The determination of UK corporate capital gearing

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This article seeks to explain the high current level of UK corporate capital gearing. It also explores the empirical relationship between gearing and a range of financial characteristics. Analysis of aggregate data suggests that the sharp rise in gearing between 1999 and 2002 cannot all be explained by an increase in its long-run equilibrium level, according to a model where that equilibrium is determined by the trade-off between the tax benefits of debt and the risks of financial distress. There are a number of factors not captured by that model that could have contributed to a sustainable increase in gearing. But on balance it seems that gearing has been above a sustainable level, causing firms to adjust their balance sheets by paying lower dividends and issuing more equity and perhaps by investing less than they otherwise would have done. Analysis of company accounts data suggests that gearing levels are persistent, positively related to company size and negatively correlated with growth opportunities and the importance of intangible assets. In the past, highly profitable companies had low gearing, but this relationship has broken down since 1995 as more profitable firms have increased their debt.

Introduction

Corporate capital gearing is a measure of the net indebtedness of the corporate sector. It rose sharply in the late 1990s and remains at an historically high level, although it has fallen back from the peak seen in 2002. Substantial research and analysis has been carried out by the Bank and other researchers over the past few years into the behaviour and determinants of corporate gearing. This article reports on that work, places it in the context of the extensive literature on corporate capital structure and assesses the extent to which it can explain why corporate gearing is currently so high.

High levels of corporate gearing are of interest because they have important implications for both financial and monetary stability. Other things being equal, rapid growth of borrowing increases the probability of the corporate sector facing difficulties in servicing its debt, thereby raising the expected rate of corporate liquidations and the likelihood of losses for the financial sector. And any attempt by companies to reduce their indebtedness by cutting back real expenditures has implications for aggregate demand and hence for the achievement of the inflation target.

This article begins by discussing recent trends in corporate gearing. It goes on to give a brief overview of the main theories of corporate capital structure that have been developed in the literature. We then look at empirical work carried out at the Bank to explain corporate gearing and the extent to which this can account for recent developments. Finally, the relationship between gearing and various characteristics of companies is explored.

Recent trends

Two aggregate series on UK corporate capital gearing can be calculated from data published by the Office for National Statistics (ONS). The first of those series assesses corporate indebtedness in relation to the market value of UK companies (the market value measure). The second compares indebtedness with the cost of replacing the corporate sector's capital stock (the replacement cost measure). Chart 1 shows the evolution of the market value and replacement cost measures since 1970 for the private non-financial corporate (PNFC) sector.[1][2]

On both measures, capital gearing is currently at high levels by historical standards. Over much of the 1990s,

(1) Wider measures of the corporate sector's gearing, or its 'economic leverage', would also need to take into account other
debt-like corporate sector obligations, such as those relating to pension-fund liabilities and leases.
(2) The large spike in capital gearing at market value in 1974 is a result of stock market volatility over that period.

net debt rose broadly in line with the capital stock measured at replacement cost. Rising equity markets during this period meant that capital gearing at market value fell modestly. But both measures of capital gearing rose markedly around the turn of the century. This increase coincided with low and falling interest rates, the boom in mergers and acquisitions in 1999–2001 and a surge in borrowing by telecommunications companies associated with the bidding for third-generation (3G) mobile phone licences. Weak equity markets post-2000 resulted in larger increases in the market value measure of corporate gearing than in the replacement cost measure. Over the past two years, capital gearing has begun to fall back again, especially on the market value measure, as equity prices have started to recover and firms have begun to adjust their balance sheets. However, capital gearing remains at historically high levels.

Chart 1
**Aggregate capital gearing of UK companies**(a)

Sources: ONS and Bank calculations.

(a) Private non-financial companies. Data before 1987 are based on discontinued series.

Information on trends in corporate gearing is also available from company accounts data, which permit analysis of the distribution of gearing across companies. Chart 2 shows the distribution of capital gearing at market value over the period 1975–2004 for quoted non-financial UK companies.[1] From these data it appears that gearing for most individual companies is not currently at historically high levels. In particular, the rise in gearing in the late 1990s appears more moderate than suggested by the aggregate ONS measures and has been concentrated among the most heavily geared firms. But the company-level data concur

with the aggregate data in suggesting a reduction in gearing across the distribution in the recent past.

Chart 2
Distribution of corporate capital gearing(a)(b)
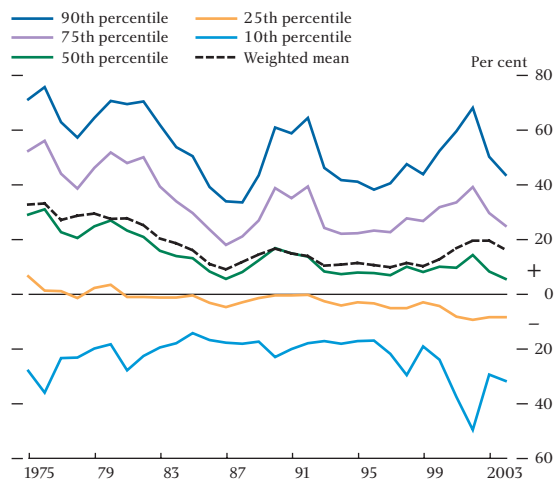
Sources: Thomson Financial Datastream and Bank calculations.

(a) Market value measure. The 90th, 75th, 50th, 25th and 10th percentiles are shown by the solid lines, moving from the most to the least geared companies. The broken line is a weighted mean that is calculated as the sum of net debt of all firms divided by the aggregate market valuation of their capital.
(b) The capital gearing calculation uses net debt, so firms who have more cash than debt will have negative gearing.

Chart 2 also shows a weighted average of corporate gearing, which has risen by more than median gearing since the late 1990s. This weighted measure is dominated by very large companies with substantial amounts of debt in absolute terms, and it more closely follows the profile of the aggregate measures calculated from ONS data. Company accounts information suggests that it is those large firms that have raised their gearing most rapidly since the mid-1990s; smaller firms' gearing has risen by less, remained stable or fallen (see the section below which examines the relationship between gearing and company size). Given that the very large companies represent a small minority of the sample, the build-up of their gearing would be less apparent from looking only at the median and other summary percentiles in the distribution, which are not weighted.

The concentration of debt among large firms is crucial in assessing the implications of rising corporate indebtedness for financial stability. The largest quartile of quoted companies ranked by market capitalisation (which roughly corresponds to the FTSE 350) accounted for an average of 92% of the net debt of all quoted non-financial companies between 1975 and 2004; in

(1) At the individual firm level, we focus only on capital gearing at market value rather than replacement cost, given the difficulty in accurately measuring the true value of the replacement cost of the capital stock for each firm using the perpetual inventory method.

2004 this proportion was 97%. Indeed, the largest decile (corresponding roughly to the FTSE 100) accounted for 84% of net debt in 2004. Smaller than average firms currently have only 1% of the whole sample's net debt, and this proportion has been falling in recent years. It follows that any assessment of the risks to the financial sector arising from recent rapid increases in corporate gearing and of the implications for monetary stability of subsequent corporate sector adjustment needs to focus mainly on the behaviour of the largest companies.

Empirical evidence

This section discusses empirical work carried out at the Bank and investigates the extent to which the models described in the box on page 359 can account for the current high level of capital gearing. It begins by looking at aggregate-level work before moving on to summarise firm-level analysis and to investigate the relationship between gearing and some key financial characteristics.

(i)   Bank empirical work at the aggregate level

The Bank's empirical work on aggregate corporate gearing is based on the trade-off model (see Bunn and Young (2003 and 2004) and described in the box on page 359, extending the approach taken in earlier work by Young (1996)). The trade-off model is used to estimate a target level of gearing. That can be compared with the actual value, to see whether gearing appears to be above its long-term equilibrium level.

Table A reports the estimated equation that links the change in corporate net debt to lagged gearing (at market value), changes in the market value of the corporate sector, the tax benefits of gearing and the liquidations rate (proxying for the risks of financial distress associated with debt). The motivation for this equation is to test empirically the hypothesis that increases in debt are greater when there are significant tax advantages associated with raising debt levels and/or a low risk of financial distress from those higher debt levels, as suggested by the trade-off theory. The tax benefits of gearing have a positive effect on debt that is significant at the 5% level, while the liquidations rate has a negative effect which is significant at the 10% level.

In the short run, a variety of different factors can affect corporate gearing. But in the long run, the equation reported in Table A implies a relationship between gearing and the tax benefits of debt (with a positive effect) together with the risk of bankruptcy (with a negative effect). This can be interpreted as a long-run equilibrium or a target level of gearing, and it provides empirical support for the trade-off theory. Chart 3 plots this implied equilibrium level of gearing alongside the actual level.[1] It shows that the rise in capital gearing since the late 1990s cannot be accounted for by the long-run equilibrium level of gearing implied by this particular model, although this has increased modestly in recent years, largely reflecting low and falling corporate liquidations.

Table A
Aggregate equation for net debt of UK corporate sector

Estimated coefficients
Dependent variable: Δ1n (net debt)

		Coefficient	T-ratio
Constant		0.253	4.66
1n (capital gearing at market level)	$t-1$	-0.078	-4.38
Δ1n (market valuation)	t	0.073	1.50
Δ1n (market valuation)	$t-1$	-0.177	-3.78
Tax gains from gearing	t	2.085	2.30
Corporate liquidations rate	t	-0.014	-1.69
Q1 dummy	t	0.035	3.37
1981 Q2 impulse dummy	t	-0.175	-3.57
1987 Q1 impulse dummy	t	0.137	2.74
1990 Q1 impulse dummy	t	0.201	4.10

Long-run solution
Dependable variable: 1n (capital gearing at market value)
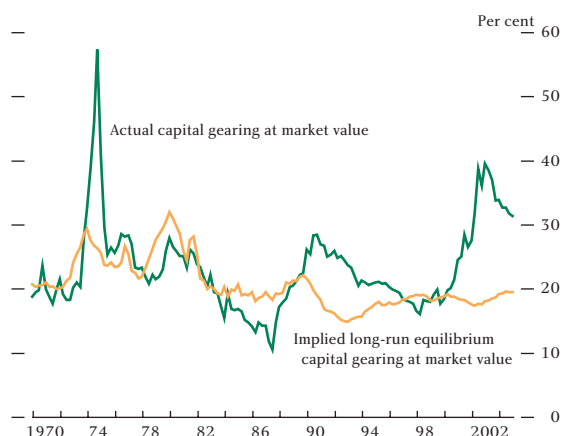
Constant	2.88
Tax gains from gearing	26.61
Corporate liquidations rate	-0.18

Note: The estimated equation has an R^2 of 0.48 and passes all of the standard diagnostic tests. Estimation is by OLS using quarterly data from 1970 Q1 to 2003 Q3. See Bunn and Young (2004) for more details of the definitions.

Chart 3
Actual and implied long-run equilibrium capital gearing[a]

Sources: ONS and Bank calculations.

(a)   Private non-financial companies.

(1) The aggregate gearing measures shown in Charts 1 and 3 are those reported in recent issues of the *Financial Stability Review*. These differ from those used in Bunn and Young (2004) because our preferred definition of debt has been slightly widened to incorporate finance leasing and loans from institutions other than banks. A minor adjustment is also made to the market valuation of PNFCs. The long-run equilibrium level of gearing shown in Chart 3 has also been adjusted accordingly.

Theories of corporate financial structure

The modern literature on corporate capital structure dates back to Modigliani and Miller (1958), who showed that, in a perfect capital market, the value of a company is independent of its capital structure. In such a world, there is no optimal capital structure. Much of the subsequent discussion in the literature has focused on the implications of capital market imperfections. One such imperfection is the existence of taxes. In the United Kingdom, as in most other developed countries, corporate debt interest payments are tax-deductible, which implies that firms can reduce their tax liability by additional borrowing. They can then pay out the additional funds to shareholders as dividends who can invest the proceeds and earn a return, although the size of this benefit also depends on the tax regime faced by shareholders. Debt finance is consequently more tax efficient for the company and its shareholders than equity finance because it is better for the firm to borrow than for shareholders to borrow and supply equity capital to the firm. The **trade-off model** of corporate gearing postulates that firms will aim for target or 'optimal' gearing levels that balance (ie trade off) the tax benefits of additional debt against the expected costs of the financial distress that becomes more likely as indebtedness rises (Barclay *et al* (1995), Myers (2001)).

The literature also extends the benefits of debt finance to include non-tax factors. In particular, costs may result if the debt market is characterised by information asymmetries between lenders and borrowers. Managers may seek to exploit these asymmetries by raising equity only when they view the company's shares as overvalued. Investors will consequently discount any new and existing shares when a new equity issue is announced. The **pecking order model** was developed by Myers and Majluf

(1984), who argued that managers will try to avoid the resulting risk that profitable investment projects will be foregone by seeking to finance them internally. If retained earnings are insufficient, they will opt for debt rather than equity finance, because debt providers, with a prior claim on the firm's assets and earnings, are less exposed than equity investors to errors in valuing the firm. Managers will only opt for equity finance as a last resort in this model. In these circumstances, corporate gearing will reflect a company's need for external funds and — unlike with the trade-off approach — there will not necessarily be any target or optimal level of gearing.

The agency costs arising from the separation of ownership and control may exacerbate information asymmetries by inducing conflicts of interest between a company's managers, shareholders and creditors, based on differing incentives. In the **agency cost models** of gearing initiated by Jensen and Meckling (1976), managers have other objectives, which may involve wasteful usage of the company's free cash flow. One of the advantages of debt is that it limits free cash flow available to managers, although investors may seek to limit agency costs by monitoring managers or putting them on compensation packages that align their interests more closely with those of investors.

In recent years, a new approach to the determination of corporate gearing has developed from the financial contracting literature associated with Hart (1995 and 2001). This **'control rights' model** tends to focus on small entrepreneurial firms, in which owner-managers prefer debt to equity because they do not wish to cede control rights to outside investors.

So why might capital gearing have risen so rapidly in the early years of the new century? Aside from possible special factors such as 3G-related telecoms borrowing, there are a number of factors that are not explicitly included within this model (and therefore are implicitly assumed to be constant) that may help to explain an increase in the true target level of corporate gearing. The shift to a more stable, low inflation, low nominal interest rate macroeconomic environment will have reduced the probability of firms suffering financial distress; this may not be adequately captured by the simple proxy in the model. A shift in the inflation environment may also have reduced the real cost of debt finance if it has been accompanied by a shift in the inflation risk premium. Also lower interest rates make high debt levels easier to service and to sustain for a longer period of time.

Bunn and Young (2003 and 2004) investigate ways in which companies adjust their balance sheets when gearing deviates from the implied long-run equilibrium level. They find that a positive gap between actual and long-run equilibrium gearing induces companies in aggregate to pay lower dividends than they would otherwise have done and/or issue more equity (assuming market conditions are favourable). This strengthens the empirical support for the trade-off theory, because it shows that firms adjust their behaviour in response to deviations from the target. The effect on gross investment, although negative as predicted by theory, is not robustly statistically significant.[1] The speed of adjustment is found to be slow, not surprisingly given that the flows of dividends and net equity finance are small relative to the stock of debt. This work does not test for other possible forms of corporate adjustment, such as through reduced expenditure on inventories or cutbacks in the number of employees or in hours worked.

(ii) Empirical work at the company level

The estimated relationships discussed so far are derived from aggregate data. Work has also been carried out at the company level to estimate equations for dividends, the propensity to issue equity and investment. These merely include actual gearing as an explanatory variable (among other factors) rather than gearing relative to its target level (see Benito and Young (2002)). But if each firm's target is stable, or if changes in targets over time

are common across firms, then all of the variation in actual gearing picks up variation in gearing relative to target. Internal Bank work has recently re-estimated the key equations from Benito and Young (2002); these results are summarised in Table B.

Table B
Company-level equations for dividends, investment and equity issuance

		Dividends		Investment		Equity issuance (probit model)	
		Coefficient	T-ratio	Coefficient	T-ratio	Coefficient	T-ratio
Income gearing	$t-1$	-0.394	-4.28	-0.091	-6.50		
Capital gearing at replacement cost (using net debt)	$t-1$	-0.191	-5.62	-0.048	-2.67		
Capital gearing at replacement cost (using gross debt)	$t-1$					0.685	6.99
Other controls		Lagged dependent variable, cash flow, investment, Q, real sales, year effects		Lagged dependent variable, cash flow, investment, Q, sales to capital, year effects		Cash flow, cash holdings, investment, Q, real sales, year effects	

Note: Dividends and investment equations are dynamic panel data models estimated using the GMM-SYSTEM estimator, the equity issuance equation is a random effects probit model where a firm is defined as making an issue if it issues shares for cash in excess of 2% of market capitalisation. Dividends are scaled by sales; cash flow, cash holdings and investment are all scaled by the capital stock. The data are a panel of 652 firms with 8,751 firm-year observations between 1980 and 1998.

The company-level results provide broad support for the plausibility of the aggregate equations. They suggest that high levels of gearing have a negative impact on dividend payouts and increase equity issuance. Capital spending is found to be significantly adversely affected by the cost of servicing debt. But, even after controlling for this, there is a statistically significant negative relationship between capital gearing and investment. To reconcile this with the weaker aggregate result, it may be that debt only constrains the investment of the most highly geared firms, so it is difficult to pick up this effect in a robustly significant way using aggregate data. Chart 4 supports this argument; though it does not hold other balance sheet factors constant as the econometric analysis does, it shows that the most highly geared quartile of firms have persistently invested less than firms with lower gearing over the past 30 years.

The implications from this work on balance sheet adjustment are that dividends will be lower and equity issuance higher than they would have been if there was no constraint from high gearing levels. High gearing levels may also be acting as a constraint on investment for the more highly geared firms. The corporate sector has now been in financial surplus for the past 13 quarters following the peak in gearing, which

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(1) In a broadly specified investment equation the deviation between actual and implied equilibrium capital gearing is only significant at the 30% level, although this can be improved by restricting the sample period and adjusting the equation specification. See Bunn and Young (2004) for further details.

suggests that this balance sheet adjustment has already been taking place.

Chart 4
Median investment as a percentage of the capital stock by capital gearing quartile(a)

— Lowest gearing quartile
— Second lowest gearing quartile
— Second highest gearing quartile
— Highest gearing quartile
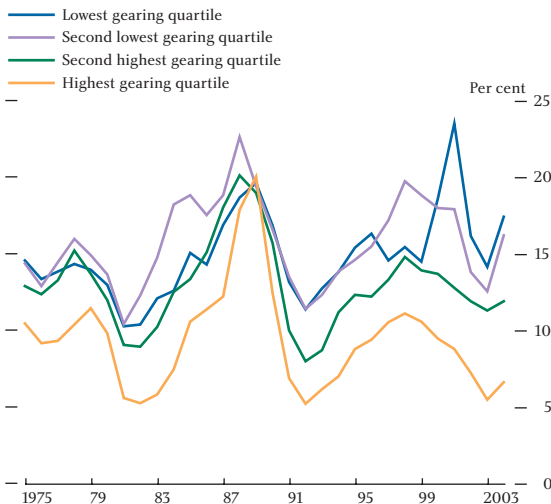
Sources: Thomson Financial Datastream and Bank calculations.

(a) Median investment as a percentage of the capital stock for quartiles of companies ranked by their capital gearing at market value in each year.

From a financial stability perspective, separate empirical work in the Bank has found that it is the cost of servicing debt rather than the level of capital gearing itself which is the key determinant of corporate liquidations in aggregate.[1] As interest rates are currently low and corporate profitability robust, debt servicing costs are low by historical standards. Providing current conditions persist, this implies that the existing high gearing levels do not pose a major financial stability risk, although they do increase the vulnerability of the corporate sector to a significant rise in interest rates or fall in profitability.

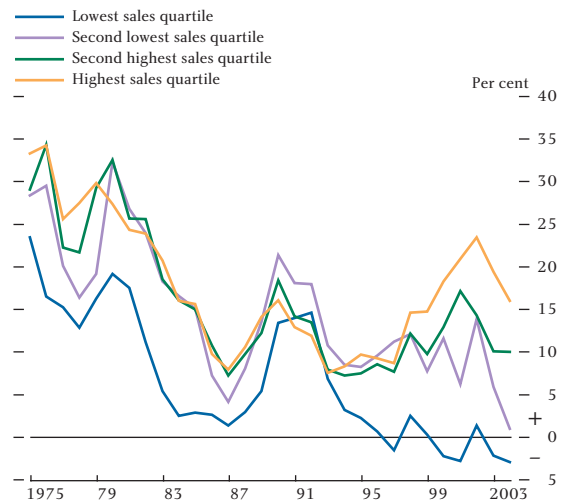**(iii)   Corporate gearing and company characteristics**

An alternative approach to comparing the empirical relevance of the different models is to investigate how gearing is related to particular characteristics of companies. This may provide a useful insight into the firms that have been primarily responsible for the movements in gearing at the aggregate level, and whether the firms who are more highly geared are better placed to be able to sustain those debts. It may also help to discriminate between the competing theories of corporate capital structure by considering the implications of the different theories for the relationship

between gearing and company characteristics and assessing whether these relationships hold in the actual data.

(a)   Company size

The effect of company size on gearing is unclear theoretically. Larger firms tend to enjoy more diversified income streams and a lower volatility of earnings; as such, they may face a lower risk of bankruptcy, which should point to a positive relationship between gearing and size. Indeed, this would be predicted by both the trade-off and pecking order approaches: in the former, the lower risks of distress would push up optimal gearing, while in the latter, the lower volatility of earnings and lower costs at which larger firms can access debt markets should also tend to raise gearing. But at the same time, larger firms tend to be subject to less acute information asymmetries, given that more published information is generally available to investors. This may mean that larger firms face fewer difficulties in raising equity relative to debt finance. Other things equal, that might suggest a negative relationship between gearing and size.

Chart 5
Capital gearing by sales quartile(a)

— Lowest sales quartile
— Second lowest sales quartile
— Second highest sales quartile
— Highest sales quartile

Sources: Thomson Financial Datastream and Bank calculations.

(a) Median capital gearing at market value of quartiles of companies ranked by sales in each year.

The empirical evidence points to a positive relationship. The effect is small and uncertain in some studies (see Barclay *et al* (1995)), but well-determined in others (see Fama and French (2002)). In an international comparison, Rajan and Zingales (1995) find evidence of a significant positive relationship in most of the G7

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(1) Recent work on modelling aggregate corporate liquidations is discussed in Bunn, Cunningham and Drehmann (2005).

countries. Company accounts data for UK-quoted companies provide some support for this, although the evidence is not conclusive. If companies are grouped by sales, the quartile with the lowest turnover has persistently lower median gearing than the other three quartiles throughout nearly all of the 1975–2004 period (Chart 5). The gearing of these other quartiles moved in a similar way up to the mid-1990s, since when (as noted earlier) the gearing of the largest firms has risen most rapidly, to move above that of the other groups. Given the dominant role of these firms in the aggregate statistics, the increase in aggregate gearing since the late 1990s can be explained by large firms leveraging up. This increase in debt concentration is important in informing surveillance of financial stability risks in the corporate sector. It is perhaps reassuring, because large companies generally have a lower probability of default than smaller firms, although should large firms get into financial difficulty the systemic consequences are potentially greater.

(b)   Profitability

The pecking order model clearly suggests that there should be a negative relationship between gearing and profitability. By contrast, the trade-off model points to a positive relationship, given that the tax benefits of debt would tend to increase and the costs of financial distress decrease as profits rise. A positive relationship is also implied by agency cost models, in which gearing disciplines managers of more profitable firms to commit larger fractions of earnings to debt interest payments.

Empirical evidence tends to support the pecking order model's prediction of a negative relationship between corporate gearing and profitability (see, for example, Titman and Wessels (1988), Rajan and Zingales (1995) and Fama and French (2002)). Chart 6 shows median capital gearing at market value of four groups of UK-quoted non-financial companies ranked by profitability. Between 1975 and 1995 there was evidence of a clear negative relationship between gearing and profitability, but this has broken down in recent years as the least profitable firms have become less highly geared and more profitable companies have increased their leverage. One explanation is that the least profitable companies have been deterred from borrowing because their earnings have fallen to levels that are insufficient to service higher debts.[1]

From a financial stability viewpoint, the recent rise in gearing among the more profitable firms and fall in gearing at the least profitable firms is reassuring, since the more profitable the firm (other things equal) the more able it is to sustain higher levels of debt. The more profitable companies also tend to be the larger firms that were identified above.

Chart 6
Capital gearing by profitability quartile(a)
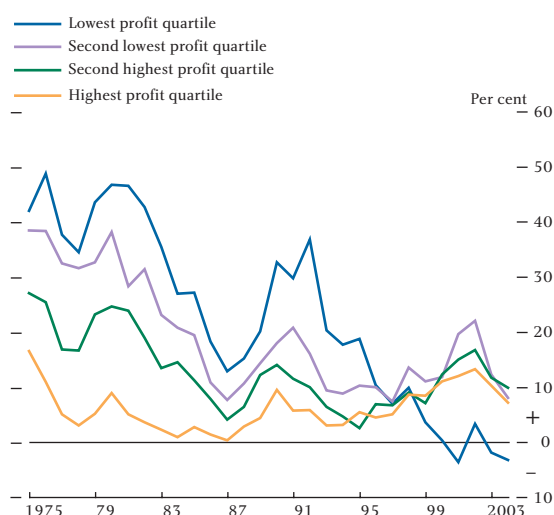
Sources: Thomson Financial Datastream and Bank calculations.

(a) Median capital gearing at market value of quartiles of companies ranked by their operating profit margin in each year.

(c)   Growth opportunities

Theory suggests that separate considerations apply to the capital structure of high-growth companies with substantial investment opportunities. Such companies should aim for low gearing now because the opportunity cost of not being able to finance valuable future investment opportunities is greater than for a firm which does not expect to have such profitable opportunities. Agency cost models would suggest that such companies also have less need for debt to control free cash flows. On the face of it, the higher investment requirements of these companies should lead to higher gearing in the pecking order model, but Fama and French (2002) proposed a dynamic version of the pecking order, where firms currently maintain more low risk debt capacity in order to finance greater expected investment in the future. In such a model, high-growth firms would again have low current gearing.

Growth opportunities are generally proxied in empirical studies by the ratio of the market value of the company's assets to their book value. Most of these studies, notably

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(1) These are generally small companies who are particularly concentrated among technology-based industries.

those by Barclay *et al* (1995), Rajan and Zingales (1995), Fama and French (2002) and most recently Hovakimian *et al* (2004), support the theory in finding strong evidence of a negative relationship between gearing and market to book ratios. UK company accounts data lend clear support to these empirical findings: Chart 7 shows that companies with the highest (lowest) levels of Tobin's Q (one proxy for the market to book ratio) had the lowest (highest) gearing for most of the 1975–2004 period.

Chart 7
Capital gearing by Tobin's Q quartile(a)
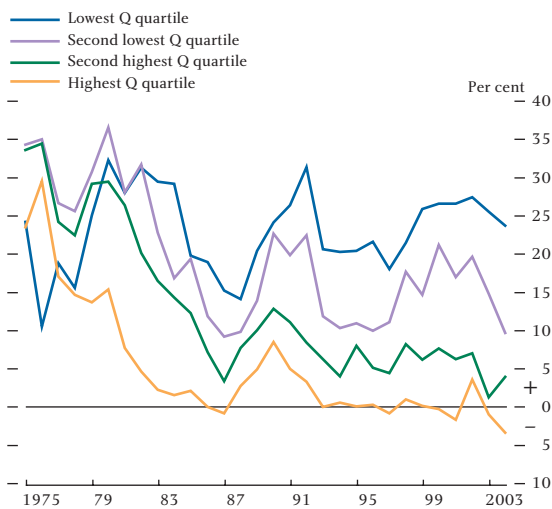
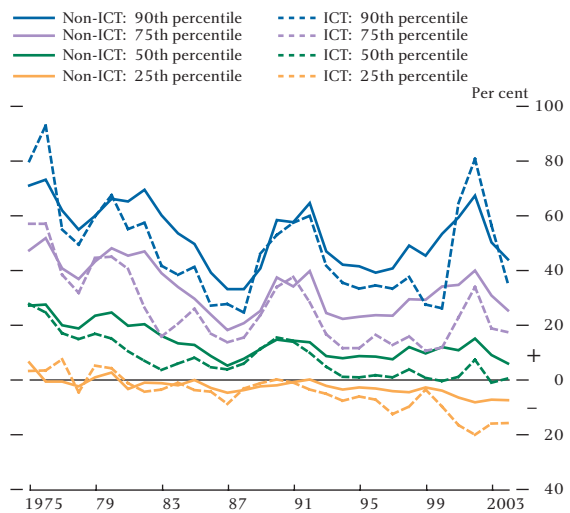Sources: Thomson Financial Datastream and Bank calculations.

(a) Median capital gearing at market value of quartiles of companies ranked by Tobin's Q (ratio of market value of capital stock to replacement cost) in each year.

The Bank's work on the financing of technology-based small firms, summarised in Brierley (2001), finds that debt finance is less important than equity finance for high-tech firms. Given that high-tech firms are likely to have stronger growth opportunities than small firms in general, this is consistent with a negative relationship between gearing and growth opportunities. Chart 8 shows that capital gearing of companies in the information, communications and technology (ICT) sector has generally been lower than that of non-ICT companies across the distribution for most of the period between 1975 and 2004.

(d) Tangibility of assets

The consensus in the literature is that, other things being equal, the greater a firm's dependence on intangible assets (such as patents), the lower should be its target and actual gearing. Firms with low proportions

(1) Current assets are defined as assets that can be converted into cash within one year.

Chart 8
Distribution of capital gearing of ICT and non-ICT companies(a)(b)

Sources: Thomson Financial Datastream and Bank calculations.

(a) Market value measure. The 90th, 75th, 50th and 25th percentiles are shown, solid lines represent the distribution for non-ICT firms, and broken lines show the distribution for ICT companies. The 10th percentile is omitted to reduce the height of the y-axis and improve the readability.
(b) ICT sector is defined as the Thomson Financial Datastream sectors: computer hardware, computer services, consumer electronics, electrical equipment, electronic equipment, internet, telecom equipment, telecom fixed line and telecom wireless.

of tangible assets (that is, physical assets such as property, vehicles and machinery) are likely to face relatively high bankruptcy costs, given that they can only offer limited collateral to secure their debt finance, and so will tend to have low levels of target gearing according to the trade-off theory. The lack of collateral also raises the agency costs of debt relative to equity finance, so such firms should also have relatively low gearing under the pecking order approach. This is borne out by UK company accounts data for the quoted sector, which confirm that capital gearing has generally been positively related to capital intensity (the ratio of fixed to current assets(1)), and therefore inversely related to the importance of intangible assets, since the mid-1980s (Chart 9). This is reassuring for financial stability as it suggests that it is principally the companies with most collateral available to secure their debt that have raised gearing to historically high levels in recent years.
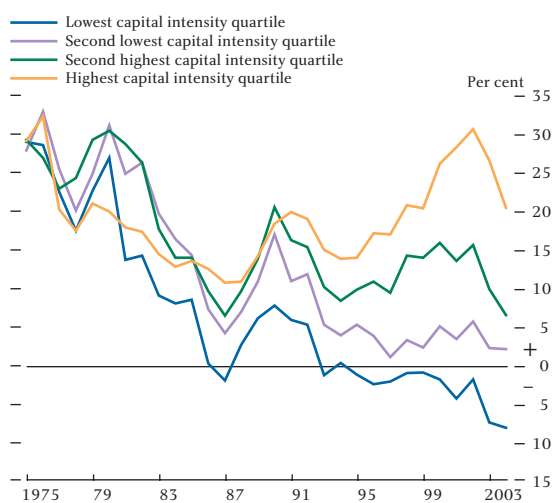
(e) Persistence in gearing levels

These relationships between gearing and various financial characteristics of companies may help to explain the persistent manner in which gearing levels appear to vary across industries, although there can also be substantial dispersion between different firms in the

same industry. UK company accounts data indicate that industries with persistently high gearing include hotels, house builders, restaurants and pubs, transportation, vehicle distribution and water, while examples with low gearing include the media, pharmaceutical, retailing and, as noted above, IT/high-tech industries. This persistence in gearing levels in certain industries may reflect common company-level characteristics with systematic links to target gearing levels, for example (as already noted) the ratio of tangible to intangible assets.

Chart 9
Capital gearing by capital intensity quartile(a)

Sources: Thomson Financial Datastream and Bank calculations.

(a) Median capital gearing at market value for quartiles of company ranked by capital intensity (ratio of fixed to current assets) in each year.

Persistence in gearing also reflects the fact that the flows used to adjust balance sheets are relatively small in relation to the stocks being adjusted, which means that adjustment is likely to be a protracted process. Consistent with this, Benito and Young (2002) find that the coefficient on the lagged dependent variable in a simple autoregression (AR(1)) for corporate gearing using a panel of UK companies is of the order of 0.6. In other words, the level of a firm's gearing today is heavily influenced by its level in the recent past. This persistence in gearing has important financial stability implications because it illustrates that firms may not be able to adjust their debt levels easily in response to shocks. For example, were interest rates to rise sharply, debt levels could not be quickly reduced, implying an increase in debt-servicing costs in the short run and consequently a rise in bankruptcy risks.

Persistence in gearing does, however, tend to erode over time. A one-year transition matrix for UK-quoted companies shows that, over the period 1975–2004, 73%

of companies ranked in the highest gearing quartile in any one year remained in that quartile in the following year (Table C). That proportion falls to 40% in the ten-year transition matrix.

Table C
Capital gearing one and ten-year transition matrices(a)(b)

		Group in t			
		1	2	3	4
Group in $t-1$	1	73	19	5	3
	2	18	56	22	4
	3	5	21	54	20
	4	3	4	19	73
Group in $t-10$	1	45	24	17	14
	2	24	30	26	19
	3	16	26	31	27
	4	15	19	26	40

Sources: Thomson Financial Datastream and Bank calculations.

(a) Market value measure. One-year transition probabilities are based on a sample of 32,525 firms with capital gearing data in year t and year $t-1$, the ten-year probabilities use 12,584 firms with observations in t and $t-10$.
(b) The groups one to four run from the least to the most-geared companies.

Conclusions

Our approach to modelling corporate gearing in empirical work at the aggregate level is based on the trade-off model, in which companies target a long-run equilibrium gearing ratio that is determined by the tax benefits of gearing relative to the risks of financial distress. This work suggests that the equilibrium level of gearing has been relatively stable over the past decade, and the sharp rise in UK corporate gearing between 1999 and 2002 to historically high levels cannot be explained by a substantial rise in the target. It may partly reflect special factors, beyond the scope of the model, such as borrowing by telecoms companies to acquire 3G mobile phone licences. And the shift to a more stable, low inflation, low interest rate macroeconomic environment may have increased the true target level of gearing by more than our estimate. Low interest rates allow firms to remain above their equilibrium gearing for longer, given that the costs of servicing high debt levels are likely to be relatively low.

The implication of gearing being above the long-run equilibrium level is that companies will seek to adjust their gearing back towards target over time, but that this process will be protracted. The initial stabilisation and subsequent modest fall in gearing since 2002, along with the corporate sector maintaining a financial surplus over this period, supports this interpretation, as does the fact that gearing levels tend to be persistent, with the degree of persistence declining over time. The work suggests that the adjustment will occur partly through reductions in dividend payouts and partly through increases in equity issuance. Less evidence is found that

investment spending will be cut back solely in response to balance sheet pressure at the aggregate level, although empirical work at the firm level has shown stronger support for this possibility.

The aggregate model cannot be used directly to test between models of corporate gearing postulated in the literature, not least because the assumptions underlying the pecking order, agency cost and control rights theories are less amenable to quantification. It seems unlikely that corporate capital structure can be fully explained by any one theory, especially given that the theories are not mutually exclusive.

Evidence from UK accounts-based data for quoted companies suggests that gearing has been persistently negatively related to growth opportunities and the importance of intangible assets in balance sheets over the past 30 years. There also seems to be a negative relationship between gearing and profitability over the bulk of this period. But that relationship appears to have broken down since 1995, as unprofitable firms have scaled back gearing and more profitable firms have leveraged up. The relationship between gearing and company size appears to be broadly positive, especially in the recent past when the rises in gearing have been concentrated among large companies.

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