DIVIDEND DECISIONS OF UK FIRMS: WHAT DO WE REALLY KNOW?

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ABSTRACT

The literature on dividend pay-out is both crowded and relatively homogenous, generally aimed at bridging the gap between an abstract world of dividend irrelevance and the observed practice of firms that pay stable dividends. Research on dividends needs to be empirically focused because the opportunity cost of paying dividends is hard to define, let alone measure. Our methodological approach in this paper is to employ appropriate estimation techniques for dividend equations, something that is often neglected. We pay attention to issues such as choice of estimator, the inclusion of a lagged dependent variable, the stability of the coefficients over time, the robustness to different datasets, and the issue of sample selection. We identify from the literature five theoretical perspectives, namely substitution between sources and uses of funds, signaling and dividend smoothing, agency, catering to investors, and idiosyncrasies. We argue that the theoretical literature is not sufficiently discriminating to support tightly defined hypotheses but is nevertheless a useful starting point for empirical work, a view that is consistent with the ambiguous findings in previous empirical studies. Our results are consistent with the Lintner model and they support the role of investment opportunity as captured by the market to book ratio. The importance to dividends of asset growth and leverage depends on which of two datasets we use, on estimation method, and on the time period; the paper uses these contrasts to suggest interpretations and future avenues for research.

Keywords: dividend policy; dividend measurement; dividend specification; estimation methods; financial crisis; UK

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1. Introduction

This paper studies dividend behavior in UK public firms for the period 1997-2012. Although the study is of a single-country and thus exhibits less institutional variation than cross-country studies, we believe that this is balanced by avoiding measurement issues associated with cultural, policy or legal-economic factors.

We make two broad contributions to the literature. First, we examine critically the different rationales for standard dividend specifications. Second, we report results for the whole sample period and the period since the financial crisis using a number of estimation procedures, using two different data sources, and allowing for potential sample selection bias.

The paper is organized as follows. We begin with a selective literature review (Section 2) and then provide a specification (Section 3). Estimation and sampling issues are dealt with in Section 4. Details of the sample and data are given in Section 5. Initial results are presented in Section 6.1 and extended in 6.2 to consider the effect of the financial crisis. Complementary results for a larger sample based on Datastream-reported dividend payments are presented in 6.3, where some differences are noted and discussed with respect to the Compustat results. Section 6.4 reports a Heckman analysis which is only possible for the Datastream sample. Concluding comments are contained in Section 7.

2. Dividend Theories

Much of what we know about the propensity to pay - and the intensity of - cash dividends has been established through surveys of company executives in Lintner (1956), Graham and Harvey (2001), Baker et al (2002), Brav et al (2005), and Servaes and Tufano (2006). There is considerable consistency over time and place, with many of Lintner's ideas reflected in the survey responses tabulated in Brav et al (2005) *viz*. the importance of the historical level; the existence of payout ratios or other targets; the tendency to smooth with respect to earnings; and an asymmetric penalty for cutting or ceasing payments. Theoretical work has informed the interpretation of these practitioner surveys. Major advances are summarized in overviews such as Allen and Michaely (2003), and Leary and Michaely (2011) and Farre-Mensa et al (2014). Empirical econometric work has reported results from specifications based on these theories, including for the UK and EU, by Benito and Young (2003) and Von Eije and Megginson (2008).

We identify from the literature five sets of major issues, noting for each set the contending variables that represent or proxy for an influence on dividends. These sets are: substitution between sources and uses of funds; signaling and smoothing; agency concerns; catering to investors; and company characteristics. We deal with these in turn.

2.1 Substitution between sources and uses of funds.

It is not generally reasonable to assume that either investment or financing decisions are independent of the dividend policy, and in particular investment may depend on dividends where firms face financing constraints.[1] Maintaining the level of the dividend is reported by survey respondents to be more important than some positive NPV projects (Brav et al: 497). The literature sometimes assumes, following Lintner, that debt is the residual financing decision (Fama and French 1997; Aivazian et al 2006) but that it is moderated by the cost and availability of credit. More generally, the likelihood of payout will depend on access to external borrowing after internal funds are exhausted (Fazzari et al 1988).

For dividends to be justified, their marginal benefits (or the costs of cutting dividends) have to be higher than the cost of external borrowing or the cost of turning down marginally profitable investment. Since we do not know whether the relevant shadow price of dividends is the marginal cost of external funds or the opportunity cost of investing we need to consider both in disequilibrium. Since paying down debt is the most popular alternative (at least in some surveys) to dividend pay-out and the propensity to reduce debt increases with the firm's debt ratio, it may be reasonable to proxy the marginal cost (or availability) of external funds by leverage (Brav et al 2005, Fig 2; Benito and Young 2003).[2] However leverage targets tend to be industry specific (Graham and Harvey 2001, Table 12) so that leverage relative to the industry or sector mean may be more relevant.

Where pay-out is warranted, a final optimization needs to be carried out with respect to the form of pay-out – cash dividends or repurchases, though the degree of substitutability may be weak and asymmetric. Reportedly, few firms would pay dividends out of foregone repurchases, presumably because dividends imply a continual commitment (Brav et al 2005, Fig 2.). Substitutability is supported for US data in Grullon and Michaely 2002, but other empirical results are conflicting; for the UK, evidence suggests only weak substitutability at least up to the early 2000s (Benhamouda 2007) or no substitutability (Geiger and Renneboog, 2015).

[1] For US firms, Brav et al (2005) find a response of 0.3 on a five point scale for the proposition that investment decisions are made before dividends, while noting that dividend increases are secondary to investment increases. National institutional features appear to affect dividend behavior so that it is important not to infer behavior from a single source. Survey evidence suggests that North American firms will prefer to defer or cut investment, borrow externally or sell assets before cutting dividends (Brav et al 2005). This is not true for all global regions however. Although firms may be reluctant to cut dividends, the global survey (Servaes and Tufano 2006) shows that it will be done in 41% of cases where there is a shortfall in earnings. Firms will *defer* investment as a second choice (27% likely); with a third choice of borrowing up to the credit rating limit (26% likely) and in fourth place cutting investment or selling assets (14% each). In relation to the UK context in which this paper applies, there is undoubtedly a general reluctance to cut dividends.

[2] "…in the longer run a higher level of debt will be associated with higher interest payments and lower dividends. (Benito and Young 2003 p.536)

In all these marginal decisions the role of taxes needs to be considered, though they are indicated to be "a second order concern" in Brav et al (p.485), especially where there is rough equality of tax treatment between capital gains from repurchases and dividends. It may be noted that even in countries where the tax regime has favored capital gains over dividends in the past, most firms have, nevertheless, tended to pursue dividend pay-outs.

2.2 Signaling under asymmetric information and dividend smoothing.

Managers with inside information may value firms differently to investors, particularly if there is asymmetric information, and if there is investor herding in regard to rumors or bias for or against certain market sectors. Stretched valuations can then cause managers to prefer to rely on internal funds to protect the interests of current shareholders. By contrast when valuations are unduly low, diligent managers may offer a bigger payout to communicate prospects to investors, especially where simple guidance might be distrusted or - under US-style corporate reporting restrictions, difficult to explain.

The least restrictive version of signaling means that dividends convey information e.g. they confirm that the company can afford a pay-out. Dividends here are simply a sign with predictive content rather than an intentional signal. A more specific version is that dividends are intentionally used to credibly communicate future earnings not available from the current share price, where due to industry characteristics or low analyst coverage such information is not transparent to outsiders. On this understanding, firms with (better) investment opportunities would pay (more) dividends to achieve lower borrowing costs for the same risk. Formal models treat the creation of the signal as a costly but necessary investment by the firm on the grounds that otherwise any information content would not be credible. As with models of (truthful) advertising, effective dividend signals require a separating equilibrium whereby investors can distinguish future value-creating firms from those who simply mimic this. This may be achieved by a self-imposed cost i.e. dissipation of cash flow. Different models envisage this either as a higher risk of needing to borrow to sustain dividend flows, or as the cost of rejecting positive NPV projects so as to finance higher dividends. Such models have been criticized on the basis of their assumptions and empirical validity; for example signaling should benefit young firms most but these are least likely to pay dividends (Allen and Michaely 2003; Brav et al 2005). Other evidence shows that firms facing more asymmetric information pay out less (Leary and Michaely 2011). The evidence is unclear as to whether future *unanticipated* earnings or future risk attitude can be forecast from dividend behavior.

The function of dividends as a signal may seem at odds with dividend smoothing, an established practice which *attenuates* any earnings information by adopting a conservative attitude to changing the dividend per share. Dividend smoothing has been argued to be associated with asymmetric information as measured by idiosyncratic risk, analyst forecast error and dispersion of that error

across analysts (Booth and Xu 2008). This is in keeping with the view that smoothing lowers firm transactions cost (less unexpected capital raising) when earnings and investment needs are volatile or non-transparent. For investors also, smoothing removes the necessity to trade shares, perhaps important for less liquid holdings. The tendency to smooth dividends can also be understood through option theory. A dividend payout has uncertain net benefits that depend on the future path of earnings. On this reasoning, smoothing would be more indicated under high uncertainty or low growth where there is less room for correcting errors. The underlying maintained hypothesis is, however itself left unexplained in these theories i.e. that dividend cuts are regarded as a last resort for struggling firms.[3] Put differently, cuts in dividends are assumed to signal bad news in smoothing theory, even if the contrary does not always apply to dividend increases. Smoothing, if practiced to avoid cutting future dividends thus implies that dividends convey information, albeit not necessarily constituting an intentional signal.

2.3 Agency.

Whereas signaling models generally assume that managers aim to correct market mis-pricing in the interests of investors, agency models focus on the potential mis-alignment of investor and manager interests. Agency concerns arise under asymmetric information between principals and agents and could imply higher borrowing costs unless countered by adopting a conservative approach to retained earnings, thus favoring dividends. The argument follows from the notion of debt as a discipline on management, given that interest payments are a hard constraint, or, that debt finance involves more monitoring than either internal funds or that provided by dispersed shareholders. On one view debt and dividends are substitute forms of mitigating agency concerns so that higher leverage can reduce the need for dividend payments. On the other hand if higher leverage works to reduce over-investment, it may free up more cash flow that is available for distribution through dividends (Chirinko and Phillips, 1999). Agency models of dividends are hard to test but one argument is that agency concerns *a priori* will be higher in large mature firms so that stock market reactions to higher dividend payments should be more favorable in such firms. The evidence for this claim is however mixed (Allen and Michaely 2003: 396-7). Arguably, agency concerns will also be greater under bond (rather than bank) finance and here the agency view has claimed support in a higher proclivity to pay dividends for those with credit ratings on the reasoning that dividends are a substitute for the close monitoring that banks provide (Aivazian et al 2006). Survey evidence does not, however, strongly support the view of pay-out policy as self-imposed discipline to counter agency concerns with nearly

[3] See Thaler (2015) who attributes this to loss aversion. Thaler also justifies high and stable dividends as anchored in the historical tendency of endowment and other foundations to conserve capital ad spend income (p.165-166).

90% of executives rejecting this view in Brav et al (2005 Table 5).[4] The idea that dividends are a device to increase external monitoring is rejected in Baker et al (2002; p.27). Nor is it clear that dividends play an important disciplinary role where there is an effective market for corporate control that operates as a good substitute. Rather dividends might be interpreted as protection against takeovers, especially in the UK where forms of poison pills are illegal; take-over of a peer or a hostile bid has been shown to be a trigger for higher payout (Bolton and Scharfstein 1990; Lomax 1990; Servaes and Tamayo 2014). In this case, higher dividends may be variously interpreted as an elimination of the agency cost of excessive retentions, a manifestation of market short-termism, or an agency cost of entrenchment.

2.4 Catering to investors.

Shifts in investors' appetite for dividends in general may cause a pricing effect with a variable premium for dividend paying stock (Baker and Wurgler 2004; 2011). Some sets of investors, such as personal (retail) investors or pension funds may also have separate preferences for dividends, smoothed dividends or high pay-outs. Investors may be grouped into various classes or clienteles, some of whom prefer regular income in the form of dividends and others who prefer reinvestment. The reason could be tax liability, an agency concern, matching assets with liabilities or unspecified behavioral preferences. From time to time the weight of those favoring dividends may change and this is reflected in a differential return to dividend-paying or higher-dividend-paying stocks, leading to a herd movement towards pay-outs or increased pay-outs.

2.5 Firm characteristics.

Age and size are often found to be good predictors of dividend payout, perhaps reflecting a lifecycle influence (Damodaran 1999). Survey evidence in Baker et al (2002) reports relatively weak support for any lifecycle pattern but that may reflect the preponderance of financial groups in the sample. Recent literature has suggested that lifecycle stage may be proxied by the fraction of retained earnings in total equity (DeAngelo and DeAngelo 2006; Denis and Osobov 2008), but others have found age to be a better predictor (Von Eije and Megginson 2008). Other firm characteristics are often captured by industrial dummies .We do not deal in this paper with endogenous firm characteristics such as the details of its governance arrangements; the large literature on governance and performance has produced markedly variable results for different metrics of governance so that the subject requires its own separate and in-depth treatment that is not possible here.

[4] Agency concerns can be mitigated by governance procedures such as monitoring and incentives, acting as substitutes for dividends, though both of these can be argued to have potentially perverse effects on managerial behavior (Gromb et al 1997; Dhanani and Roberts 2009).

3. Specification choices in dividend studies

The majority of previous empirical studies examine pay-out levels using the insights of Lintner (1956) which is still the baseline model for both dividends and total pay-out (Fama and Babiak 1968; Brav et al 2005; Aivazian et al 2006; Khan 2006). Less commonly there are studies that focus on or include the incidence of dividend payments (Benito and Young 2006; Von Eije and Megginson 2008; Denis and Osobov 2008). Some see merit in concentrating research on those firms likely to pay regular dividends - on the grounds that it is too difficult to have "a theory of everything" (Lambrecht and Myers 2012 p.1764).

Lintner's findings may be expressed by an equation that is now recognized as an equilibrium correction model, where the dynamics are nested in a target equilibrium ratio for dividends, but with the added twist that the adjustment is non-linear. This model appears to perform well in different contexts, though the non-linearities are often ignored: an exception is Leary and Michaely (2011) who find that firms adjust dividends quicker when they are below their target than when they are above. Some studies report that the adjustment parameter appears to have been reduced over time, possibly due to the increased use of share repurchases that can buffer changes in earnings as they do not need to be smoothed. For the US, Leary and Michaely (2011) argue that smoothing has *increased* over a long time-period and is unrelated to the level of repurchases.

The basic specification that we adopt for estimation is in levels and is a semi-log version of Lintner (1956) where a lagged dependent variable is included. [5]

$$\mathrm{D_{it}} = \alpha_i + \lambda\left(\mathrm{D_{i,t-1}}\right) + \beta X_{\mathrm{i,t-1}} + \partial_t + \epsilon_{\mathrm{it}} \qquad (1)$$

where $\mathrm{D_{i,t}}$ is the natural log of nominal dividends, and $X_{\mathrm{i,t-1}}$ is a vector of regressors (including earnings variables) lagged one period to minimize endogeneity, ∂_t are time dummies, and where the error term comprises time-invariant unobserved firm-level characteristics and a white noise term.

The set of explanatory variables is drawn from the literature and our discussion in Section 2; detailed definitions and sources are given in Table 6. From the discussion in 2.1 we use the earnings to asset ratio (EA) as an indicator of the affordability or desirability of dividends. Alternative earnings variables include the level of earnings before interest and after tax (LEBIAT) in natural logarithms. The Market to Book ratio (MBF) is taken as an indicator of opportunity cost of investment. A further proxy for the opportunity cost is the rate of growth of assets (DAA), where the interpretation is,

[5] A differenced form may be preferable when the dependent variable is non-stationary. However, because of the non-linearity of the dividend adjustments with dividends sticky downwards, stationarity tests are problematic; in effect, there are structural breaks of unknown frequency and timing in the dividend data. The levels form may also be justified by behavioral assumptions based on reference points and loss aversion which imply a partial adjustment model (Baker and Wurgler 2011). The levels form represses some non-linearity but that can be re-introduced by interactive terms.

however, clouded when M&A activity has occurred and where final or liquidating dividends may be part of the transaction. Leverage (LEV) is taken as a proxy for the marginal cost of funds, though others interpret it differently in agency terms. From 2.3 we recall that debt and dividends are held to be alternative forms of mitigating agency concerns so high leverage reduces the need for dividend payments – *leverage negative for dividends*. Alternatively if leverage (with more monitoring) reduces "over-investment" it may free up funds (under capital constraints) so *leverage positive for dividends*. Given that debt norms are industry specific, we test this by interacting leverage with sector dummies.

As regards tax issues, for our UK data there were no major tax changes to dividends after April 1999, though the relative attractiveness of dividends as compared with buy-backs decreased from 2002. Between 1997 and 1999, pension funds may have benefited from the passing on the tax savings of a set of multinationals that were able to elect for a particular form of dividend between 1997 and 1999 (Bond et al 2005). According to Geiler and Renneboog (2015) the attractiveness of dividends was reduced in the reforms of 1997 and increased after April 1999 with the abolition of the Advanced Corporation Tax system (which however adversely affected non-resident investors). The typical investor in UK firms also changed over the sample period with domestic pension funds diversifying into foreign assets while the share of foreign owners, subject to a variety of tax arrangements increased. For these owners the fact that the main corporate tax rate was gradually reduced – from 28% in 2008 to 24% by the end of the sample in 2012 – may have changed their preferences for UK dividend income, as may have any assumptions on the level and path of exchange rate movements.[6] Time dummies are included in all specifications to capture such complexities. Any substitution effect of share repurchases on dividends can be examined by including lagged repurchase (REP) as an additional control.

From the discussion in 2.2 we recognize the need for a lagged dependent variable to capture dividend smoothing. Lags are also used for all regressors except age to lessen endogeneity and to reflect information lags. From 2.4 we note inconsistent evidence for catering behavior so that here we represent the idea more simply as a herding variable (PEER) based on industry peer behavior.[7] Finally, from 2.5 we add basic characteristics of size and age. The alternative lifecycle variable that measures the ratio of earned equity to contributed capital was found insignificant in Von Eije and Megginson (2008).

[6] Exchange rate influences on dividends are complex where earnings are reported in foreign currency. Boards may "flex" dividend payments to offset the effect of currency changes on domestic investors (Capita 2014).
[7] This argument finds some support in Brav et al (2005) who report the view that firms may delay dividend reductions until "air cover" is provided by competitors (p.501). We distinguish herding among peers from common events (Farre-Mensa et al 2014) by also including time dummies.

4. Econometric Issues

4.1 The dependent variable.

The dependent variable can be defined as a nominal or real cash sum or as a ratio reflecting some target objectives such as a stable dividend pay-out ratio. The literature shows much variety: survey evidence shows that the target objective varies across countries and firms within countries, with the most common approaches, globally, being to target stable or increasing dividend per share; stable or increasing dividend payout ratio; setting dividends in line with cash-flow; or stable or increasing dividend yield (Servaes and Tufano 2006). For US firms, Brav et al (2008) reports a variety of different targets for dividends and also evidence that such targets are not often strict. Given the variety of targets the most general approach is to estimate dividends as a cash level, though with consideration given to inflation and exchange rate adjustments (Von Eije and Megginson 2008). In our study we obtain the sterling equivalent dividend amounts but as we include time dummies and as all variables are nominal we do not adjust for inflation.[8] We log the dependent variable to reduce the degree of skewness expected in earnings variables.

4.2 Estimation methods: panel estimation.

Equation 1 is estimated by several different techniques including random effects and fixed effects panel estimation. The use of a lagged dependent variable (LDV) in short panel regression may be expected to introduce Nickell bias in the LDV coefficient and in that of correlated variables. Nickell bias is often addressed by dynamic panel estimation techniques such as Generalized Method of Moments (GMM). In our context, the sample T is borderline short with an average of 9 years. However, the lagged dependent variable has a low coefficient so that the true value cannot be close to one and this will tend to reduce the severity of any downward bias.[9] Nevertheless the *t*-value is also biased so that the null is rejected too often particularly when N is much greater than T which tends to be the case in studies such as ours. In our results section we include runs with and without the LDV for comparison. The induced bias for other regressors depends also on the sign and magnitude of the correlation with the LDV and, as with the LDV coefficient itself, this increases the likelihood of falsely rejecting the null**.**

4.3 Selection bias.

Data availability often results in oversampling of certain types of firms and often checks are performed to assure the reader that sample statistics such as median values ratios are approximately similar to population values (Khan 2006). However, not all non-random sampling is problematic and the checks mentioned above may not always be necessary especially if no population inference is

[8] Lomax (1990) comments that nominal rather than real dividends per share are targeted (p.4)
[9] See Cheng Hsiao (2003:72). We are grateful to Ron Smith for this reference.

intended. Sampling on the basis of age or size – a default position when attention is confined to listed firms - may not be problematic where age and size are exogenous variables in the regression of interest – so called exogenous sample selection (Wooldridge 2013: p. 315).

Sampling issues are of particular importance where the dependent variable registers zero for a sizeable fraction of the dependent variable observations e.g. the case of firms paying zero dividends. Samples with large numbers of small, young firms are more likely to record zero payers. In the UK, using a sample drawn from Datastream, one study showed the number of never-payers (using a window of at least twenty years) rose from 4.4% in 1994 to 14.0% in 1999 (Benito and Young 2003) and appears to have risen further since then. This rise in permanent non-payers is thought to reflect in part the changing nature of the population of listed firms with the introduction of the junior Alternative Investor Market (AIM) in 1995 increasing the proportion of smaller firms with the result that the unconditional propensity to pay dividends showed a trend fall (Von Eije and Megginson 2008). However, despite the changed composition of firms, research on a UK sample shows "… there is little evidence of a systematic decline in the propensity to pay dividends", once the characteristics of firms are taken into account (Denis and Osobov 2008: p. 65). These authors reached this conclusion by modelling the cross-sectional behavior of dividends in a period and applying the coefficients to subsequent years to obtain an expected dividend pattern based on the second-period characteristics which was then compared with the actual pattern to show little difference.

Where the interest is in the absolute or proportionate amount of cash dividends paid, it is possible to ignore the non-payers and simply estimate for the sample of dividend payers (Von Eije and Megginson, 2008, Table 6); this is the main approach that we follow in this paper. However, we return to selection bias later in Section 6.4.

5. Data Description

We focus on dividend behavior of listed firms the UK over the period 1997-2012. Although an increasing number of UK firms now combine dividends with share repurchases, the UK, unlike the US, has not seen a sustained rise in stock repurchases since 2000, and dividends still remain the dominant channel (Geiler and Renneboog, 2015).

Compustat fundamentals are widely used in studies of payout channels e.g. Skinner (2008). We search the Compustat Global database for financial and accounting data on FTSE All-share companies, active as well as inactive and suspended listings in order to avoid survivors' bias (von Eije and Megginson, 2008). We use International Securities Identifying Number (ISIN) as a primary identifier of the companies in our sample. We complement this database with market data and dividend data from Datastream. We further include information from Bureau van Dijk's Zephyr, one of the most

comprehensive databases of deal information, for share repurchases data and Bureau van Dijk's Fame, a database of companies in the UK and Ireland, for share ownership data. Since we combine four datasets, the total sample results in some missing observations, as not all companies are matched on each year throughout the studied period. For example, companies found in both Datastream and Zephyr in a given year, but not in Compustat will not have accounting data. Hence, for such companies, we would not know if the accounting data was simply 0 or missing. We do not impute the data and leave the missing observations as such. This initial dataset includes 57,461 observations and provides payout information for 3,184 companies as of 2012. We have excluded firms in the Utilities and Financial sectors from our results.

Cash dividend data are collected from Compustat Global on FTSE ALL-Share companies. There are 11,096 non-missing observations for dividends (including 0, when the firms do not pay dividends), which represents 19% of the total sample. This variable represents the total annual amount of dividends, other than stock dividends, declared on all equity capital of the company, based on the current year's net income, in millions of GBP, and is taken from the Income Statements. Listed UK companies typically pay dividends twice a year, with a relatively small interim dividend being paid during the accounting period, and a relatively large final dividend being paid when profits are reported (Bond et al., 2005). Our measure of dividends is the total of both these payments, and includes common/ ordinary dividends, preferred dividends and dividends on other share capital, which includes payments to holders of participation rights certificates (when such payments have not been charged to net income). The dividend declared we use as our dependent variable mainly differs from the dividend paid in terms of timing, but is a better measure in terms of understanding the strategic decision process. Annual Compustat data on payout are shown in Table 1.

Table 1 presents an annual summary of the number of observations for cash dividend declarations, as well as the number of firms that do share repurchases for the total Compustat sample of UK firms 1997-2012 excluding the financial and utilities sectors. The number of firms that declare cash dividends falls almost monotonically from a peak of 1024 in 1998 to 311 in 2012, reflecting similar trends noted elsewhere (Denis and Osobov, 2008; Von Eije and Megginson, 2008). The number of companies doing share repurchases increases, from a low base to almost a third of dividend payers just before the financial crisis, and then falls back to around a fifth of dividend payers in 2012.

[TABLE 1 HERE]

The dividend data in Compustat may be compared with those from Datastream. This is of interest because: 1) Compustat data has many missing values for dividends due to changes in their methodology in 2006; 2) having more than one source of data validates our analysis and gives a better perspective on dividend behavior of UK firms; 3) we compare the type of firms covered by

Compustat with the type of firms covered by Datastream which allows us to differentiate their dividend behavior.

Figure 1 provides a comparison of Datastream dividend data (left) with Compustat (right). While Compustat reports the dividend declared, Datastream reports the dividend paid so we would expect to see differences if only in timing. There is some consistency between the two in that a downward trend in the number of dividend payers is evident in both, although the Compustat number declines more rapidly, at least from 1998 – see also Table 2. The 'CD obs.' lines indicate firms for which dividend data are available, including those who pay or declare no dividends – these are termed for convenience 'non dividend payers' and also represented separately. These lines are substantially different as between Compustat and Datastream but as explained below the trend in this divergence is largely explained by the data on non-payers.

The 'Non dividend payers' line indicates number of firms where dividends were recorded at 0 in a given year. With the increase in the surveyed population of firms in 2006, Compustat changed its methodology and stopped recording zero dividends. This meant that for firms that did not report dividends, Compustat changed from recording them as zero to not recording anything, leading to missing observations. But even before this change took place, the number of firms paying zero dividends in Compustat was much lower in the years 1997 to 2006 than in Datastream.

[FIGURE 1 AND TABLE 2 HERE]

Figure 2 plots dividends declared in Compustat against the dividends paid in Datastream, where zero and missing values are excluded from both series. We observe a positive strong correlation over much of the range.

[FIGURE 2 HERE]

Table 3 provides comparative descriptive statistics for dividends and other characteristics of firms in the Compustat and Datastream samples. Dividend payers in Datastream report higher average dividend amounts for each year 1997-2006 than dividend payers in Compustat, and then become lower in years 2007-2012 (see also Figure 4). Overall, average and median dividend amounts (for dividends>0) over the whole 1997-2012 period reported for Datastream were GBP 62.1 million and GBP 3.1 million respectively; while in Compustat such amounts stood at GBP 52.2 million and GBP 2.9 million respectively.

We observe that firms reporting non-zero dividends in Datastream are older by 1 year than dividend payers in Compustat, with a firm median age of 21 years (vs. 20 years for Compustat and 19 years for the whole sample). Firms reporting dividends in Datastream have a slightly bigger mean size than those in Compustat (48.6 as compared to 48.3) though the identical medians at 47.1 indicate a

stronger right skew for Datastream. A plot of the distributions also reveals a higher concentration of firms at the lower size range for Datastream than for Compustat.

Given the differences in samples, particularly the number of firms recorded as dividend payers, age and size of such firms, it is not surprising that results using dividend data recorded by Compustat are different to the results using dividend data recorded by Datastream.

[TABLE 3 HERE]

Table 4 (and Figure 3) detail the *total value of dividend declarations* (both Compustat and Datastream samples) and share repurchases, each year between 1997 and 2012. First, total dividends reported in Compustat increase dramatically by 170% from GBP10.4bn in 1997 to GBP28.6bn in 2001. Total dividends reported in Compustat then fall to GBP26.0bn in 2002, to recover at GBP27.3bn in 2003, as UK's economic recovery gathers pace. There is another dip in 2008-2009 around the credit crunch, but by 2011, the dividends as reported in Compustat recover to GBP44.3bn, well above their pre-credit crunch level of GBP42.4bn in 2007. Overall, the cash value of declared dividends as reported in Compustat increases at an 11% CAGR over the 15-year period and there is a clear business cycle effect. This feature of rising total dividend payout is also documented in von Eije and Megginson (2008) findings for Europe and in other findings for the United States (DeAngelo, DeAngelo and Skinner, 2004).

[TABLE 4 AND FIGURE 3 HERE]

Figure 3 shows little indication of substitution between dividends (as reported in Compustat) and repurchases except perhaps for the post-financial crisis period when repurchases continued an upward trend while dividends retreated. There is a 73% increase in share repurchases from 2000 (GBP9.0bn) to 2001 (GBP15.7bn), but this is largely reversed by 2003. A new cycle then sees share repurchases increase to nearly five times their 2003 level. In 2006, the value of share repurchases surpasses the value of dividend payouts by GBP4.2bn but this is not maintained and repurchases fall off to a sixth of the total payout by the end of the sample period in 2012. The total value of share repurchases over the 15-year period (GBP237bn) represents 31% of total payout and 45% of cash dividends. This is in line with von Eije and Megginson (2008) findings regarding share repurchases for 15 European countries (p. 355). They report that repurchases represented 34% of total payout and 50% of cash dividends in 2005. They also report that among their sampled countries, the UK firms are the most active repurchasers of their own shares, accounting for half of the total share repurchases for their studied period (1989-2005). Not surprisingly, Figure 3 also shows how share repurchases have a higher volatility and cyclicality than dividends.

Figure 4 shows the change in *average dividends payments* (as reported in Compustat and Datastream), average share repurchases, and average Earnings before Interest and After Tax (EBIAT). We observe

a plateau from 1997 to 2003, then a striking increase in the average amount of annual dividends as reported in Compustat from GBP27.6 million in 2003 to GBP148.3 million in 2012, or a CAGR of 13% over the 15-year period. It is useful to compare such data with similar data reported in Datastream. We plot the dividends including 0 payers and excluding them, as Datastream reports more 0 payers than Compustat (the data for dividends>0 are not reported as they are similar to dividends>=0). While average dividend amounts in Compustat are consistently lower than in Datastream until 2006, the situation reverses from 2007 until 2012. As previously mentioned, 2006 corresponds to the period when Compustat stopped reporting 0 dividends. This explains why on average, Compustat dividend amounts appear to be higher for the period 2007-2012.

Table 5 presents the mean and standard deviation of key variables (EBIAT, leverage, market-to-book ratio, growth in assets, age and size) for Compustat dividend payers and non-payers (i.e. where dividends equal to 0) for the entire sample. Comparing those companies that paid a dividend with those that did not, it is clear that the latter are less profitable, have relatively higher leverage, lower assets growth, a higher market-to-book ratio, are younger, and smaller in size.

[FIGURE 4 AND TABLE 5 HERE]

Denis and Osobov (2008) note a concentration of dividend payers. We also find a large difference between mean and median dividends, consistent with Denis and Osobov (2008) findings. In comparison, for the year 2000, we report a mean dividend per payer of GBP 28.4 million and a median of GBP 1.7 million (Compustat), vs. GBP23.8 million and GBP1.7 million in Denis and Osobov (2008). For the year 2002, we report a mean dividend per payer of GBP27.6 million and a median of GBP1.3 million (Compustat), vs GBP27.0 million and GBP1.9 million respectively in Denis and Osobov (2008). Mean dividends per payer increase over the period, as illustrated in Figure 4. The ratio of mean to median dividend payout increases monotonically from 1997 to 2004, indicating a rise in concentration during this period (as in Denis and Osobov, 2008) but subsequently the rise is reversed.

6. Results

This section reports the results from estimating a dividend equation to test the main influences that we have identified in Section 2. We explain in the process how we addressed issues such as the choice of estimator, the inclusion of a lagged dependent variable, the stability of the coefficients over time, the robustness to different data sets, and the issue of sample selection.

6.1. Initial Results

We carried out estimation for both Random Effects (RE) and Firm Fixed Effects (FE). Estimation by FE is generally less efficient and it requires sufficient time variation in the data to be able to capture significant effects. Nevertheless, the tests reported in Appendix A show that the RE results will be

biased and inconsistent due to correlation between the regressors and the error term. Accordingly, we focus here on the FE results, presented in Table 8.

[TABLE 8 HERE]

The first specification in column A follows broadly that in previous literature e.g. von Eije and Megginson (2008) Table 6A (hereafter E&M). Column B includes a lagged dependent variable to represent the slow adjustment process that has been found in past studies of dividend behavior[10]. Column C and D include the (ln) level of earnings (LEBIAT) instead of the earnings ratio EA, thus allowing the nominal value of dividends to track earnings.

The results in Table 8, column A show that only earnings, size, age and peer effects are significant. Similar results are found with the inclusion of LDV in column B, except that here LDAA appears as positively significant, contrary to expectations if its role is to proxy investment opportunity with a negative (substitutive) effect on dividends. In columns C and D where the log earnings level (LEBIAT) substitutes for EA, the coefficient on MBF nudges closer to negative significance at the 10% level, while DAA continues to be significantly positive. Leverage LEV is insignificant throughout and a further set of runs was used to check whether this reflects the fact that leverage targets tend to be sector specific. However, interacting leverage with ten sector dummies produced only one at $p<0.1$. Overall, these estimates give some – but not strong - support to the explanatory variable sets outlined in section 2. As the data period straddles the beginning of the financial crisis of 2008, we extend the analysis in the following sub-section to consider time shifts in the coefficients.

6.2 The effects of the Financial Crisis

The stability of the coefficients may be affected by the financial crisis that began in the UK in 2007-2008. The crisis produced new economic conditions that would be expected to have had an impact on payouts. For example, a shortage of bank credit caused larger firms to turn to equity and bond markets for finance, especially in the immediate aftermath of the shock, while many firms struggled to get

[10] The LDV is also significant throughout; as noted earlier, this normally indicates the need for special dynamic panel methods. For our estimates, as reported in Section 4.2, we believe that Nickell bias will be low on account of the panel length and the relatively small coefficient on the LDV, though there will be a greater tendency to reject the null as N is much greater than T. Because of this we also include specifications without the LDV. Induced bias for correlated variables will be limited as may be inferred from the correlation matrix (Table 7) where the highest (absolute) correlations are in respect of earnings variables. As earnings and dividends are positively correlated, the direction of Nickell bias should be positive but as noted from Column B of Table 8, the (long-run) coefficient on EA shows a small fall falls (of about 7%) with the introduction of the LDV. Even with panel data estimation, endogeneity of regressors is a potential problem and is often countered by the use of GMM. However, as noted in Baum et al (2003) use of GMM comes at a price and reasonable estimates may require very large samples so that IV if needed may be superior where heteroscedasticity is not present. Using the specification in the first column of Table 8 and selecting an option for xtivreg2 that is robust to heteroscedasticity, we cannot reject the null hypothesis that the hypothesized set of endogenous regressors: EA, MBF, DAA, LEV and PEER can be treated as exogenous ($p=0.1152$). A similar finding occurs with Table 9, column 2 where the endogeneity of the LDV is also tested for ($p=0.1106$).

bank credit. The effects of continuous low worldwide interest rates encouraged firms to swap equity for debt which resulted in higher company pay-outs sometimes financed by debt.

We define a crisis variable as a dummy variable that takes a value of 1 in the year 2008 or later. Thus we are testing for whether the influences on the dividend decision were altered in magnitude by events in 2008 that lasted throughout the period up to the end of the sample in 2012. The individual year dummies are also included. We interact each of the variables EA, MBF, LDAA, LEV, SIZE, and PEER with the CRISIS dummy and report the results in Table 9 for specifications with and without the LDV, first for the EA earnings variable and secondly, in the last two columns for LEBIAT

The year dummies indicate a significant negative effect for the crisis year 2008. The stability of the individual coefficients after 2008 is indicated by the level of significance of the interaction terms. For the second column of Table 9, for the period before the crisis, MBF is now found to be significantly negative ($p<0.1$) but after 2008 this negative MBF effect is eliminated. The previously insignificant DAA coefficient now appears as asset growth driving dividends in the early period and even more so after 2008 when of course asset growth will have been much reduced or negative The positive catering coefficient is also increased after the crisis. The leverage variable remains insignificant for the early period but is negative and weakly significant or close to that across the specifications after 2008. There are no other significant interactions and in particular the coefficient on the earnings ratio EA (and LEBIAT) remain stable.

These findings may be interpreted as follows. The strong interactive MBF indicates a diminishing investment opportunity effect as measured by this variable, for the crisis period. This might imply that even firms with "opportunities" were not minded to pursue them in this period. The DAA interaction is also positive which might be explained as reflecting a correspondence between falls in asset value and a preference for repaying debt over dividends. There is also a negative interaction effect for leverage. This can hardly be interpreted as an agency effect since there is no reason to suppose that agency concerns became more important after 2008. It seems more likely that the negative LEV effect is reflecting financial pressure on firms that were over-indebted in a period when banks were becoming more reluctant to lend and where it was not yet obvious how long interest rates would remain low. The significant positive interaction effect for PEER may suggest that herding behavior increased somewhat after 2008.

[TABLE 9 HERE]

6.3 Comparison of results with Datastream data

As noted earlier in the data description section we have obtained dividend data from Datastream corresponding to our full Compustat sample as it allows us to distinguish zero payments from non-available data. Table 10 shows the results using the larger sample of Datastream observations (here

we use data for dividend payers only) in place of the Compustat sample; the individual columns correspond to the FE Compustat specifications in Table 7.

[TABLE 10 HERE]

Focusing on the case with the LDV included, the sign of the coefficients for EA, LEBIAT, MBF, SIZE, AGE, PEER are the same as those with the Compustat sample. Some differences in magnitude may be noted including a smaller LDV coefficient, but on the whole the coefficient pattern is similar as us the pattern of significance, with leverage insignificant in all runs. However, there is one striking difference between the two samples in that the DAA variable is consistently negative, sometimes significantly so, in the Datastream sample whereas it is consistently positive in the Compustat sample results noted in Table 7.

In order to understand the opposing LDAA signs, we interacted LDAA with a dummy variable for young firms corresponding to a unitary value if age is less than the median age in the full Compustat sample; we ran this specification for both the Compustat and Datastream samples. For completeness we performed the exercise with all of the non-category variables interacted with the young dummy and report the results in Table 10.

For the Compustat sample (last two columns in Table 7) LDAA is highly significantly positive for old firms but almost cancelled by the interaction term to produce a much smaller positive term for young firms. For the Datastream sample the coefficient is similar to that for Compustat for old firms (positive) but has a more negative interaction coefficient with young firms that actually changes the sign. These results suggest that the interpretation of LDAA is different for young and old firms with the variable playing the role of investment opportunity only for young firms, if at all.

6.4 Sample Selection and Heckman Estimation

The Datastream sample allows us to correct for sample selection bias, given that the incidence of non-payment of dividends is recorded as nil as opposed to Compustat sample where the non-payers are treated as missing data after the year 2006. As noted in Section 4.3 the selection problem arises because the decision to pay or not to pay dividends may be related to unobservables in the dividend payout equation in which case equation (1) will not be consistent in estimating β. The bias is known as (incidental) truncation bias, similar to the classic problem of estimating wage offer equations for participants in the workforce without correcting for the likelihood of non-participation or for sampling voters by telephone without correcting for the likelihood of having a telephone.

The appropriate procedure is to add an explicit selection equation to the dividend payout regression (Heckman 1979) as long as the same unobservable factors affect the error term in the selection equation and in the main dividend payment equation. It is natural to suppose that this condition is present in the dividend context, given the variety of influences on both decisions and the difficulty of

measuring them. For example, consider where the main dividend equation contains just earnings and an indicator of over-confidence that affects both the decision to pay dividends and the amount paid out. We assume here that over-confidence is unrecorded though the same reasoning would follow if it were measured with error. To belong to the dividend paying sample, a low earnings firm will have to have a highly overconfident CEO. Similarly, a high earnings firm is likely to be in the dividend paying sample even with low CEO overconfidence. This means that, in the sample, the average level of overconfidence for those on low earnings will be higher than the average level of overconfidence with those on high earnings. So earnings and overconfidence are negatively correlated in the sample and the composite error term in the dividend paying equation is not independent of the earnings variable, causing bias and inconsistency[11]. Similar reasoning applies to the other regressors.

There are few previous studies using Heckman selection in dividend studies, unlike in labor market studies where the technique is commonly employed. The reason for this may lie in the fact that while it is easy to find variables that affect labor participation but not a wage offer, the same cannot be said for dividends where the same set of variables is often used as determinants of both the decision to pay and the amount paid[12]. Nevertheless, on a priori grounds there is reason to argue that the determinants may differ, at least in form. The decision to engage in dividends is costly to the firm (now and later) but may bring benefits in the form of lower cost of capital, less risk of takeover, or convenience of particular groups of shareholders. Retained earnings or borrowing facility confers an option to pay dividends. Whether that option is exercised needs attention to variables such as the exercise price (transaction costs), net benefits of dividends and the underlying volatility of these net benefits by incurring this exercise price. Initiation of dividends thus depends on the existence of the option and the trigger price of exercising it, both of which sets will contain variables that are threshold rather than continuous variables. This opens the possibility of distinguishing variables that affect the likelihood of paying dividends separately from the regressors in the dividend equation.

Table 11 reports a Heckman results for the Datastream sample where we use as an identifying selector the threshold variable EAQ1, lagged, which is a dummy variable for the condition that earnings are greater than the sample's first quartile value. This is justified by the analogy between dividend initiation (or renewal) and the exercise of an option with implied irreversibility, given the damage from ceasing dividend payments, so that a threshold effect is expected.

[11] A Tobit model could be employed, designed to deal with censoring at the lower bound of zero where the theoretical model consistent with the notion of desired negative dividends, which cannot be observed due to institutional and legal issues. This latter option uses data on the non-dividend paying firms and is valid in the case of exogenous sample selection - where the additional firms do not have characteristics associated with unobserved influences in the dividend equation. Essentially, the Tobit model is designed for situations of censored data where the zeros represent unobserved realizations from a common distribution that also describes the observed outcomes.

[12] Abu Khalaf (2012) finds significance for the Heckman approach employing a categorical (?) profitability in the selection equation. Kim and Jang (2010) reject the need for selection in a US industry study.

[TABLE 11 HERE]

The diagnostics for the Heckman specification are reported in Table 11 giving σ (sigma), the standard error of the residual in the dividend equation and ρ (rho) the correlation between the error term in both equations. The Chi-square test reported for ρ = 0 is a test of the joint likelihood of an independent probit model for the selection equation and a regression model for the dividend data, against the Heckman model. As it is highly significant it supports the Heckman specification. The product of ρ and σ known as the inverse Mills ratio λ is also given with its confidence interval, showing that it is significantly positive as expected. There are 1271 censored observations in the sample, out of the total 4459 observations.

In the selection equation EA and the threshold effect EAQ1 are both significant along with age, but not size, MBF, or DAA[13]. The coefficients for the Heckman dividend equation are interpreted as though we observed dividend data for all firms. The LDV coefficient is now about 0.7. MBF is now highly significantly negative, there is no significant DAA effect.

Leverage is now positive at the 5% level. In the selection equation, however, leverage appears with a negative effect apparently indicating that highly indebted firms are less inclined to become dividend payers. This contrast between the signs of the coefficient on leverage in the selection and the main equations suggests that there may be a non-linear effect operating in respect of leverage. The second column of Table 11 reports a quadratic term in leverage which is significantly negative in both equations, indicating that that any positive leverage effect will disappear at a sufficiently high leverage ratio.

7. Conclusions

We have shown that RE panel estimation is likely to be biased for our sample and have thus focused on the FE results. Using the level of dividends as the dependent variable, we find that only the earnings ratio, age, size and the herding variables are consistently significant, though the growth of assets is positively significant when a lagged dependent variable is present. With a different specification where the earnings ratio is replaced by a (log) earnings level, the latter is again significant and we find similar results to before including a positive DAA effect. In all these specifications the market-to-book ratio is negative but just generally just short of 10% significance in two sided tests. One interpretation of these results is that they weakly confirm the importance of investment opportunity (as measured by MBF) in dividend decisions, with dividends also being positively related to size and age, and influenced in a herding fashion by what others in the same

[13] The results here are shown without the PEER variable as it is hard to see this variable as relevant to the decision to pay dividends. However when the variable is included it produces results that are almost identical.

industry are doing. As expected, there is a consistent autoregressive effect. For none of these estimation runs is there much support for including the leverage variable.

When interacted with the financial crisis the market-to-book factor, consistently negative now in the pre-crisis period, appears to be cancelled out or to change sign, suggesting perhaps that investment opportunity became a less important concern. There is also evidence of increased herding in this period. The coefficient on the change in assets variable DAA shows a strengthening after 2008 which may be explained by the effect of falling asset values on required debt ratios so that those who suffered the greatest falls may have been required to retire debt.

The leverage variable becomes significantly negative in the crisis period. However it is not clear that this can be represented as an agency effect and it seems more likely to represent a financial constraint. We do not see any consistent change in the relationship of dividends to earnings in the financial crisis, in contrast to some claims that this relationship has been upset by an increased secular trend in repurchases. Nor do we find a substitution effect from repurchases in our results.

The estimation results reported above are all for firms paying positive cash dividends. In order to estimate a sample that included non-payers we had to employ a separate data source to our main provider Compustat, which we did by sourcing dividend payments (including zero payments) from Datastream. To check for consistency we utilized the Datastream dependent variable on our Compustat sample and found that the estimates were broadly comparable to before in magnitude and significance except for the coefficients on asset growth. Differences in the age profile of the samples appear to be responsible for this difference which was lessened when we included interaction terms using a dummy for young age for the asset growth variable – and also the market to book ratio.

The advantage of using the Datastream data is not only that it provides a check on our primary source of data but that it allows us to investigate sample selection bias occasioned by correlated omitted variables in the decisions to pay dividends and in the amount of the payout. Such an analysis requires data on payers and non-payers which is only consistently available for the Datastream sample. Using a Heckman specification, and a selection variable augmented by a threshold profit rate variable, we confirm the presence of selection bias. The selection equation estimates suggest that a dividend is more likely to be paid in older firms with high profitability and lower leverage where a threshold profitability is exceeded. The estimates for the unconditional expected value of dividends is also found to depend on age, size and a herding variable with high significance for a negative effect from the market to book ratio. There is no effect observed for the asset growth variable. A significant leverage effect appears to be positive quadratic, becoming negative at very high levels of leverage.

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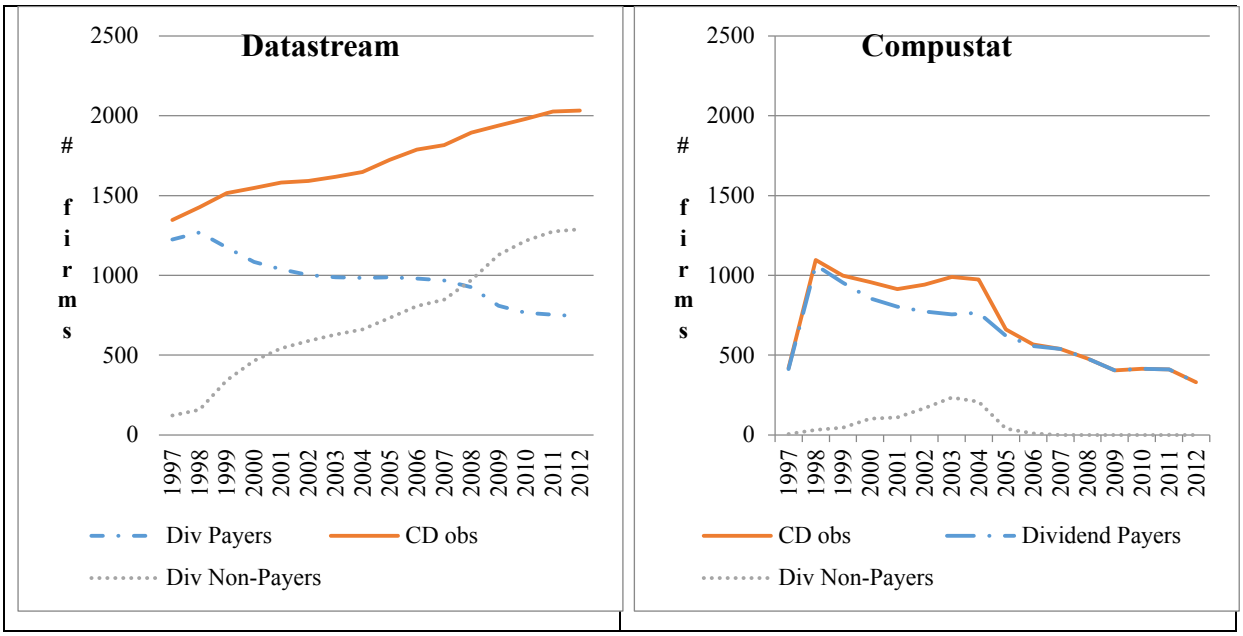
APPENDIX 1 RANDOM EFFECTS ESTIMATION AND TESTS CORRESPONDING TO TABLE 7

Random estimation requires for consistency that the heterogeneous error term is uncorrelated with the regressors. This is *a priori* unlikely when the LDV is included and may even not be the case with LDV excluded. The assumption may be tested by employing the Correlated Random Effects (CRE) model in which the time-averaged mean of time-varying variables is included in the regressor set (Wooldridge 2013). Results of using this estimating technique are shown in columns A to D of Table APPENDIX A1. In each case, the null hypothesis for the exclusion of time means was rejected decisively – at least at the 0.01% level. This indicates that RE estimates are biased and inconsistent and that other methods such as fixed effects (FE) estimation are preferred.

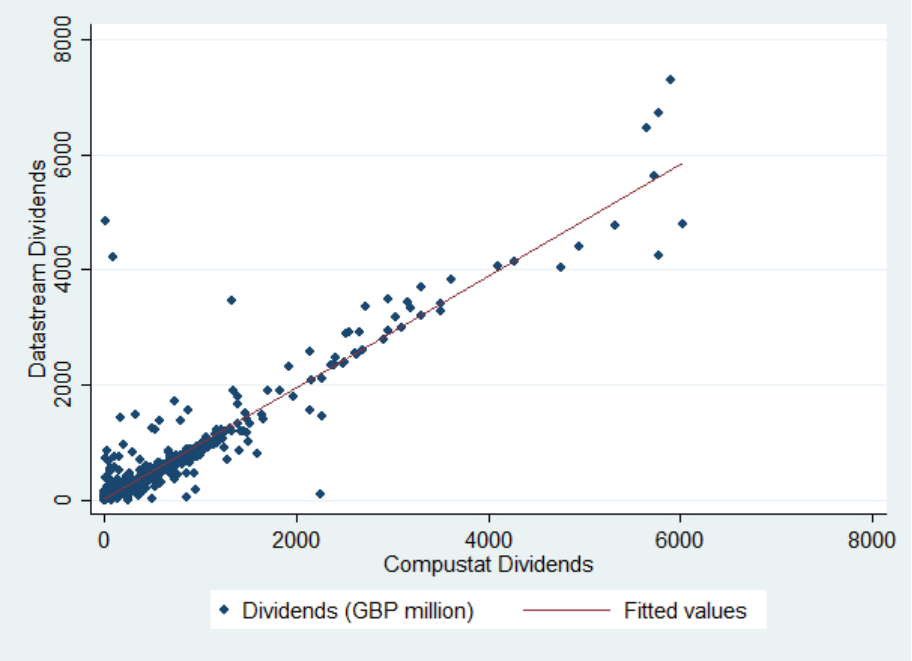
[TABLE APPENDIX A1 HERE]

FIGURE 1. COMPARISON OF DIVIDEND PAYERS AND NON-PAYERS AS REPORTED IN DATASTREAM AND COMPUSTAT, TOTAL SAMPLE OF UK FIRMS 1997-2012



Note: 'CD obs.' represents firms with dividend data available, including where dividends are indicated at 0.

FIGURE 2. DIVIDENDS DECLARED IN COMPUSTAT SAMPLE PLOTTED AGAINST DIVIDENDS PAID IN DATASTREAM SAMPLE FOR ALL UK FIRMS 1997-2012



Note: We exclude 0 dividends and missing values for both Compustat and Datastream samples

FIGURE 3. THE EVOLUTION OF TOTAL PAYOUT AMOUNTS OVER TIME

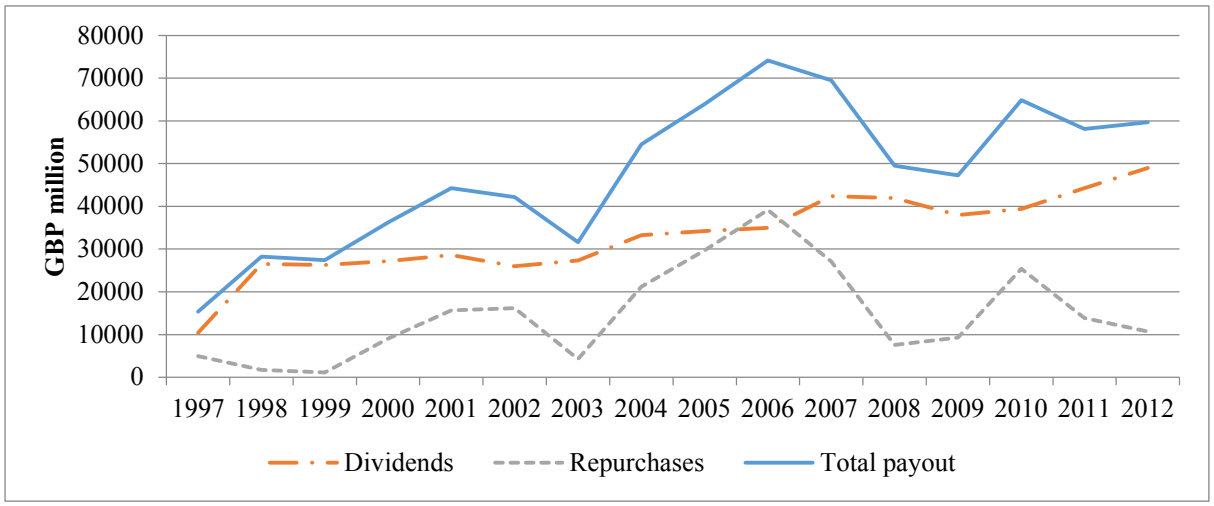
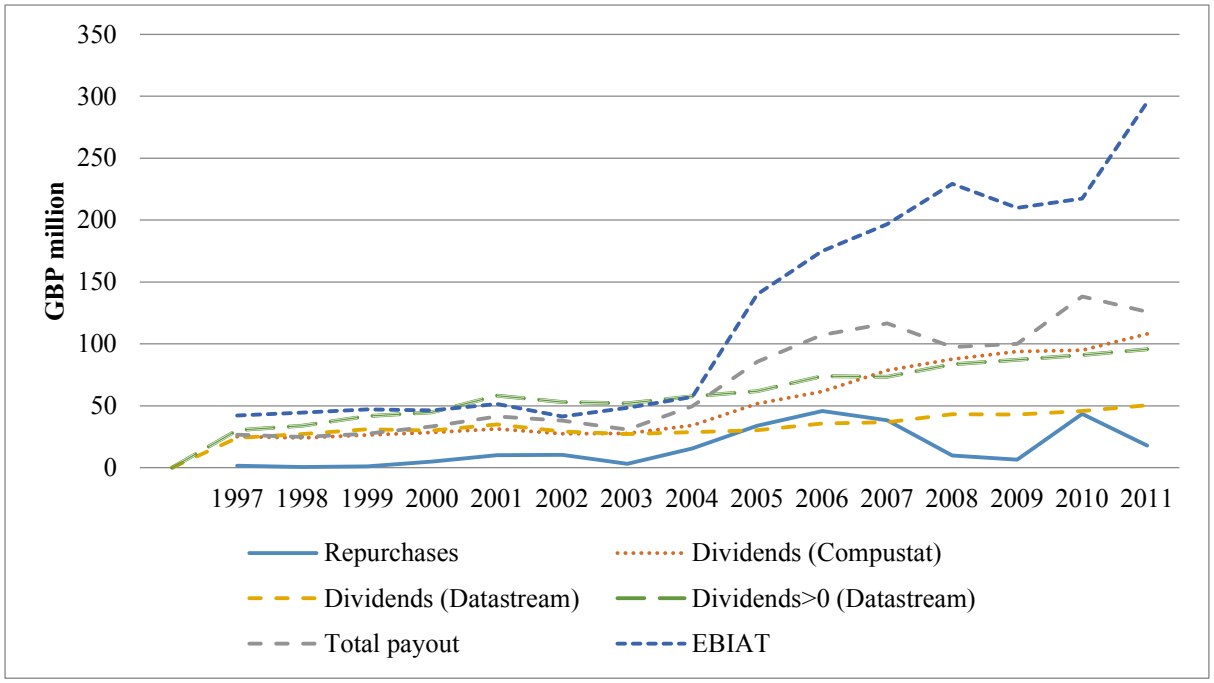


FIGURE 4. MEAN DIVIDENDS, REPURCHASES AND EBIAT (GBP MILLION)



Note: The figure shows the average distributed amounts over time for dividend providers (i.e. for firms where dividends>=0) and for dividend payers (i.e. for firms where dividends>0) as reported in Datastream (average dividends for payers in Compustat are very similar to average funds for dividend providers and are not reported here).

TABLE 1. NUMBER OF OBSERVATIONS FOR CASH DIVIDENDS DECLARED, SHARE REPURCHASES & TOTAL NUMBER OF FIRMS WITH DIVIDEND DATA EXPRESSED AS A PERCENTAGE OF TOTAL COMPUSTAT SAMPLE EXCLUDING FINANCIAL AND UTILITIES SECTORS OF UK FIRMS 1997-2012

(1) Year	(2) Firms that declare cash dividends	(%) Total	(3) Firms that do share repurchases	(%) Total	(4) Firms with dividend data available ("CD Obs.")	(%) Total
1997	382	12%	18	1%	387	12%
1998	1024	33%	49	2%	1055	34%
1999	910	29%	6	0%	953	30%
2000	814	26%	32	1%	914	29%
2001	767	24%	32	1%	872	28%
2002	738	24%	63	2%	903	29%
2003	720	23%	109	3%	950	30%
2004	728	23%	183	6%	934	30%
2005	594	19%	231	7%	631	20%
2006	530	17%	203	6%	540	17%
2007	512	16%	108	3%	512	16%
2008	453	14%	53	2%	453	14%
2009	381	12%	72	2%	381	12%
2010	390	12%	97	3%	390	12%
2011	390	12%	85	3%	390	12%
2012	311	10%	75	2%	311	10%
1997-2012	9644		1416		10576	

TABLE 2. DIVIDEND PAYERS IN COMPUSTAT VS. DATASTREAM WITH DIVIDEND DATA EXPRESSED AS A PERCENTAGE OF TOTAL COMPUSTAT AND DATASTREAM SAMPLES OF UK FIRMS 1997-2012

Year	Firms that declare cash dividends, Compustat	% total	Firms that pay cash dividends, Datastream	% total
1997	413	13%	1224	39%
1998	1064	33%	1268	40%
1999	953	30%	1174	37%
2000	856	27%	1084	34%
2001	803	25%	1038	33%
2002	773	24%	1002	31%
2003	756	24%	988	31%
2004	765	24%	985	31%
2005	622	19%	989	31%
2006	557	17%	980	31%
2007	540	17%	968	30%
2008	478	15%	926	29%
2009	405	13%	810	25%
2010	415	13%	765	24%
2011	410	13%	753	24%
2012	330	10%	744	23%
1997-2012	9810		15698	

Note: We exclude firms that recorded dividends at 0 in both Compustat and Datastream

TABLE 3. DIVIDEND PAYERS IN COMPUSTAT VS. DATASTREAM, DESCRIPTIVE STATISTICS SAMPLE OF UK FIRMS 1997-2012

	Firms that declare cash dividends, Compustat	Firms that pay cash dividends, Datastream	Total sample
Age, yrs – obs.	4,071	6,902	10,207
Age, yrs – mean	22.8	23.5	22.4
Age, yrs – median	20	21	19
Size - obs.	9,138	14,876	44,355
Size - mean	48.3	48.6	39.9
Size - median	47.1	47.1	33.3
Dividend – obs.	10,140	15,677	n.a.
Dividend – mean	52.2	62.1	n.a.
Dividend – median	2.9	3.1	n.a.

TABLE 4. THE VALUE OF DIVIDENDS DECLARED, SHARE REPURCHASES AND TOTAL FUNDS DISTRIBUTION (DIVIDENDS PLUS REPURCHASES) IN £ MILLION 1997-2012

(1) Year	The total value of dividends, Compustat (GBP million)	%	The total value of share repurchases (GBP million)	%	The total payout (GBP million)	The total value of dividends, Datastream (GBP million)
1997	10446	68%	4945	32%	15391	37108
1998	26497	94%	1744	6%	28242	43055
1999	26266	96%	1163	4%	27429	48950
2000	27194	75%	9047	25%	36242	48422
2001	28640	65%	15655	35%	44295	60334
2002	25959	62%	16187	38%	42146	53111
2003	27330	87%	4259	13%	31589	51373
2004	33274	61%	21231	39%	54505	56806
2005	34203	53%	29733	47%	63936	61127
2006	34965	47%	39186	53%	74151	72415
2007	42377	61%	27111	39%	69488	70996
2008	41917	85%	7590	15%	49507	77363
2009	37963	80%	9295	20%	47258	70499
2010	39408	61%	25413	39%	64821	69489
2011	44266	76%	13863	24%	58128	71909
2012	48962	82%	10693	18%	59654	80206
Total	**529668**	**69%**	**237115**	**31%**	**766783**	**973164**

TABLE 5. SUMMARY STATISTICS: SAMPLE MEAN

Variables	Definitions	Dividend Payers, Compustat		Non-Dividend Payers, Compustat	
1997-2012		Mean	Sd.	Mean	Sd.
EBIAT	EBIAT (GBP million)	146.7	956.8	63.57199	994.6487
LEV	Leverage rate from book values	0.1934	0.1770	0.3317	1.8169
MBF	Market to book ratio	2.2532	22.7952	17.4908	90.8810
DAA	(Assets - Assets[_n-1])/Assets[_n-1]	6.3708	557.1195	1.5541	27.0452
Age	Age of a firm	22.7723	13.9872	12.8233	10.9520
Size	Ranking by market value	48.3336	32.1806	46.5648	33.1610

TABLE 6. VARIABLE DEFINITIONS

Variables (l indicates 1-year lags)	**Description**
Cash dividends	Amounts paid by cash dividend payers, in nominal values and in millions of GBP, in natural logarithms, and transformed. We add 1 to these 0 values before logging them We use nominal rather than real dividends because the choice of deflator is not obvious and because we include nominal variables as right-side variables with time dummies included. Less than ten percent of our dividends are paid in non- sterling denominations and these have been converted using the relevant 2005conversion rates to GBP, with 2005 being the mid-point of our sample.
Dividend Ratio	Ratio of Cash Dividends to Total Assets
REP	Amounts declared by repurchasers, in nominal values and in millions of British Pounds, converted at mid-period annual exchange rates (as of 2005) if accounts are reported in foreign currencies (9% of the sample), in natural logarithms, and transformed.
EBIAT (LEBIAT)	(earnings before interest and taxes) – (total income taxes) in million GBP. LEBIAT refers to the natural log of EBIAT
EA	The earnings ratio of a company defined as the earnings before interest but after tax divided by the book value of assets, lagged
MBF	Market-to-book value of the firm , lagged
DAA	(change in total assets)/total assets, lagged
LEV	[(total long-term debt) + (total debt in current liabilities)] / (total assets)
SIZE	Percentile ranking of a company in the range of market values in the respective years, lagged
AGE	The age of the company.
YEAR	Time dummies
PEER	Industry dividend over sales ratio by industry in a given year, lagged. GIC Industries codes are used

TABLE 7. CORRELATION MATRIX

	Div.	Div.	EA	MBF	DAA	LEV	SIZE	AGE	PEER	EBIA
ln (Div.	1									
Div. ratio	0.15	1								
EA	0.09	0.53	1							
MBF	-	0.00	0.006	1						
DAA	0.01	-	-	-	1					
LEV	0.24	-	0.028	0.004	-	1				
SIZE	0.16	0.01	0.076	0.060	-	0.000	1			
AGE	0.25	-	-	-	-	0.042	0.076	1		
PEER	0.27	0.17	0.125	-	-	0.117	-	0.015	1	
EBIAT	0.90	0.00	0.193	-	0.012	0.263	0.181	0.192	0.241	1

TABLE 8. FIXED EFFECTS Dependent variable ln Dividends (£million) from Compustat

	A	B	C	D
Const.	1.369***	1.258***	1.014***	0.995***
EA	1.190***	0.880***		
MBF	-0.004	-0.002	-0.003+	-0.002
DAA	0.015	0.042***	0.016+	0.043***
LEV	-0.063	-0.051	-0.129	-0.104
SIZE	0.008***	0.006***	0.006***	0.004***
AGE	0.039***	0.031***	0.023***	0.019**
PEER	3.376***	1.479+	3.041***	1.434+
LDV		0.180***		0.174***
EBIAT			0.256***	0.192***
Time dummies	YES***	YES***	YES***	YES***
No. obs.	3316	3231	3197	3122
Sigma(u)	1.631	1.354	1.252	1.074
Sigma(e)	0.492	0.450	0.457	0.419
Rho	0.917	0.901	0.882	0.868

Notes:

(i) Legend: + p<0.10; * p<0.05; ** p<0.01; *** p<0.001. Sigma(u): standard deviation of residuals within groups. Sigma(e): standard deviation of residuals. Rho: proportion of the variance due to differences across groups.

(ii) Variable definitions:
EA: [(earnings before interest and taxes) – (total income taxes)]/(total assets)
MBF: (price*share/1000 market cap) / (total assets)
DAA: [(total assets) - (total assets)$_{-1}$] / (total assets)$_{-1}$
LEV: [(total long-term debt) + (total debt in current liabilities) / (total assets)
SIZE: Percentile ranking of a company in the range of market values in the respective years, lagged
AGE: number of years since firm birthday
PEER: (total dividends by year and industry) / (total sales/turnover by year and industry)
LDV: lagged dependent variable
LEBIAT: Ln of [(earnings before interest and taxes) – (total income taxes)]

(iii) EA, MBF, DAA, LEV, SIZE and PEER are lagged one period.

TABLE 9. FIXED EFFECTS FINANCIAL CRISIS INTERACTIONS Dependent Variable Ln Dividends (£ million) from Compustat

	A	B	C	D
Constant	1.611***	1.531***	1.211***	1.204***
EA	1.139***	0.796**		
MBF	-0.003+	-0.002+	-0.003+	-0.002*
DAA	0.001	0.028**	0.005	0.031***
LEV	0.051	0.020	0.033	0.014
SIZE	0.007***	0.005***	0.005***	0.004***
AGE	0.028**	0.018+	0.015	0.010
PEER	2.467*	0.873	2.252*	0.876
EBIAT			0.243***	0.179***
CRISIS*EA	0.407	0.775		
CRISIS*MBF	0.002***	0.002***	0.002***	0.001***
CRISIS*DAA	0.155**	0.158***	0.112**	0.121***
CRISIS*LEV	-0.486+	-0.348	-0.602*	-0.476*
CRISIS*SIZE	0.002	0.002	0.001	0.001
CRISIS*PEER	3.315*	2.372+	2.689+	1.900
CRISIS*EBIAT			0.017	0.020
LDV		0.180***		0.174***
Time dummies	YES***	YES***	YES***	YES***
No. obs.	3316	3231	3197	3122
Sigma(u)	1.613	1.337	1.258	1.081
Sigma(e)	0.487	0.446	0.453	0.416
Rho	0.916	0.900	0.885	0.871

Notes: See notes to Table 8.
CRISIS: dummy variable = 1 if year ≥ 2008

TABLE 10. FIXED EFFECTS – Dependent Variable Ln Dividends (£ million) from Datastream

	A	B	C	D	E	F	G	H
Const.	1.091***	1.064***	0.675***	0.754***	0.775*	0.694+	1.222***	1.251***
EA	0.735+	0.669+			2.054*	1.225*	0.771*	0.900***
MBF	-0.003+	-0.002+	-0.002	-0.001	-0.003	-0.003	-0.001	-0.001
DAA	-0.043+	-0.017	-0.072**	-0.055**	0.121+	0.140+	0.142***	0.138***
LEV	0.008	-0.108	0.020	-0.057	-0.562+	-0.701*	-0.191	-0.066
SIZE	0.009***	0.008***	0.007***	0.006***	0.006***	0.006***	0.006***	0.006***
AGE	0.044***	0.037***	0.029***	0.025***	0.021	0.025	0.032***	0.031***
PEER	2.818**	1.493+	2.763**	1.566*	1.660	1.734	1.570+	1.563+
LDV		0.134***		0.118***	0.383***	0.383***		
EBIAT			0.270***	0.216***				
DAA*YOUNG					-0.214**	-0.234**	-0.115***	-0.110***
EA*YOUNG					-1.370		0.198	
MBF*YOUNG					-0.000	-0.000**	-0.001***	-0.001***
LEV*YOUNG					-0.199		0.216	
LDV							0.181***	0.180***
Time dummies	YES***	YES***	YES***	YES***	YES***	YES***	YES***	YES***
No. obs.	3487	3475	3349	3337	3188	3188	3231	3231
Sigma(u)	1.625	1.458	1.180	1.096	1.486	1.485	1.358	1.359
Sigma(e)	0.490	0.445	0.442	0.404	1.139	1.139	0.448	0.448
Rho	0.917	0.915	0.877	0.880	0.630	0.630	0.902	0.902

Notes: See notes to Table 8.

TABLE 11. HECKMAN ESTIMATION - Datastream

	A	B
Const.	0.092	-0.006
LDV	0.686***	0.683***
SIZE	0.003*	0.003**
EA	1.806***	2.107***
MBF	-0.001***	-0.001***
DAA	-0.026	-0.028
LEV	0.400*	1.292***
LEV^2		-1.436**
AGE	0.007***	0.007**
PEER	4.985***	5.004***
Time	YES***	YES***
Auxiliary		
Const.	0.394	0.376
LDV	0.186***	0.184***
SIZE	0.001	0.001
EA	2.428***	2.627***
MBF	0.000	0.000
DAA	0.009	0.008
LEV	-0.385**	0.448
LEV^2		-1.322**
AGE	0.004*	0.004*
PEER	-1.598	-1.564
EAQ1	0.822***	0.755***
Time	YES***	YES***
No. obs.	4459	4459
Censored	1271	1271
Uncensored	3188	3188
rho	0.093	0.064
sigma	1.334	1.219
lambda	0.124	0.083
Wald χ^2	4481.00	4506.92
Prob > χ^2	0.0000	0.0000
Pseudo log-	-7013.722	-7004.703

Notes: t statistics in parentheses + p<0.10, * p<0.05, ** p<0.01, *** p<0.001

TABLE APPENDIX A1. CORRELATED RANDOM EFFECTS Dependent variable ln of Dividends (£ million) from Compustat

	A	B	C	D
Const.	-1.215	1.637	-0.361	0.440
EA	1.173***	0.945***		
MBF	-0.004	-0.002	-0.003+	-0.002
DAA	0.015	0.045***	0.014+	0.044***
LEV	-0.053	-0.043	-0.133	-0.109
SIZE	0.008***	0.005***	0.005***	0.004***
AGE	0.022***	-0.002	0.006**	0.002
PEER	3.478***	1.453+	3.157***	1.396+
LDV		0.197***		0.187***
EBIAT			0.261***	0.192***
Time dummies	YES***	YES***	YES***	YES***
Means of time-varying variables	YES***	YES***	YES***	YES***
No. obs.	3316	3231	3197	3122
Sigma(u)	1.440	0.607	0.538	0.395
Sigma(e)	0.492	0.450	0.457	0.419
Rho	0.896	0.646	0.581	0.470

Notes: See notes to Table 8.