Hard Times or Great Expectations?: Dividend omissions and dividend cuts by UK firms

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Abstract

The payment of dividends is one of the key unresolved puzzles of company financial behaviour. This paper uncovers a more recent dividend puzzle, that of an increasing proportion of quoted UK companies omitting cash dividends. Also motivated by a desire to understand corporate balance sheet adjustment, models for the incidence of dividend omissions and cuts are estimated as functions of financial characteristics including cash flow, leverage, investment opportunities, investment and company size. These financial variables can account for most of the increase in omissions since 1995. There is relatively little evidence to link this to the major tax reform of 1997 that abolished tax refunds on dividend income payable to tax-exempt institutions. Significant persistence effects indicate that companies are slow to adjust their balance sheets through dividends.

Key words: dividends; financial pressure; discrete panel data.

JEL classification: G35, C23, E52.

Summary

The payment of dividends is one of the key unresolved puzzles of company financial behaviour. The importance of understanding dividends also partly stems from their significance as a form of balance sheet adjustment. But relatively little is known about the determinants of a company's propensity to omit or cut its dividend in a particular year. The analysis presented in this paper, which addresses such issues, can also be interpreted in the wider sense of examining how firms respond to financial pressure.

Such analysis is important not least because it sheds light on the transmission mechanism of monetary policy through the corporate sector. If shocks to corporate cash flows affect the real economy through levels of investment then a dividend omission (or cut) may help protect investment plans and thereby attenuate any real effects on investment. Indeed, one view of dividend policies is that they are the central means through which companies attempt to maintain independence of financial and real decisions, adjusting payouts (albeit in a sticky manner) in order to preserve investment plans in the face of shocks to the balance sheet.

In examining the dividend policies of UK companies, the paper draws on the 'new view' model of taxation and corporate finance developed by King (1977). Theoretical suggestions from this approach are confronted with micro data on large numbers of quoted UK companies over the period 1974 to 1999 in order to understand the propensity for a company to omit and cut its dividend. The analysis produces several novel results. First, an increase in the proportion of quoted UK companies that omit a dividend from 1995 is uncovered. In 1995, the proportion of non-payers stood at 14.3% and reached 25.2% in 1999. Earlier high-points of omission were 16.1% and 17.9%, witnessed in 1982 and 1992 respectively, both periods of recession. This increase in dividend omission since 1995 is largely accounted for by an increase in the proportion of companies that have never paid a dividend. Second, firms with the highest levels of payout in 1999 (that is, at the 90th percentile) distribute more than double the amount to shareholders, relative to sales, than did their counterparts in 1977. Dispersion in the level of dividend payment has increased in recent years.

Third, the paper sheds light on the characteristics associated with a dividend omission and dividend cut. Low levels of cash flow, high levels of income gearing and leverage, small scale and greater opportunities for investment are all associated with an increased propensity to omit a dividend. These factors, in particular those of cash flow and leverage, are more strongly related to the propensity to cut the dividend suggesting that dividend cutting is a stronger indicator of financial fragility than is dividend omission.

Fourth, the paper uses these results to account for the observed increase in dividend omission. The analysis indicates that these characteristics can account for much of the increase in the proportion of zero-payout firms. This implies that there is a more limited role for a change in dividend policies *per se*, controlling for changes in the characteristics of firms, although we do find evidence of a change in the responsiveness of omission propensities to financial characteristics for the post-1995 period. Analysis of aggregate effects on the propensity to omit

suggests that there is relatively little evidence to link this to the major tax reform of 1997 that abolished tax refunds on dividend income payable to tax-exempt institutions. We also consider a role for state dependence in the incidence of dividend omission and find that the propensity to omit and cut is highly persistent, controlling for financial characteristics and unobserved heterogeneity. Companies are slow to adjust their balance sheets through their dividends.

These results have a number of implications. The recent increase in dividend omission is associated with a larger number of companies who have never paid dividends. For the most part, these are relatively small companies with strong investment opportunities. It might be felt then that the recent increase in dividend omission is less worrying than in previous periods when the dividend omitters were former payers who were attempting to repair their balance sheets. In this sense, the changes we have identified reflect 'Great Expectations' rather than 'Hard Times'. Nevertheless, the evidence suggests that it is low levels of profitability among dividend omitting companies that is the single most important factor accounting for the increase. As such, concerns may remain until the investment opportunities are converted into higher profitability.

Another implication is that those investors, such as trustees, that require a record of dividend payments are restricted to a materially smaller share of the quoted company sector than in the past. The increasing incidence of non-dividend-paying companies also implies that the usefulness of company valuation methods based on the existence of such payments, such as the dividend discount model, is called into question.

Finally, for dividend-omitting companies the potential role of dividend policy to respond to balance sheet shocks while maintaining independence of nominal and real outcomes is forsaken. Rather than have the option of adjusting payouts in order to maintain investment plans such companies must instead borrow more or raise more equity finance. The existence of a wedge between the price of internal and external funds makes it more likely that such companies' real investment decisions will be affected by shocks to cash flow.

1 Introduction

The payment of dividends is one of the key unresolved puzzles of company financial behaviour. Whereas companies would be indifferent to paying dividends under the conditions of Miller and Modigliani (1961), tax considerations can tilt the case towards retaining rather than distributing profits. The puzzle arises when companies pay dividends when tax considerations suggest that their shareholders would be better off if they did not. This has been the case historically in the US. Arguably, transactions costs (for trading equity), agency problems and signalling models provide a case for the payment of dividends but, as Easterbrook (1984, p. 650) noted, 'businesses find dividends obvious', whereas 'economists find dividends mysterious'.

According to the recent evidence of Fama and French (2001), US businesses have begun to behave, in respect to their dividend payments, in a way which economists might find less mysterious. They note that the percentage of publicly traded firms omitting cash dividends has increased from 33.5% in 1978 to 79.2% in 1999. But far from resolving the dividend puzzle, this raises the further question of what has changed, if anything, to make businesses behave in this way now. Indeed, has there been a change in the behaviour of individual businesses or have the financial characteristics of the business population changed so as to make dividend payments less likely?

This paper marshals evidence for the United Kingdom, using data on all quoted, non-financial companies in the United Kingdom available through Datastream over the period 1974-99. We also uncover a sharp increase in the proportion of companies omitting cash dividends. This rose to 25.2% in 1999, significantly higher than earlier high-points of dividend omission of 16.1% and 17.9%, witnessed in the recessionary years of 1982 and 1992 respectively. To understand this change, we model the probability that a company omits or cuts its dividend and then consider the extent to which changing characteristics of firms account for this pattern of increasing omission, as opposed to changing dividend policies *per se*. The set of issues considered, and empirical methods used, are broader than that investigated in the US by Fama and French (2001). A potentially important factor in the United Kingdom is the substantial change to the taxation of corporate source income, with tax credits on dividend payments to pension funds being abolished in July 1997 and Advance Corporation Tax (ACT) ending in April 1999.

Our analysis can be interpreted in the wider sense of examining how firms respond to financial pressure. Such analysis is important not least because it sheds light on the transmission mechanism of monetary policy through the corporate sector. If shocks to corporate cash flows affect the real economy through levels of investment (eg Bernanke *et al* (1996), Fazzari *et al* (1988)), then a dividend omission (or cut) may help protect investment plans and thereby attenuate any real effects on investment. It therefore seems important to consider the effects of financial pressure on dividends. This extends Nickell and Nicolitsas's (1999) study of how financial pressure affects companies to consider the propensity for such companies to omit and cut the dividend. Indeed, one view of dividend policies is that they are the central means through which companies attempt to maintain independence of financial and real decisions, adjusting

payouts (albeit in a sticky manner) in order to preserve investment plans in the face of shocks to the balance sheet.

The remainder of the paper is organised as follows. Section 2 describes the theoretical background to the study of dividends, focusing on the 'dividend puzzle', and the financial characteristics expected to be related to the propensity to pay a dividend. Section 3 contains data description of trends in dividend payments and these financial characteristics among quoted UK firms. The estimation method and results obtained for panel data probit models of dividend omission and dividend cuts are described in Section 4. The results then focus on accounting for the increasing proportion of non-dividend payers since 1995. Section 5 concludes.

2 Economic background

According to Fama and French (2001), 'dividends have long been an enigma', largely because companies in the US have traditionally paid cash dividends despite their clear tax disadvantage. Various approaches, summarised in Allen and Michaely (1995), have been suggested to reconcile observed practice with simple economic reasoning. These include signalling and the role dividends may play in disciplining companies when there is asymmetric information between managers and outside investors (eg Miller and Rock (1985), Easterbrook (1984)). If such influences are important in the United States, where they stand out because of the tax disadvantage of dividends, they should also be relevant in countries like the United Kingdom where the tax system historically has been less punitive towards dividend payments. The difficulty with these explanations for dividend payments is that they ignore the possibility that information or discipline might be gained more cheaply than by paying expensive dividends (Crockett and Friend (1988)). Moreover, they cannot offer a convincing explanation of why the propensity to pay dividends has declined markedly in the United States.

In this section we ignore any possible informational advantage to dividend payments and instead attempt to clarify the possible institutional reasons why companies might pay dividends even when this is subject to a tax disadvantage. This is particularly important in the UK context where recent tax reform has made dividends much less attractive for the tax-exempt institutions who are the most important single class of equity holders.[(1)] The model we use embodies the so-called 'new view' of corporate taxation originating from the work of King (1977) and further developed by Auerbach (1979), Bradford (1981) and others. A recent statement of the model is Auerbach (2001). According to the new view, the optimum level of dividends is chosen jointly with fixed investment and its financing to maximise the value of corporate equity. In the absence of taxes, the model would be consistent with the Modigliani-Miller propositions about the irrelevance of debt and dividend policy to firm values. A key prediction of the new view is that mature companies obtain equity funds for investment through the retention of earnings and distribute residual funds as dividends, even when the tax system discriminates against dividends (Auerbach and Hassett (2000)).

[(1)] Bell and Jenkinson (2000) examine the recent tax reform to show that the tax-exempt funds act as the 'marginal investor' in the UK market.

The model is useful in discussing dividend behaviour in the United Kingdom as it appears consistent with the broad stylised fact that companies finance investment using retained profits. Moreover, it outlines the circumstances where companies will choose to omit dividends altogether and the implications of this for company investment decisions. Further, the model has clear and interesting predictions about how companies will respond to changes in dividend taxation.

To solve the model, it is necessary to describe how the value of the firm is related to the constraints it faces.[2] The value of corporate equity is determined by the arbitraging activities of risk-neutral marginal investors indexed *m* who ensure that the return to holding a company's equity for one period is equal to what could be earned on other assets:

$$\left(1+\left(1-t^{m}\right)r_{t}\right)E_{t}=\left(1-t^{m}\right)D_{t}+(E_{t+1}-NEF_{t})-g^{m}(E_{t+1}-NEF_{t}-E_{t}) \qquad \textbf{(1)}$$

where t^m is the personal income tax rate, r is the one-period nominal interest rate, E is the value of equity in the company at the beginning of the period, D is the value of dividends paid out (including any tax credits) at the end of the period, NEF is the net value of equity issued during the period and g^m is the personal capital gains tax rate.[3] The left-hand side is the post-tax payoff at date $t+1$ on an investment of E_t in other assets and the right hand side is the post tax payoff to investment in the firm. This is made up of dividends and capital gains on the equity of the firm excluding the value of equity issued after t.

Rearranging **(1)** gives an expression for the value of equity as a function of dividends, taxes, the rate of interest and new equity:

$$E_{t}=\frac{(1-t^{p})D_{t}+E_{t+1}-NEF_{t}}{(1+R_{t})} \qquad \textbf{(2)}$$

where $(1-t^{p})=\dfrac{(1-t^{m})}{(1-g^{m})}$ and $R_{t}=\dfrac{(1-t^{m})r_{t}}{(1-g^{m})}$

This expression shows how future payments to shareholders are discounted to determine the value of equity. This plays a vital role in determining the optimal timing of payments between the firm and its shareholders. The other key factor is the rate at which the firm is able to transform current into future resources and this is reflected in the sources and uses of funds identity:

$$D_{t}=\frac{1}{(1-c)}\left[(1-t)(p_{t}-r_{t}^{B}B_{t})-(1-gt)P_{t}^{I}I_{t}+B_{t+1}-B_{t}+(1-f)NEF_{t}\right] \qquad \textbf{(3)}$$

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[2] The particular version of the model used here is described more fully in Young (1996).
[3] We ignore the indexation of capital gains tax.

where t is the corporate tax rate, p is the nominal profits of the firm, B is its stock of debt, r^B is the interest rate paid on corporate debt, g is the present value of investment allowances, P^I is the gross price of investment goods, I is the volume of capital investment and f represents the unit cost of issuing new shares. The degree of integration between the corporate and personal tax systems is reflected in c, the rate at which tax credits on dividend income are granted against personal income tax. This is equal to zero in the United States, but under the 'partial imputation system' that has operated in the United Kingdom since 1973, dividends carry a tax credit of £c/(1-c) for every £1 of dividend income, where the value of c varies over time and across investors.

Equation **(3)** is an identity which states that dividend payments can be financed by new debt, new equity or from nominal profits net of interest payments, corporate tax and spending on new capital. The optimum level of dividends is chosen jointly with investment and its financing to maximise the value of equity **(2)** subject to **(3)** and other constraints. These include the key economic constraint that profits are related to the capital stock, which is in turn determined by physical investment, and any constraints on borrowing.[4] But the choice will also depend upon constraints deriving from the legal and institutional structure of the economy.

The main institutional constraints considered are those on dividend payments and on new share issues. Dividends cannot be negative as shareholders cannot be forced to commit extra funds to the firm ($D_t \geq 0$). There are also upper limits on the size of dividend payments to prevent companies weakening their capital base unduly, although these are not considered in this paper. It used to be the case in the United Kingdom (discussed in King (1977)) that public companies were prevented by law from repurchasing their shares so that new equity finance could not be negative ($NEF_t \geq 0$). The rules were changed in the 1981 Companies Act and companies are now allowed to repurchase their shares, although many limitations remain. These are mainly to prevent firms avoiding tax. In particular, for tax purposes a component of any share buy-back is treated in exactly the same way as a dividend distribution while the size of the capital element is negotiable with the Inland Revenue. This can have advantages for companies wishing to 'stream' distributions according to the tax preferences of their different shareholders. The effect from a tax perspective is that share buy-backs can be considered equivalent to dividends rather than a negative new issue of equity. Similar considerations apply in the United States.

The solution to the optimisation leads to a set of equilibrium conditions for capital, new equity issues and debt. The level of dividends is then determined either as a residual using **(3)** or by a binding constraint. In equilibrium, the demand for capital is determined by the user cost of

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[4] These can be represented by an upward-sloping loan supply function $r_t^B = r_t + r\left(\frac{B_t}{P_t^I K_t}\right)$ where $r' \geq 0$. The elasticity of loan supply is given by $h^s = \frac{\partial r^B}{\partial B}\frac{B}{r^B}$, this is likely to be close to zero at low levels of debt but to approach infinity as leverage gets beyond a level that lenders feel comfortable with. It should be noted that any premium is to compensate lenders for deadweight costs associated with default and not just the risk that loans will not be repaid.

capital. This is given by the traditional Hall-Jorgenson formula except that it is adjusted to reflect any binding dividend constraints. This is:

$$J_{t+1} = \frac{(1-gt)}{(1-t)} \frac{P^I_{t+1}}{P_{t+1}} \left(\frac{(1+i_{t+1})}{(1+p^I_{t+1})} - (1-d) \right) \qquad \textbf{(4)}$$

where J is the user cost of capital. The nominal cost of capital in this expression is given by:

$$(1+i_{t+1}) = (1+R_{t+1}) \left(\frac{(1-t^p) + l^D_t (1+R_t)}{(1-t^p) + l^D_{t+1} (1+R_t)(1+R_{t+1})} \right) \qquad \textbf{(5)}$$

where l^D is a non-negative Lagrange multiplier on the constraint that dividends must not be negative.

This indicates that the cost of capital, and hence investment, will be unaffected by how investment is financed unless the dividend constraint binds in one period or the other. This is determined by the financing incentives facing the typical firm. To explore this, we first consider whether shareholders would benefit from new share issues used to finance dividend payments. We then go on to consider the advantages to them of using corporate debt to transfer dividends inter-temporally.

New share issues

The value to shareholders of a new share issue can be evaluated straightforwardly. By the budget constraint, **(3)** a new share issue would generate dividends of (1-*f*)/(1-*c)* for every unit issued. By **(2)**, extra dividends derived from a new issue raise the value of equity by $(1-t^p)(1-f)/(1-c) - 1$. If this is positive, then shareholders gain from higher dividends financed by new issues. Under the US tax system where the imputation rate c is zero this expression is negative for many investors even in the absence of costs of new equity (f=0). This means it would never be optimal under the assumed conditions for US companies to make dividend payments *and* issue new shares since this incurs a gratuitous tax liability which could be avoided by not paying dividends.[(5)]

Ignoring debt, this would suggest that under the US system, cash-rich 'mature' companies would minimise dividend payments by financing investment out of retained profits and not issuing new shares. Dividends would then be paid out of residual cash flows. But cash-poor 'immature' companies facing a binding dividend constraint would have a higher cost of capital by **(5)** reflecting the higher cost of new equity finance. This would be reflected in a lower rate of investment for given investment opportunities as illustrated in Chart 1.

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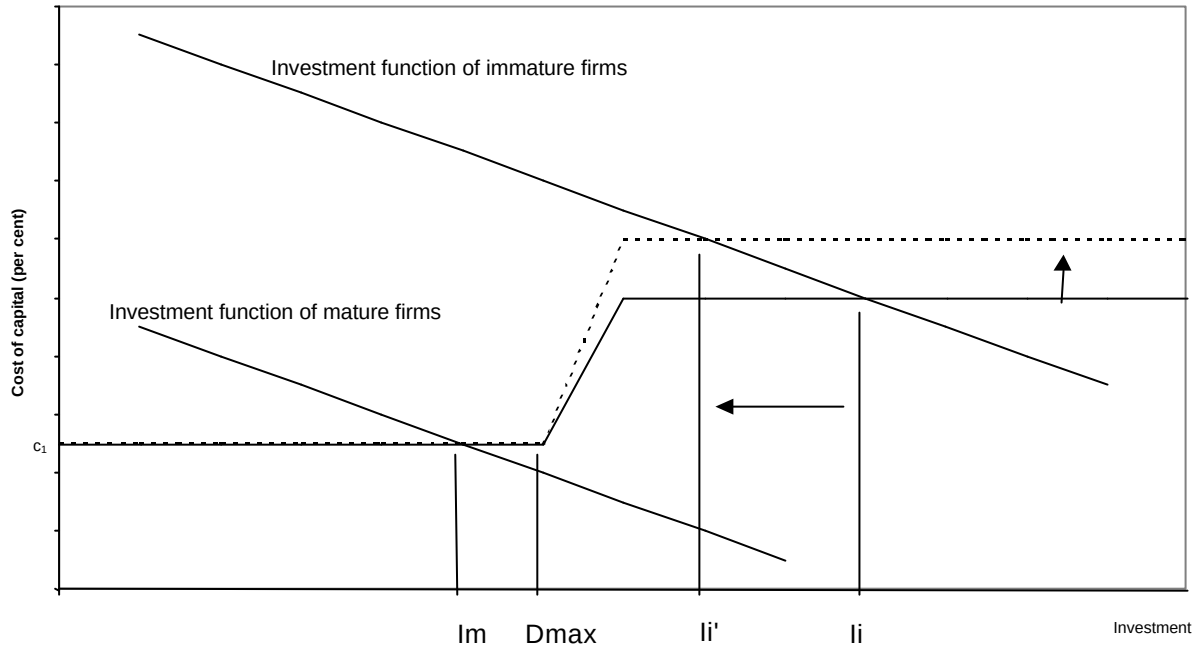
(5) Indeed, it would be optimal for companies to use the proceeds available to pay dividends to buy back shares. But, as discussed earlier, there is an asymmetry in the tax treatment of share buybacks that eliminates the advantage of this.

Chart 1 shows the cost of capital function for firms with available cash flow of Dmax; it is higher to the right of Dmax since investment in excess of this level needs to be financed by expensive new share issues. Thus, for mature firms, with investment intentions low relative to cash flow (as shown by the investment function closer to the origin), desired investment (at Im) can be funded out of the available cash flow with the residual funds paid out as a dividend (Dmax – Im). But for immature firms, with high investment intentions relative to cash flow (as shown by the investment function further from the origin), investment of more than Dmax (at Ii) would require that new shares are issued. As such the cost of capital is higher and investment spending lower than it would have been had the firm's cash flow been stronger.

Chart 1: Dividends, investment and the cost of capital



This model can be used to examine the effects of changes in the UK tax system announced in the July 1997 Budget. Until then, tax-exempt institutions could claim back the tax credit payable on dividend income. Since a dividend payment of £800 at the time attracted a tax credit of £200, the abolition of payable tax credits had a substantial effect on the attractiveness of dividend income from their perspective. Until 1997, in contrast to the US position, the imputation system had given UK companies the incentive to issue new shares and use the proceeds to pay out dividends to the maximum extent possible. The fact that new share issues were not a significant source of investment finance suggests that transactions costs outweighed the tax advantage. In this case, new issues would have been used by companies facing either low transactions costs or binding dividend constraints. This latter group would include 'immature' companies whose investment opportunities are large relative to the amount of profit they generate.

The changes to the UK tax system that eliminated the tax credit for pension funds had the effect of making the system more like that in the United States.[(6)] The main effect of the change would

[(6)] Recent changes to UK corporate taxation are summarised in Dilnot *et al* (2001), pages 75 – 78.

have been to reduce any incentive to issue new shares. But since this was relatively unimportant prior to the tax change, it is likely to have had relatively little effect on corporate behaviour. The reduction in tax credits would have raised the cost of capital of those companies using new share issues as the marginal source of finance. This is shown in Chart 1 in the upward shift in the user cost of capital function to the right of the point where dividends are available to finance investment (Dmax), shown by the dotted line. According to the model, the main effect of the change in tax credits would have been on immature companies who needed to issue equity to fund expansion. Since these companies would not have been paying dividends in the presence of the tax credit, the change would not have affected their dividend payments although it might have reduced their investment spending (from I_i to I_i').

Borrowing

Taking account of borrowing does not substantially change these conclusions. When there is a tax disadvantage to dividend payments, companies could use any excess cash flow to build up assets or run down debt instead of paying dividends, but this would merely postpone the question of how to avoid the dividend tax. In fact, optimal indebtedness is also a function of relative tax rates and dividend constraints and there are many circumstances where financial behaviour would tend to encourage greater indebtedness and exacerbate the problem in the short term.

The incentives to borrow depend on relative tax rates. The typical company will wish to borrow more when the corporate tax rate is greater than the personal tax rate adjusted for capital gains.[7] In these circumstances, it can borrow at a post tax rate that is lower than the rate at which its shareholders can lend the proceeds. With such incentives, equilibrium can only be established when the company borrows so much that the dividend constraint binds in the future or when the cost of company borrowing endogenously rises to bring about an internal equilibrium where the dividend constraint does not bind at either date.

In the first case, the company has the incentive to borrow sufficient funds that its interest payments exhaust its cash flow in the future. But this means that it pays out the borrowed funds in the form of dividends in the present. This clearly does not resolve the issue of how to avoid dividend taxes, except by suggesting that they cannot be avoided.

In the second case, the company increases its indebtedness and this raises the cost of borrowing until an internal equilibrium position is reached. In this position, dividends are paid in both the current and future periods and debt reaches an optimum level determined partly by what lenders are prepared to lend. This means that retained profits are the marginal source of investment funds and, by the expression for the cost of capital, do not impact on investment decisions. This particular case could represent actual behaviour in the United States. The change in dividend behaviour noted by Fama and French (2001) could then be accounted for by changes in borrowing behaviour over time. Increased indebtedness would lead eventually to lower

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[7] In the absence of dividend constraints and endogenous changes in borrowing constraints, the company would increase borrowing when $\left(\frac{(1-t^m)}{(1-g^m)} > (1-t)\right)$.

dividends as more corporate income is needed to service interest payments on debt. Some evidence for this effect is reported in Fenn and Liang (2001).

Empirical implications of the model

As stated, the model provides a framework for an empirical investigation of dividend behaviour. It does not point to a particular equation that could be estimated since this depends on relative taxes and which constraints are binding. Nevertheless, it suggests a range of factors that should be expected to affect the level of dividend payments and the choice of whether a dividend is paid at all. These include measures of profitability or cash flow, investment and investment opportunities and indebtedness. These can be used to motivate the subsequent empirical investigation of dividend behaviour. In summary, the following predictions emerge from the model:

1. Under the current UK tax system, dividends would be paid only when there is no cheaper way of distributing cash to shareholders. Companies would not issue new shares and pay dividends at the same time. But companies with large cash flow relative to investment opportunities are less likely to omit dividends, because of the absence of more tax-efficient means of returning cash to shareholders. The 1997 tax reform has had no effect on the propensity of such companies to pay dividends.

2. Physical investment is generally, but not always, independent of financial constraints and the level of dividends. The exception is when dividends are omitted and investment is lower than it would otherwise have been.

3. Investment opportunities as well as the current level of investment might have some independent power in explaining dividends. As in Fama and French (2001), these can be proxied by a Tobin's average Q measure, the ratio of market value of the company to replacement cost of capital. For given investment opportunities, dividend-paying companies will invest more than those omitting dividends reflecting their lower cost of capital.

4. In the short term, an increase in indebtedness could finance an increase in dividends, but in the longer run a higher level of debt will be associated with higher interest payments and lower dividends. When borrowing constraints bind, corporate dividend policy is largely dictated by the amount firms can borrow. But when debt is more freely available, changes in dividend payments are ultimately the main means by which companies can adjust their balance sheets.

In addition, a range of other factors, not included explicitly within the model, are likely to be important determinants of dividend policy:

1. Firm size is likely to be important, although this is an empirical issue. According to some arguments, agency problems and issues of signalling are expected to be more important for larger firms suggesting that such firms may be less likely to omit a dividend for a given financial

situation. Conversely, small firms might put less weight on dividend signals if there is a high fixed cost of state verification.

2. There may also be some inertia to corporate dividend behaviour. Firms may be reluctant to depart from previous levels of dividend payments because of fears about how such a move might be interpreted. This would be consistent with the well-known Lintner (1956) model which demonstrated the importance of dividend smoothing. This has implications for the speed of balance sheet adjustment following shocks.

The model as described has not taken account of a number of alternative factors that might also influence corporate dividend policies for a given set of financial characteristics. These include changes in the perception that shareholders need dividend income and the possibility that improvements in governance institutions might lessen the need for dividends as a disciplining device. But, as in Fama and French (2001), their merit will be assessed by default in the empirical estimation (see Section 4 below). It should also be noted that although we are able to shed light on the effects of the 1997 tax credit change, the paper does not aim to evaluate fully the consequences on distributions of that tax change. Instead the paper aims more generally to identify the factors underlying the propensity for companies to omit versus pay a dividend and the propensity to cut versus maintain their dividend.

3 Data description

The data

The data employed are derived from company accounts records held on Datastream, the on-line service covering all companies quoted on the London Stock Exchange (LSE), the Alternative Investment Market (AIM) and the Unlisted Securities Market that AIM replaced. Data for all non-financial companies, including those that subsequently failed, merged or de-listed, were obtained for the period 1974 to 1999.[8] The total number of companies for which dividend data are available during this period is 2,963, the number of company-year observations being 34,236. The annual sample size is at a low of 1,130 in 1992 and a high of 1,366 in 1997.

Data description

This section begins by considering some general aspects of dividend payment variation. Data on the distribution of the dividend-payout ratio and the dividend-sales ratio over time are presented. The analysis then focuses on the discrete outcomes of omitting and cutting the dividend.

Chart 2 illustrates the proportion of profits that companies pay out as dividends, how this varies across firms and over time. The dividend-payout ratio is the ratio of dividend payments to

[8] We used Datastream's lists of all live and dead UK companies for this purpose. Dead companies include those that subsequently merged or de-listed as well as those that failed.

post-tax (and post-interest) profits.[9] The median dividend-payout ratio over the period is 36.9%. But there is considerable variation around this median. The 90th percentile of the distribution over the full sample period is 95%, whilst the 10th percentile is zero. In fact, 12.7% of company-year observations involve zero dividend payments and 17% of the observations involve dividend payments equal to, or in excess of, post-tax profits. The payout ratios at the top of the distribution increase very significantly during the recessionary periods of the early 1980s and early 1990s, reflecting the increased presence of companies with negative profits.

Chart 2: Distribution of dividend-payout ratio

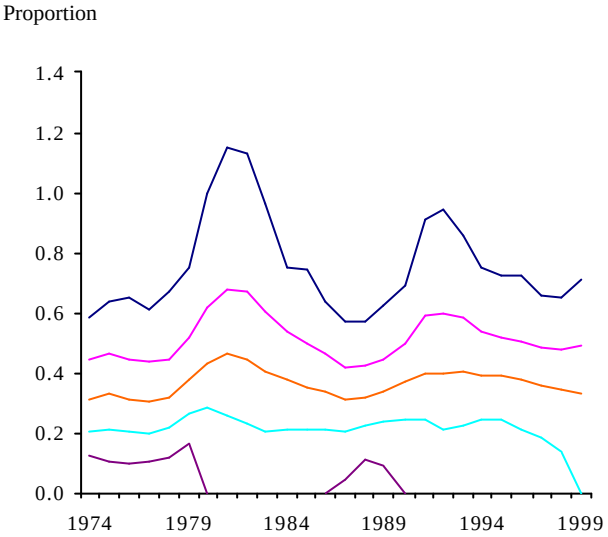
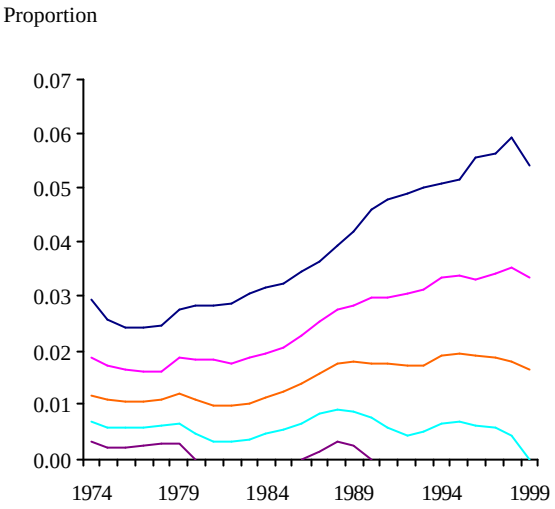


Chart 3: Distribution of dividend-sales ratio



Note: The 10th, 25th, 50th, 75th and 90th percentiles are shown.

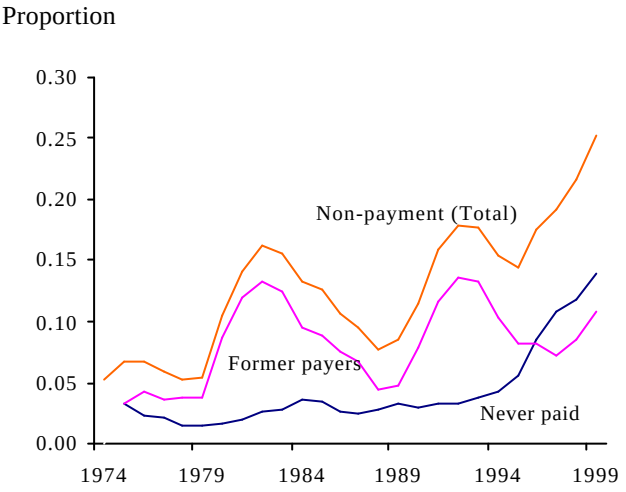
Chart 3 turns to the dividend-sales ratio. Normalising dividend payments on sales rather than profits will avoid some of the measurement issues that arise for the payout-ratio when profits are negative (footnote 9). The median ratio over the entire period is 1.3%. The 90th percentile is 3.9%. Over the period, there has been increasing diversity among companies in their dividend-sales ratios, particularly since 1994. At the lower end of the distribution, the dividend-sales ratio has fallen. In 1999, 25.2% of companies have zero dividend payments. Chart 3 suggests that there is a tendency for the dividend-sales ratio to decline during a recession, particularly at the lower points in the distribution. As companies face financial pressure, omitting the dividend is clearly one option available to them. But it is also clear from Chart 3 that there has been an increasing level of dividends relative to sales at the top end of the distribution. In 1977, the 90th percentile of the distribution was 2.4% but by 1998 this increased to 5.9%. The increase in dividends at the top of the distribution is an interesting contrast (of sorts) to the main story considered in this paper, that of a recent increase in the incidence of dividend omission in the United Kingdom.

Chart 4 illustrates the proportion of companies omitting a dividend. As expected, the proportion increased significantly during the recessionary periods. In 1979, the proportion of zero dividend

[9] Where a company has negative profits, its payout ratio is set to equal the 99th percentile of the distribution that excludes such companies.

companies stood at 5.4% but this increased to 16.1% by 1982. The proportion has also increased quite remarkably since 1995, increasing from 14.3% to 25.2% by 1999. Against a background of economic growth over this period this might seem rather surprising.[10] Following estimation of the basic models for the incidence of dividend omission, it is this observation that motivates further analysis in Section 4 to account for the increasing incidence of dividend omission. The combined market value of these non-payers has increased as a proportion of the total from 1.0% during the latter part of the 1980s to 7.5% in 1999.[11]

Chart 4: Proportion of quoted UK companies omitting a dividend



This pattern can be considered further by examining separately the proportion of companies that have never paid a dividend (ie in their available history since 1974) and the proportion that do not pay a dividend but at one time in this period did pay a dividend. Chart 4 shows that the increases in the proportion not paying dividends in the recessions are accounted for by former payers no longer paying a dividend. The increase since 1995 in the proportion of companies omitting a dividend is largely accounted for by the increasing presence of companies that have never paid dividends. From 1994, the proportion of the sample that has never paid a dividend has increased from 4.4% to 14.0%. There is an interesting contrast between the proportion of companies that have never paid a dividend—which has recently increased but has otherwise been stable during this period—and the incidence of former-payers that increased during the two recessions but has more recently been quite stable. This suggests that the recent decline in the incidence of dividend-paying companies is different in nature to that which occurred during the two recessions.

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[10] Bond *et al* (1996, footnote 12) state that zero dividends in the United Kingdom are not common, with less than 6% of their sample, for the period 1970-90, paying zero dividends. In the data used here, for the period 1974-1990 the proportion is 9.7%. In covering all quoted companies it is expected that our data have greater coverage of smaller quoted companies and size is inversely related to the propensity to omit a dividend. The analysis here also suggests that the statement that zero dividend companies are not common no longer holds.

[11] Independently, a recent paper by Lasfer (2001), examining data on quoted UK companies over the period 1989-99, also finds an increase in the proportion of dividend-omitting companies.

In 1995, the Alternative Investment Market (AIM) was created and relaxed the listing requirements for smaller firms relative to the previous Unlisted Securities Market (USM). As such, the size distribution of firms has become somewhat more skewed towards smaller firms (see Benito and Vlieghe (2000)). From 1994, the 10th percentile of the distribution of real sales (1995 prices) fell from £8.4 million to £4.2 million in 1999. The median over this period fell from £63.6 million to £55.2 million but the 90th percentile varied little, increasing marginally from £115.5 million to £115.8 million. There is also a steady increase in the proportion of quoted companies in our dataset that record their first year between 1994 and 1997, increasing from 0.023 in 1992 to 0.105 in 1997, from which point it has fallen back. The increase in new listings since 1994 is similar to that which occurred in the mid-1980s. A similar pattern of increased new listings is identified by Fama and French (2001) in the United States.

One factor that might be thought responsible for the increase in dividend omission is the greater use of share buy-backs as a way of returning cash to shareholders. In the first three quarters of 2000, share buy-backs by private non-financial corporations amounted to £7.1 billion, compared with £49.3 billion of domestically paid dividends (*Economic Trends*, February 2001, page 45). Looking at a sample of individual quoted companies in 2000, while 9.0% in total repurchased shares, only 1.7% of companies omitting a dividend also repurchased their shares.[(12)] This suggests that companies have not simply substituted payouts as repurchases in place of dividends. This is consistent with some US evidence that suggests that companies use repurchases to distribute temporary cash flows, whereas dividends are used for what are believed to be more permanent distributions (see Jagannathan *et al* (2000)).

Charts 5 and 6 consider the proportion of companies cutting their dividends in nominal and real terms respectively. The proportion of nominal cuts increased notably during the two recessionary periods and also in the period since 1995. For instance, in 1988 the proportion of such companies stood at 5.4% but reached 22.9% in 1991. In the raw data there is evidence of nominal stickiness in dividend payments. It is quite common for companies to report the same nominal dividend in successive years (and perhaps increase the nominal payment every second or third year). It may be that it is the real dividend that matters. Chart 6 reports the proportion of companies cutting the dividend where the dividend is deflated by the GDP deflator. In the high-inflation years of the mid-1970s, a high proportion of companies cut their real dividend year-on-year. As expected, the recent sharp increase in the proportion of companies cutting their nominal dividend is more modest when considered in real terms. But the proportion of such companies has increased from 17.5% in 1994 to 28.1% in 1999, alongside of which (but not mutually exclusive) are the 25.2% of companies omitting dividends altogether.

[(12)] These data, for each share repurchase transaction in 2000, were obtained from the London Stock Exchange. The number of companies undertaking a repurchase was 348, but most of these were financial companies, leaving 145 quoted non-financial companies carrying out a buyback in 2000. We matched these data to company accounts data available on Datastream, (although not all 2000 accounts were available). We were able to match financial data to 103 companies that carried out a repurchase, but also obtained data for the remaining 1,016 non-financial companies on Datastream.

Chart 5: Proportion of companies cutting dividend on last year

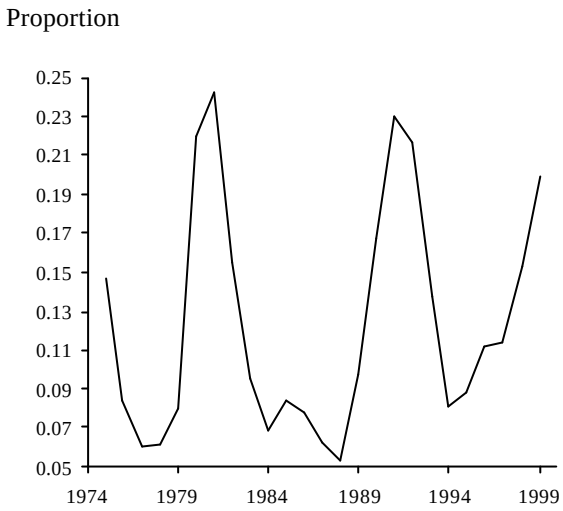
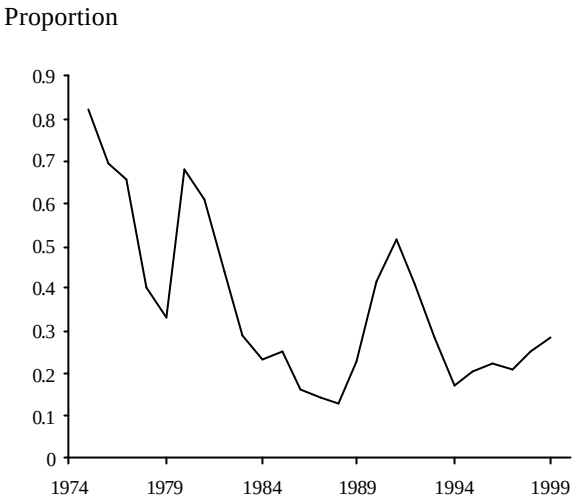


Chart 6: Proportion of companies cutting dividend in real terms



What has happened to the financial characteristics identified in Section 2 over this period? The lower tail of the distribution of profitability declined from 1995 (see Benito and Vlieghe (2000)). For instance, the number of companies making negative pre-interest profits increased from a low point of 64 in 1988 to 160 in 1992, from which point it fell to 119 in 1994. Since 1994 the number of loss-making quoted companies has increased markedly reaching 217 in 1999, representing 16.9% of companies, compared with 9.7% of companies in 1994. As noted above, the distribution of real sales also moved somewhat towards smaller companies from 1994/95. This is also expected to be associated with an increase in the incidence of dividend omission, *ceteris paribus.*

Table 1 presents summary statistics, stratifying the samples according to whether the firms pay a dividend or not, whether they have never paid a dividend and whether a dividend cut (nominal and real) has been made. Companies that omit a dividend are on average making negative profits with a rate of return of -2.8%, compared with an average return of 14.3% among dividend-paying companies. There is a considerable difference between the dividend omitters and payers in terms of interest gearing. Average interest gearing is 1.95 among the omitters with a figure of 0.28 among those that pay a dividend. Zero-payout firms in a particular year are also more highly leveraged for the period as a whole, although this is less apparent in 1995-99, where the difference in means is small and at the margin of significance (t-value=-1.76). It is also apparent that companies that have never paid a dividend are not highly leveraged on average, with a lower level of leverage than dividend payers since 1995. Non-payers of dividends are significantly smaller in size, with average sales (1995 prices) of £93 million of those not paying dividends compared with £530 million for dividend-payers. Tobin's Q is also significantly higher amongst companies that omit a dividend. There is a much smaller difference between the dividend omitters and payers in terms of actual rates of investment and the most recent data suggest that fixed investment is higher amongst the zero payout companies. Interestingly, this has not been the case historically, suggesting a possible change in this respect in recent years.

4 Estimation and results

Estimation method

Armed with these data, we model dividend 'events', considering both dividend omissions and cuts. The standard probit model for a binary event is augmented by a random effects term that allows for random unobservable differences in the propensity to pay dividends (or cut the dividend) across companies. For dividend omission, the outcome, y_{it}, is whether the firm omits a dividend (y_{it}=1) or not (y_{it}=0). This is represented by the following:

$$y_{it} = 1\{d\, y_{it-1} + X_{it}' b + a_i + e_{it} > 0\} \qquad \textbf{(6)}$$

where 'i' indexes companies i=1…N and 't' indexes years, t=1...T. a_i denotes the unobserved company-specific component that is assumed random across companies with $a_i \sim N(0, s_a^2)$. This component will pick up unobserved differences across companies in propensity to pay a dividend that are constant over time. $e_{it} \sim N(0, s_e^2)$ represents random error and is assumed to be independent of a_i. a_i and e_{it} are also assumed orthogonal to the set of covariates, X, with associated parameter vector b. Dividend omission is observed when the index function ($X_{it}b + a_i$) (where X_{it} is defined to include the lagged dependent variable, y_{it-1}) crosses a threshold which is here normalised to zero. The probability that this happens is normally distributed. As is standard, s_e is set to 1 for identification but with the implication that the parameter estimates are inconsistent in the presence of heteroskedasticity. A similar approach is used when we consider dividend cuts in which case y_{it} is 1 if the firm cuts its cash dividend and is 0 otherwise.

The within-company correlation is

$$r = \frac{s_a^2}{s_a^2 + s_e^2}$$

indicating the proportion of the total variance that is accounted for by the panel variance component, a_i. Under the testable restriction that $r = 0$, the model collapses to the pooled cross-sectional probit model. Estimation is by maximum likelihood.[13] Since the number of repeated non-payments of dividends is by no means an insignificant proportion of the total proportion of non-payment (Chart 4), *a priori* there seem grounds to prefer this approach to the pooled probit model. However, in the case of dividend cuts, since there are unlikely to be permanent differences between companies in their propensity to cut their dividend, the case for r being strictly positive is less clear. In any case the restriction implied by the pooled model is tested. Guilkey and Murphy (1993) compare the finite sample properties of the two estimators and find that the point estimates of the pooled probit are similar to the random effects (RE) estimator but the standard errors of the pooled probit suffer from a large downward bias.[14]

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[13] See STATA manual (StataCorp (2001)) for the likelihood function.

[14] Some recent papers have explored relaxing the assumption that the unobservables are normally distributed across cross-sectional units and uncorrelated with the covariates (Honoré and Kyriazidou (2000), Hyslop (1999)). This also represents an attempt to overcome the incidental parameters problem associated with treating a_i as fixed effects in which case the maximum likelihood estimates of **(6)** become inconsistent when T is fixed. We adopt a random effects approach which avoids the incidental parameters problem but at the cost of imposing additional functional form assumptions on these unobservables. These assumptions are relaxed by estimating linear probability models with fixed effects, which we compare to our random effects results.

A further issue concerns the inclusion of the lagged dependent variable, y_{it-1}, in our specifications. This captures any tendency that may exist for companies that have paid a dividend in one year to continue to do so, perhaps for signalling reasons. Heckman (1981a) distinguishes between 'pure state dependence' and 'spurious state dependence'. In this context, pure state dependence refers to the notion that the act of having made a dividend payment/omission last year increases the subsequent probability of doing so. Spurious state dependence reflects the point that companies may differ, in unobservable ways that are persistent, in their propensity to experience the event. We attempt to control for the latter through the random effects term, although clearly, conditioning on relevant financial characteristics, X, will also assist in the attempt to identify pure state dependence. By comparison, Fama and French (2001) do not allow for state dependence or unobservables. As a robustness check, we consider relaxing the RE restriction (allowing for arbitrary correlation between the unobserved heterogeneity and explanatory variables) and strict exogeneity assumptions by estimating linear probability (LP) models using the GMM fixed effects estimator of Arellano and Bond (1991).

A factor concerning the inclusion of the lagged dependent variable regards the initial conditions problem. This occurs when the first period for which we observe an outcome is not the beginning of the underlying process and gives rise to a bias on the coefficient on the lagged dependent variable (see Heckman (1981b)). In our case, we have known starting dates (that is, since listing) for 57.3% of the companies. In addition because the time dimension of the panel, at max(T) = 26, is relatively large, this should improve the performance of the estimate of d further. An alternative estimator that could correct for the initial conditions problem more directly is not available since we do not have pre-sample information that might provide convincing exclusion restrictions, identifying the propensity to be a payer in the first period. As well as benefiting from the large T aspect of our data it should be noted that the linear probability models avoid this initial conditions problem (see Hyslop (1999)). The LP estimates are also consistent in the presence of heteroskedasticity, which the RE probit estimates are not.

After estimating models for the probability of dividend omission, we then use the results to consider to what extent the estimated models can account for the increase in the proportion of non-payers since 1995. We estimate the models described above for data up to end-1994. We wish to assess to what extent the subsequent increase in non-payment reflects company characteristics as opposed to a declining propensity, for given characteristics, to omit a dividend. To this end, the parameter estimates, $\hat{b}$, are used alongside the values for the characteristics, X_{it}, in each year 1995-99 to produce predicted probabilities of omission for each company, conditional on these characteristics for these years. Thus,

$$Z_t = \frac{\sum_{i=1}^{N} \left(\Phi\left(X_{it}' \hat{b} \right) \right)}{N}$$

where $\Phi(.)$ is the cumulative standard normal distribution. This gives the predicted proportion of omission (ie. the mean predicted probability). Since the main emphasis concerns the extent to which financial characteristics can account for the varying incidence of dividend omission we

focus on specifications that omit the lagged dependent variable. The difference between this proportion and the actual proportion of companies that omit a dividend is then accounted for by a changing propensity to pay for given characteristics. Since the mean predicted proportion of companies omitting may differ from the actual proportion, in practice we are interested in the profile of '*Z*' over time and the profile of its deviation from the actual proportion.

Estimation results

Tables 2 and 3 contain results from estimation of the random effects probit models for the probability of a dividend omission and a dividend cut respectively. Our regressor set consists of a lagged dependent variable, (y_{it-1}), cash flow, (*CF/K*), leverage, (*B/MV*), investment opportunities, (*Q*), actual investment, (*I/K*), and a scale term, the log of real sales, (*s*). The subsequent specifications consider alternative terms in place of the cash flow term that are functions of profits, namely, return on capital, (*p/K*) and interest gearing, (*IP/p*). One restriction is considered in the form of the ratio of investment to investment opportunities. A final specification in column 5 omits the lagged dependent variable for comparison. These same specifications are used for both the probability of dividend omission and a dividend cut.

The propensity to omit a dividend is highly persistent. The relationship between this propensity to omit a dividend and the financial characteristics are generally consistent with the framework described in Section 2. A high level of cash flow lowers the probability of omitting a dividend whilst a high level of debt to market value increases the probability significantly. An increase in investment opportunities is expected to be positively related to the propensity to omit a dividend. This is also borne out by the results. Given investment opportunities, high actual levels of investment are inversely related to the propensity to omit a dividend. This is consistent with the model, in that non-payers are more likely to be on the higher part of the investment supply schedule (in Chart 1), doing less investment than their dividend paying counterparts. The specifications that consider profitability rather than cash flow or interest gearing are also highly significant. In column 3, the interest gearing variable is used in place of the cash flow or profitability term, reflecting the financial pressure arguments of Nickell and Nicolitsas (1999). It suggests that companies facing financial pressure in terms of large debt service payments relative to earnings are significantly more likely to omit a dividend payment. The results uniformly indicate that larger companies are less likely to omit a dividend payment than smaller companies, controlling for other characteristics. This is consistent with the notion that agency and signalling issues are more important for larger firms.

An aspect of the results for dividend omission is the evidence that the LR Test of the pooled estimator against the panel estimator rejects the pooled cross-sectional probit model in each specification (ie r =0), indicating the importance of inclusion of the random company-specific effects. In omitting the lagged dependent variable, which will be picking up persistence in the propensity to omit a dividend, the estimate of r (standard error) increases from 0.225 (0.030) to 0.666 (0.015). Note also that the coefficients and standard errors of the included regressors are barely affected by the omission of the lagged dependent variable. This is also the case when the alternative specifications in columns 2 to 4 are used, although for parsimony they are not reported

here. The specification in column 4 considers including the actual investment and Q measures in ratio form. This restriction is easily rejected by the data (LR Test, $\chi^2(1)=138.67$).

There is the possibility that estimating models such as that of column 1 in Table 2 do little more than estimate the company budget constraint. We do not believe this is a serious possibility since estimating a model for the discrete outcome of dividend payment is some way removed from the budget constraint. Nevertheless, in order to remove the potential issue, we re-estimate the model of column 1 but omit the debt and investment rate terms. The resulting estimates on the included variables are similar to that of column 1. The coefficient (standard error) on the lagged dependent variable is 2.083 (0.051), that on cash flow increases slightly to -3.681 (0.134) with the results for investment opportunities being similar at 0.086 (0.008) and the relationship in company size declining slightly in absolute size, with a coefficient (standard error) of -0.180 (0.015). The results do not suggest that one cannot interpret the results in Table 2 meaningfully for reasons of an identity being estimated.

Turning to the propensity for a company to cut its cash dividend this shares many of the same qualitative features to the dividend omission case. Companies with high levels of cash flow are less likely to cut their dividend, while high levels of leverage increase the probability of initiating a dividend cut. A high level of investment is negatively related to the probability of cutting the dividend. This may be because companies undertaking high levels of investment are quite confident about their future prospects, and we would expect such a characteristic to be inversely related to the propensity to cut the dividend. An increase in Q is also negatively related to the probability of a dividend cut. This may reflect the suggestion above that companies with high levels of Q are thought by the market to have good financial prospects and, while they have a higher demand for funds and thereby a greater propensity to omit, also feel they can maintain a given dividend when it is being paid. This accounts for the opposite sign on the Q term to that estimated in the dividend omission equation.

The propensity to cut the dividend is much less persistent than is the propensity to omit a dividend. An estimate of 0.441 (0.033) on the lagged dependent variable compares with 2.065 (0.052) for dividend omission. The tendency for a dividend cut to persist therefore remains strong. The estimate of r is also smaller for the case of a dividend cut. Indeed, where the lagged dependent variable is included, the estimate of r is driven to zero. This indicates that there is no permanent unobserved heterogeneity in the propensity to cut a dividend—an intuitively appealing result. Nevertheless, there remains some evidence of state dependence as the lagged dependent variable is significant. This is consistent with Lintner's (1956) notion of 'partial adjustment' as companies are reluctant to undertake all of a necessary change in dividend in a single period. However, if companies were only concerned with cutting *per se*, then they would not wish to reduce the dividend by an amount that would then raise the probability that they would cut the dividend again the following period, and we would not observe persistence in cutting behaviour.

It is not clear that for the dividend cut models the explanatory variables should be considered in levels rather than differences. It is reasonable to suppose that both the level and the change in the financial characteristics will be important. This is considered in column 4, which reports

estimates for a model that includes all regressors in both levels and differences. The coefficients on the differenced variables have the same sign as their levels counterparts, with the latter remaining quite similar to the estimates when the differenced terms are omitted (column 1). *Inter alia*, these results suggest that reductions in cash flow and increases in gearing increase the probability of cutting the dividend in addition to effects resulting from a low level of cash flow and high leverage.

In order to help interpret the quantitative relation between the probabilities of omitting and cutting the dividend and these financial characteristics, Table 4 reports the marginal effects of the different characteristics in levels. These refer to the change in the probability of observing a dividend omission or dividend cut for a 1 unit change in the particular regressor—with the exception of the estimated effect of the lagged dependent variable, which considers a discrete change in having omitted or cut the dividend in the previous year (see Arulampalam (1999)). An interesting feature of these results is the fact that the marginal effects of characteristics such as cash flow (and profitability), income gearing and leverage are greater for dividend cuts than dividend omission. This suggests that a dividend cut is a stronger sign of companies facing financial pressure than dividend omission.

A dividend omission in the previous year is associated with an increase in the probability of omitting the dividend of 0.35, a very large effect. An increase in cash flow of 10 percentage points reduces the probability of dividend omission by 0.01 (ie -0.104/10), whilst an increase in leverage of the same amount increases the probability of dividend omission by 0.004. Since the mean proportion of dividend omission up to 1995 is 0.11, these are not such small effects. The proportion of dividend cuts is 0.12. It is clear that dividend cutting is less persistent than is omission since a previous dividend cut increases the probability of cutting this year by 0.08.

We now consider relaxing the random effects assumption as a robustness check on our parameter estimates reported above. In Table 5 we report estimates from linear probability (LP) models for our base model, applying the Arellano and Bond (1991) GMM estimator to our binary outcomes for dividend omissions and dividend cuts. The main drawback of estimating the LP models in this way is that the predicted probabilities are not bounded by the unit interval. These models treat the unobservables, a_i, as fixed effects that may be correlated with the covariates, X_{it}, and the lagged dependent variable, y_{it-1}. The lagged dependent variable and each of the covariates are instrumented using lags dated from t-2 and earlier. This requires selection on the availability of at least 4 observations per company. For dividend omission, the LP estimates are similar to the RE estimates (ie the marginal effects) reported above. Each of the variables remains statistically significant with the exception of the Tobin's Q variable that is insignificant under the fixed effects LP model.

For dividend cuts, the LP estimates are also broadly similar to the RE estimates. The main exception concerns the cash flow term that loses its significance under the linear probability GMM estimates, when estimated on the data up to 1994. For the full sample period, this term retains its significance with a coefficient (standard error) of -0.064 (0.031). Leverage increases the probability of a cut (with a slightly larger point estimate compared with the RE estimates).

Investment remains inversely related to the probability of a cut and is on the margins of significance. Tobin's Q loses its significance under the LP estimates with the scale term remaining inversely related to the probability of a cut. There remains evidence of persistence in cutting, with the coefficient on the lagged dependent variable of 0.15 comparing with an estimate of 0.08 under the RE estimates.

Table 6 considers the implications for state dependence in greater detail. The raw data probabilities for both dividend omission and dividend cut are reported as well as these probabilities given that the firm omitted or cut its dividend the previous year. For dividend omission there is the strong suggestion of persistence. The overall proportion of dividend omission is 0.110, for the pre-1995 samples. Among those that omitted a dividend payment in the previous year, the probability, at 0.764, is considerably greater than 0.036 for those that paid a dividend in the previous period. For a dividend cut, the tendency of persistence is less strong. A raw probability of a dividend cut amongst the companies that cut their dividend in the previous year of 0.292, compares to a figure of 0.097 for those that did not cut their dividend. Not surprisingly, the evidence of state dependence is reduced when including the controls for other characteristics. Including the controls, we find a reduction in the predicted probability, conditional on having been a dividend omitter in the previous year to 0.368, with a probability for those that paid a dividend in the previous year of 0.016. In the case of a dividend cut, the probability of cutting a dividend given that the dividend was cut the previous year is 0.160, compared with a probability of 0.075 if the dividend was not cut the previous year, controlling for financial characteristics. This continues to indicate persistence in dividend-cutting behaviour such that is evidence of smoothing of dividend cutting, with companies being averse to making the complete adjustment in a single period.

The increasing incidence of dividend omission from 1995

Table 7 reports the implied proportions of firms with zero payout given two specifications reported in Table 2, alongside the actual proportion observed. These expected proportions use the parameter estimates based on data up to 1994 alongside the values for the financial characteristics of quoted UK companies from 1995 onwards. Since the motivation for this part of the analysis is to see to what extent financial characteristics alone can account for the observed increase in the incidence of dividend omission, we focus on a model with the lagged dependent variable omitted (column 2). The preferred model tracks the observed increase in the proportion of dividend omitters quite well. The predicted proportion increases from 0.102 in 1994 to 0.168 in 1999, compared with an actual increase from 0.153 to 0.252. Although the level of dividend omission is underpredicted somewhat, the proportionate increase from 1995 is fully accounted for. Table 7 also assesses the individual contribution of the financial characteristics in accounting for the increase in omission. The results suggest that changes in profitability and size of quoted firms are the single most important factors.

We consider one alternative way of examining the role of financial characteristics versus common macro changes in accounting for the increasing incidence of omission from 1995. The base model is re-estimated over the whole sample period up to 1999, and in Chart 7 we report the

estimated year effects. The year effects will pick up common macroeconomic influences across companies. This should include the effects of the tax credit changes in 1997. Note, however, that whilst the post-1995 dummies are jointly significant ($\chi^2(5)=24.34$; p-value=0.00), several of the individual year-on-year differences are insignificant. For instance, testing the restriction that the 1996 and 1997 effects are equal cannot be rejected ($\chi^2(1)=0.43$; p-value=0.51) but the restriction that the 1997 and 1998 effects are equal is rejected ($\chi^2(1)=7.02$; p-value=0.01). The best that can be said is that there is evidence of common effects at work post-1995 but our analysis is not able to identify whether this is specifically due to the tax change.[15]

Thus the proportionate increase in incidence of dividend omission is largely accounted for by changes in the financial characteristics of quoted firms in the United Kingdom, although there is also evidence of some common macro-changes at work. These macro influences may include factors such as the 1997 abolition of the tax credit and changes in corporate governance practices that may render the use of dividends as a signal or means of economising on agency costs less cost-effective.

These results can be compared with those obtained for the United States by Fama and French (2001) who find that lower propensity to pay is at least as important as changing characteristics in accounting for the declining incidence of dividend payers.

5 Conclusions

This paper has examined the incidence of dividend omission and dividend cuts among quoted UK firms. The paper has produced several novel results.

First, an increase in the proportion of quoted UK companies that omit a dividend from 1995 has been identified. This pronounced trend is not well known. In 1995, the proportion of non-payers stood at 14.3% and reached 25.2% in 1999. Earlier high-points of omission were 16.1% and 17.9%, witnessed in 1982 and 1992 respectively, both periods of recession. This increase in dividend omission since 1995 is largely accounted for by an increase in the proportion of companies that have never paid a dividend. This contrasts with previous increases, during recessions, which were accounted for by an increase in the proportion of former-payers that elected to omit a dividend.

Second, firms with the highest levels of payout in 1999 (that is, at the 90th percentile) distribute more than double the amount to shareholders, relative to sales, than did their counterparts in

[15] We also estimated a model for the full sample period that included interaction terms between a post-1995 (or post-1997) dummy variable and each of the explanatory variables. A test of the joint significance of the interaction terms constitutes a test of a difference in the responsiveness of the propensity to omit to the financial characteristics. The post-1995 year dummies indicate whether there is evidence of a common shift effect in the propensity to omit a dividend. The interaction terms were jointly significant ($\chi^2(5)=65.14$; p-value=0.00). This was driven by a smaller absolute sensitivity to cash flow (coefficient (standard error) on the interaction term of 1.011(0.219)), investment (0.416(0.112)) and smaller sensitivity to leverage (coefficient and standard error on the interaction term of -0.342(0.120)).

1977. The median firm in 1999 is much more similar to its counterpart in the mid/late 1970s. Again, such patterns in the variation in financial policies across firms are not well known.

Third, the paper has shed light on what characteristics are associated with a dividend omission and dividend cut. Low levels of cash flow, high levels of income gearing and leverage, small scale and greater opportunities for investment are all associated with an increased propensity to omit a dividend. These factors, in particular those of cash flow and leverage, are more strongly related to the propensity to cut the dividend. This suggests that dividend cutting is a stronger indicator of financial fragility than is dividend omission.

Fourth, the paper has used these results to account for the observed increase dividend omission. The analysis indicated that these characteristics could account for much of the increase in the proportion of zero-payout firms. This implies that there is a more limited role for a change in dividend policies *per se*, controlling for changes in the characteristics of firms, although we do find evidence of a change in the responsiveness of omission propensities to financial characteristics for the post-1995 period. We also considered a role for state dependence in the incidence of dividend omission and the results indicate that the propensity to omit is highly persistent, controlling for financial characteristics and unobserved heterogeneity. In considering the incidence of dividend reduction, there was also some evidence of state dependence, albeit less strong than for dividend omission. We interpret this as consistent with Lintner's (1956) notion of partial adjustment of dividend payments. Companies are unwilling to adjust their dividend payment fully in the light of financial pressure but instead have regard for target payouts. This also has implications for companies' investment policies since it makes it more likely that some of the adjustment to a balance sheet shock will come through real outcomes such as employment or investment.

These results have a number of implications. The recent increase in dividend omission is associated with a larger number of companies who have never paid dividends. For the most part, these are relatively small companies with strong investment opportunities. It might be felt then that the recent increase in dividend omission is less worrying than in previous periods when the dividend omitters were former payers who were attempting to repair their balance sheets. In this sense, the changes we have identified reflect ‘Great Expectations’ rather than ‘Hard Times’. Despite this comforting conclusion, the evidence suggests that it is low levels of profitability among dividend omitting companies that is the single most important factor accounting for the increase. As such, concerns may remain until the investment opportunities are converted into higher profitability.

Another implication is that those investors, such as trustees, that require a record of dividend payments are restricted to a materially smaller share of the quoted company sector than in the past. Further, for large parts of the quoted UK corporate sector, the notion of automatic dividend payments no longer holds. For such companies the possibility of adjusting their payout in response to a balance sheet shock is not available. The increasing incidence of non-dividend-paying companies also implies that company valuation methods based on the existence of such payments, such as the dividend discount model, are called into question.

Finally, the paper has explored how financial pressure is related to firms' dividend decisions. The increase in the proportion of companies that have never paid a dividend has further implications here. As noted above, for such companies the potential role of dividend policy to respond to balance sheet shocks whilst maintaining independence of nominal and real outcomes is forsaken. Rather than have the option of adjusting payouts in order to maintain investment plans such companies must instead borrow more or raise more equity finance. The existence of a wedge between the price of internal and external funds makes it more likely that such companies' real investment decisions will be affected by shocks to cash flow. This implication finds empirical support in company-level studies of investment (see Fazzari *et al* (1988)). Our finding that the incidence of dividend omission has increased significantly since 1995 implies that aggregate investment may be more sensitive to cash flow effects in the late 1990s than had been the case previously.

Table 1: Summary statistics (means)

	Dividend paid	Dividend omitted	Dividend never paid	Nominal dividend cut	Real dividend cut
Return on capital, $(p/K)_{it}$					
1974-79	0.146	0.022	0.059	0.143	0.141
1980-84	0.108	-0.009	0.007	0.072	0.078
1985-89	0.162	-0.003	-0.006	0.152	0.133
1990-94	0.135	-0.023	-0.034	0.072	0.086
1995-99	0.164	-0.071	-0.117	0.097	0.098
Test of equality of means	t=60.32				
Interest gearing, $(IP/p)_{it}$					
1974-79	0.197	1.235	0.901	0.390	0.257
1980-84	0.483	3.003	1.978	1.850	1.060
1985-89	0.205	1.231	1.053	0.529	0.465
1990-94	0.368	2.772	2.230	1.438	0.987
1995-99	0.189	1.256	1.330	0.574	0.489
Test of equality of means	t=-57.99				
Leverage, $(B/MV)_{it}$					
1974-79	0.184	0.511	0.505	0.308	0.208
1980-84	0.134	0.409	0.244	0.300	0.216
1985-89	0.072	0.167	0.081	0.118	0.110
1990-94	0.085	0.289	0.080	0.242	0.184
1995-99	0.062	0.084	-0.040	0.087	0.086
Test of equality of means	t=-19.52				
Sales (£million, 1995), (S_{it})					
1974-79	430.011	180.783	84.277	328.847	390.391
1980-84	465.764	96.848	43.512	161.328	331.608
1985-89	518.245	63.417	19.354	187.450	191.371
1990-94	637.635	96.607	26.607	343.252	437.730
1995-99	646.970	70.037	49.570	380.852	439.138
Test of equality of means	t=27.59				
Tobin's Q, (Q_{it})					
1974-79	0.927	1.066	1.219	0.939	0.886
1980-84	1.455	1.863	6.746	2.117	1.363
1985-89	2.787	3.447	7.028	4.271	3.403
1990-94	2.132	3.404	8.236	2.453	2.068
1995-99	3.565	7.688	11.724	5.384	4.438
Test of equality of means	t=-15.43				
Investment, (I_{it}/K_{it-1})					
1974-79	0.100	-0.013	0.003	0.061	0.079
1980-84	0.077	0.019	0.284	0.012	0.030
1985-89	0.246	0.143	0.348	0.151	0.115
1990-94	0.088	0.031	0.269	0.008	0.010
1995-99	0.138	0.210	0.413	0.061	0.051
Test of equality of means	t=4.62				

Note: Tests of equality consider null of equal means between dividend payers and omitters for the period 1974-99.

Table 2: Random effects probit models for dividend omission

	[1]	[2]	[3]	[4]	[5]
y_{it-1}	2.065 (0.052)	2.128 (0.052)	2.195 (0.050)	2.014 (0.052)	
$(CF/K)_{it}$	-3.229 (0.136)			-2.927 (0.131)	-3.853 (0.163)
$(p/K)_{it}$		-7.282 (0.269)			
$(IP/\pi)_{it}$			0.470 (0.014)		
$(B/MV)_{it}$	1.238 (0.068)	1.080 (0.069)	0.942 (0.068)	1.307 (0.068)	1.448 (0.073)
(I_{it}/K_{it-1})	-0.544 (0.061)	-0.531 (0.065)	-0.497 (0.060)		-0.731 (0.068)
Q_{it}	0.086 (0.009)	0.051 (0.008)	0.005 (0.006)		0.068 (0.010)
$(I_{it}/K_{it-1})/Q_{it}$				-0.107 (0.018)	
s_{it}	-0.259 (0.018)	-0.227 (0.018)	-0.246 (0.018)	-0.299 (0.019)	-0.513 (0.026)
Year effects	Yes	Yes	Yes	Yes	Yes
Log-likelihood	-3052.585	-2892.143	-2771.769	-3121.922	-3795.737
S_a	0.538 (0.046)	0.542 (0.047)	0.478 (0.044)	0.611 (0.047)	1.411 (0.047)
r	0.225 (0.030)	0.227 (0.030)	0.186 (0.028)	0.272 (0.030)	0.666 (0.015)
Companies	2,101	2,096	2,097	2,101	2,101
Observations	21,906	21,886	21,885	21,916	21,934

Notes: Estimated over the period 1974-1994. Standard errors in parentheses. $r=0$ is the restriction implied by the pooled probit estimator against the random effects probit. s_a is the standard deviation of the panel component, a. See the data appendix for variable definitions.

Table 3: Random effects probit models for dividend cut

	[1]	[2]	[3]	[4]	[5]
y_{it-1}	0.441 (0.033)	0.381 (0.034)	0.311 (0.035)		
$(CF/K)_{it}$	-1.166 (0.075)			-0.798 (0.089)	-1.396 (0.077)
$(p\ K)_{it}$		-3.323 (0.146)			
$(IP/p)_{it}$			0.230 (0.009)		
$(B/MV)_{it}$	0.715 (0.037)	0.607 (0.037)	0.562 (0.037)	0.767 (0.043)	0.823 (0.039)
(I_{it}/K_{it-1})	-0.305 (0.054)	-0.242 (0.054)	-0.296 (0.054)	-0.221 (0.081)	-0.356 (0.050)
Q_{it}	-0.014 (0.006)	-0.020 (0.006)	-0.040 (0.006)	-0.053 (0.009)	-0.014 (0.006)
s_{it}	-0.075 (0.008)	-0.048 (0.008)	-0.054 (0.008)	-0.071 (0.009)	-0.080 (0.009)
$D(CF/K)_{it}$				-1.771 (0.098)	
$D(B/MV)_{it}$				0.196 (0.046)	
$D(I_{it}/K_{it-1})$				-0.319 (0.045)	
DQ_{it}				0.014 (0.012)	
Ds_{it}				-0.425 (0.059)	
Year effects	Yes	Yes	Yes	Yes	Yes
Log-likelihood	-6131.003	-5982.188	-5944.083	-5868.517	-6870.657
S_a	0.001 (0.000)	0.001 (0.000)	0.001 (0.000)	0.298 (0.025)	0.372 (0.024)
r	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.082 (0.013)	0.122 (0.014)
Companies	1,972	1,967	1,968	1,969	2,101
Observations	19,846	19,820	19,818	19,813	21,906

Notes: As for Table 2

Table 4: Marginal effects

	[1]	[2]	[3]	[4]	[5]	[6]
Dividend omission						
y_{it-1}	0.352	0.341	0.336			
$(CF/K)_{it}$	-0.162			-0.227		
$(p/K)_{it}$		-0.336			-0.559	
$(IP/p)_{it}$			0.025			0.041
$(B/MV)_{it}$	0.062	0.050	0.049	0.085	0.075	0.081
$(I/K)_{it}$	-0.027	-0.025	-0.026	-0.043	-0.028	-0.033
$*Q_{it}$	0.433	0.234	0.024	0.398	0.423	0.066
s_{it}	-0.013	-0.010	-0.013	-0.030	-0.024	-0.031
Dividend cut						
y_{it-1}	0.085	0.084	0.085			
$(CF/K)_{it}$	-0.178			-0.204		
$(p/K)_{it}$		-0.496			-0.552	
$(IP/p)_{it}$			0.037			0.041
$(B/MV)_{it}$	0.109	0.091	0.090	0.126	0.103	0.099
$(I/K)_{it}$	-0.047	-0.036	-0.047	-0.054	-0.043	-0.050
$*Q_{it}$	-0.211	-0.303	-0.631	-0.239	-0.324	-0.605
s_{it}	-0.012	-0.007	-0.009	-0.012	-0.007	-0.009

Notes: The table reports marginal effects of a unit change on the probability of observing y_{it}=1 evaluated at the means, with the exception of the effect of y_{it-1} which considers the change in the probability for a discrete change in last period's outcome. * denotes effect multiplied by 100. The marginal effects for the continuous explanatory variables are calculated as $\frac{d[prob\ (y=1|x)]}{dx_k} = f\left(\bar{x}b\sqrt{1-r}\right)\left(\sqrt{1-r}\,b_k\right)$ where $\phi(.)$ is the standard normal density function, $\bar{x}$ is the vector of mean characteristics, β the vector of coefficient estimates with b_k the coefficient estimate on regressor x_k (see Arulampalam (1999) on the adjustment to the standard expression for marginal effects by the $\sqrt{(1-r)}$ correction factor in a random effects probit model).

Table 5: Linear probability fixed effects estimates

	Dividend omission	Dividend cut
y_{it-1}	0.442 (0.021)	0.149 (0.013)
$(CF/K)_{it}$	-0.070 (0.026)	-0.026 (0.035)
$(B/MV)_{it}$	0.103 (0.017)	0.187 (0.027)
$(I/K)_{it}$	-0.130 (0.025)	-0.050 (0.032)
$*Q_{it}$	-0.036 (0.265)	-0.463 (0.337)
s_{it}	-0.044 (0.016)	-0.038 (0.018)
Year effects	Yes	Yes
Companies	1,901	1,867
Observations	19,669	17,816

Notes: Estimates from Arellano and Bond (1991) GMM fixed effects estimator. Instruments dated t-2…t-5 (where available). Standard errors in parentheses.

Table 6: Raw data and predicted probabilities by previous state

	Dividend omission	Dividend cut
Raw data probabilities		
Unconditional	0.110	0.121
i) Given dividend omission/cut, *t*-1	0.764	0.292
ii) Given dividend payment/non-cut, *t*-1	0.036	0.097
i) - ii)	0.728	0.195
Predicted probabilities holding characteristics constant		
i) Given dividend omission/cut, *t*-1	0.368	0.160
ii) Given dividend payment/non-cut, *t*-1	0.016	0.075
i) - ii)	0.352	0.085

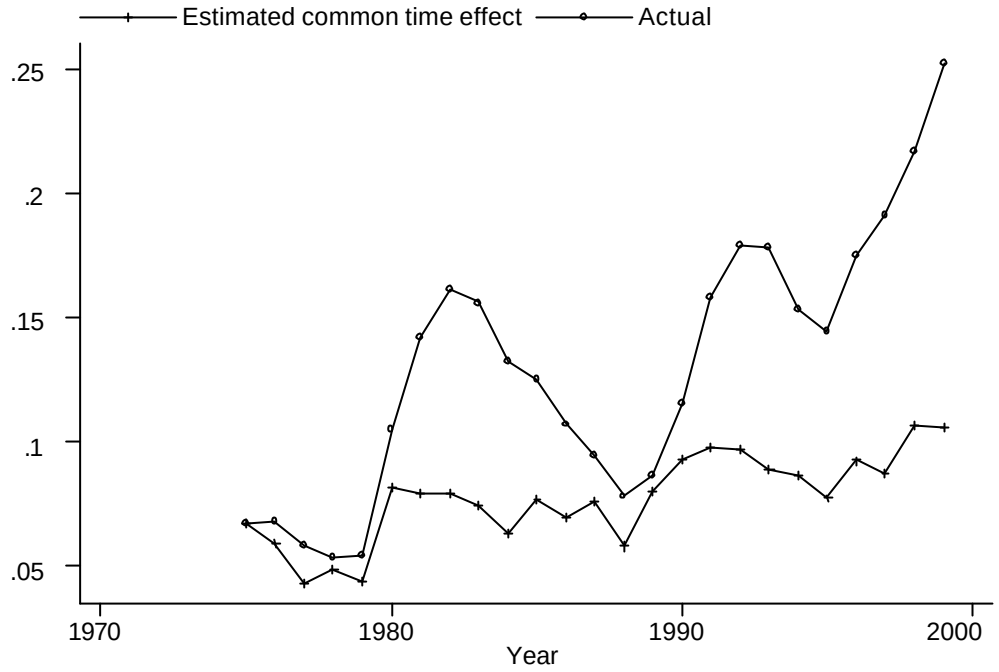
Note: Predicted probabilities are calculated using the specification shown in column 1 of Tables 2 and 3, evaluated at the means of the data with the previous state set to either 1 or 0.

Table 7: Actual and predicted proportions of dividend omission

	Actual	Model 1	Model 5	$(p/K)_{it}$	$(B/MV)_{it}$	$(I/K)_{it}$	Q_{it}	s_{it}
1990	0.115	0.109	0.058	0.048	0.025	0.025	0.025	0.055
1991	0.158	0.147	0.099	0.092	0.054	0.053	0.056	0.094
1992	0.179	0.174	0.120	0.118	0.079	0.081	0.079	0.120
1993	0.178	0.168	0.115	0.107	0.077	0.076	0.077	0.119
1994	0.153	0.140	0.102	0.089	0.057	0.053	0.055	0.098
1995	0.144	0.137	0.116	0.103	0.057	0.049	0.055	0.106
1996	0.175	0.141	0.133	0.117	0.056	0.052	0.055	0.119
1997	0.191	0.158	0.135	0.112	0.055	0.057	0.055	0.130
1998	0.217	0.171	0.144	0.124	0.062	0.053	0.055	0.132
1999	0.252	0.201	0.168	0.143	0.059	0.052	0.053	0.140

Note: Models 1 and 5 refer to the columns in Table 2. The estimates are based on data to 1994. Columns labelled with single explanatory variables give predicted proportion derived from a univariate model with that variable and a set of time effects.

Chart 7: Estimated year effects and omission



Note: The estimated year effects are shown as marginal effects associated with the year dummies shifted to equal the actual proportion of omission in 1975.

Data appendix

Variable construction

Dividends (*D*)
Ordinary dividends net of Advance Corporation Tax. (Datastream Item 187).

Capital stock (*K*)
Capital stock is measured on a replacement cost basis. The procedure employed to convert the historic cost measure to replacement cost–a perpetual inventory method–has been used in a number of company accounts panel data studies (eg. Blundell *et al*., (1992)). The raw data provide cost of plant and machinery (Datastream Item 328), buildings (DS327) and other assets (DS329) separately in gross historic cost terms. Investment is obtained as the sum of the change in the gross historic cost of each category of asset plus depreciation of fixed assets (DS136).

Changes in the gross fixed assets of each asset type are used to estimate the proportion of investment in each category of asset. In a company's first year, its proportion of investment in plant and machinery is taken to equal the ratio of plant and machinery to total book value of assets.

$$PMR_{it} = \frac{GFP_{it}}{GFP_{it} + GFB_{it} + GFOT_{it}}$$

For subsequent years the annual difference in each of the terms on the right hand side of this expression is used to obtain PMR_{it}. Investment in a particular type of asset is then given by

$$NFAPM_{it} = I_{it} * PMR_{it}$$

Replacement cost capital stock, K, is estimated using the perpetual inventory formula

$$K_{it+1} = (1+P_t)K_{it}(1-d) + IJ_{it}$$

where P_t is the inflation rate for the particular asset type in year t; δ is the rate of depreciation of the asset. This is assumed to be equal to 0.025 for buildings, 0.08 for plant and machinery and 0.05 for other assets; IJ is investment in a particular asset type (ie. NFAPM in the case of plant and machinery as defined above). Similar calculations are done for the other asset types (buildings and 'other'). Total stocks and work in progress (DS364) is then added for each company in a particular year to obtain the company capital stock in that year. For the company's first observation, the replacement cost is assumed equal to the gross historic cost.

Profits (*p*)
Pre-tax profit (DS157) has interest payments (DS153) subtracted, so earnings before interest and taxes is given as DS157+DS153.

Tobin's Q (*Q*)

Q is calculated as follows: $Q_{it} = \left(\frac{mv_{it} + b_{it} - c_{it}}{K_{it}} \right)$

where *mv* is market capitalisation of the company at December 31 in year *t* (Datastream Item mv); *b* is book value of outstanding debt (DS321 for loans and bonds repayable in more than one year and DS309 for borrowings repayable within 1 year); *c* is book value of cash and equivalent (DS375). High values (the top 1%) are recoded to the 99th percentile.

Investment (*I*)

Fixed investment is measured as the proportionate change in the replacement cost capital stock plus current cost depreciation of fixed assets (DS136). The total new fixed assets item on Datastream (DS435) has been unavailable since 1993.

Cash flow (*CF*)

Profit after tax and interest payments (DS157 – DS172) plus depreciation of fixed assets (DS136).

Interest gearing (*IP/p*)

Interest payments (DS153) divided by profit before tax (DS157) plus interest received (DS143).

Leverage (*B/MV*)

Net debt divided by market value of assets, where market value is measured by market capitalisation (Item mv) plus net debt and where net debt is equal to total borrowing repayable within a year (Item 309) plus total loan capital (Item 321) less total cash and equivalent (Item 375).

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