DISADVANTAGED CAPITAL ACCESS – IMPEDIMENTS TO SCOTLAND'S ECONOMIC GROWTH?

Jo Danbolt*, William P Rees*, and Mohamed Shamsher**

* University of Glasgow, ** Universiti Putra Malaysia

ABSTRACT

Scottish based firms appear to have under-performed those in the south east of England for many years. There are many possible reasons but the one we investigate here is the funding gap. If Scottish firms have difficulty raising funding they will forego opportunities which may have lead to economic growth and wealth creation. If the sources of debt used by non-Scottish firms is lower cost, or has tax advantages, Scottish firms may face a higher cost of capital than their English competitors.

We analyse the capital structure of UK companies over the period from 1981 to 1997. The firms in our sample include public and private limited companies and include small firms for which regional classifications are more meaningful than for larger ones. This focus on unquoted firms and regional attributes make this paper somewhat unusual within finance literature. Based on an a sample of 457,394 company-years, we find significant regional variations in capital structures, with companies in Scotland having significantly lower gearing ratios than companies located in London or the South of England. This is largely due to greater use of non-debt liabilities to fund assets outwith Scotland. This result persists even when we control for firm and industry characteristics.

It is not clear whether the funding gap is a function of the distance from London or the business culture of Scotland, but as similar disadvantages are to be found in Wales, Northern Ireland and northern England, we speculate that it is the former. It is also difficult to be sure that the funding gap is the cause of low gearing or if it matters. We are able to show that those companies with high gearing ratios experience higher growth than others, but the direction of causality is problematical. However, we can clearly demonstrate that modest debt rationing has the potential to have a big influence on economic performance.

Address for correspondence:

Professor William P Rees, Department of Accounting and Finance, University of Glasgow, 65-73 Southpark Avenue, Glasgow G12 8LE; E-mail: B.Rees@accfin.gla.ac.uk; Telephone: 0141 330 6313; Fax; 0141 330 4442.

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INTRODUCTION

Scottish based firms have tended to under-perform those of the south east of England for many years. The implications for the inhabitants of Scotland are severe in the lack of jobs and resources and in a perceived, although possibly overstated, dependence on central government support which sits ill after devolution. There are many possible reasons, but the one we investigate here is the funding gap. If Scottish firms have difficulty raising funds they will forego opportunities which may have lead to economic growth and wealth creation. If debt - the source of funds that is thought to be rationed - has tax advantages or is otherwise cheaper, Scottish firms may also face a higher cost of capital than their English competitors.

We analyse the capital structure of UK companies over the period from 1981 to 1997 – although there are few cases in the sample before 1988. The firms in our sample include a few public and many private limited companies and the sample is dominated by small firms for which regional classifications are more meaningful than for larger ones. This focus on unquoted firms and regional attributes make this paper somewhat unusual in the finance literature. Despite the work of various small firm research centres and a small number of research journals devoted to small and medium sized firms, we argue that finance research is dominated by analysis of publicly quoted companies. In our opinion, this is largely due to the ready availability of data rather than any intrinsic importance of the research questions. After all the larger part of economic activity takes place in unquoted firms: although it should be acknowledged that many of these are subsidiaries of quoted firms. In preparing a large data set including both quoted and unquoted firms, and in addressing research questions that are of importance to smaller firms, we intend to help redress the balance. It is also natural that the analysis of quoted firms, often multinationals or at least national in scope, diverts the researchers attention away from regional issues. Whilst understandable, we view regional issues as important and doubly so in a devolved economy.

Based on a sample of 457,394 company-years, we find significant regional variations in capital structures, with companies in Scotland having significantly lower gearing ratios than companies located in London or the South of England. This result persists even when we control for firm and industry characteristics. These industry effects are significant and we also find that size and profitability are inversely related to gearing, and that the nature of the debt (essentially long term versus short term) is related to asset structure. Whilst these relationships are largely as expected they do not explain the regional differences.

It is not clear whether the funding gap is a function of the distance from London or of the business culture of Scotland, but as similar disadvantages are to be found in Wales, Northern Ireland and northern England we speculate that it is the former. It is, however, a speculation that we are uneasy with. The implication is that access to debt providers based in London is important, but with cities the size of Glasgow and Edinburgh, both of which are substantial financial centres, and in an era of easy communications, this proposition seems almost untenable. It must remain possible that business practices or culture, or even cultural biases, are part of the explanation.

It is also difficult to be sure that the funding gap is the cause of low gearing or if this matters. We are able to show that those companies with high gearing ratios experience higher growth in subsequent years than do others and they also have somewhat larger improvements in profitability, but the direction of causality is problematical. However, we can clearly demonstrate that modest debt rationing has the potential to have a big influence on economic performance. A simple example illustrates the potential impact. If a typical Scottish firm has a cost of capital of 15 percent and a growth rate of 5 percent, and its London based competitor has the same growth rate but a 14 percent cost of capital the London firm may be valued 11 percent higher than the Scottish one. Is a one fifteenth improvement in the cost of capital viable? According to our results London based firms have 7 percent more of their assets funded by liabilities than do Scottish firms (see table 3), and this is largely represented by non-interest bearing liabilities. In other words, about one fifteenth of the London firm's assets are funded by free liabilities that are unavailable to (or unused by) Scottish firms.

The previous example of course takes no account of improved growth opportunities. If the London based firm is able to take on viable opportunities that the Scottish firm cannot fund, and thereby increase its growth to 6 percent, it will now be valued 25 percent higher than the Scottish firm. Is such a difference in growth feasible? Our estimate of the difference in growth of turnover is actually 2 percent per annum in favour of the London firms. Of course funding problems might not be the cause of this difference.

The proceeding speculation is not meant to be an estimate of the impact of capital structure differences, but simply a demonstration of the potential impact. This potential is clearly huge. It is worth emphasising that whilst the calculation is of firm value this is the capitalisation of future wealth creation. We would argue that the case for investigating regional differences in capital structure is made.

The paper continues with an analysis of previous research into capital structure; a presentation of the data and our research method; our results concerning regional differences in capital structure; a preliminary analysis of the impact of capital structure on growth; followed by our conclusions.

THE ANALYSIS OF CAPITAL STRUCTURE IN THE UK

Modigliani and Miller (MM) (1958) argue that – under conditions of perfect capital markets – the value of the firm is unaffected by its capital structure. Subsequent research has, however, suggested that MM's assumptions are unlikely to be valid, causing the capital structure choice to have an impact on company performance and value.

In this paper we extend our knowledge of the capital structure debate in 3 main areas. Firstly, we extend the analysis of the cross-sectional variation in the capital structure to a substantially larger sample than what has commonly been applied. Our sample consists of 457,394 firm-years, covering 65,800 companies over the period from 1981 to 1997. While the majority of previous studies of UK capital structure in the UK (e.g., Rajan and Zingales (1995) and Bevan and Danbolt (2001)) have tended to restrict their analyses to listed companies, our database covers predominately non-listed firms.

Secondly, we analyse the extent to which capital structures vary geographically, by classifying the companies according to the region of their incorporation. We find companies in Scotland, on average, to have significantly lower gearing ratios than companies based in the southern parts of England, with companies located in London tending to have the highest gearing ratios. Consistent with prior literature, we find gearing ratios to vary significantly with company characteristics, such as company size, the level of corporate profitability, the fixed asset ratio, and the industry to which the companies belong. However, differences in company characteristics do not appear to account for the regional differences in capital structure, which remain highly significant when industry and other firm effects are controlled for.

Thirdly, we analyse the extent to which the capital structure of the firm affects its future performance. In particular, we test whether future growth rates are affected by the capital structures of the firms. We find companies with high gearing ratios to have higher growth rates during the following year, suggesting that the low gearing ratios of Scottish firms may significantly hamper Scotland's economic growth. Further, we find companies with high gearing ratios to achieve somewhat larger increases in profitability than do less geared firms.

The focus of our analysis is on the presence and impact of regional variations in capital structure. However, previous studies of the capital structure decision, have established that a significant proportion of the cross-sectional variation in gearing ratios can be explained by the characteristics of the firms. In this study we control for four key determinants of capital structure identified in the prior literature. These are: tangibility, size, profitability and industry.

Tangibility

Tangibility, or the fixed asset ratio, is adopted as a proxy for collateral value. Collateral may help alleviate the risks of adverse selection and moral hazard faced by lenders (Jensen and Mekling (1976), Scott (1977), Stiglitz and Weiss (1981), Williamson (1988) and Harris and Raviv (1990)). However, while Marsh (1982), Bradley *et al*. (1984), Titman and Wessels (1988) and Rajan and Zingales (1995) find a significant positive relationship between tangibility and gearing, the impact of tangibility on gearing ratios may depend on the definition of gearing applied. While Chittenden *et al*. (1996), and Bevan and Danbolt (2001) find

tangibility to be positively correlated with the level of long-term debt, they observe significant negative correlations for short term debt elements. Similarly, Stohs and Mauer (1996) find debt maturity to be highly correlated with asset maturity. These results are not surprising in light of the maturity matching principle – long-term debt is used to finance long-term fixed assets, while current liabilities are more closely related to the financing of current assets (Brealey and Myers (2000)). Following Rajan and Zingales (1995), we use the fixed asset ratio as our proxy for tangibility.

Size

While Rajan and Zingales (1995) acknowledge that it is not clear why company size should affect its capital structure, several authors have suggested that gearing ratios may be influenced by company size. Indeed, Rajan and Zingales (1995) argue that "Larger firms tend to be more diversified and fail less often, so size … may be an inverse proxy for the probability of bankruptcy". One can therefore expect large companies to be able to cope with higher gearing ratios than smaller firms. Coase (1937) argue that contracting and transactions costs of debt finance may be particularly burdensome for small companies, which can therefore be expected to rely more on retained earnings than larger companies. However, size may also have an impact on the various forms of debt available to companies. Smith and Warner (1979) and Michaelas *et al*. (1999) argue that long-term debt finance may be unavailable for small firms as the agency conflict between shareholders and lenders may be particularly severe for small companies. Lenders manage the risk of lending to small companies by restricting the length of maturity offered. Thus, while large companies may have more long-term debt than smaller companies, small firms may compensate by having high proportions of short-term debt in their capital (Barnea *et al*. (1980), Whited (1982), and Stohs and Mauer (1996)).

However, the empirical evidence with regard to the impact of company size on capital structure is rather mixed. Crutchley and Hanson (1989) and Rajan and Zingales (1995) find significant positive correlation between company size and gearing, while Marsh (1982) find the probability of companies issuing debt to be positively correlated with company size. However,

Remmers *et al.* (1974), Kester (1986) and Barclay *et al.* (1995) find no significant size effect and Titman and Wessels (1988) find large companies to have significantly lower gearing ratios than smaller firms. This may be due to their analyses being based on aggregate gearing measures, which fail to capture significant differences in the determinants of short- and long-term forms of debt. Chittenden *et al.* (1996), Michaelas *et al.* (1999) and Bevan and Danbolt (2001) all find large companies to use more long-term debt than smaller firms, with small firms compensating by borrowing more on a short-term basis. Similarly, Stohs and Mauer (1996) find debt maturity to be positively correlated with company size. Following Rajan and Zingales (1995), we use the natural logarithm of total sales as our measure of company size.

Profitability

There are various theories regarding the impact of profitability on corporate gearing ratios, with conflicting predictions. On the one hand, profitable firms can be expected to have high gearing ratios, as highly profitable companies are likely to have less difficulty in raising debt finance than less profitable firms. Profitable firms may also seek high gearing ratios in order to reduce their tax liability (Modigliani and Miller (1963)), although others (e.g., Miller (1977) and DeAngelo and Masulis (1980)) have subsequently questioned the presence of any net tax benefits of debt. Finally, in order to reduce the potential for agency conflict associated with free cash flow, shareholders in highly profitable firms may wish their companies to assume large amounts of debt (Jensen (1986)). On the other hand, due to information asymmetries and the costs involved in raising external financing, a 'pecking-order' may exist, with highly profitable firms having low gearing ratios, as they rely on retained earnings rather than debt finance for funding investments (Myers (1984), Myers and Majluf (1984)).

The majority of the empirical evidence regarding the relationship between gearing and profitability tends to lend more support to Myers' 'pecking-order' theory than to the theories based on agency costs or tax. In their analyses of the capital structures of UK companies, Michaelas *et al.* (1999) and Bevan and Danbolt (2001) find profitability to have a significant negative impact on gearing levels. Similarly, in their analysis of gearing ratios in the G7 economies, Rajan and Zingles (1995) find a significant negative relationship between

profitability and the level of debt in all countries, including the UK. Similar results have also been found for the US by e.g., Toy *et al*. (1974), Kester (1986), and Titman and Wessels (1988). We use operating profit to total sales as our measure of profitability.

Industry

Several studies have suggested that gearing ratios may depend on the industry the company operates in. Schwarz and Aronson (1967) and Scott (1972) suggest that industry debt ratios provide good proxies for business risk, while Scott (1980) and Castanias (1983) suggest industry classification may proxy for bankruptcy risk and the cost of bankruptcy. Titman (1984) suggests that gearing ratios may be low for companies in industries where liquidation is especially costly. Balakrishnan and Fox (1993) suggest the variability in cash flows may differ between industries, while Fries *et al*. (1997) argue that the optimum capital structure may depend on the industry equilibrium and the elasticity of demand for total industry output. Jordan *et al*. (1998), however, argue that broad industry classifications may not be appropriate for categorising small companies who often operate in niche markets, which may have little in common with other areas of the same industry.

The empirical evidence with regard to the impact of industry classification on gearing ratios is mixed. While Bowen *et al*. (1982), Castanias (1983), Bradley *et al*. (1984), Long and Malitz (1985), Kester (1986), Harris and Raviv (1991) and Bennett and Donnelly (1993) argue that industry effects significantly influence capital structure, Balakrishnan and Fox (1993) find industry classification to explain little of the cross-sectional variation in gearing ratios. Remmers *et al*. (1974) find the results to vary internationally, and conclude that "…industry does *not* appear to be a determinant of corporate debt ratios in the manufacturing sectors in The Netherlands, Norway and the United States. It does appear to be a determinant in France and Japan". (p. 30). With regard to small and medium sized UK companies, Jordan *et al*. (1998) find industry effects not to be important, while Hutchinson *et al*. (1999) argue that "…industry itself does not seem to affect the determinants of capital structure in a major or systematic way". (p. 8). We analyse the impact of industry classification on the capital structure by splitting the sample into 58 industrial groups.

DATA AND RESEARCH METHOD

Our analysis is based on data obtained from One Source. From this database we extracted information on all non-financial companies, giving an initial sample of 600,311 company financial year-ends over the period from 1981 to 1997. However, due to missing values and controlling for outliers by excluding the top and bottom 1% of companies based on their gearing ratios, our analysis is based on a final sample of 457,394 company-years.

Controversy surrounds the selection of appropriate gearing measure for cross-sectional analyses of the capital structure decision. Rajan and Zingales (1995) argue that "The extent of leverage – and the most relevant measure – depends on the objective of the analysis". (p. 1427). As highlighted by Bevan and Danbolt (2001), analyses based on aggregate gearing measures may obscure the differences in the determinants of the different debt components. Consequently, in this study we disaggregate the overall gearing measure into short- and long-term debt, as well as distinguishing between debt and liabilities.

Current finance theory tend to suggest that gearing is most appropriately measured at market values (e.g., Modilgiani and Miller (1958) and Brealey and Myers (2000)). Marsh (1982), however, argue that managers tend to focus on book rather than market values in their capital structure decision. Most studies tend to combine these approaches by applying book and quasi-market value gearing measures. In this study, however, this option is not available to us. With the vast majority of our companies being non-listed, no market value data is available. Consequently, all our gearing ratios are measured at book values. Our five gearing measures are defined as follows:

$$\text{TOTAL} \qquad (TA - EQR)/TA \qquad (1)$$

where TA refers to the book value of total assets, and EQR to the book value of equity capital and reserves. This broad gearing measure captures the total indebtedness of the company. Total gearing is sub-divided into two main components; total liabilities and total debt:

$$\text{LIABILITIES} \qquad (TA - EQR - TD)/TA \qquad (2)$$

where TD refers to the book value of total debt. Total liabilities captures all non-debt borrowing.

DEBT TD/TA (3)

Total debt captures all formal debt borrowing. Total debt is further sub-divided into long term and short term debt:

LONG TERM LTD/TA (4)

where LTD refers to long term debt, repayable in more than 1 year, and

SHORT TERM STD/TA (5)

where STD refers to short term debt, repayable in less than 1 year.

Descriptive statistics are contained in Table 1. From this table it can be seen that total gearing on average accounts for 68.3% of the book value of total assets, with equity finance accounting for the remaining 31.7%. Of the total gearing for the average UK company, less than half is accounted for by formal debt, with the majority of borrowing accounted for by liabilities. Trade credit and other liabilities thus account for a major proportion of the total indebtedness of the average UK company. Of the formal debt component, the vast majority is of a short-term nature, with only a third having a maturity of more than one year. With a large proportion of liabilities (such as trade credit) also being repayable in the near future, it is evident that the vast majority of borrowings are of a short-term nature. In their analysis of the capital structures of listed UK companies, Bevan and Danbolt (2000, 2001) find the smaller companies to have limited access to long term debt finance. Given that our sample contain mainly small, non-listed companies, it is not surprising that we find most companies in our sample to have low proportions of long term debt in their balance sheets.

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Table 1 about here

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The annual variations in gearing ratios are given in Table 2. As can be seen from this table, there are some variations in the average level of indebtedness of UK companies over time. It is particularly noticeable that the level of debt – both long-term and short-term – has fallen substantially between 1996 and 1997, resulting in a 2.56 percentage point reduction in the mean level of total indebtedness. In the analyses of regional variations in capital structure below, we control for the timing of the observations in order to ensure that any regional effects

are not attributable to timing differences in the sample. While some of the annual dummy variables are significant, the inclusion or exclusion of time dummies only has a very minor impact on the level of the other regression coefficients, and does not affect the main results.

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Table 2 about here

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REGIONAL DIFFERENCES IN CAPITAL STRUCTURE

In order to test the extent to which capital structures differ between regions in the UK, we classify all companies into four regions, according to the where the company is incorporated. As can be seen from Table 3, on average, companies based in London or the South of England tend to have significantly higher gearing ratios than companies based in either Scotland or in other parts of the UK. The regional differences in capital structures are highly significant, and the average gearing ratio for companies in Scotland is only 63.8%, compared to 71.1% for companies based in London, a difference of 7.2 percentage points.

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Table 3 about here

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The differences in capital structures between companies in London and the South versus Scotland and the rest of the UK is significant for all debt components, with companies in the North of the UK having lower gearing ratios than companies based nearer to London. The regional differences in capital structure are, however, more pronounced for total liabilities than for total debt.

What may be the cause of these regional variations in capital structures? As discussed above, prior research has found capital structures to vary significantly with corporate characteristics. The regional differences in capital structure *may* thus be due to differences in the characteristics of the companies based in Scotland and in the other parts of the UK.

In order to test for this possibility, we start by analysing the influence of industrial classification on capital structure. Our database classifies the companies in our sample into 58 mutually exclusive non-financial industrial groups. As is evident from Table 4, gearing ratios differ significantly depending on the industrial grouping of the companies. On average, transport companies, or firms in the business services sector tend to have high gearing ratios, while metal producers as well as food and beverages companies tend to have relatively low gearing ratios. However, there are also significant industrial differences in the relative importance of the various components of debt. For example, while real estate companies tend to have relatively low levels of total gearing, such firms tend to have high debt ratios. This is consistent with the predictions of Scott (1977), Williamson (1988) and Harris and Raviv (1990) - debt finance may be more readily available to companies with high levels of fixed assets, as such assets may provide security for the debt, thus reducing the potential loss to lenders from default.

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Table 4 about here

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In order to establish whether the apparent regional variations in gearing ratios is attributable to the different industrial composition of firms in the various regions in the UK, we calculate industry-adjusted gearing ratios by subtracting the industry mean from each firm-year observation. The regional variations in industry-adjusted gearing ratios are reported in Table 5. As can be clearly seen from this table, the regional differences in capital structure remain highly significant, and are thus not attributable to industrial differences. When controlling for industry effects, companies in Scotland still have a total gearing ratio, on average, 5.4 percentage points lower than companies based in London.

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Table 5 about here

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Industrial classification is, however, only one of a number of factors that may influence the optimum level of gearing. As discussed above, prior studies have suggested that company

size, profitability and asset structure may also have a significant impact on the cross-sectional variations in capital structure. In table 6 we report the results of the following regression equation:

$$(Gearing - Industry\ Mean) = a_1 + a_2 Scotland + a_3 London + a_4 South + a_5 Size + a_6 Profitability + a_7 Tangibility + a_{8\text{-}23} Year + , \quad (6)$$

where 'Gearing' refers to the gearing for the company (using each of the five gearing measures as specified in equations 1 to 5 above), 'Industry Mean' to the mean gearing ratio for the industry in which the company operates, 'Scotland' is a 0-1 dummy variable taking the value 1 for companies incorporated in Scotland, 'London' a 0-1 dummy variable taking the value 1 for companies incorporated in London, 'South' a 0-1 dummy variable taking the value 1 for companies incorporated in the South of England (excluding London), while the effect for companies located in the rest of the UK are captured by the intercept a_1. 'Size' is measured as the natural logarithm of turnover, 'Profitability' as the ratio of operating profit to total assets, 'Tangibility' to the ratio of fixed to total assets, while 'Year' represent 0-1 dummy variables for each of the financial year ends from 1981 to 1996. The intercept a_1 thus captures the effect for 1997 for companies based in the rest of the UK. , refers to the error term.

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Table 6 about here

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The relationship between tangibility and total gearing is highly significantly negative, contrary to the findings of e.g., Rajan and Zingales (1995). However, as argued by Bevan and Danbolt (2001), analyses based on aggregate gearing measures may hide significant differences in the determinants of long- and short-term forms of debt. Consistent with Chittenden *et al*. (1996) and Bevan and Danbolt (2001), we find the relationship between gearing and tangibility to depend significantly on the component of debt being analysed. We find companies with high tangibility to have significantly more long-term debt than other companies, consistent with the hypothesis that fixed assets provide security for corporate debt. However, we also find that companies with high proportions of tangible assets have

significantly lower levels of short-term debt and liabilities than do other firms. This is consistent with the maturity matching principle. While fixed assets are predominately of a long-term nature, the residual of the tangibility ratio captures predominately current assets. It is therefore not surprising to find a negative correlation between tangibility and current liabilities, similar to what we observe.

With regard to company size, we find large companies on average to have significantly lower gearing ratios than do smaller firms. This is contrary to the majority of prior empirical findings, as discussed above. However, the vast majority of our companies are not listed, with the exception of a few larger companies. The listed companies may have better access to equity finance than do the smaller firms, which compensate by assuming additional debt. The negative relationship between gearing and company size is attributable to short-term debt, indicating that small companies – possibly due to limited access to other sources of external finance – tend to rely on short-term debt.

At the aggregate level, we observe a negative relationship between the level of profitability and total gearing, consistent with the predictions of the pecking-order theory. This negative relationship is driven by the relationship between profitability and formal debt, where we find negative coefficients for both long- and short-term debt components. Profitable firms do, however, tend to have higher levels of liabilities than do less profitable firms. While all of the profitability regression coefficients are statistically significant, the coefficients are small, indicating that profitability has relatively little impact on the level of gearing for the companies in our sample.

We therefore conclude that regional differences in gearing are substantial – whether industrial or firm specific characteristics are controlled for or not.

GEARING RATIOS AND CORPORATE GROWTH

Do gearing ratios influence corporate performance or rates of growth? We investigate this question firstly by analysing the relationship between gearing and subsequent increases in turnover, and secondly by future changes in profitability.

Corporate Growth

In table 7 we report the outcome of regression analyses of the relationship between gearing ratios and the rate of change in turnover during the subsequent year. The regression equation (for illustrative purposes, the equation refers to the regression for the second column) is specified as follows:

$$Log_e(Sales_{t+1}/Sales_t) = b_1 + b_2 Total\ Gearing + b_3 Scotland + b_4 London + b_5 South + \varepsilon \quad (7)$$

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Table 7 about here

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The regression output indicates that there is a significant positive relationship between gearing ratios and subsequent increases in turnover. This relationship holds for all debt components. The regression coefficients are highly significant, as are the regressions overall, although the adjusted R^2 of 1% is low, suggesting that capital structure only explains a fairly small proportion of subsequent growth. Analysis of the regression coefficients for the regional dummies indicate that companies located in Scotland have lower rates of growth than companies based in other parts of the UK, over and above what can be explained by the generally low gearing ratios of Scottish firms. Thus, while our results suggest the low gearing ratios of Scottish firms hampers the economic growth of the Scottish economy, there appears to be other impediments to the economic growth of this region not captured by our analysis of gearing ratios.

Corporate Profitability

In table 8 we report the results of our analysis of the relationship between gearing and changes in corporate profitability, as measured by $Profitability_{t+1}/Profitability_t$. Grossman and Hart (1982) and Jensen (1986) suggest that debt may help reduce the agency costs associated with the separation of ownership and control, by reducing the scope of managerial discretion. It can therefore be hypothesised that companies with high gearing ratios will be more efficient

– and consequently more profitable – than less geared firms. Our findings lend some support to this hypothesis. Analysis of the regression coefficients suggests that companies with high levels of total gearing, and long-term debt in particular, experience larger improvements in profitability during the following year than do less geared firms. However, these results should be interpreted with care. The explanatory power of the regressions are low, suggesting that gearing has relatively little impact on changes to corporate performance. In addition, there is a potential for reverse causality, with companies expecting improved profitability assuming additional long-term debt, rather than the improvement in profitability being attributable to high levels of debt.

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Table 8 about here

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CONCLUSION

In this paper we present results which add to the limited amount of evidence available on the economic performance of small firms. We are particularly interested in capital structure and its effect on the performance of Scottish firms in comparison with others in the UK and particularly those based in London.

Our results show that there is a substantive difference in the capital structure of unquoted firms across the UK. However, rather surprisingly, it is not the differences in debt which are most striking - although these also demonstrate statistically significant results - but differences in other liabilities. Some 5 to 7 percent more of the assets of London based firms are financed by other liabilities than are those of Scottish firms. This result is robust to controls for industry and firm characteristics or performance.

We are unable to demonstrate convincingly that capital structure matters. It is associated with subsequent growth, but the direction of causality is not clear. However, if the cost of capital of Scottish firms were to be reduced by one percentage point, and the rate of

growth increased by the same (under any realistic scenario of normal capital costs and growth rates), this would have a huge effect on the value of the firms in question. We argue that these assumptions are feasible given our results. One fifteenth more of the assets of London firms are financed by liabilities than is the case for Scottish firms and the London firms are apparently growing at 2 percent per annum faster that the Scottish ones.

We are also unable to say why the differences in capital structure should be so. We had expected to find a difference in the availability of debt, but this is relatively minor, although we do find a noticeable difference in the type of debt with southern firms using more long-term debt. Differences in debt might be a function of a funding gap, although why such a gap should impact more strongly on Scottish than London firms would be difficult to say. However, we find the difference to be largely confined to liabilities other than debt. At the moment we cannot say whether this is a function of Scottish business culture or the circumstances in which Scottish firms find themselves. These speculations point to further research, but we should not neglect the startling findings of the research reported here. Scottish firms have very different capital structure than do firms based in the south of England and this could be very much to their disadvantage and to that of the Scottish economy.

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Table 1 Descriptive Statistics

Gearing	Mean	Median	TrMean	StDev	SE	Minimum	Maximum	Q1	Q3
Total	0.68296	0.70161	0.68229	0.26604	0.00039	0.00754	2.53785	0.51030	0.86395
Liabilities	0.37686	0.34256	0.36675	0.22652	0.00033	0.00551	1.02551	0.20370	0.51888
Debt	0.30609	0.25254	0.28561	0.26869	0.00040	0.00000	1.77202	0.07922	0.46462
Long Term	0.10093	0.01523	0.07588	0.16848	0.00025	0.00000	0.99473	0.00000	0.13598
Short Term	0.20516	0.13211	0.17959	0.22771	0.00034	0.00000	1.30667	0.02962	0.29736

The sample is restricted to the 457,394 cases in the database for which the necessary data is available to calculate all the measures of gearing, and to those for which any of those measures do not fall in the top or bottom one percent of the distribution. The gearing measures are defined as follows: total = all liabilities except equity capital over total assets; liabilities = all liabilities except equity and debt over total assets; debt = long term and short term debt over total assets; long term = long term debt over total assets; and short term = short term debt over total assets.

Table 2. Annual Variations in Capital Structure

		Total		Liabilities		Debt		Long Term		Short Term	
Year	Sample	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
81	3	0.5303	0.3541	0.4666	0.3695	0.0637	0.0753	0.0020	0.0034	0.0618	0.0761
82	4	0.7085	0.6358	0.3759	0.4002	0.3326	0.5647	0.2280	0.4543	0.1046	0.1262
83	7	0.9157	0.3984	0.3861	0.2661	0.5295	0.4284	0.0595	0.0985	0.4700	0.3851
84	13	0.7159	0.3821	0.3182	0.2309	0.3977	0.3767	0.0255	0.0647	0.3722	0.3432
85	20	0.7279	0.3581	0.3506	0.2177	0.3774	0.3268	0.0312	0.0589	0.3462	0.3265
86	31	0.6972	0.2913	0.3549	0.1911	0.3424	0.3101	0.0660	0.1156	0.2764	0.2982
87	1,047	0.7056	0.2577	0.4165	0.2119	0.2891	0.2623	0.0859	0.1451	0.2032	0.2287
88	27,051	0.6691	0.2443	0.3867	0.2063	0.2825	0.2463	0.0854	0.1476	0.1971	0.2117
89	32,682	0.6763	0.2493	0.3759	0.2099	0.3004	0.2544	0.0914	0.1537	0.2090	0.2201
90	36,259	0.6811	0.2552	0.3738	0.2211	0.3072	0.2630	0.0959	0.1604	0.2114	0.2250
91	40,561	0.6822	0.2657	0.3675	0.2255	0.3147	0.2732	0.1019	0.1694	0.2128	0.2310
92	44,371	0.6827	0.2707	0.3668	0.2271	0.3158	0.2754	0.1055	0.1739	0.2104	0.2310
93	50,825	0.6858	0.2716	0.3805	0.2339	0.3053	0.2741	0.1035	0.1734	0.2018	0.2296
94	55,283	0.6872	0.2701	0.3784	0.2285	0.3088	0.2715	0.1057	0.1732	0.2032	0.2289
95	61,413	0.6937	0.2701	0.3801	0.2306	0.3136	0.2728	0.1053	0.1729	0.2083	0.2326
96	65,800	0.6896	0.2721	0.3787	0.2322	0.3108	0.2734	0.1035	0.1735	0.2073	0.2330
97	42,024	0.6640	0.2676	0.3786	0.2295	0.2854	0.2606	0.0977	0.1649	0.1877	0.2181
		30.19		17.67		41.43		34.21		28.03	
		0.000		0.000		0.000		0.000		0.000	

The table contains the Mean and Standard deviation for each of the five measures of gearing for each year. The F-statistic is calculated from a oneway analysis of variance.

Table 3. Regional Differences in Capital Structure

		Total		Liabilities		Debt		Long Term		Short Term	
Region	Sample	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Scotland	27,989	0.6384	0.2576	0.3369	0.2062	0.3015	0.2576	0.0960	0.1576	0.2055	0.2180
London	127,053	0.7107	0.2844	0.4002	0.2550	0.3105	0.2941	0.1036	0.1861	0.2070	0.2482
South	136,794	0.6828	0.2675	0.3731	0.2221	0.3097	0.2672	0.1017	0.1653	0.2080	0.2271
Rest of UK	163,765	0.6688	0.2488	0.3687	0.2071	0.3001	0.2525	0.0990	0.1580	0.2011	0.2123
F-Statistic		883.06		828.39		49.71		26.58		27.13	
P-Value		0.000		0.000		0.000		0.000		0.000	

The table contains the Mean and Standard deviation for each of the five measures of gearing for each of the regions. The F-statistic is calculated from a oneway analysis of variance. In all cases the conclusion is that there is statistically significant differences between the gearing measures over the four regions.

Table 4. Industry Differences in Capital Structure

		Total		Liabilities		Debt		Long Term		Short Term	
	Sample	Mean	Std. Dev.	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
Transport, Supporting Activities	14,143	0.7563	0.2534	0.5214	0.2511	0.2349	0.2524	0.0835	0.1559	0.1514	0.2077
Business services	36,601	0.7542	0.2687	0.4726	0.2535	0.2816	0.2784	0.0723	0.1465	0.2093	0.2492
Wholesale Trade, Except Motor Vehicles	91,233	0.7229	0.2428	0.4158	0.2278	0.3071	0.2698	0.0618	0.1249	0.2454	0.2494
Construction	33,571	0.7170	0.2165	0.4829	0.2204	0.2341	0.2217	0.0569	0.1060	0.1772	0.1959
Printing & Publishing	15,086	0.7151	0.2598	0.4003	0.2049	0.2147	0.2574	0.1255	0.1712	0.1892	0.2067
Motor Vehicles & Parts, Sales & Repair	26,894	0.6936	0.2303	0.3387	0.1886	0.3549	0.2464	0.1055	0.1464	0.2494	0.2124
Sporting Activities	10,538	0.6679	0.3288	0.3482	0.2608	0.3197	0.3091	0.1291	0.2067	0.1906	0.2480
Retail Trade, Except Motor Vehicles	17,796	0.6638	0.2636	0.3832	0.2027	0.2807	0.2492	0.0925	0.1501	0.1882	0.2115
Machinery & Equipment	15,205	0.6627	0.2383	0.3785	0.1766	0.2842	0.2334	0.0956	0.1508	0.1886	0.1944
Real Estate Activities	22,972	0.6616	0.3252	0.1754	0.2193	0.4862	0.3403	0.2118	0.2780	0.2744	0.3153
Metal Products	15,276	0.6473	0.2327	0.3704	0.1685	0.2769	0.2222	0.0997	0.1422	0.1773	0.1827
Food & Beverages	10,899	0.6312	0.2479	0.3172	0.1565	0.3141	0.2405	0.1149	0.1569	0.1992	0.2003
F-Statistic		527.16		1,359.62		516.43		644.56		292.49	
P-Value		0.000		0.000		0.000		0.000		0.000	

The table contains the Mean and Standard deviation for each of the five measures of gearing for the 11 largest industry groups (each containing more than 10,000 observations). In total there are 58 industrial groups used in the analysis. The F-statistic is calculated from a oneway analysis of variance.

Table 5. Regional Differences in Industry-Adjusted Capital Structure

		Total		Liabilities		Debt		Long Term		Short Term	
Region	Sample	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Scotland	27,989	-0.0372	0.2527	-0.0312	0.1939	-0.0060	0.2480	-0.0090	0.1527	0.0029	0.2140
London	127,053	0.0168	0.2759	0.0189	0.2323	-0.0021	0.2805	-0.0009	0.1775	-0.0012	0.2443
South	136,794	0.0004	0.2584	-0.0061	0.2074	0.0065	0.2611	0.0035	0.1601	0.0030	0.2233
Rest of UK	163,765	-0.0075	0.2434	-0.0046	0.1961	-0.0029	0.2467	-0.0007	0.1534	-0.0023	0.2088
F-Statistic		420.70		612.09		42.58		51.42		16.60	
P-Value		0.000		0.000		0.000		0.000		0.000	

The table contains the Mean and Standard deviation for the deviation from the industry mean for each of the five measures of gearing for each of the regions. The F-statistic is calculated from a oneway analysis of variance. In all cases the conclusion is that there is statistically significant differences between the gearing measures over the four regions.

Table 6. Regression Analysis of Regional Differences in Industry-Adjusted Capital Structure, Controlling for Annual Variations

	Total	Liabilities	Debt	Long Term	Short Term
Constant	0.0502	0.0563	-0.061	-0.0436	0.0375
	(17.97)	(26.04)	(-2.15)	(-24.58)	(15.22)
Scotland	-0.0300	-0.0210	-0.0089	-0.0140	0.0050
	(-16.59)	(-15.02)	(-4.88)	(-12.24)	(3.18)
London	0.0143	0.0111	0.0033	0.0111	-0.0079
	(13.74)	(13.71)	(3.08)	(16.64)	(-8.57)
South	0.0033	-0.0015	0.0048	0.0046	0.0002
	(3.23)	(-1.89)	(4.62)	(16.84)	(0.23)
Tangibility	-0.0900	-0.1930	0.1027	0.1514	-0.0487
	(-54.45)	(-150.69)	(61.17)	(144.44)	(-33.41)
Size	-0.0044	0.0000	-0.0044	-0.0003	-0.0041
	(-16.43)	(0.17)	(-16.29)	(-1.74)	(-17.53)
Profitability	-0.0002	0.0004	-0.0007	-0.0002	-0.0005
	(-2.46)	(6.08)	(-7.05)	(-2.82)	(-6.10)
Adj R^2	1.2%	6.2%	1.4%	5.4%	0.6%
F-Statistic	220.42	1,169.20	248.89	1,005.01	98.48
P-Value	0.000	0.000	0.000	0.000	0.000

The sample is restricted to the 386,195 cases in the database for which the necessary data is available to calculate all the measures of gearing and for which the explanatory variables are present. Annual dummy variables have been included, but are not reported individually in the table above.

Table 7. Regression Analysis of the Impact of Industry-Adjusted Gearing Ratios on Corporate Growth, Controlling for Annual Variations

Constant	0.1247	0.1185	0.1240	0.1173	0.1255	0.1185	0.1245	0.1174	0.1254	0.1183	0.1248	0.1186
	(47.68)	(41.22)	(47.26)	(40.70)	(47.92)	(41.14)	(47.47)	(40.75)	(47.83)	(41.08)	(47.71)	(41.23)
Total	0.1462	0.1444										
	(44.67)	(44.08)										
Liabilities			0.0607	0.0589							0.1380	0.1355
			(14.71)	(14.22)							(30.62)	(30.00)
Debt					0.1057	0.1050						
					(32.59)	(32.37)						
Long							0.0912	0.0906			0.1528	0.1513
Term							(17.67)	(17.54)			(28.40)	(28.10)
Short									0.0935	0.0928	0.1483	0.1467
Term									(24.85)	(24.69)	(36.58)	(36.19)
Scotland		-0.0047		-0.0082		-0.0087		-0.0087		-0.0098		-0.0048
		(-1.24)		(-2.17)		(-2.31)		(-2.31)		(-2.61)		(-1.28)
London		0.0149		0.0162		0.0184		0.0179		0.0181		0.0151
		(6.93)		(7.72)		(8.56)		(8.34)		(8.42)		(7.04)
South		0.0067		0.0075		0.0069		0.0072		0.0072		0.0067
		(3.17)		(3.52)		(3.26)		(3.41)		(3.40)		(3.16)
Adj R^2	1.0%	1.0%	0.4%	0.5%	0.7%	0.7%	0.5%	0.5%	0.6%	0.6%	1.0%	1.0%
F-Statistic	211.92	180.45	100.27	88.45	153.33	133.15	106.28	94.03	125.43	109.98	188.79	163.67
P-Value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

The sample is restricted to the 351,648 cases in the database for which the necessary data is available to calculate all the measures of gearing and for which the explanatory variables, including growth in turnover over the coming year. The sample is restricted to 350,517 cases when regional dummies are included. The salesgrowth variable is defined as $Log_e (Sales_{t+1}/Sales_t)$.

Table 8. Regression Analysis of the Impact of Industry-Adjusted Gearing Ratios on Changes in Corporate Profitability, Controlling for Annual Variations

Constant	0.0648	0.0607	0.0649	0.0598	0.0659	0.0613	0.0639	0.0594	0.0651	0.0602	0.0645	0.0603
	(2.91)	(2.48)	(2.19)	(2.44)	(2.95)	(2.50)	(2.87)	(2.43)	(2.92)	(2.46)	(2.89)	(2.46)
Total	0.1100	0.1110										
	(3.73)	(3.74)										
Liabilities			-0.0349	-0.0333							0.0385	0.0406
			(-0.94)	(-0.89)							(0.94)	(0.99)
Debt					0.1272	0.1268						
					(4.39)	(4.36)						
Long							0.2415	0.2417			0.2655	0.2663
Term							(5.31)	(5.29)			(5.57)	(5.56)
Short									0.0391	0.0386	0.0769	0.0770
Term									(1.16)	(1.14)	(2.11)	(2.11)
Scotland		0.0066		0.0020		0.0038		0.0052		0.0028		0.0063
		(0.20)		(0.06)		(0.12)		(0.16)		(0.09)		(0.19)
London		-0.0086		-0.0049		-0.0061		-0.0066		-0.0056		-0.0076
		(-0.46)		(-0.26)		(-0.32)		(-0.35)		(-0.30)		(-0.40)
South		0.0219		0.0228		0.0215		0.0215		0.0227		0.0211
		(1.20)		(1.25)		(1.18)		(1.18)		(1.24)		(1.15)
Adj R^2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
F-Statistic	1.47	1.38	0.66	0.68	1.81	1.64	2.37	2.12	0.69	0.71	2.36	2.13
P-Value	0.099	0.125	0.834	0.838	0.024	0.038	0.002	0.003	0.805	0.811	0.001	0.002

The sample is restricted to the 345,595 cases in the database for which the necessary data is available to calculate all the measures of gearing and for which the explanatory variables, including change in profitability over the coming year. The sample is restricted to 344,438 cases when regional dummies are included. The profitgrowth variable is defined as $Profitability_{t+1}/Profitability_t$).