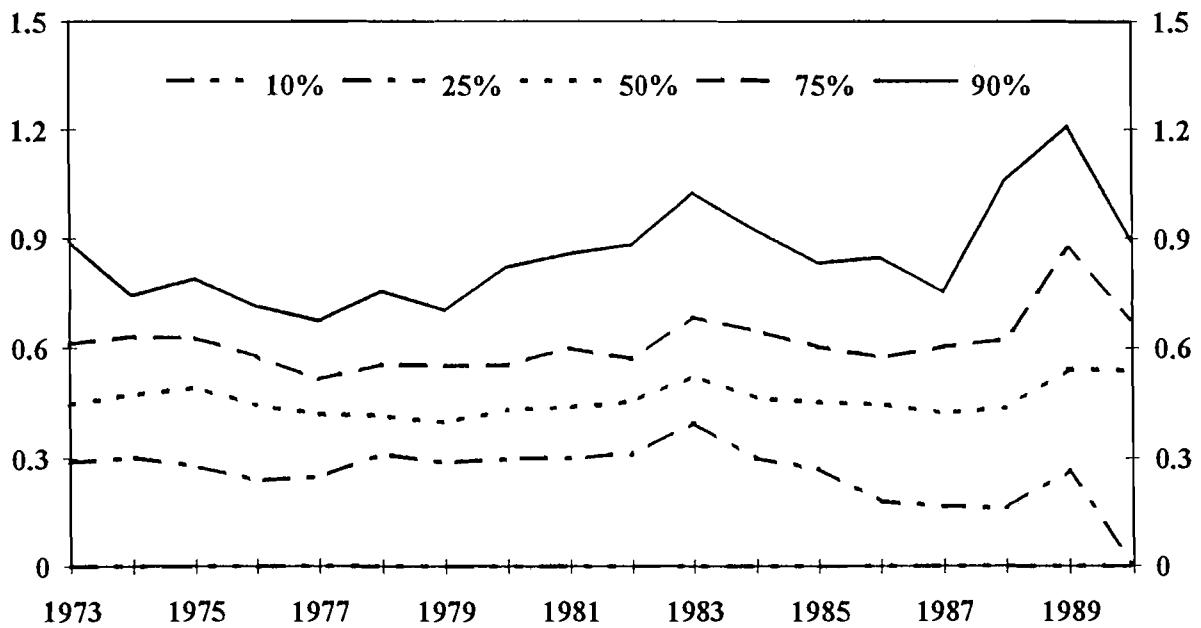
3.3. Dividend Pay-out Ratio

Graph 12 shows the weighted average dividend pay-out ratio and Graph 13 presents the percentiles of the distribution for each year. Between 1973 and 1988, the weighted average dividend pay-outs oscillated between 43 and 63 percent of net profits and there was no evidence of either a positive or negative trend. It does not appear that the desire to build up corporate balance sheets in the 1980s induced the majority of firms to increase their retained earnings as a percentage of net profits. After 1988, the weighted average dividend pay-out ratio increased significantly, rising from 47 percent in 1988 to 76 percent in 1990. Callen, Morling and Pleban (1992), in a study of the behaviour of firm dividend policies, attribute much of this increase to changes in the taxation system. These changes included the introduction of a capital gains tax in September 1985, the introduction of dividend imputation in July 1987 and the introduction of a 15 percent tax on the earnings of superannuation funds in July 1988. Another major factor driving the increase in the payment of dividends over the late 1980s was the rising popularity of dividend reinvestment schemes wherein firms could make the dividend payments desired by shareholders while effectively retaining the funds for future investment. The use of these schemes is also documented in Callen, Morling and Pleban (1992).

The graphs suggest that the business cycle has a considerable influence on the dividend pay-out ratio. Apart from the strong rise at the end of the sample, the largest increase in the ratio occurred in 1983. In this year, the weighted average pay-out ratio was 63 percent. 1983 was also the year in which the average return on firm assets was at its lowest. The increase in the pay-out ratio suggests that firms were unwilling to reduce the value of dividends in line with their lower profits. This is consistent with the view that dividends are used by management to signal to shareholders that the firm is basically sound. By keeping dividends reasonably high when profits are low, management signal to the owners of the firms, and to the firm's creditors, that the firm is expecting a recovery in its profitability. As a result, the dividend pay-out ratio is counter-cyclical. While the weighted average does not show an increase in the dividend pay-out ratio during slowdowns in 1974/75 and 1977/78, the percentiles show that, in both periods, a reasonably wide cross section of firms increased their pay-out ratios.

Graph 12: Weighted Average Dividend Pay-out Ratio
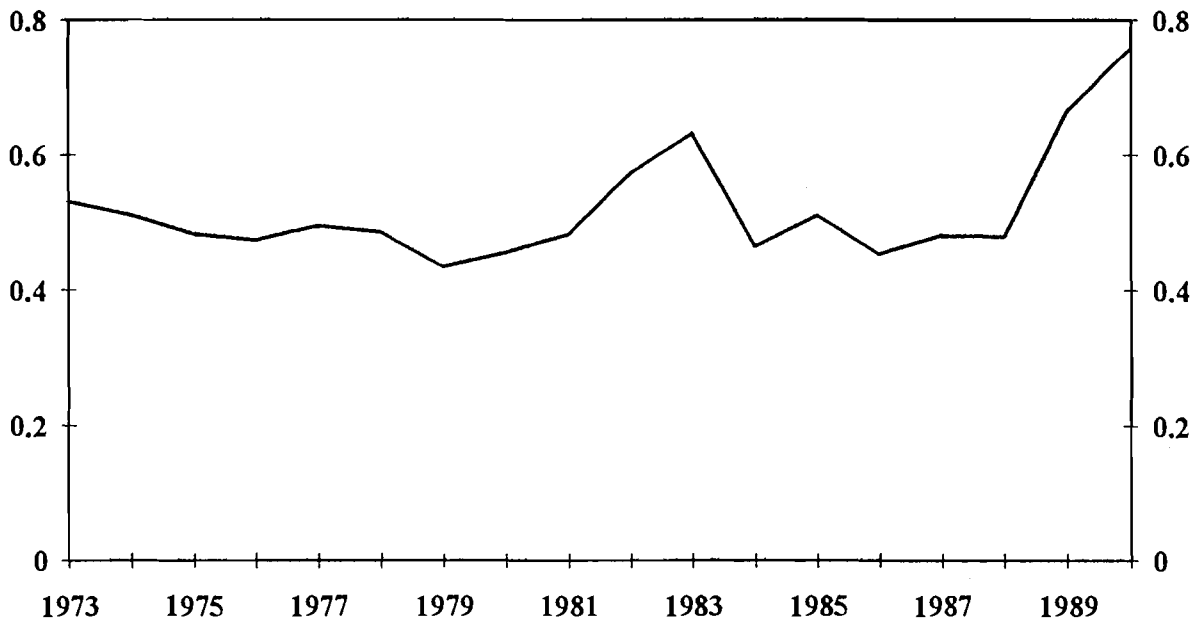
Graph 13: Dividend Pay-out Ratio Percentiles

The percentiles show a wide dispersion in the dividend pay-out ratios across firms. In every year, at least 10 percent of firms have a pay-out ratio less than or equal to zero[10]. In contrast, the 90th percentile is greater than 70 percent in most years. The increase in the pay-out ratio in 1983 appears to be a widespread feature as does the increase in 1989. It is also interesting to note that, over the 1980s, the dispersion of the ratios increased. This increase largely reflects firms in the lower quartile of the distribution reducing their pay-out ratios; in 1983, the 25th percentile was 0.40 but by 1988 it had fallen to 0.16.

Graph 12 shows that the average dividend pay-out ratios increased rapidly in 1989 and again to a lesser extent in 1990. However, the percentiles in Graph 13 do not show the 1990 increase in any of the percentiles. The weighted average between 1989 and 1990 was driven by a small number of large firms that were making high losses. In comparison, at a disaggregated level, 54 percent of firms increased their dividend pay-out ratios in 1989 compared to only 40 percent in 1990. The remaining 60 percent of firms drive the 1990 fall in the percentiles shown in Graph 13.

3.4. Creditors to Debt Ratio

Most sales by firms are credit sales. A recent survey of manufacturing firms by the State Bank of New South Wales (1992) reported that the average proportion of credit sales to total sales was 88.9 percent. Of the firms surveyed, 73.4 percent reported that the most common period over which credit was extended was 30 days while the average time taken to pay was 50.6 days. This type of credit, whereby one firm finances the purchases of its own output by another firm, constitutes an important component of the total debt of many firms. Unlike much credit from financial intermediaries, it is generally short-term and is not used to finance longer-term asset accumulation. In this section we look at the relative importance of this type of credit and at changes in its importance through time.

If capital markets are perfect, firms should be indifferent between trade and bank credit. Imperfections in capital markets often remove this indifference. In their

---

[10] Dividend pay-out ratios can be negative if the firm makes a loss after tax, interest payments and depreciation. These are treated as zero in the percentile graph of dividend pay-outs.

survey of the reasons for the existence of trade credit, Schwartz and Whitcomb (1979) identify two such imperfections. The first is the existence of ceilings on interest rates and the second is the fact that information is costly to collect and that the cost differs between providers of finance. If there are ceilings on the interest rates which financial intermediaries can charge, and those ceilings are binding, then there must be disequilibrium credit rationing. That is, some firms that require funds will be unable to obtain them from a financial intermediary. In such a situation, it may be optimal for suppliers to extend finance to buyers through trade credit. This allows the buyer to achieve a more satisfactory level of gearing and allows the supplier to continue selling its product and, in so doing, earn a higher implicit rate of return than was available through the controlled interest rates available from financial intermediaries.

In many cases, information concerning the creditworthiness of a firm can be obtained with little cost to a firm's suppliers. By observing the firm's orders and its payments over a period of time, the suppliers are provided with considerable information about the firm. Thus, suppliers may have a lower cost of acquiring information concerning the firms to which they sell than do banks. As a result, they may be able to provide finance to the firm at a lower cost than could the intermediary. While this explanation of trade credit is useful for explaining why the importance of trade credit differs across various firm types, it can not explain changes over time unless the relative information costs of suppliers and intermediaries are changing.

The time profile of the weighted average ratio of trade credit to total debt is shown in Graph 14 and the 10th, 25th, 50th, 75th and 90th percentiles of the distribution are shown in Graph 15. The period between 1973 and 1981 is characterised by trade credit accounting for an increasing share of corporate debt. Over that period the average share rose from 19 percent to 26 percent. Since 1981, however, the trend has been reversed with the average share falling back to 21 percent by 1990. The percentiles show that the increase and then the fall in the share of trade credit is characteristic of a wide range of firms. All percentiles were higher in 1981 than they were in 1973 and were lower in 1990 than in 1973.

Graph 14: Weighted Average Creditors-Debt Ratio
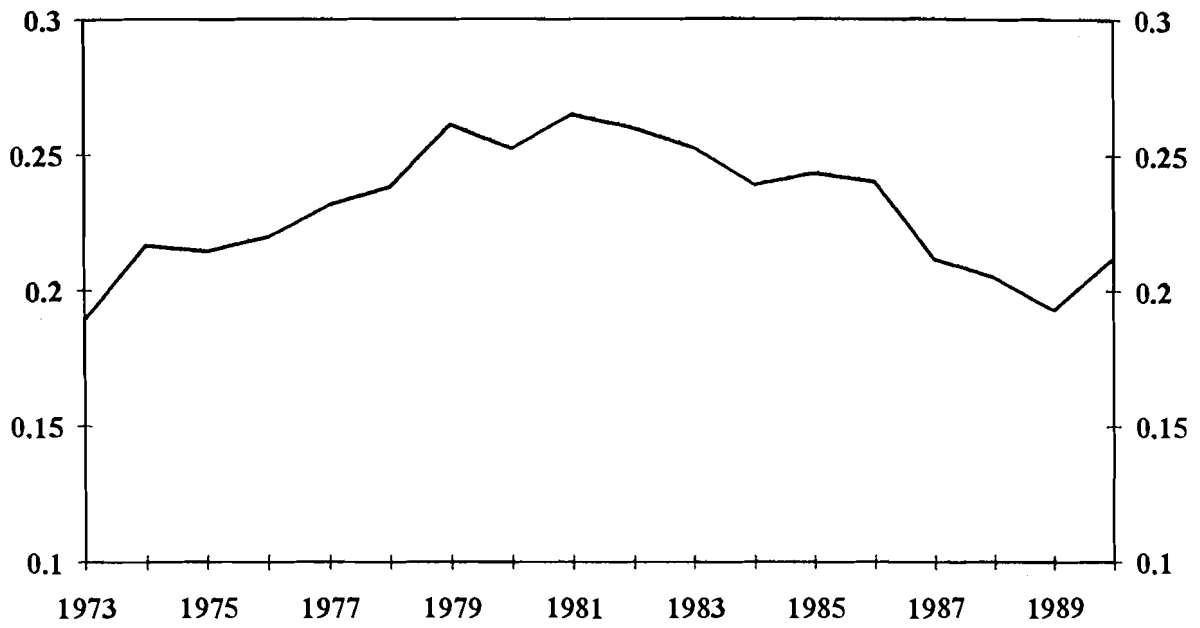
Graph 15: Creditors-Debt Ratio Percentiles
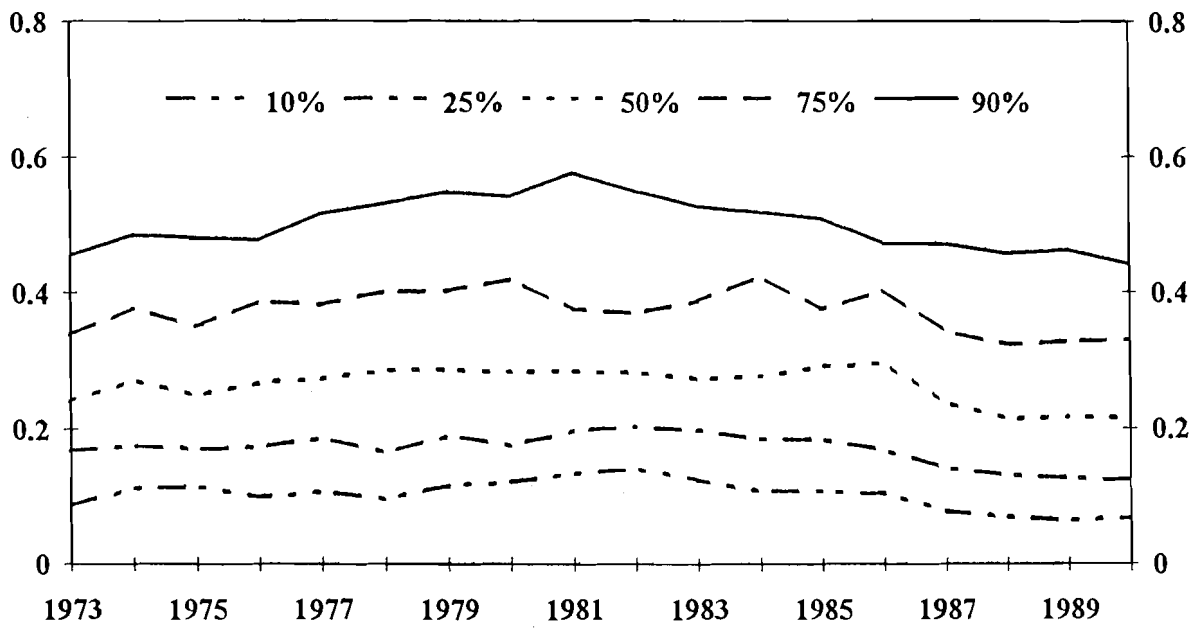
Much of this pattern in the ratio of creditors to total debt can be explained in terms of financial regulation. Up until the early 1980s, controls over the interest rates charged by banks were a principal tool of monetary policy. These controls had the effect of limiting the growth in financial intermediation. The slow growth in intermediated credit before the 1980s can be seen in Graph 16 which shows the ratio of the combined assets of all Australian financial institutions (excluding the Reserve Bank of Australia) over nominal GDP. This ratio actually fell between 1973 and 1977, only reaching its 1973 level again in 1983. With the limited growth of intermediation it is not surprising that trade credit became increasingly important over the 1970s and then declined in importance as financial markets were liberalised in the 1980s.

Graph 15 shows that the importance of trade credit varies significantly across firms. In 1990, the 10th percentile was 7 percent while the 90th percentile was 44 percent. A large amount of this variation is accounted for by industry-specific factors. For example, trade credit is relatively unimportant for mining firms and relatively important for retail firms. This issue is discussed further in the following section.

Graph 16: Assets of Financial Institutions Over GDP
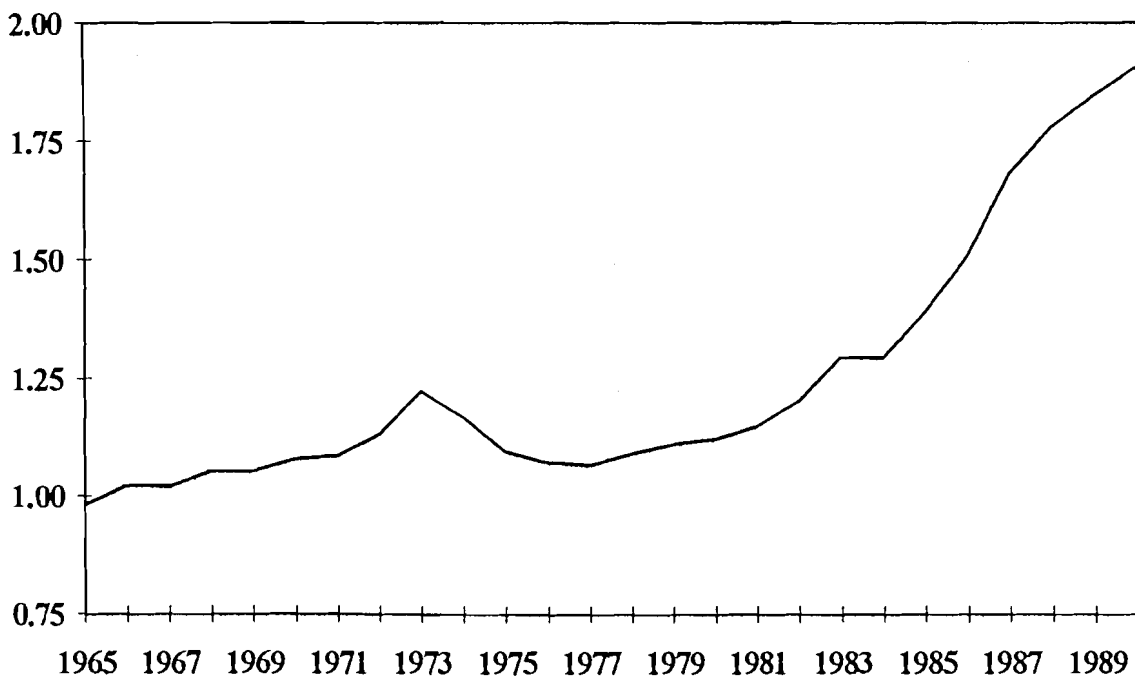
4. THE RELATIONSHIP BETWEEN FINANCIAL STRUCTURE AND THE CYCLICALITY OF OUTPUT AND EARNINGS

The results in Section 3 indicate that the majority of firms significantly altered their financial structure during the 1980s. In this section, we explore the issue of whether changes in financial structure were concentrated in particular industries. This section also discusses the relationship between the evolution of various ratios and the volatility/cyclicality of industry output and earnings. Detailed examination of the relationship between leverage and firm characteristics is undertaken in Lowe, Morling and Shuetrim (1993).

Given expected returns, the risk that a firm is unable to meet its obligations out of current earnings increases with the extent of its leverage and with the volatility of its cash flows. As a result, extremely risk averse firms are likely to have lower leverage, as are firms with highly volatile or cyclically sensitive earnings. If shocks to individual firms are idiosyncratic (that is, if the shocks are uncorrelated across firms) then a widespread increase in leverage, similar to that which took place in the 1980s, is unlikely to have important implications for the growth path of the macro-economy. However, in many cases, major shocks are highly correlated across firms. For example, unexpectedly tight monetary policy is likely to cause a slowdown in economic activity and this slowdown is likely to reduce profits for a wide cross-section of firms. If, as a result of the slowdown, firms wish to increase their interest cover and reduce their leverage, a period of low aggregate investment might ensue as firms become less able to undertake additional debt financed investment. This would imply that firms are foregoing investment projects with positive net present values. The problem is potentially more severe if the increase in leverage is predominantly concentrated in firms with volatile or cyclically sensitive earnings. On the other hand, firms whose profits are relatively insensitive to the business cycle are less likely to require balance sheet reconstruction following an adverse macro-economic shock.

There is a growing literature on the links between the financial structure of firms and the evolution of the macro-economy. This literature is discussed in some detail in Lowe and Rohling (1993). They identify three key transmission mechanisms through which the state of corporate balance sheets can affect the evolution of the business cycle. The first is that emphasised by Bernanke and Gertler (1990). As a firm's leverage increases and the probability of insolvency rises, financial

intermediaries become less willing to lend to the firm, even if it proposes a project with a positive net present value. Second, if corporate insolvencies get translated into the balance sheets of financial institutions, the equity of those financial institutions is reduced. The reduction in equity may result in the financial institutions becoming less able to undertake risky lending. Some form of lending institution induced credit squeeze may result. Third, and perhaps most importantly, the incentives of managers are a function of the financial structure of the firm. The higher probability of financial failure may reduce the incentives for risk-averse management, with firm-specific capital, to undertake further ex-ante profitable, but risky, investment.

Recent research has examined the link between changes in leverage and earnings volatility. Seth ((1990) and (1991)) calculated correlations between the degree of cyclicality in industry earnings and both the extent of industry leverage, and its rate of change, for a range of countries including Australia. His results suggest that, in the United States, increases in leverage have been concentrated in those industries with cyclically sensitive earnings. No such result was found for Australia; the average annual correlation between cyclicality and leverage being less than 0.1 over the sample period. Seth found a similarly small average annual correlation between cyclicality and the **growth rate** of leverage in Australia. Seth also analysed the relationship between earnings cyclicality and both the level and growth rate of interest cover. He concluded, again on the basis of annual average correlation coefficients, that there was no evidence that cyclically sensitive sectors in Australia had either lower levels of interest cover or more rapid declines in interest cover.

The conclusions reached by Seth require some qualification. His results are based on correlations between the average leverage of firms in each of the 10 industry groupings and the degree of cyclicality of each industry's earnings. Separate correlations coefficients between industry leverage and industry cyclicality are calculated for each of 10 years and the correlations are then averaged. For the Australian firms, the correlation between leverage and cyclicality vary considerably over time; in 1983, the correlation was -0.81 while in 1987 it was 0.39. While the correlations are generally positive, indicating that industries with cyclical earnings had higher leverage, the average correlation is essentially zero. To a large extent this reflects the high negative correlation in 1983.

Lee (1990) also considered the relationship between leverage and cyclicality but concentrated his study on the United States. Again, Lee classified industries into cyclical and non-cyclical groups based upon the correlation, within each industry, between firm cash flow and the business cycle. Median debt-asset ratios indicated that the leverage of firms in cyclical industries was marginally lower than that of firms in the more stable industries. Further, he found that the pattern was similar in 1978 and in 1987 and that the relative debt-asset ratio rankings of industries within their cyclicality groupings were fairly stable over the time period studied.

To explore the Australian experience more deeply, we compare various measures of industry cyclicality and industry volatility to weighted average and median industry financial ratios. We begin by classifying the firms in our database into industry groups. The choice of industries is restricted to the intersection of industry classifications in our database and those in the National Accounts data. These are the manufacturing, mining, wholesale trade, retail trade and service sectors. Most firms are classified into one of these five industry groupings. Given that many firms are highly diversified, the classifications are far from perfect. Of the 110 firms, five were excluded from the analysis as we felt that they could not sensibly be put into any category. The classifications are given in Appendix 1.

Having classified each firm into one of the five industry groups, we then examine the degree of volatility and cyclicality of industry earnings and output. Industry output is derived from the National Accounts data and average earnings is based upon each individual firm's financial statements. Finally, we examine the relationship between changes in leverage, interest cover and the ratio of trade creditors to debt for each of the industry groups and the volatility/cyclicality of the industries' earnings/output.

Various methods are used to construct measures of cyclicality and volatility. The simplest measure of volatility is the standard deviation of the growth rate of industry output. This is calculated using the percentage change in quarterly industry GDP measured at 1984/85 prices. These standard deviations are shown in the first column of Table 1. Table 1 also contains the coefficient of variation (the standard deviation divided by the mean). Higher volatility of industry output does not necessarily imply a greater riskiness if the average growth rates of firms in the industry are also higher. The coefficient of variation attempts to control for the different rates of growth experienced in various industries between 1973 and 1990.

Both the standard deviation and the coefficient of variation are measures of the volatility of industry output. It is also interesting to examine the extent to which industry output and profitability vary with the business cycle. The first method used to obtain a measure of industry cyclicality involves regressing the quarterly percentage change in real industry GDP on a constant and the quarterly percentage change in total GDP[11].

$$GDP_{industry} = \alpha + \beta GDP_{total} + \varepsilon \qquad (5)$$

If changes in total GDP are uncorrelated with changes in industry GDP, the coefficient on total GDP (β) will be zero. Typically, those industries with coefficients greater than one are said to be cyclically sensitive while those with coefficients less than one are said not to be cyclically sensitive. This distinction is somewhat arbitrary in that it is made relative to the normal level of cyclicality defined by the percentage changes in total GDP.

A second measure of cyclicality can be obtained by calculating the correlation coefficients (ρ) between changes in industry output and changes in GDP. These correlation coefficients equal β multiplied by the ratio of the standard deviation of the total GDP growth rate over the standard deviation of the industry output growth rate. Both the estimates of β and ρ are presented in Table 2 along with their standard errors.

A similar method is used to gauge earnings cyclicality. This measure is estimated by regressing the industry rate of return on a constant and the gap between actual output and potential output.

$$\frac{\pi}{A}_{industry} = \alpha + \gamma GAP_{total} + \varepsilon \qquad (6)$$

---

[11] Both the industry aggregate and total aggregate measures of GDP are seasonally adjusted series measured at constant prices from the Australian National Accounts, catalogues 5206.0 and 5222.0.

The industry rate of return is based upon an individual firm's financial statements[12]. Potential output is estimated using a Hodrick-Prescott (1980) filter which generates a non-linear trend from the actual GDP series[13]. The Hodrick-Prescott filter minimises a function of the sum of squared deviations of the trend value from the logarithm of actual GDP and a penalised sum of the squared changes in trend in each quarter. Again, the size of the coefficient on the GAP variable is an indication of the cyclicality of an industry's average rate of return. Industries whose rates of return on assets vary substantially with the business cycle should generate higher estimates of γ than should industries whose profitability is largely independent of the business cycle. The estimated coefficients are reported in the third column of Table 2 along with their standard errors[14].

The results in Table 1 show that the standard deviation of the growth rate of the output of the mining industry is considerably higher than the standard deviation for the other sectors. On the basis of the standard deviation measure of volatility, wholesale and manufacturing are the next two most volatile sectors, followed by the retail sector and finally, the service sector. Using the coefficient of variation measure, manufacturing has the highest measure of volatility with a coefficient of 10.6 followed by wholesale trade with a coefficient of 7.2 and mining with 4.2. Retail trade and service are considerably more stable with coefficients of 3.0 and 1.6 respectively. It should be noted that the relative ranking of the mining industry alters between measures. During the period from 1973 to 1990, the output of the mining industry grew much more rapidly than that of the manufacturing and

---

[12] A weighted average measure of firms' rates of return was used for each industry. This was calculated as the sum of net profits across the firms in an industry divided by the sum of total assets across the same group of firms.

[13] The Hodrick-Prescott procedure was run with the non-linearity penalty parameter (λ) set at 1600, the value favoured by Kydland and Prescott (1990). The original data series is quarterly real GDP with 1987 as the base year and runs from March 1964 to December 1991. To generate annual observations, a weighted average of the observed quarterly gaps over eight quarters is used. The eight quarters capture all possible observations relating to the financial statements in one year and the weights reflect the fraction of financial statements reported in each quarter.

[14] Note that the standard errors of the estimated γ coefficients are not directly comparable between industry equations in this table. This reflects the fact that, when averaging the data over an increasing number of firms, that part of the variance caused by variability in firm specific factors becomes increasingly small. Those industries with a large number of firms would, thus, be expected to exhibit a smaller total error variance.

wholesale sectors. As a result, the coefficient of variation of the growth rate of the mining sector is less than that of the manufacturing and wholesale sectors.

Given our definition of a cyclical industry, the measure of cyclicality obtained from estimating equation (5) shows that the mining, manufacturing and wholesale sectors are cyclical while the retail and service sectors are relatively insensitive to the business cycle. The retail industry appears to exhibit the least degree of cyclicality, followed by the service industry, both of which have coefficients significantly less than one. Manufacturing and wholesale trade, on the other hand, are clearly cyclical with coefficients significantly greater than one. The coefficient on mining is also greater than one but not significantly so[15]. The correlation coefficients show broadly similar rankings except that the mining sector appears much less cyclical than the results in column one of Table 2 suggest. This reflects the relatively large standard deviation of the growth rate of the mining sector.

The regressions of industry return on the output gap yielded relatively imprecise estimates of the degree of cyclicality. Of the five parameters estimated, only the coefficients in the equation for the manufacturing and retail sectors are significantly different from zero at the 5 percent level of significance. The service industry coefficient is actually negative unlike those of the other industries. However, the insignificance of the service industry coefficient prevents any special interpretation of the result.

The above results suggest the following conclusions. Both the retail and the service sectors have output that is relatively stable and both sectors are relatively insulated from the business cycle. In contrast, output of the manufacturing and wholesale sectors is relatively volatile and influenced more heavily by the business cycle. The mining sector has the most volatile output but the volatility in its output is less directly associated with the business cycle than is the case for the manufacturing or wholesale industries.

---

[15] All significance tests are done at the five percent level using a one tailed test.

Table 1: Industry Measures Of Volatility

Industry	Standard Deviation of Output Growth Rate	Coefficient of Variation of Output Growth Rate
Mining	5.03	4.21
Manufacturing	2.52	10.61
Wholesale	2.61	7.16
Retail	1.91	2.96
Service	1.55	1.61
Total	1.11	1.62

Table 2: Industry Measures Of Cyclicality

Industry	(β)	(ρ)	(γ)
Mining	1.24	0.27	1.01
	(0.35)	(0.12)	(0.69)
Manufacturing	1.66	0.72	0.64
	(0.21)	(0.08)	(0.19)
Wholesale	1.63	0.68	0.20
	(0.15)	(0.09)	(0.28)
Retail	0.36	0.21	0.55
	(0.23)	(0.12)	(0.26)
Service	0.64	0.45	-0.08
	(0.15)	(0.11)	(0.29)

1. Quarterly growth rates have been used in both Tables 1 and 2.

2. Numbers given in parentheses are standard errors. They are estimated using the Newey-West procedure. Only one lag is used in the construction of the variance covariance matrix.

3. β: the coefficient on the percentage change in total GDP for each industry. (See Equation 5)

4. ρ: the correlation coefficient between the percentage change in total GDP and the percentage change in GDP for each industry.

5. γ: the coefficient on the GDP gap variable explaining the industry rates of return on total assets. (See Equation 6)

Table 3: Weighted Average Industry Debt-Asset Ratios

Industry	1973	1975	1980	1983	1985	1987	1990
Mining	0.59	0.59	0.45	0.54	0.63	0.61	0.51
Manufacturing	0.46	0.48	0.49	0.52	0.55	0.60	0.61
Wholesale	0.67	0.64	0.69	0.68	0.65	0.66	0.70
Retail	0.50	0.56	0.62	0.59	0.61	0.61	0.60
Service	0.65	0.64	0.64	0.63	0.67	0.70	0.67

Table 4: Median Industry Debt-Asset Ratios

Industry	1973	1975	1980	1983	1985	1987	1990
Mining	0.36	0.51	0.41	0.44	0.49	0.54	0.55
Manufacturing	0.46	0.49	0.50	0.52	0.55	0.57	0.58
Wholesale	0.55	0.55	0.68	0.68	0.65	0.68	0.65
Retail	0.50	0.52	0.55	0.53	0.52	0.57	0.56
Service	0.56	0.53	0.55	0.50	0.55	0.57	0.61

Table 5: Weighted Average Industry Interest Cover Ratios

Industry	1973	1975	1980	1983	1985	1987	1990
Mining	6.21	8.89	11.84	3.95	2.94	4.16	6.27
Manufacturing	8.92	7.20	6.92	3.95	4.99	4.28	3.58
Wholesale	2.30	2.19	2.31	1.84	2.27	2.20	1.58
Retail	10.89	5.31	11.40	6.49	4.84	3.39	3.45
Service	6.60	5.11	5.82	3.91	3.83	3.56	2.92

Table 6: Median Industry Interest Cover Ratios

Industry	1973	1975	1980	1983	1985	1987	1990
Mining	5.17	6.02	12.38	5.36	3.77	5.57	6.13
Manufacturing	9.92	5.39	7.67	4.33	5.01	4.88	3.98
Wholesale	2.31	2.41	1.79	1.86	1.74	1.30	1.24
Retail	7.86	4.16	7.72	3.49	5.21	4.12	4.00
Service	9.55	7.29	7.04	3.83	4.39	3.40	3.61

Table 7: Weighted Average Industry Creditors To Debt Ratios

Industry	1973	1975	1980	1983	1985	1987	1990
Mining	0.09	0.13	0.18	0.20	0.14	0.11	0.09
Manufacturing	0.21	0.23	0.26	0.25	0.27	0.23	0.22
Wholesale	0.17	0.17	0.20	0.25	0.26	0.29	0.25
Retail	0.40	0.44	0.46	0.43	0.40	0.32	0.29
Service	0.26	0.28	0.32	0.29	0.28	0.24	0.25

Table 8: Median Industry Creditors To Debt Ratios

Industry	1973	1975	1980	1983	1985	1987	1990
Mining	0.09	0.13	0.13	0.16	0.14	0.13	0.10
Manufacturing	0.26	0.26	0.31	0.30	0.31	0.27	0.24
Wholesale	0.17	0.16	0.15	0.18	0.23	0.24	0.18
Retail	0.40	0.47	0.36	0.45	0.33	0.21	0.27
Service	0.24	0.26	0.30	0.29	0.27	0.23	0.25

The ranking of the five industry groups can be compared to the industry debt-asset, interest cover and creditors to debt ratios to determine whether the firms in the more cyclical and the more volatile industries have lower leverage and have exhibited more restraint in their debt expansion. The dividend pay-out ratio was also considered but no substantial industry specific effects were detected. To allow an examination of the relationship between cyclicality/volatility and the levels and changes in the various ratios over time, the weighted averages and medians, by ratio, for each of the five industries are presented in Tables 3 through 8.

Of the relatively volatile industries, manufacturing is clearly the one that has made the most significant changes to its financial structure over the 1980s. The results in Table 3 show that the weighted average debt-asset ratio for manufacturing increased from 0.46 in 1973 to 0.61 in 1990. The median debt-asset ratio for manufacturing in Table 4 shows a similar rise.

Associated with the increase in leverage of manufacturing was a pronounced decline in interest cover. The weighted average interest cover (Table 5) fell from 8.9 in 1973 to 3.6 in 1990 while the median interest cover (Table 6) fell from 9.9 to 4.0 over the same period. Although most of the financial structure adjustment may have reflected a movement from a constrained position to an unconstrained position, the severity of the adjustment in the manufacturing sector suggests that some firms may have increased their leverage excessively.

The weighted average debt-asset ratio for mining actually fell between 1973 and 1990 after a brief increase in the mid 1980s. However, this fall is mainly associated with a single firm that had total assets greater than the sum of total assets across all other mining firms. Given the dominance of the single firm, the median debt-asset ratio may provide a more accurate picture of the industry as a whole. The median figures show considerable volatility, increasing significantly between 1973 and 1975 before falling in the early 1980s and then increasing again through the remainder of the decade. The low figure for 1980 (both the median and the weighted average) reflects the equity raisings associated with the increase in investment in the mining sector in the early 1980s.

As is the case for the debt-asset ratio, the interest cover ratio for the mining sector is volatile. Although it appears that interest cover in the mining sector has not experienced the same sustained decline as in other sectors, the mining boom in 1980

raised the median interest cover to 12.4. The 1982/83 recession, however, caused it to fall to a low of 5.36. By 1990 interest cover had recovered to be similar to the cover experienced during the first half of the 1970s.

The results in Tables 7 and 8 show that, of the five sectors examined, the mining sector has made the least use of trade credit. In 1990, such credit accounted for less than 10 percent of total debt in the mining industry. However, like the other industry groups, the reliance on trade credit did increase over the 1970s and then fell over the 1980s.

The results for the wholesale sector need to be interpreted with some caution. Although the wholesale firms faced the highest leverage and lowest interest cover during most of the sample period, it is difficult to compare these results with those of other industries because three of the six wholesale firms in our sample are subsidiaries of Japanese multinationals. The consolidated risk position of the parent company and its subsidiaries should be considered rather than the individual accounts of the subsidiary. Thus, the high leverage and low interest cover of the wholesale industry may not be representative of the subsidiaries' true financial security.

Traditionally, the retail sector has been more highly geared than the manufacturing sector. However, the increase in leverage in the manufacturing sector during the 1980s has meant that, more recently, the two industry groupings have been similarly geared. Over the sample period, the weighted average debt-asset ratio of firms in the retail sector increased from 0.50 to 0.60 while the weighted average interest cover ratio fell from 10.9 to 3.5. The results in Tables 7 and 8 also show that the retail firms have typically been heavy users of trade credit. In 1980, creditors accounted for 46 percent of the total debt of the retail firms. This share had fallen to 29 percent by 1990. The results also show that between 1980 and 1990, there was little change in the gearing of the retail industry. This may have reflected the changing composition of total debt away from trade creditors towards other forms of debt.

Table 3 shows that the weighted average debt-asset ratio for the service industry increased marginally from 0.64 to 0.67 over the period. A possible reason for the limited expansion of debt by the service sector is the fact that its leverage was already high in comparison to the other industries. Accompanying the relatively

minor debt expansion that occurred between 1973 and 1990 were significant declines in the weighted average and median interest cover ratios from 6.6 to 2.9 and from 9.6 to 3.6 respectively. The declines primarily reflect a substantial increase in the average interest rate paid. There was also a slight decline in the ratio of earnings to total assets.

Of the five industry groups considered in this section, developments in the manufacturing sector are of potential concern. The evidence suggests that the increases in leverage and the decline in interest cover were very pronounced for the manufacturing sector. The manufacturing sector also appears to have the most cyclically-sensitive output[16]. A significant increase in leverage within a cyclically-sensitive sector is exactly the situation in which increasing average leverage is likely to affect the evolution of the macro-economy. An adverse shock to demand places the highly geared firms under considerable financial distress. This distress may well lead to a period of relatively low investment as companies attempt to retain earnings in an effort to improve their financial structure. The likely consequence is a slower recovery from an adverse macro-economic shock. This is not to say that high debt is the only factor that can slow investment recovery. Most notably, excess capacity and slack demand, by reducing the number of investment projects with positive net present value, will also reduce the level of corporate investment.

5. SUMMARY AND CONCLUSIONS

The financial liberalisation of the 1980s eliminated the need for disequilibrium credit rationing in Australian financial markets. This permitted a wide range of firms to enjoy greater access to borrowed funds intermediated by the finance sector. In the newly liberalised and competitive financial markets, lending institutions competed aggressively for market share. This drive for market share was reflected in an enthusiasm to lend and a relaxation of credit control standards. The result was a rapid increase in aggregate credit extended by financial institutions. During the

---

[16] The internationalisation of the Australian manufacturing sector may well have made the industry, as a whole, less sensitive to the Australian business cycle in recent years. In this case, the measured cyclicality of the manufacturing sector may overstate the actual degree of cyclicality in recent years.

period from 1983 to 1990, credit increased at an average rate of 18 percent per annum[17]. This rapid growth in credit was reflected in corporate balance sheets. During the 1980s the real size of corporate balance sheets increased at a considerably faster pace than in the 1970s and the proportion of total assets financed by debt increased markedly.

The results reported in Section 3 of this paper indicate that, through the 1970s, total debt accounted for an average of just over of 50 percent of total assets of the firms in our sample. By 1990, this share had increased to around 66 percent. The results also suggest that the increase in leverage was characteristic of a wide range of firms rather than being confined to a small number of firms. After 1987, while most firms reduced their leverage, average gearing continued to rise. This reflected the fact that, in the late 1980s, a number of firms that were already highly leveraged, further increased their debt-asset ratios.

Associated with the increased gearing of the 1980s was a significant decline in interest cover. During the 1982/83 recession, interest cover fell in line with the reduction in firm profits and the rise in interest rates. As the economy recovered from the recession, firms began to finance asset expansion primarily through debt. Thus, even though earnings increased and interest rates initially fell, interest cover did not return to the levels of the 1970s.

The paper also suggests that the constraints on the financial system, which were in place in the 1970s, led to firms becoming increasingly dependent upon trade credit as a source of finance. The liberalisation of financial markets over the 1980s has reduced the importance of this type of credit. However, given the lower transaction costs and the information advantage that suppliers of trade credit often hold over financial institutions, trade credit should remain an important funding source for many firms.

Section 4 of the paper indicated that the increase in leverage that occurred in the 1980s was characteristic of a range of different industry groups. The increase was relatively large in the manufacturing sector. Manufacturing is also the sector with the most cyclically sensitive output. The combination of cyclically-sensitive output

---

[17] Based upon Table 3.2 in Occasional Paper No. 8 published by the Reserve Bank of Australia.

and significant increases in leverage (and declines in interest cover) increased the probability that firms would be unable to meet current obligations out of current earnings following an adverse macro-economic shock. In a world characterised by full information and appropriate financial contracts, this would not necessarily imply an increased probability of financial distress or firm failure. However, we do not live in such a world. The increased probability of financial distress occasioned by higher leverage and an adverse shock to demand, is likely to have changed the incentives for management to undertake risky investment and for financial intermediaries to finance such investment. In turn, these changes are likely to have altered the evolution of the business cycle. This is a topic for further research.

APPENDIX 1: DATA

The database used in this study consists of 224 firms. There are both listed and unlisted firms in the sample; however, no financial institutions have been included because of their different balance sheet structures. Of the 114 firms that do not have complete data series, 22 firms do not have data until in 1973 and 104 firms ceased to have data available prior to 1990. The firms that left the sample prior to 1990 did so for a variety of reasons. Some were taken over or merged with other companies thereby losing their identity in the parent company. These firms continued operating but did not generate separate financial statements and thus had to be excluded. Others left the sample because of financial distress. A full listing of the companies in the database is given below. Those with an asterisk do not have complete data for the entire sample period.

Conglomerates

Adelaide Steamship Co Ltd
Australian Consolidated Investments
Bond Corporation Holdings Ltd
Foster's Brewing Group Ltd

Industrial Equity Ltd*
Parry Corporation Ltd*
WR Carpenter Holdings Pty Ltd*

Mining

Aberfoyle Ltd
Ampolex Ltd
Ashton Mining Ltd*
Austen & Butta Ltd*
Australian Oil & Gas Corporation Ltd*
Bridge Oil Ltd*
Clutha Ltd
Coal & Allied Industries Ltd*
Consolidated Rutile Ltd
CRA Ltd
Crusader Ltd
ERA*
Genoa Resources & Investment Ltd*
Gove Aluminium Ltd
Griffin Coal Mining Co Pty Ltd*
Hartogen Energy Ltd*
MIM Holdings Ltd
Newcrest Mining Ltd*
North Broken Hill Peko Ltd
Oakbridge Ltd*

Offshore Oil N L
Pancontinental Mining Ltd
Peko Wallsend Ltd*
Pilbara Iron Ltd
Placer Pacific Ltd*
Queensland Mines Ltd*
Renison Goldfields Consolidated Ltd
Santos Ltd
Shell Development (Australia) Ltd*
Swiss Aluminium Australia Ltd*
The Moonie Oil Co Ltd*
Thiess Bros Pty Ltd
Thiess Dampier Mitsui Coal Pty Ltd*
Ulan Coal Mines Ltd*
Utah Mining Australia Ltd*
Vamgas Ltd
Western Mining Corporation Holdings Ltd
White Industries Australia Ltd*
Woodside Petroleum Ltd

Manufacturing

ACI International Ltd*
Adelaide Brighton Cement Holdings Ltd
Advertiser Newspapers Ltd*
Alcan Australia Ltd
Alcoa of Australia Ltd
Altona Petrochemical Co Ltd*
Amcor Ltd
AMI Toyota Ltd*
Arnotts Ltd
Associated Pulp & Paper Mills*
Australian Chemical Holdings Ltd
Australian National Industries Ltd
Australian Newsprint Mills Ltd*
AWA Ltd
Beatrice Australia Ltd*
Blue Circle Southern Cement Ltd*
Bonds Industries Ltd*
Boral Ltd
Borg Warner (Australia) Ltd*
Bowater Corporation of Australia Ltd*
Bowater Industries Australia Ltd*
BP Australia Ltd
Brick & Pipe Industries Ltd*
Brickworks Ltd
Bridgestone Australia Ltd
BTR Nylex Ltd
Bundaberg Sugar Co Ltd
Bunnings Ltd
Bushells Holdings Ltd*
Cadbury Schweppes Australia Ltd*
Caltex Australia Ltd
Carlton & United Breweries Ltd*
Castlemaine Tooheys Ltd*
Caterpillar of Australia Ltd*
Chamberlain Holdings Ltd*
Cheetham Salt Ltd*
Ciba-Geigy Australia Ltd
Clyde Industries Ltd
Coca-Cola Amatil Ltd
Comalco Ltd
Commonwealth Industrial Gases Ltd*
Consolidated Press Holdings Ltd Group*
CSBP & Farmers Ltd*
CSR Ltd
Dow Chemical (Aust) Ltd

Dupont Australia Ltd*
EFFEM Foods Pty Ltd*
Email Ltd
EPT Group Holdings Ltd*
Ericsson Australia*
Esso Australia Ltd
F H Faulding & Co Ltd
Ford Motor Company of Australia Ltd
G E Crane Holdings Ltd
GEC Australia Ltd
General Motors-Holden's Automotive Ltd*
George Weston Foods Ltd
Gibson Chemical Industries Ltd
Goodman Fielder Wattie Ltd
Goodyear Australia Ltd*
Hawker de Havilland Ltd
Hills Industries Ltd
HJ Heinz Co Aust Ltd
Hoechst Australia Ltd*
Humes Ltd*
Hunter Douglas Australia Ltd
ICI Australia Ltd
J Gadsden Australia Ltd*
James Hardie Industries Ltd
JI Case (Australia) Pty Ltd*
John Fairfax Group Pty Ltd*
Johnson & Johnson Australia Pty Ltd*
JRA Ltd*
Kellogg (Aust) Pty Ltd*
Kimberly Clark Australia Pty Ltd
Kodak (Australasia) Pty Ltd*
Kraft Foods Ltd*
McPherson's Ltd
Metal Manufactures Ltd
Mitsubishi Motors Australia Ltd
Mobil Oil Australia Ltd
Monier PGH Ltd*
Monsanto Australia Ltd*
National Can Industries Ltd*
National Consolidated Ltd
NEC Australia Pty Ltd*
Nestle Australia Ltd
Nicholas Kiwi Ltd*
Nissan Motor Manufacturing Co (Aust) Ltd
Nucleus Ltd*

Nylex Corporation Ltd*
OPSM Pty Ltd
Pacific Dunlop Ltd
Petersville Sleigh Ltd*
Phillip Morris (Australia) Ltd*
Phillips Industries Holdings Ltd*
Pilkington (Australia) Ltd
Pioneer International Ltd
Pioneer Sugar Mills Ltd*
Queensland Alumina Ltd*
Queensland Cement Ltd*
Queensland Press Ltd*
QUF Industries Ltd
Reckitt & Coleman Australia Ltd*
Repco*
Rothmans Holdings Ltd
SA Brewing Holdings Ltd
Shell Australia Ltd

Siemens Ltd*
Softwood Holdings Ltd*
Sperry Ltd*
Standard Telephones & Cables Pty Ltd*
Textron Pacific Ltd*
The Broken Hill Proprietary Co Ltd
The Herald & Weekly Times Ltd*
The News Corporation Ltd
Thorn EMI (Australia) Ltd*
Tooth & Co Ltd
Toyota Motor Corporation Australia Ltd
Tubemakers of Australia Ltd
Unilever Australia Ltd*
Union Carbide Australia & New Zealand
    Ltd*
Wattyl Ltd
Wormald Australia Pty Ltd

Retail

Brash Holdings Ltd
Coles Myer Ltd
David Jones Ltd
Fujitsu Australia Ltd
Hastings Deering Corporation Ltd
IBM Australia Ltd
John Martin Retailers Ltd*

LNC Industries Pty Ltd*
Nissan Motor Co (Aust) Pty Ltd
The Myer Emporium Ltd*
Waltons Bond Ltd*
Wang Australia Pty Ltd*
Woolworths Ltd*

Service

Ansett Transport Industries (Operations)
    Pty Ltd
Austmark International Ltd*
Brambles Industries Ltd
Costain Australia Ltd*
Eastwest Airlines Ltd*
ENT Ltd
Entrad Corporation Ltd*
Howard Smith Ltd
Hoyts Entertainment Ltd
Jennings Group Ltd
John Holland Group Pty Ltd*
Kern Corporation Ltd
L J Hooker Australia Ltd*

Latec Investments Ltd
Leighton Holdings Ltd
Lend Lease Corporation Ltd
Mayne Nickless Ltd
McIlwraith McEacharn Ltd
P & O Australia Ltd*
SAGASCO Holdings Ltd*
Spotless Group Ltd
TAL Holdings Ltd*
The Australian Gas Light Company
The Greater Union Organisation Pty Ltd*
TNT Ltd
Westfield Holdings Ltd*

Wholesale

Burns Philp & Company Ltd	Marubeni Australia Ltd
C Itoh & Co (Aust) Ltd	Mazda Australia Pty Ltd*
Charles Davis Ltd	Mercedes Benz (Australia) Pty Ltd*
Edwards Dunlop & Co Ltd*	Mitsui & Co (Australia) Ltd
Gordon and Gotch Ltd*	Southern Farmers Group Ltd*
Great Western Australia Ltd*	Toyota Motor Sales Australia Ltd*
Honda Australia Pty Ltd*	Volvo Australia Pty Ltd*
Honeywell Holdings Pty Ltd*	Washington H Soul Pattinson & Co Ltd

Aggregate and industry Gross Domestic Product figures were taken from the Australian Bureau of Statistics publications catalogues 5206.0 and 5222.0 respectively. They run from the third quarter in 1974 through to the first quarter in 1992. Mining, manufacturing, wholesale and retail trade are taken directly from 5222.0 while service output is approximated by the aggregation of the transport and storage, the communication and the finance, property and business services industries.

Nominal total Gross Domestic Product and the Net Operating Surplus of corporate trading enterprises (including public trading enterprises) was obtained from catalogue 5204.0 published by the Australian Bureau of Statistics.

The total assets of private corporate trading enterprises in 1990 was obtained from the Australian Bureau of Statistics, catalogue 5232.0.

The Overdraft interest rate in Graph 7 was extracted Table F.3 in the Reserve Bank of Australia Bulletin series. It is the minimum of a range of indicator rates reported by major Australian banks.

The total assets of financial institutions, excluding the Reserve Bank of Australia, were obtained from Table 3.4A of Occasional Paper No. 8, published by the Reserve Bank in 1990.

APPENDIX 2: SAMPLE SELECTION BIAS

The graphs presented in the paper are based on a balanced data set of 110 firms. A balanced or constant sample of firms was chosen so that changes in the ratios were not induced by changes in the basket of firms being measured. However, using a balanced sample introduces a potential selection bias. Firms that fail are typically highly geared and have low interest cover. Thus, if firms leave the sample, due to failure, the average debt-asset ratio of the balanced sample of firms is likely to underestimate the actual debt-asset ratio of all firms that were operating at a particular point in time. Alternatively, firms may leave the sample by being taken-over by another company. Firms that are taken-over often have relatively low gearing. Thus, if take-overs represent the principal form of attrition, the constant sample of firms may overestimate the actual debt-asset ratio of all firms operating at a particular point in time.

This appendix examines the difference between the ratios obtained from the balanced sample of 110 firms and the ratios obtained from the larger but unbalanced sample. For this purpose the weighted averages from both the balanced and unbalanced samples are presented in Graphs A1 through A4. The unbalanced sample consists of up to 224 firms.

The qualitative conclusions from the unbalanced sample match those reported in this paper. The differences between the ratios generated by the two samples are insignificant relative to the changes in leverage that were occurring over the sample period. Given that the graphs generated from either sample yield the same qualitative conclusions, we are satisfied with reporting the results for the balanced sample only.
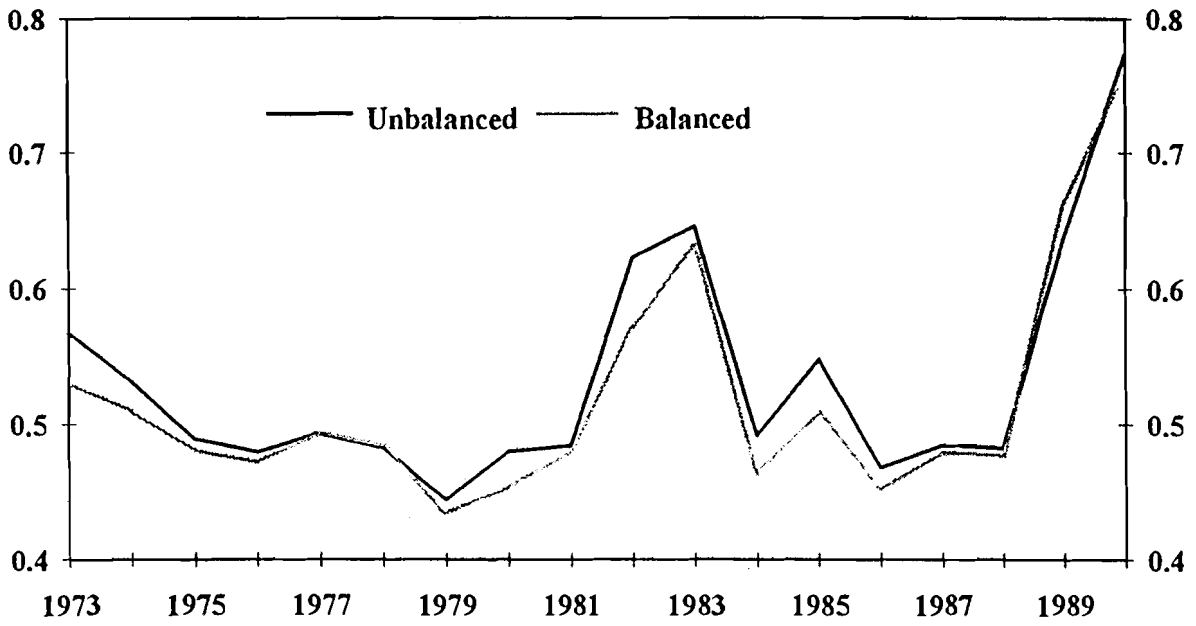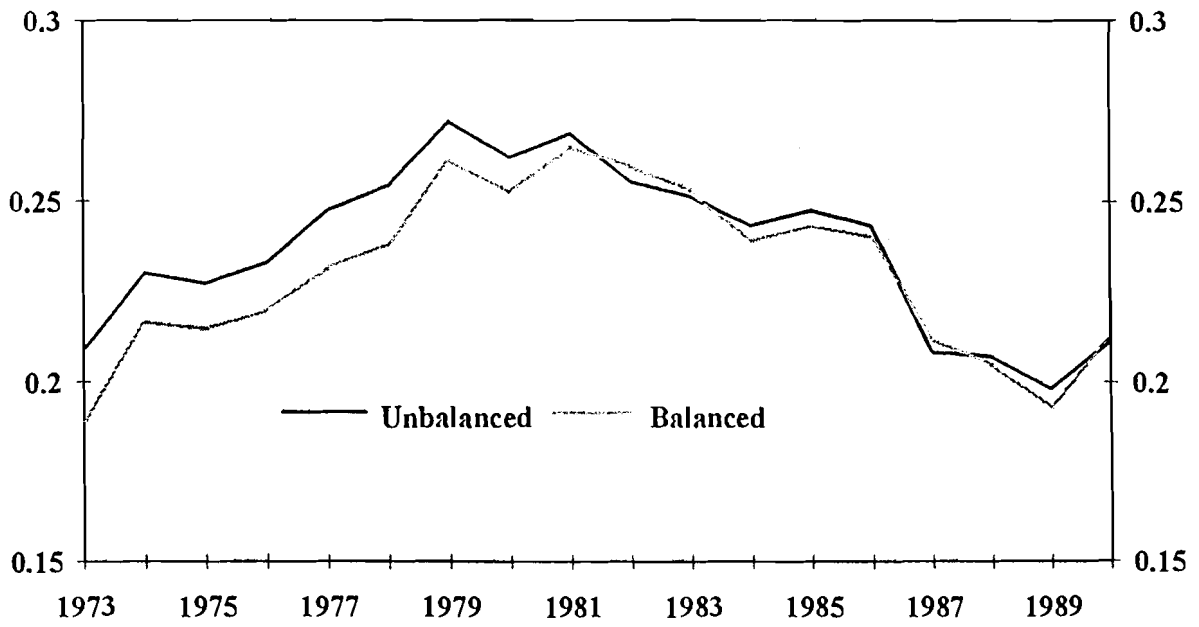
Graph A1: Debt-Asset Ratio: Sample Comparison
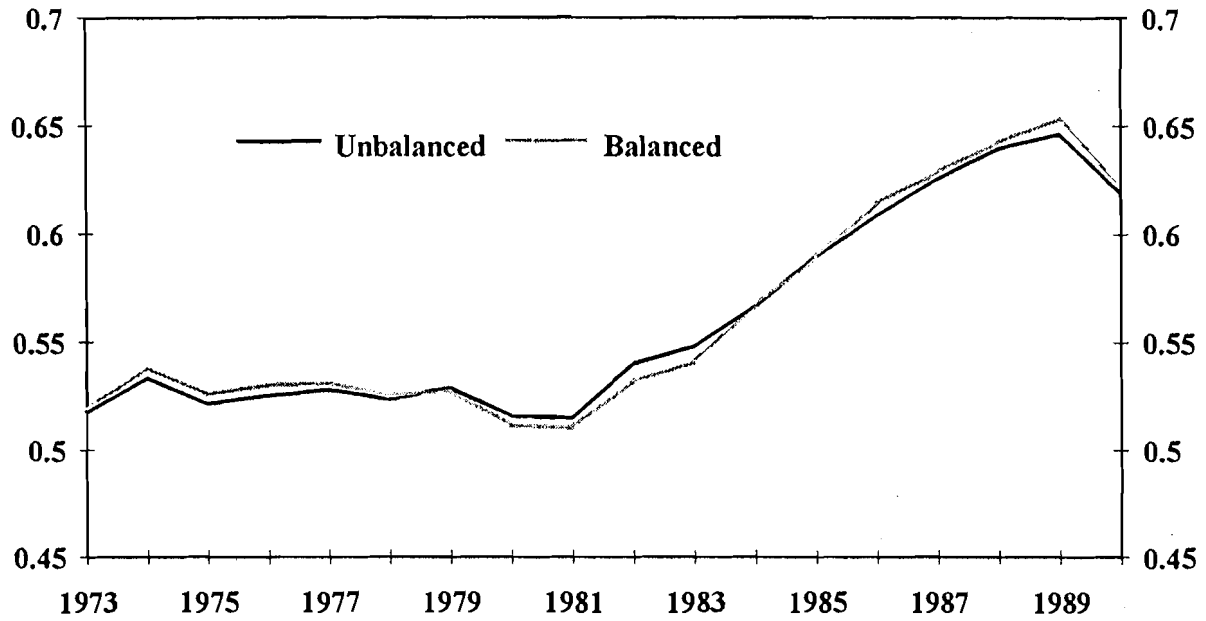
Graph A2: Interest Cover Ratio: Sample Comparison
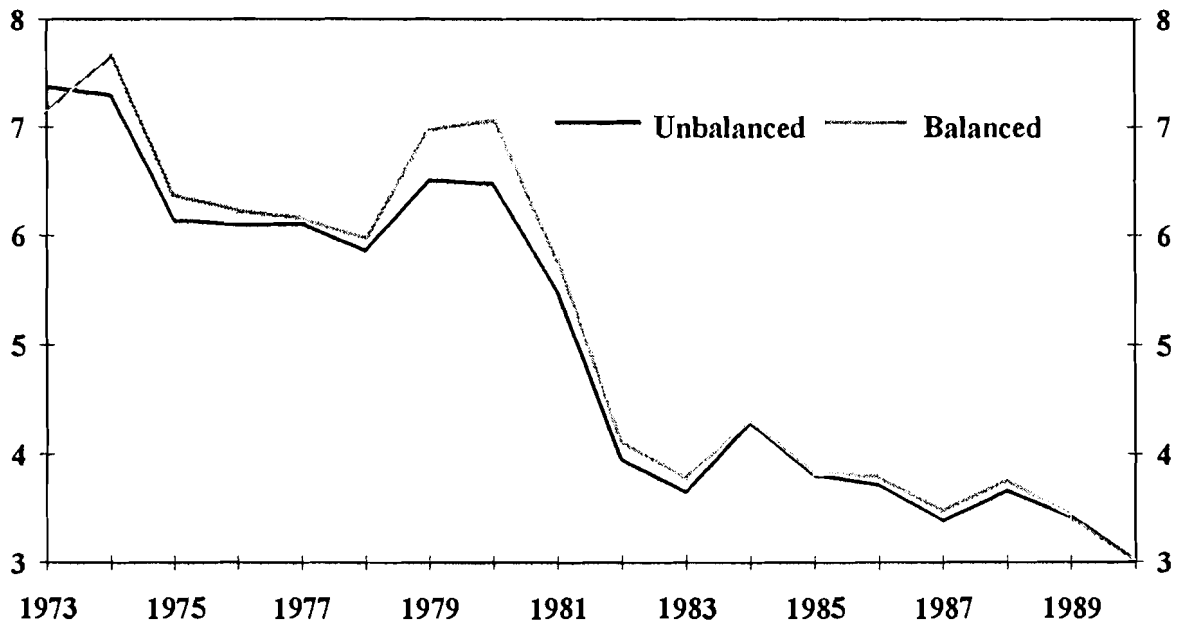
Graph A3: Dividend Pay-Out Ratio: Sample Comparison

Graph A4: Creditors-Debt Ratio: Sample Comparison

REFERENCES

Anderson, Ray H. and Albie Brooks (1991), "Current Research into Leveraged Buyouts", Proceedings of the 3rd Australian Institute of Bankers Banking and Finance Conference, Melbourne, 203-221.

Bernanke, Ben and Mark Gertler (1990), "Financial Fragility and Economic Performance", Quarterly Journal Of Economics, 105: 87-114.

Callen, Tim, Steven Morling and Jill Pleban (1992), "Dividends and Taxation: A Preliminary Investigation", Reserve Bank of Australia, Research Discussion Paper 9211.

Cantor, Richard (1990), "A Panel Study of the Effects of Leverage on Investment and Employment", Federal Reserve Bank of New York Research Paper, 9011.

Dempster, Peter, John Howe and Ed Lekawski (1990), "Trends in Corporate Debt", EPAC Council Paper, 41: 141-206.

Friedman, Milton and Anna Schwartz (1963), A Monetary History of the United States: 1867-1960, Princeton University Press.

Gertler, Mark (1988), "Financial Structure and Aggregate Economic Activity: An Overview", National Bureau of Economic Research Working Paper, 2559.

Hodrick, Robert and Edward Prescott (1980), "Postwar US Business Cycles: An Empirical Investigation", Carnegie Mellon University Discussion Paper, 451.

Kydland, Finn and Edward Prescott (1990), "Business Cycles: Real Facts and a Monetary Myth", Federal Reserve Bank of Minneapolis Quarterly Review, 14: 3-18.

Lee, William (1990), "Corporate Leverage and the Consequences of Macro Economic Instability", Federal Reserve Bank of New York Research Paper, 9012.

Lowe, Philip, Steve Morling and Geoffrey Shuetrim (1993), The Determinants of Corporate Financial Structure, Reserve Bank of Australia, mimeograph.

Lowe, Philip and Thomas Rohling (1993), Balance Sheets and the Business Cycle, *Reserve Bank of Australia*, mimeograph.

Macfarlane, Ian (1989), "Money, Credit and the Demand for Debt", *Reserve Bank of Australia Bulletin*, May, 21-31.

Macfarlane, Ian (1990), "Credit and Debt: Part II", *Reserve Bank of Australia Bulletin*, May, 27-34.

Modigliani, Franco and Merton Miller (1958), "The Cost of Capital, Corporate Finance and the Theory of Investment", *American Economic Review*, 48: 261-297.

Schwartz, Robert A. and David K. Whitcomb (1979), "The Trade Credit Decision", in "Handbook of Financial Economics", ed. James L. Bicksler, *North Holland, Amsterdam*.

Seth, Rama (1990), "Leverage and Cyclicality", *Federal Reserve Bank of San Francisco Working Paper*, 90-01.

Seth, Rama (1991), "Patterns of Corporate Leverage in Selected Industrialised Countries", *Federal Reserve Bank of New York Research Paper*, 9107.

State Bank of New South Wales/Chamber of Manufactures (1992), "Survey of Manufacturing Conditions and Future Prospects for NSW", June Quarter.

Stevens, Glenn (1991), "The Rise in Private Debt in the 1980s: Why Did it Happen, and Will it Continue in the 1990s", from The Surge In Australia's Private Debt: Causes, Consequences, *Outlook: Office of Economic Planning Advisory Council*, June, 43-63.