A J-Shaped Cross-Sectional Relation Between Dividends and Firm Value

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Abstract

Using U.S. data over the period 1971-2005, we identify a J-shaped relation between dividends and firm value. Top-dividend-payers tend to be valued higher than all other firms including non-dividend-payers, while non-dividend-payers tend to be valued higher than low-dividend-payers. This J-shaped relation is fairly stable over time and robust to controlling for the potential endogeneity bias in the dividend-value relation. This time-invariant nonlinear dividend-value relation is at odds with the premise of the catering hypothesis that the dividend premium varies over time. We also find that a similar J-shaped relation is obtained in other major stock markets including Australia, Canada, France, Germany, Japan and U.K. Our evidence indicates that the ability of existing theories—such as the free-cash-flow and clientele hypotheses—to account for the cross-sectional dividend-value relation is rather poor.

JEL classification: G30, G31, G35
Key words: firm value, dividends, clientele effect, tax, free cash flow

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1. Introduction

One of the central questions in corporate finance is whether dividends are relevant to firm value. Miller and Modigliani (1961, MM hereafter) suggest that, in frictionless markets, all feasible dividend policies imply identical stockholder wealth, and so the choice among them is irrelevant. Thus, their irrelevance theorem implies that investment policy alone determines stockholder wealth in frictionless markets. However, DeAngelo and DeAngelo (2006) point out that MM's analysis is predicated critically on the assumption that firms pay out 100% of their free cash flows in every period. If we allow firms to retain some of their free cash flows, payout policy matters, particularly when the present value of distributions does not equal the present value of projected cash flows.

Empirical studies, such as those of Fama and French (1998) and Pinkowitz, Stulz, and Williamson (2006), document that firm value is positively associated with the amount of dividends. These two studies offer different interpretations on this finding. Fama and French (1998) suggest that this association arises because dividends pick up information about future business prospects that is missed by control variables. On the other hand, Pinkowitz et al. (2006) interpret this association as evidence that investors assign high value to firms that reduce the agency costs of free cash flows by paying dividends. However, there are other studies that do not necessarily predict a positive relation between firm value and dividends. For example, according to the catering theory of Baker and Wurgler (2004), the relation between firm value and dividends can be either positive or negative. These authors document that the dividend premium—the spread between the values of dividend-payers and non-dividend-payers—varies over time.

In this study, we examine the cross-sectional relation between firm value and dividends and thereby seek to tackle the question of whether dividends are relevant to firm value. In conducting our investigation, we depart from prior studies at least in two important respects. First, we consider a potential nonlinear relation between dividends and firm value. Prior studies, such as Fama and French (1998) and Pinkowitz et al. (2006), examine the presence of a linear dividend-value relation. However, some dividend hypotheses, e.g., the clientele hypothesis, may imply a nonlinear dividend-value relation. Assuming the demands by pro-dividend clienteles are concentrated in high-dividend-payers, their demands would push up the value of these high-dividend-payers relative to other firms.[1] Similarly, the demands by anti-dividend clienteles

[1] The key here is that the demands by pro-dividend clienteles may be not evenly distributed across all dividend-payers, but concentrated on high-dividend-payers. Prior studies, however, for example, Baker

would drive up the value of non-dividend-payers. If both pro-dividend and anti-dividend clienteles are present, high-dividend-payers and non-dividend-payers could be traded at a premium relative to low or medium-dividend-payers, thereby resulting in a nonlinear relation between dividends and firm value.

Second, the current study carefully addresses the potential endogeneity bias in the relation between dividends and firm value. Because prior studies, such as Fama and French (1998) and Pinkowitz et al. (2006), do not take into account the potential endogeneity bias, there is a chance that the positive valuation effect of dividends in their results could be an outcome of reverse causation. For example, investors could award high-dividend-payers with high values, not because they pay high dividends per se, but because a set of firm characteristics associated with high dividends (e.g., cash-flow stability and high profitability) creates high firm value. We devise a scheme that allows us to examine the dividend-value relation after controlling for the potential endogeneity bias.

Our investigation of U.S. data over the period 1971-2005 reveals that the relation between the amount of dividends (cash dividends scaled by total assets) and firm value (measured by Tobin's q) is not monotonic but J-shaped. On average, top-dividend-payers are valued highly in comparison to all other firms including non-dividend-payers, while non-dividend-payers are valued higher than low-dividend-payers. This J-shaped dividend-value relation is fairly stable over time. For example, the median firm value for top-dividend-payers is greater than that for other firms including non-dividend-payers in every year, while the median firm value for non-dividend-payers is greater than that for low-dividend-payers in most sample years. Thus, it appears that the average value spread between top-dividend-payers and non-dividend-payers does not vary in sign over time but is consistently positive.

We then assess whether the J-shaped dividend-value relation persists after controlling for the endogeneity bias. This is accomplished by evaluating the dividend-value relation within subgroups of firms in each of which firms have similar levels of expected dividend likelihood (or amount). If a similar J-shaped dividend-value relation is obtained in each of these subgroups, such relation could be viewed as evidence that actual dividends drive the J-shaped dividend-value relation, rather than firm characteristics associated with dividends. The expected dividend likelihood for each firm is estimated from logit regression of the decision to pay dividends on previously identified determinants of dividends—e.g., cash-flow uncertainty, retained earnings,

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and Wurgler (2004), tend to lump all dividend-payers together in quantifying the value spread between dividend- spayers and non-dividend-payers.

profitability and firm size—as explanatory variables. We then sort firms into five subgroups by the expected dividend likelihood. Our results reveal that similar J-shaped dividend-value relations are obtained in these expected dividend likelihood subgroups. This implies that *actual* dividend payouts are responsible for the J-shaped dividend-value relation. For example, even among firms that are most likely to pay high (or low) dividends, investors appear to award high-dividend-payers with highest firm values and also award no-dividend-payers with relatively high firm values as compared to low-dividend-payers. In sum, the J-shaped dividend-value relation appears to persist after controlling for the potential endogeneity problem.

We also examine whether the J-shaped dividend-value relation persists when we include share repurchasing firms in the dataset.[2] We find that in all sample years, the median firm value for top-dividend-payers is greater than the corresponding values for other subgroups of firms. And in almost all years, the median firm value for non-dividend-payers is greater than that for lowest-divdend-payers. Thus, the data tell us that the J-shaped dividend-value relation is robust to inclusion of share repurchasing firms in the dataset.

For a further robustness check, we examine international data that are composed of six major economies—Australia, Canada, France, Germany, Japan and U.K.—and two additional economies—Hong Kong and New Zealand. The two additional countries provide an invaluable opportunity to weigh whether the J-shaped pattern can be attributed partly to the tax-induced anti-dividend clientele, given that the dividend tax penalty does not exist under the tax system of these two countries (see, e.g., La Porta, Lopez-de-Silanes, Shleifer and Vishny, 2000). Our investigation reveals that the J-shaped pattern is present in all of the eight countries, which suggests that the J-shaped pattern is not unique to the U.S. stock market. The results for Hong Kong and New Zealand imply that the tax-induced anti-dividend clientele is unlikely to provide an explanation for the J-shaped dividend-value relation.

Based on our findings, we assess the ability of existing dividend hypotheses—in particular, the free-cash-flow and clientele hypotheses—to explain the observed J-shaped dividend-value relation. First, the free-cash-flow hypothesis maintains that firm value would be positively associated with dividends because investors assign high values to firms that reduce the agency costs of free cash flows by paying dividends. However, this hypothesis is unable to

[2] One can presume that the valuation effect of share repurchases would be different from that of dividends due to the nonpermanent nature of share repurchases as documented in prior studies (e.g., Stephen and Weisbach, 1998; Jagannathan, Stephens and Weisbach, 2000; Guay and Harford, 2000; Grullon and Michaely, 2002; Lee and Suh, 2009.)

provide an explanation for the nonlinear nature of the empirical dividend-value relation.[3] In particular, our finding of the value premium commanded by non-dividend-payers relative to low-dividend payers is in direct conflict with the prediction of the free-cash-flow hypothesis.

Second, the clientele hypothesis could accommodate a potential nonlinear relation between value and dividends, at least in theory. The observed J-shaped dividend-value relation may indicate the presence of both pro-dividend and anti-dividend clienteles. That is, the demands of pro-dividend clientele drive up the value of high-dividend-payers and those of anti-dividend clientele push up the value of no-dividend-payers (to a lesser extent), thereby creating a J-shaped pattern. However, as our international evidence on Hong Kong and New Zealand indicates, (tax-induced) anti-dividend clientele is not likely to be responsible for the J-shaped pattern. Also, prior research does not offer sufficient evidence for the clientele effects. For example, DeAngelo, DeAngelo and Skinner (2008) conclude that "little or no empirical basis exists for viewing [dividend clientele effects] as a major determinant of firms' payout decisions. (p. 203)." Grinstein and Michaely (2005) document that while institutional investors tend to avoid non-dividend-payers, they prefer low-dividend-payers among dividend-paying firms. Thus the empirical distribution of institutions' share ownership does not conform to the J-shaped dividend-value relation.

This study makes substantial contributions to the payout literature. In stark contrast to the importance of the question of whether dividends are relevant to firm value, there is a relative dearth of formal empirical investigation of this question in the recent literature. While some prior studies indicate that firm value is positively associated with dividends (Fama and French, 1998; Pinkowitz et al., 2006), our evidence suggests that the valuation effect of dividends may be nonlinear. Pinkowitz et al. (2006) argue that the empirical dividend-value relation supports the free-cash-flow hypothesis, but our evidence suggests that the precise dividend-value relation is non-monotonic, unlike what is implied by the free-cash-flow hypothesis. Our evidence also suggests that if we measure the dividend premium by the mean value spread between top-dividend-payers and non-dividend-payers, the dividend premium does not vary in sign over time but is always positive. This finding runs counter to the notion proposed by Baker and Wurgler

[3] Another problem of the free-cash-flow hypothesis is that an alternative hypothesis, for example, a sizable pro-dividend clientele (who prefer high dividends), would generate a similar positive dividend-value relation. In our view, the stronger test of the free-cash-flow hypothesis would be conducted by estimating the effect on firm value of the interaction of dividends and residual cash flows (defined by the difference between operating cash flows and investments), rather than estimating the effect of dividends per se.

(2004) that the dividend premium varies in sign over time. Nearly fifty years ago, MM (1961) asked, "Do companies with generous distribution policies consistently sell at a premium above those with niggardly payouts?" According to our evidence, the answer to this question is *yes*. However, our evidence also indicates that existing dividend hypotheses fall short of providing a complete explanation for the observed J-shaped dividend-value relation.

The organization of this paper is as follows. The next section presents hypotheses. Section 3 describes research design and data. Section 4 conducts empirical analyses and presents the results. Section 5 concludes the paper.

2. Hypotheses on the dividend-value relation

In this section, we present three key hypotheses about the cross-sectional relation between dividends and firm value: the free-cash-flow hypothesis, the dividend clientele hypothesis and the dividend catering hypothesis.

To begin, the *free-cash-flow hypothesis* predicts a positive relation between firm value and dividends. According to Jensen (1986), free cash flows at managements' discretion can lead to value-destroying investments. Assuming that investors are attracted to firms that reduce the agency costs of free cash flows by paying dividends, high-dividend-paying firms would command high values. By estimating the Fama-French value regression model, Pinkowitz, Stulz, and Williamson (2006) find that dividends have a positive impact on firm value and that this impact is more pronounced in countries with poor shareholder protection. These observations are consistent with the free-cash-flow hypothesis.

On the other hand, Fama and French (1998) do not provide an interpretation based on agency costs, although they find a similar positive impact of dividends on firm value in the value regression. They conjecture that this positive impact of dividends is a byproduct of the ability of dividends to predict future profitability (i.e., the key determinant of firm value)—combined with the lack of ability of the control variables in the value regression to sufficiently account for future profitability. This interpretation is akin to the signaling hypothesis of dividends, which posits that firms signal favorable future prospects by paying dividends (Bhattacharya, 1979; Miller and Rock, 1985). However, the signaling hypothesis pertains to the change in firm value in response to dividend changes, rather than to the cross-sectional dividend-value relation. Typically, the signaling hypothesis is tested by examining the announcement effects of dividend changes, i.e., whether those announcements give rise to significant stock price responses (e.g., Lang and Litzenberger, 1989; Bajaj and Vijh, 1990; Denis, Denis Michael, Thaler and Womack, 1995).

Second, the *dividend clientele hypothesis* does not necessarily predict a monotonic or linear relation between dividends and firm value. This hypothesis postulates that there exist several investor groups with varying preferences for current dividends vs. capital gain (i.e., future dividends) and that firms would design their dividend policy to satisfy the demands (MM, 1961; Black and Scholes, 1974). Prior studies point to the tax code and behavioral biases as the source for the presence of these dividend clienteles. The *anti*-dividend clientele prefer non-dividends because dividends are generally taxed at a higher rate than are capital gains and thus reduce shareholder wealth (Elton and Gruber, 1970). The *pro*-dividend clienteles prefer high dividends for their naivety (Shefrin and Statman, 1984) or for the incentive to minimize transaction costs (MM, 1961). Petitt (1977) provides evidence that investor demands for stocks are explained by proxy variables, such as age, for the dividend clientele effect. Bajaj and Vijh (1990) and Denis, Denis and Sarin (1994) document that the stock price response to dividend change announcements is relatively more pronounced for high dividend-yield stocks, which suggest that pro-dividend investors make up a high proportion of marginal investors for high dividend-yield stocks.

This dividend clientele hypothesis can be extended to form predictions about the cross-sectional relation between dividends and firm value. Suppose that firms may make incomplete supply adjustments and individuals' portfolio adjustments may be limited by transaction costs such as short sale and margin restrictions (MM, 1961; Litzenberger and Ramaswamy; 1980, 1982). Then the demand of *pro*-dividend clienteles for high dividend stocks could create value premiums for high-dividend-paying stocks. Similarly the demands of *anti*-dividend clienteles could create value premiums for non-dividend-paying stocks. In a nutshell, the relative significance of the demands of these clienteles would determine the cross-sectional dividend-value relation.

Third, the *dividend catering hypothesis* proposed by Baker and Wurgler (2004) assumes that the cross-sectional dividend-value relation would be rather unstable over time or time-varying. This hypothesis posits that firms determine their dividend policy, depending on whether dividend-paying stocks are under or overvalued relative to non-dividend-paying stocks. Baker and Wurgler (2004) document that more firms tend to initiate (omit) dividends in years during which the dividend premium—measured by the mean difference in firm value between dividend-payers and non-dividend-payers—is positive (negative). Note, however, that a key feature of the Baker and Wurgler (2004) study is that they treat all dividend paying firms as a single group, not sorting them into subgroups by the amounts of dividends.

In summary, the free-cash-flow hypothesis predicts a positive dividend-value relation. According to this hypothesis, firm value is expected to increase monotonically with the amount of dividends, i.e., reduction in cash flows at managers' discretion. However, the dividend clientele hypothesis does not predict a monotonic relation between dividends and firm value because it presumes that the relative size of anti-dividend clienteles and pro-dividend clienteles would determine the dividend value relation. Finally, the dividend catering hypothesis predicts that the cross-sectional dividend-value relation may vary over time.

3. Research design and data

In examining the relation between firm value and dividends, we pay special attention to the possibility that this relation could be non-monotonic. Instead of trying to determine a linear relation (or lack thereof) between firm value and dividends, we compare firm values across different groups of firms classified by the amount of dividends. To do so, we partition each year's cross-section of firms into six groups by the amount of dividends. This is done by first partitioning firms into non-dividend-payers (*DIV_ID* = 0) and dividend-payers. Then we further divide dividend-payers into five groups by the amount of dividends, *DIV_ID* = 1, 2, 3, 4 or 5, with *DIV_ID* = 1 being the lowest-dividend-payers and *DIV_ID* = 5 being the highest-dividend-payers. The next step is to compare the mean and median firm values for these six groups.

We also estimate the valuation effect of dividends using the modified Fama-French value regression:

$$\begin{aligned} Q_t = &\sum_{j=0}^{5} b_j \cdot DIV\_INC_{jt} + a_{12} dDIV_t + a_{13} dDIV_{t+1} \\ &+ a_1 E_t + a_2 dE_t + a_3 dE_{t+1} + a_4 dA_t + a_5 dA_{t+1} \\ &+ a_6 RD_t + a_7 dRD_t + a_8 dRD_{t+1} + a_9 I_t + a_{10} dI_t + a_{11} dI_{t+1} + a_{14} dQ_{t+1} + e_t \end{aligned} \quad (1)$$

The dependent variable (Q) is firm value as measured by Tobin's q. The key explanatory variables are the DIV_INC_j's, the 0-1 indicator variables for the six groups of firms classified by the amount of dividends. For example, DIV_INC_0 is equal to 1 for non-dividend-payers (i.e., *DIV_ID* = 0) but 0 for other firms. Five other indicator variables are similarly defined. Our focus in this value regression is the sign and significance of the coefficients, b_j's. $dDIV_t$ and $dDIV_{t+1}$ are one-year changes in cash dividends, $DIV_t - DIV_{t-1}$ and $DIV_{t+1} - DIV_t$, respectively. Other explanatory variables include earnings before interest and extraordinary items but after depreciation and taxes (E_t), book value of total assets (A_t), R&D expenditures (RD_t), and interest expense (I_t). For a given explanatory variable, X_t, dX_t and dX_{t+1} indicate the one-year changes, $X_t - X_{t-1}$ and $X_{t+1} - X_t$, respectively. dQ_{t+1} is the future change in firm value (Q) from t to t+1. This variable is included because firm value reflects expected future profitability but the other explanatory variables may not pick up expected future profitability sufficiently. All explanatory variables are scaled by total assets (A_t). Note that firm subscript i is suppressed for notational convenience.

The above value regression is similar to the one that is developed by Fama and French (1998). The major difference here is, however, that we treat the amount of dividends as a categorical variable in this regression in order to identify a potential nonlinear relation between firm value and dividends. Prior studies, such as Fama and French (1998) and Pinkowitz et al. (2006), use the amount of dividends as a continuous variable. These authors find that the coefficient for dividends is significantly positive in the value regression.

Next we address the issue that the empirical dividend-value relation may reflect a potential endogeneity bias. The key to controlling for the endogeneity bias in this study is to estimate the dividend-value relation among firms that have similar levels of expected dividend likelihoods (or amounts). The first step in this task is to estimate the expected likelihood of paying dividends for each firm. We estimate the following cross-sectional logit regression for each year's dataset.

$$\log\frac{p}{1-p} = \gamma_0 + \gamma_1 ROAVOL + \gamma_2 RETE + \gamma_3 ROA + \gamma_4 LOGTA + \gamma_5 SGR5_t + \gamma_6 CASH + \gamma_7 LEVER + u \tag{2}$$

The dependent variable is the log odd of paying dividends. The explanatory variables are lagged values of the standard deviation of five year operating profitability (ROAVOL), the retained-earnings-to-total-equity ratio (RETE), operating profitability (ROA), firm size (LOGTA), five-year sales growth (SGR5), cash holdings (CASH) and leverage (LEVER).[4] The definitions of

[4] These explanatory variables are considered to be determinants of the likelihood of paying dividends (or the amount of dividends) by prior studies such as those of Chay and Suh (2009), DeAngelo et al. (2006), and Fama and French (2002).

these explanatory variables are provided in Table A.1. Because the explanatory variables are lagged values (i.e., t-1 values) of key firm characteristics, they reflect information available to investors prior to a firm's decision to (or not to) pay dividends at t. As a result, the estimated likelihoods from this regression model capture the investors' perception of the probability that dividends will be paid.

Once the expected dividend likelihood is obtained, we divide the sample firms each year into quintiles based on that likelihood (*E(DIV)_ID* = 1, 2, 3, 4 or 5)[5] such that firms in the same quintile have similar expected likelihoods of paying dividends (mainly because these firms have similar firm characteristics). The next step is to examine the relation between the amount of dividends and firm value in each expected dividend likelihood quintile. Essentially, this allows us to assess whether a firm enhances or destroys its value when it deviates from other firms with similar expected dividend likelihoods by paying high, low or no dividends. Or more importantly, this allows us to examine the extent to which *actual* dividend payouts—rather than firm characteristics associated with dividend payouts—affect firm value.

The dataset for this study is constructed using the *Compustat* database for the period 1971-2005. The dataset is comprised of non-financial firms. We measure the amount of dividends as the ratio of cash dividends to total assets. Our main findings remain unchanged when we use an alternative measure, the ratio of cash dividends to sales. When necessary, we present results only for the four representative years of 2005, 1995, 1985, and 1975 to save space, although our main findings are obtained for other sample years as well. We deal with extreme values by Winsorizing the variables in this study (whose definitions are provided in Table A.1.) at the top and bottom one percent of their own distributions in each year's sample. We remove firms with negative book equity because those firms create a problem in the interpretation of the retained-earnings-to-total-equity ratio (RETE).

Finally, in our primary analysis, we drop firms if they repurchase shares during a given

[5] An alternative approach is to sort firms into subgroups based on expected dividend amounts, instead of expected dividend likelihoods. However, the expected dividend likelihood estimated from the logit regression model is highly correlated with the expected dividend amount estimated from a Tobit regression model (with the same explanatory variables given in Equation (2)). Thus, firms with a high (low) expected dividend likelihood can be considered to have a high probability of paying *high* (*low*) dividends. We find that our main results remain unchanged when we use this alternative sorting scheme based on expected dividend amounts estimated from a Tobit regression. We choose to present results that are obtained from logit regressions, because, as Billett and Xue (2007) point out, estimated coefficients from Tobit regressions suffer serious lack of consistency if heteroscadasticity and normality are present in error terms.

year in order to focus on the valuation effects of dividends. Given the nonpermanent nature of repurchases as documented in prior studies (e.g., Stephen and Weisbach, 1998; Jagannathan, Stephens and Weisbach, 2000; Grullon and Michaely, 2002), repurchases would have potentially different valuation effects from dividends. Thus inclusion of repurchasing firms in the dataset could interfere with proper assessment of the valuation effect of dividends. However, our investigation is also conducted on the extended dataset that includes share repurchasing firms. The results for this extended dataset are reported in Section 4.4.

4. Empirical Results

4.1. The J-shaped relation between firm value and dividends

We begin by plotting the relation between firm value and dividends for the pooled dataset from the period 1971-2005. To do so, we sort each year's sample into six groups—*DIV_ID* = 0, 1, 2, 3, 4 or 5—by the amount of dividends. As explained above, *DIV_ID* = 0 indicates non-dividend-payers, while *DIV_ID* = 1 and *DIV_ID* = 5 indicate the lowest-dividend-payers and the highest-dividend-payers, respectively, among dividend-paying firms. For a given year, we then calculate the median firm value (measured in Tobin's q) for each of these six groups of firms.

Figure 2 documents the relation between firm value and dividends. This box-plot is constructed using the median firm values for the six groups of firms for each individual year over 1971-2005. It shows that the dividend-value relation is not monotonic but rather J-shaped. For example, over the sample period, the median of the annual median firm values for non-dividend-payers (*DIV_ID* = 0) is greater than the corresponding value for lowest-dividend-payers (*DIV_ID* = 1). Among dividend-payers (i.e., *DIV_ID* = 1, 2, 3, 4 or 5), the median of the annual median firm values tend to increase as we move from the lowest-dividend-payers (*DIV_ID* = 1) to the highest-dividend-payers (*DIV_ID* = 5). The most salient feature of the box-plot is that the median of the median firm values for the highest-dividend-payers is greater than that of any other firm group.

These observations based on the pooled dataset over the entire sample period suggest that there is a J-shaped relation between dividends and firm value. However, it is essential to asssess whether this relation is stable over time, especially in light of the dividend catering hypothesis that postulates that the dividend-value relation may vary from year to year. For example, Baker and Wurgler (2004) document that the dividend premium—the spread between the values of dividend-payers and non-dividend-payers—may turn negative. In their approach, however, they treat all dividend-payers as a single group, thereby dismissing the potential importance of dividend amounts in determining the dividend-value relation.

To evaluate the stability of the J-shaped dividend-value relation over time, Table 1 tabulates the median and mean values for Tobin's q for the six groups of firms from *DIV_ID* = 0 to 5 for each individual year over the period 1971-2005. The table shows that the J-shaped dividend-value relation is present in almost all individual years. That is, in almost all years, there is a tendency for non-dividend-payers to be valued higher than low-dividend-payers. And among dividend-payers, firm value tends to increase monotonically with the amount of dividends. In particular, this table shows that, in all years without exception, the median firm value for top-dividend-payers (*DIV_ID* = 5) is greater than the corresponding values for other groups of firms including non-dividend-payers (*DIV_ID* = 0). It also shows that, in almost all years (with only five exceptions), the median firm value for non-dividend-payers (*DIV_ID* = 0) is greater than that for lowest-dividend-payers (*DIV_ID* = 1).

Thus, the data indicate that the J-shaped dividend-value relation is fairly stable over time. What does this imply for the dividend catering hypothesis of Baker and Wurgler (2004)? This hypothesis presumes that the value spread between dividend-payers and non-dividend-payers varies (i.e., change sign) over time. However, our findings suggest that lumping all dividend-payers together as a single group may not be appropriate if we intend to capture the complete dividend-value relation. It appears that it is essential to account for the amount of dividends in analyzing the dividend-value relation. The data show that *top*-dividend-payers are traded consistently at a premium over time relative to non-dividend-payers, while low-dividend-payers are traded consistently at a discount over time relative to non-dividend-payers. Thus, if we take into account the amount of dividends, the observed dividend-value relation appear to be fairly stable over time—contrary to the premise of the catering hypothesis that this relation may vary over time.

4.2. Modified Fama-French value regression results

Next we estimate the modified Fama-French value regression given in equation (1) in order to assess the significance of the J-shaped dividend-value relation. Table 2 presents the results for the sample firms over the period 1971-2005. In this value regression, the key explanatory variables are indicator variables for six groups of firms (i.e., *DIV_ID* = 1, 2, 3, 4 or 5) classified by the amount of dividends. The coefficients returned for these indicator variables confirm that there is a J-shaped relation between firm value and dividends. Specifically, in both pooled regression (Panel A) and Fama-McBeth regression (Panel B), the coefficient on the indicator variable for non-dividend-payers (DIV_INC_0) is high compared to those on the indicator variables for the majority of dividend-payers ($DIV\_INC_{j,}$ j = 1, 2, 3 or 4). Further, the coefficient on the indicator variable for top-dividend-payers (DIV_INC_5) is higher than that on the indicator variable for any other group including non-dividend-payers. Panel C of the table reports that the coefficient for top-dividend-payers is significantly greater than that for non-dividend-payers as well as that for low-dividend-payers (i.e. b_5 - b_0 is positive and significant). It also reports that the coefficient for non-dividend-payers is significantly greater than that for low-dividend-payers (i.e. b_0 - b_1 are positive and significant).

In sum, our regression results confirm that top-dividend-payers tend to be valued highly in comparison to other firms including non-dividend-payers. Non-dividend-payers, however, tend to be valued highly in comparison to low-dividend-payers. This J-shaped dividend-value relation suggests that inferences from the linear value regression models (employed by prior studies) may be misleading. In particular, Pinkowitz et al. (2006) concludes that the empirical dividend-value relation supports the free-cash-flow hypothesis on the basis of the finding that the coefficient for dividends is positive in their linear value regression. However, as our results suggest, firm value does not increase monotonically with dividends, a finding that does not conform to the prediction of the free-cash-flow hypothesis.

4.3. The dividend-value relation after controlling for the endogeneity bias

Thus far our results indicate a significant J-shaped relation between dividends and firm value. However, one could raise a concern that the observed dividend-value relation may arise not from dividends per se but from a set of firm characteristics that affect both dividend decisions and firm value (that is, an endogeneity or self-selection bias). For example, according to the observed J-shaped relation, top-dividend-payers tend to be valued higher than other firms. This pattern could be an outcome of a tendency of high-valued firms to pay high dividends—if such tendency exists. In order to address the potential endogeneity problem, we divide our sample firm-years into several subgroups in each of which firms have similar levels of expected dividend likelihood (or amounts) and then evaluate the dividend-value relation in each of these subgroups. If similar J-shaped dividend-value relations are obtained in all of these subgroups, it would be an indication that such relation is robust to the potential endogeneity bias.

The first step in this robustness check is to estimate the expected likelihood of paying dividends for each firm-year using the logit regression model (2). In the second step, we sort firm-years into five subgroups by expected dividend likelihood (i.e., *E(DIV)_ID* = 1, 2, 3, 4, 5). The final step involves examining the cross-sectional value-dividend relation in each of these five subgroups.

Table 3 reports the results of logit regression for four representative sample years, 2005, 1995, 1985 and 1975, as well as for the entire sample period 1971-2005. Note that ROAVOL, RETE, ROA, LOGTA and SGR5 enter significantly with the predicted signs as in prior studies (See, e.g., Chay and Suh, 2009; DeAngelo et al., 2006; Fama and French, 2002). Thus the estimation results indicate that the probability of paying dividends decreases with cash-flow uncertainty (ROAVOL) and investment opportunities (SGR5), but increases with retained earnings (RETE), profitability (ROA) and firm size (LOGTA). It appears that the logit regression model predicts the actual likelihood of paying dividends fairly accurately. For example, in 2005, the concordant ratio is as high as 75 percent and this ratio is even greater in other sample years.

By plugging lagged values for explanatory variables into the logit regression model estimated for each fiscal year, we can obtain the expected dividend likelihood for each firm-year. Because we use lagged values for explanatory variables in this process, the estimated expected dividend likelihood closely reflects the likelihood of dividend payment that an investor can estimate using public information. Furthermore, as stated above, because the expected dividend likelihood estimated from the logit regression model is highly correlated with the expected dividend amount estimated from a Tobit regression model, firms with a high (low) expected dividend likelihood can be considered to have a high probability of paying *high* (*low*) dividends.

We then sort firms into quintiles (*E(DIV)_ID* = 1, 2, 3, 4, 5) for each year's sample by the expected dividend likelihood. Firms in *E(DIV)_ID* = 1 have the lowest expected dividend likelihoods, while firms in *E(DIV)_ID* = 5 have the greatest expected dividend likelihoods. Table 4 presents the median values for Tobin's q and other key firm characteristics for each expected dividend likelihood quintile for four representative sample years as well as the entire sample period. As expected, firms in the same expected dividend likelihood quintile have similar firm characteristics. As we move from low to high expected dividend likelihood quintiles (e.g., from *E(DIV)_ID* = 1 to *E(DIV)_ID* = 5), firms have more stable profitability (ROAVOL), have more retained earnings (RETE), are more profitable (ROA) and are greater in size (LOGTA). The most noteworthy pattern from the table is displayed in the last rows (marked 'ALL') that report the median of median Tobin's q values for each expected dividend likelihood quintile from thirty-five individual years over 1971-2005. There is a noticeable J-shaped relation between the expected dividend likelihood and Tobin's q. The median Tobin's q is relatively high at 1.156 for the lowest expected dividend likelihood group (*E(DIV)_ID* = 1), but it is relatively low at 1.092 and 1.140 for the low and medium expected dividend likelihood groups (*E(DIV)_ID* = 2 and *E(DIV)_ID* = 3), respectively, but high at 1.183 and 1.292 for high expected dividend likelihood groups (*E(DIV)_ID* = 4 and *E(DIV)_ID* = 5), respectively. Hence, firm value tends to have a J-shaped relation with the expected dividend likelihood, similarly with the actual dividend amounts.

The implication of the above observation is that the J-shaped relation between dividends and firm value may arise from a set of firm characteristics that are associated with dividends (and that determines the expected dividend likelihood)—rather than from dividends per se. For example, firms in the highest expected dividend likelihood quintile (*E(DIV)_ID* = 5) are characterized by low cash-flow uncertainty, high retained earnings and high profitability retained earnings. These firm characteristics could give rise to high firm values as well as high expected dividend likelihoods. Similarly, firms in the lowest expected dividend likelihood quintile (*E(DIV)_ID* = 1) are characterized by high investment opportunities (indicated by high SGR5) but high cash-flow uncertainty, low retained earnings and low profitability retained earnings. These firm characteristics could explain why they have high firm values but low expected dividend likelihoods. In sum, the lesson here is that accounting for the endogeneity bias is critical in the inference on the value-dividend relation.

Our way of controlling for this endogeneity problem is to analyze the dividend-value relation within a subgroup of firms that have similar levels of expected dividend likelihood. If a J-shaped dividend-value relation is obtained in all such subgroups, then this dividend-value relation would be considered to be robust to the endogeneity bias. To see this, suppose that high firm values in the highest expected dividend likelihood subgroup (*E(DIV)_ID* = 5) are driven not by actual dividends but mainly by firm characteristics such as low cash-flow uncertainty, high retained earnings and high profitability. If so, there should be no particular pattern in the relation between actual dividends and firm values within this subgroup.

Table 5 documents the relation between the amount of dividends and Tobin's q for each subgroup of firms with similar levels of expected dividend likelihoods. To construct this table, each year's sample is first divided into five quintiles by the expected dividend likelihood (*E(DIV)_ID* = 1, 2, 3, 4, 5) and then firms in each dividend likelihood quintile is further divided into six subgroups by the amount of actual dividends (*DIV_ID* = 0, 1, 2, 3, 4, 5). Hence, this procedure creates thirty (=5×6) subgroups. The table covers four representative years, 2005, 1995, 1985 and 1975, as well as the entire sample period 1971-2005. We learn from the table that firm value tends to have a J-shaped relation with dividends within each expected dividend likelihood quintile. For example, almost invariably across expected dividend likelihood quintiles from *E(DIV)_ID* = 1 to *E(DIV)_ID* = 5, top-dividend-payers (i.e., *DIV_ID* = 5) have greater median and mean firm values than do other firms, while non-dividend-payers (i.e., *DIV_ID* = 0) tend to have greater median firm values than do low-dividend-payers (i.e., *DIV_ID* = 1). The last panel of the table reports the median of median firm values for each of the thirty subgroups over the period 1971-2005. It confirms that top-dividend-payers tend to have the greatest median firm value irrespective of the expected dividend likelihood. It also shows that non-dividend-payers have greater median firm values than do low-dividend-payers while this pattern is a somewhat weak in the lowest expected dividend likelihood quintile.

In summary, our investigation reveals that actual dividend payouts—not just expected dividend payouts—are responsible for the J-shaped dividend-value relation. For example, even among firms that are expected to pay high (or low) dividends, investors appear to award high-dividend-payers with highest firm values and also award no-dividend-payers with relatively high firm values as compared to low-dividend-payers. The J-shaped dividend-value relation tends to persist after controlling for expected dividend likelihoods, which suggests that this relation is quite robust to the potential endogeneity problem.

4.4. The dividend-value relation after including share repurchasing firms in the dataset

Thus far our investigation has not included share repurchasing firms because our focus is on the valuation effect of dividends. However, given that the number of share repurchasing firms has been on the rise over our sample period (See, e.g., Grullon and Michaely, 2002), it is necessary to address the question of whether our main findings are affected by exclusion of share repurchasing firms. To the best of our knowledge, the valuation effect of share repurchases is not clear, especially given that share repurchases are not long-term commitments to distributing cash to shareholders. For example, share repurchases are not persistent and the amount of share repurchases varies widely from year to year (Stephen and Weisbach, 1998; Jagannathan, Stephens and Weisbach, 2000; Grullon and Michaely, 2002; Lee and Suh, 2009). In addition, Guay and Harford (2000) document evidence that firms use share repurchases to distribute temporary cash flows. Given this nonpermanent nature of share repurchases, it is not likely that they have sustained effects on firm value.

Table 6 reports the dividend-value relation for each individual year over the sample period for an extended dataset that includes share repurchasing firms along with the dividend-paying and non-dividend-paying firms examined in the preceding analyses. Our key question is whether a J-shaped dividend-value relation persists for this extended dataset. Inspection of the table suggests that that is the case. In all sample years without exception, the median value for top-dividend-payers (i.e., *DIV_ID* = 5) is greater than the corresponding values for all other subgroups of firms. It also shows that, in almost all years (with only five exceptions), the median firm value for non-dividend-payers (*DIV_ID* = 0) is greater than that for lowest-dividend-payers (*DIV_ID* = 1). A similar pattern is found for the dividend-value relation in terms of mean firm values (as reported in Panel B). Thus, the data tell us that the J-shaped dividend-value relation is robust to inclusion of share repurchasing firms in the dataset.[6]

4.5 International evidence

We now examine stock markets outside the U.S. to evaluate whether the J-shaped dividend-value relation can be extended to other stock markets. Our international dataset covers the period 1994-2005 for eight stock markets: six major markets including Australia, Canada, France, Germany, Japan and U.K. and two additional markets including Hong Kong and New Zealand. This international dataset is constructed using the data from the *Worldscope* database. The two additional markets are considered here because they provide an interesting opportunity to assess the role of taxes in generating the J-shaped dividend-value relation. The dividend tax penalty does not exist in these two countries (see, e.g., La Porta, Lopez-de-Silanes, Shleifer and Vishny, 2000), which implies that the tax-induced anti-dividend clientele would be nonexistent in those countries. We hypothesize that if the tax-induced anti-dividend clientele is responsible for the value premium of non-dividend-payers relative to low-dividend-payers (a pattern obtained for the U.S. stock market), this value premium would disappear for those two countries.

The results presented in Table 7 strongly suggest that the J-shaped dividend-value

[6] We also analyze the dividend-value relation after controlling for the probability of paying dividends—in the same manner as in Table 5—for this extended dataset. We find that a J-shaped dividend-value relation is obtained in each subgroup of firms classified by the likelihood of paying dividends.

relation is not unique to the U.S. stock market. In all eight countries, there is a clear J-shaped relation between firm value and dividends. For example, in Australia, the median value for the annual median firm values for non-dividend-payers (i.e., *DIV_ID* = 0) is 1.358, which is greater than the corresponding value for low-dividend-payers (i.e. *DIV_ID* = 1) at 1.065. The median firm value increases monotonically among dividend-payers as we move to medium- and high-dividend-payers. As a results, top-dividend-payers command high firm values relative to other groups of firms. Similar patterns are observed for other countries as well. In particular, note that the results from Hong Kong and New Zealand suggest that the tax-induced dividend clientele may not be attributable to the value premium of non-dividend-payers relative to low-dividend-payers. In spite of the fact that the dividend tax penalty is non-existent in those countries, there is a substantial value premium of non-dividend-payers relative to low-dividend-payers in those countries; both mean and median firm values for non-dividend-payers (*DIV_ID* = 0) are greater than those for lowest-dividend-payers (*DIV_ID* = 1).[7]

4.6 Discussion of several issues

According to the J-shaped dividend-firm value relation, the average firm value of non-dividend-payers is greater than that of low-dividend-payers. One might argue that this relatively high firm value of non-dividend-payers could be explained by the observation that non-dividend-payers are clustered in the technology sector and their retained earnings are typically negative (See, e.g., DeAngelo, DeAngelo and Skinner, 2004). Indeed, firms with negative retained earnings could assume high q values, not because investors award these firms with high firm values, but because negative retained earnings lower the denominator of the q value. However, we still find that a J-shaped relation persists after removal of negative earnings firms (in unreported results). Also, we note that some of our earlier results imply the robustness of the J-shaped relation to the presence of negative earnings firms: a significant J-shaped value dividend relation persists even within subgroups of firms with high expected dividend likelihood (e.g., E(DIV)_ID = 4 or 5)—i.e., essentially, firms with non-negative retained earnings.

In light of the J-shaped dividend-value relation in a cross-section of firms, an interesting question to pose is whether this pattern implies that firms can enhance value by changing the amount of dividends (or, in other words, whether this pattern implies the valuation

[7] In unreported results, we examine the significance of the difference in both mean and median firm values between non-dividend-payers (DIV_ID = 0) and lowest-dividend-payers (DIV_ID = 1) in these two countries. The differences are statistically significant.

effect of dividend changes). For example, could low-dividend-payers raise value by increasing dividends to become medium- and high-dividend-payers? A particularly puzzling observation in our results is the relatively low average value of low-dividend-payers as compared to non-dividend-payers. Does this observation imply that firm value would actually drop when firms initiate dividends—assuming that dividend initiating firms become low-dividend-payers, not medium- or high-dividend-payers? In unreported results, we examine whether firms experience significant changes in firm value over the three-year period if they move from a given dividend payout subgroup (e.g. *DIV_ID* = 0) to another (e.g., *DIV_ID* = 1). We find that the changes in firm value following dividend changes are not statistically significant. Thus it does not appear that the cross-sectional J-shaped dividend-value relation implies the significant valuation effect of dividend changes.

However, the lack of valuation effect of dividend changes is not in conflict with existing evidence reported in the dividend literature. Benartzi, Michaely and Thaler (1997) document that dividend increases are not followed by significant earnings growth in subsequent years. Given that earnings are the main driver of firm value, their finding indicates that dividend increases would be not be followed by significant improvements in firm value. Furthermore, some prior studies provide little evidence that changes in dividend policy attract or drive off a particular investor clientele. For example, Hoberg and Prabhala (2008) report that institutional ownership does not change significantly after dividend increases (See DeAngelo et al., 2008, for a review of this strain of research). The relatively weak response in investor demands to dividend changes suggests that the valuation effect of dividend changes would be rather small—at least over a short period of time.

5. Concluding remarks

In this study, we investigate the cross-sectional relation between dividends and firm value. The data show that there is a J-shaped relation between firm value and dividends. On average, high-dividend-payers are valued higher than all other firms including non-dividend-payers, but non-dividend-payers are valued higher than low-dividend-payers. It appears that this J-shaped relation is fairly stable over time and robust to controlling for a potential self-selection bias. The time-invariant nature of this J-shaped relation cases doubt on the premise of the catering theory that the dividend premium varies over time.

Our tests show that the ability of existing hypotheses, such as the free-cash-flow hypothesis and the dividend clientele hypothesis, to explain the J-shaped pattern is rather poor. For example, the free-cash-flow hypothesis is unable to offer an explanation for the nonlinear nature of the empirical dividend-value relation, more specifically, the value premium of non-dividend-payers relative to low-dividend payers. We acknowledge that the J-shaped dividend-value relation does not imply rejection of the free-cash-flow hypothesis. At a minimum, however, the J-shaped relation suggests that there is more to the cross-sectional relation between firm value and dividends than is explained by the free-cash-flow hypothesis.

Second, our J-shaped pattern may be resulted from the demands of the two dividend clienteles; pro-dividend clienteles push up the value of high-dividend-payers, while anti-dividend clienteles push up the value of non-dividend-payers to a lesser degree. However, prior research offers little empirical evidence for the importance of dividend clienteles (See, e.g., DeAngelo, DeAngelo and Skinner, 2008). Furthermore, our own international evidence suggests that tax-induced anti-dividend clienteles may not be an explanation for the value premium commanded by non-dividend-payers relative to low-dividend-payers.

In conclusion, it appears that dividend policy matters to firm value, for example, as indicated by a substantial value premium commanded by top-dividend-payers. On the other hand, it is not clear what drive the J-shaped dividend-value relation, given the failure of existing hypotheses to provide a complete explanation for this observed relation. It is not clear either that the J-shaped relation implies that firms can influence its value by modifying their dividend policies. These questions present interesting yet challenging venues for future research.

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Appendix

Table A.1

Description of key variables

Variable	Description
Key variables	
Tobin's q (Q)	(book value of total assets – book value of equity – deferred taxes + market value of common stock) / book value of total assets
Dividend (DIV)	Cash dividends paid
Explanatory variables in Fama-French value regression	
Earnings (E)	Earnings before interest and extraordinary items but after depreciation and taxes
Total assets (A)	Book value of total assets
R&D expenditures (RD)	R&D expenditures
Interest expenses (I)	Interest expense
Explanatory variables in logit regression	
Operating profit variability (ROAVOL)	Lagged value of the standard deviation of operating rate of return (i.e., EBIT/total assets) over the most recent five years
Retained-earnings-to-total-equity ratio (RETE)	Lagged value of retained earnings/common equity
Operating profitability (ROA)	Lagged value of earnings before interest and taxes/total assets
Firm Size (LOGTA)	Lagged value of the logarithm of total assets
Five year sales growth rate (SGR5)	Lagged value of the geometric growth rate of five year sales
Cash holdings (CASH)	Lagged value of cash and short-term investments/ total assets
Leverage (LEVER)	Lagged value of (short-term debt + long-term debt)/total assets

Table 1

Median and mean firm values for DIV_ID = 0, 1, 2, 3, 4 & 5 for each individual year

For each individual year over 1971-2005, the table reports the median and mean Tobin's q (Panels, A and B, respectively) for six groups of firms classified by the amount of dividends. Each year's sample is partitioned into non-dividend-payers (DIV_ID = 0) and dividend-payers. Dividend-payers are further partitioned into five groups by the amount of dividends, with DIV_ID = 1 being the lowest-dividend-payers and DIV_ID = 5 being the highest-dividend payers. In Panel C, *, ** and *** indicate two-tailed significance at the 10%, 5% and 1% levels, respectively.

DIV_ID	0	1	2	3	4	5
	Panel A: Median value of Tobin's q					
1971	1.211	1.074	1.115	1.236	1.317	1.936
1972	1.095	1.042	1.075	1.153	1.193	2.020
1973	0.869	0.868	0.872	0.981	1.023	1.482
1974	0.814	0.831	0.801	0.821	0.876	1.174
1975	0.866	0.890	0.865	0.901	0.927	1.340
1976	0.911	0.923	0.922	0.967	1.032	1.407
1977	0.983	0.925	0.925	0.944	1.012	1.247
1978	1.084	0.960	0.952	0.932	0.999	1.233
1979	1.096	0.964	0.961	0.965	1.038	1.258
1980	1.177	1.013	1.004	1.019	1.089	1.314
1981	1.048	0.964	0.990	1.002	1.040	1.250
1982	1.063	0.995	1.023	1.092	1.042	1.196
1983	1.204	1.083	1.175	1.172	1.208	1.373
1984	1.072	1.023	1.053	1.090	1.131	1.305
1985	1.133	1.083	1.128	1.165	1.198	1.319
1986	1.153	1.099	1.170	1.230	1.248	1.333
1987	1.114	1.054	1.111	1.211	1.164	1.352
1988	1.108	1.112	1.141	1.253	1.213	1.335
1989	1.118	1.098	1.147	1.281	1.222	1.350
1990	1.029	1.070	1.088	1.144	1.154	1.323
1991	1.115	1.072	1.163	1.186	1.242	1.414
1992	1.193	1.122	1.165	1.227	1.308	1.545
1993	1.327	1.192	1.287	1.312	1.358	1.545
1994	1.254	1.152	1.222	1.245	1.321	1.402
1995	1.303	1.201	1.248	1.281	1.336	1.519
1996	1.343	1.268	1.290	1.302	1.352	1.495
1997	1.415	1.265	1.407	1.422	1.407	1.499
1998	1.156	1.145	1.281	1.262	1.287	1.565
1999	1.198	1.084	1.150	1.159	1.314	1.569
2000	1.148	1.067	1.057	1.140	1.295	1.433
2001	1.169	1.101	1.135	1.170	1.263	1.542
2002	1.050	1.040	1.056	1.168	1.181	1.481
2003	1.361	1.144	1.211	1.304	1.249	1.560
2004	1.444	1.263	1.243	1.298	1.356	1.797
2005	1.525	1.217	1.256	1.315	1.403	1.863
	Panel B: Mean value of Tobin's q					
1971	1.575	1.282	1.501	1.577	1.737	2.691
1972	1.476	1.294	1.384	1.533	1.638	2.916

1973	1.163	1.102	1.084	1.300	1.465	2.088
1974	0.929	0.902	0.873	0.946	1.067	1.383
1975	1.017	0.965	1.021	1.045	1.155	1.595
1976	1.077	0.974	1.036	1.062	1.148	1.603
1977	1.113	0.956	0.991	1.028	1.108	1.392
1978	1.226	1.037	1.011	1.037	1.081	1.404
1979	1.463	1.125	1.127	1.100	1.197	1.490
1980	1.779	1.295	1.258	1.240	1.259	1.678
1981	1.441	1.136	1.114	1.171	1.192	1.470
1982	1.430	1.192	1.219	1.281	1.215	1.442
1983	1.588	1.245	1.378	1.334	1.374	1.561
1984	1.287	1.149	1.219	1.184	1.360	1.492
1985	1.397	1.266	1.283	1.333	1.395	1.700
1986	1.430	1.319	1.334	1.359	1.553	1.751
1987	1.353	1.175	1.262	1.472	1.427	1.683
1988	1.329	1.235	1.303	1.417	1.424	1.599
1989	1.481	1.230	1.292	1.401	1.469	1.704
1990	1.331	1.191	1.300	1.353	1.339	1.686
1991	1.558	1.357	1.411	1.566	1.446	1.804
1992	1.543	1.332	1.435	1.459	1.563	1.964
1993	1.704	1.423	1.563	1.530	1.535	1.984
1994	1.567	1.309	1.378	1.404	1.463	1.767
1995	1.730	1.443	1.451	1.461	1.568	1.893
1996	1.722	1.485	1.583	1.467	1.613	1.879
1997	1.797	1.579	1.558	1.696	1.707	1.991
1998	1.598	1.486	1.547	1.505	1.608	2.239
1999	2.224	1.468	1.444	1.409	1.621	2.070
2000	1.916	1.439	1.247	1.378	1.833	2.133
2001	1.585	1.443	1.328	1.271	1.591	1.860
2002	1.302	1.160	1.209	1.243	1.324	1.815
2003	1.745	1.364	1.337	1.479	1.499	1.961
2004	1.792	1.568	1.427	1.44	1.552	2.291
2005	1.923	1.373	1.487	1.496	1.685	2.351

Panel C: Test for difference in Tobin's q between key subgroups

	Based on annual *median* q for a given subgroup			
	mean	median	t-stat.	signed rank .
(DIV_ID=5) - (DIV_ID=0)	0.304	0.238	10.11***	315***
(DIV_ID=5) - (DIV_ID=1)	0.382	0.323	12.92***	315***
(DIV_ID=5) - (DIV_ID=3)	0.298	0.293	10.09***	315***
(DIV_ID=0) - (DIV_ID=1)	0.078	0.068	6.31***	285***
(DIV_ID=0) - (DIV_ID=3)	-0.006	-0.007	-0.38	-34
	Based on annual *mean* q for a given subgroup			
	mean	median	t-stat.	signed rank
(DIV_ID=5) - (DIV_ID=0)	0.335	0.275	6.17***	301***
(DIV_ID=5) - (DIV_ID=1)	0.572	0.474	11.63***	315***
(DIV_ID=5) - (DIV_ID=3)	0.496	0.433	11.04***	315***
(DIV_ID=0) - (DIV_ID=1)	0.237	0.211	9.22***	315***
(DIV_ID=0) - (DIV_ID=3)	0.160	0.101	4.60***	239***

Table 2
Modified Fama-French value regression

The table reports the results of the Fama-French value regression for the pooled sample (Panel A) and for the year-by-year regressions (the Fama-Macbeth method) over the period 1971-2005. The dependent variable is firm value (Tobin's q). The key explanatory variables are the 0-1 indicator variables for the six groups of firms classified by the amount of dividends. Each year's sample is partitioned into non-dividend-payers (DIV_ID = 0) and dividend-payers. Dividend-payers are further partitioned into five groups by the amount of dividends, with DIV_ID = 1 being the lowest-dividend-payers and DIV_ID = 5 being the highest-dividend payers. As an example, the indicator variable for DIV_ID = 0 (DIV_INC_0) is equal to 1 for non-dividend-payers but 0 for other firms. The other indicators variables are similarly defined. The definitions of the other explanatory variables are provided in Table A.1. The year dummy variables are included in the pooled regression reported in Panel A, but the results for them are not reported. *, **, and *** indicate two-tailed significance at the 10%, 5%, 1% levels, respectively.

Panel A: For pooled dataset

	$DIVC\_INC_0$	$DIVC\_INC_1$	$DIVC\_INC_2$	$DIVC\_INC_3$	$DIVC\_INC_4$	$DIVC\_INC_5$	$dDIV_t$	$dDIV_{t+1}$	E_t	dE_t
Coefficient	1.44***	1.35***	1.32***	1.32***	1.34***	1.54***	4.21***	6.79***	3.31***	-1.56***
S. Error.	0.03	0.03	0.03	0.03	0.03	0.03	0.74	0.72	0.09	0.08
	dE_{t+1}	dA_t	dA_{t+1}	RD_t	dRD_t	dRD_{t+1}	I_t	dI_t	dI_{t+1}	dQ_t
Coefficient	0.41***	0.32***	0.51***	4.06***	-1.93***	1.04**	-3.81***	3.58***	-3.04***	-0.59***
S. Error.	0.05	0.02	0.02	0.13	0.46	0.44	0.31	0.61	0.61	0.01

Panel B: Average coefficients from year-by-year regressions (Fama-MacBeth regression)

	$DIVC\_INC_0$	$DIVC\_INC_1$	$DIVC\_INC_2$	$DIVC\_INC_3$	$DIVC\_INC_4$	$DIVC\_INC_5$	$dDIV_t$	$dDIV_{t+1}$	E_t	dE_t
Coefficient	1.18***	1.07***	1.06***	1.07***	1.08***	1.28***	3.36***	4.94***	3.67***	-1.57***
S. Error.	0.05	0.05	0.05	0.05	0.05	0.06	1.01	1.37	0.16	0.09
	dE_{t+1}	dA_t	dA_{t+1}	RD_t	dRD_t	dRD_{t+1}	I_t	dI_t	dI_{t+1}	dQ_t
Coefficient	0.88***	0.32***	0.45***	3.08***	-0.44	1.99**	-3.31***	3.59***	-1.72*	-0.52***
S. Error.	0.16	0.03	0.04	0.41	0.77	0.77	0.65	0.48	0.87	0.07

Panel C: Statistical tests for b_j's (coefficients for *DIV_INC_j*'s)

	From pooled regression		From Fama- MacBeth regression	
	difference	F-statistics	mean difference	t-statistics
$b_5 - b_0$	0.10	31.80***	0.09	2.89***
$b_5 - b_1$	0.19	86.60***	0.20	8.19***
$b_0 - b_1$	0.09	33.70***	0.11	7.94***
$b_5 - b_3$	0.22	121.46***	0.21	7.88***
$b_0 - b_3$	0.12	54.71***	0.12	5.72***

Table 3
Logit Regression Results

The table reports logit regression results for four representative sample years, 2005, 1995, 1985 and 1975 as well as for the entire sample period 1971-2005. The dependent variable is the likelihood of paying dividends. The definitions of the firm characteristic variables are provided in Table A.1. Concord is the concordant ratio, and N is the number of observations. *, ** and *** indicate two-tailed significance at the 10%, 5% and 1% levels, respectively. Standard errors are shown in the parentheses. In the last panel (marked ALL), the reported numbers are the average of coefficient estimates returned for individual years over the period 1971-2005.

Year	Intercept	ROAVOL	RETE	ROA	LOGTA	SGR5	CASH	LEVER	N	Concord
2005	-2.464***	-6.771***	0.913***	3.733***	0.301***	-1.342*	-0.501	0.864	664	75.5
	(0.416)	(2.578)	(0.237)	(1.368)	(0.052)	(0.725)	(0.700)	(0.583)		
1995	-1.451***	-14.023***	0.156	7.065***	0.515***	-5.716***	-4.137***	-1.274	494	83.5
	(0.508)	(3.833)	(0.320)	(1.831)	(0.074)	(1.232)	(1.108)	(0.776)		
1985	-1.752***	-14.632***	1.192***	8.016***	0.586***	-6.081***	0.239	-1.521**	691	87.3
	(0.519)	(2.970)	(0.380)	(1.577)	(0.073)	(1.057)	(0.953)	(0.691)		
1975	-2.288***	-9.152**	2.551***	7.827***	0.548***	-0.880	3.328	-2.508**	551	88.1
	(0.756)	(4.018)	(0.536)	(2.147)	(0.100)	(1.402)	(2.882)	(1.015)		
ALL	-2.219***	-12.917***	1.173***	7.434***	0.579***	-4.363***	-0.607	-1.019***	34	85.4
	(0.142)	(1.161)	(0.163)	(0.640)	(0.024)	(0.432)	(0.376)	(0.196)		

Table 4 Tobin's q and other key firm characteristics for each expected dividend quintile

The table reports the median values for Tobin's q and other key firm characteristics for firms in each expected dividend quintile (E(DIV)_ID = 1, 2, 3, 4 or 5). Firms in a higher quintile (e.g., E(DIV)_ID = 5) are more likely to pay dividends than those in a lower quintile (e.g., E(DIV)_ID = 1). The likelihood of paying dividends (E(DIV)_ID) is estimated based on the logit regression results (as reported in Table 3). The definitions of the firm characteristic variables are provided in Table A.1. Tobin's q's (Q) in brackets are mean values. N is the number of observations. In the last panel (marked ALL), the reported numbers are the median of median values of individual years over the period 1971-2005.

Year	E(DIV)_ID	Likelihood	N	Q		ROAVOL	RETE	ROA	LOGTA	SGR5	CASH	LEVER
2005	1	0.114	132	1.658	[2.100]	0.087	-0.074	0.032	4.101	0.074	0.191	0.049
	2	0.282	133	1.453	[1.666]	0.051	0.216	0.060	5.016	0.048	0.123	0.128
	3	0.419	133	1.573	[1.890]	0.030	0.370	0.085	5.907	0.075	0.084	0.163
	4	0.548	133	1.360	[1.595]	0.027	0.525	0.078	6.572	0.078	0.041	0.244
	5	0.706	133	1.364	[1.561]	0.017	0.669	0.085	8.396	0.091	0.042	0.252
1995	1	0.109	98	1.359	[1.939]	0.086	0.344	0.044	3.045	0.070	0.148	0.121
	2	0.317	99	1.255	[1.683]	0.046	0.416	0.076	3.995	0.076	0.084	0.140
	3	0.528	99	1.160	[1.298]	0.029	0.539	0.084	4.589	0.060	0.045	0.260
	4	0.732	99	1.219	[1.506]	0.022	0.623	0.093	5.660	0.060	0.029	0.219
	5	0.891	99	1.378	[1.534]	0.014	0.615	0.097	7.520	0.044	0.020	0.248
1985	1	0.148	138	1.225	[1.407]	0.090	0.307	0.042	2.973	0.134	0.056	0.244
	2	0.513	138	1.134	[1.330]	0.045	0.562	0.095	3.598	0.086	0.070	0.263
	3	0.761	139	1.232	[1.399]	0.040	0.616	0.116	4.880	0.088	0.048	0.237
	4	0.905	138	1.170	[1.408]	0.033	0.753	0.127	5.595	0.062	0.047	0.198
	5	0.964	138	1.200	[1.424]	0.023	0.791	0.126	7.294	0.068	0.051	0.195
1975	1	0.433	110	0.894	[0.945]	0.054	0.359	0.062	3.423	0.129	0.039	0.368
	2	0.799	110	0.848	[0.930]	0.029	0.593	0.095	4.274	0.109	0.042	0.313
	3	0.906	111	0.853	[1.004]	0.025	0.679	0.126	4.807	0.111	0.038	0.261
	4	0.960	110	0.947	[1.132]	0.025	0.735	0.128	6.080	0.121	0.041	0.246
	5	0.985	110	1.303	[1.556]	0.023	0.816	0.154	7.239	0.127	0.075	0.175
ALL	1	0.121	35	1.156	[1.429]	0.082	0.306	0.042	3.263	0.128	0.071	0.224
	2	0.401	35	1.092	[1.320]	0.045	0.522	0.082	3.973	0.101	0.055	0.253
	3	0.645	35	1.140	[1.322]	0.032	0.577	0.087	4.771	0.091	0.051	0.260
	4	0.831	35	1.183	[1.453]	0.025	0.662	0.097	5.824	0.092	0.044	0.245
	5	0.954	35	1.292	[1.521]	0.018	0.737	0.107	7.490	0.067	0.041	0.248

Table 5
Median and mean Tobin's q for DIV_ID = 0, 1, 2, 3, 4 & 5 in expected dividend likelihood quintiles

The table reports the median and mean Tobin's q for thirty subgroups of firms for four representative years as well as for the entire sample years over 1971-2005. To construct this table, we first split each year's sample into quintiles by the expected likelihood of paying dividends (E(DIV)_ID) that is estimated from the logit regression (as reported in Table 3). Firms in a higher quintile (e.g., E(DIV)_ID = 5) are more likely to pay dividends than those in a lower quintile (e.g., E(DIV)_ID = 1). For a given dividend likelihood quintile each year, we partition firms into non-dividend-payers (DIV_ID = 0) and dividend-payers. We further partition dividend-payers into five groups by the amount of dividends, with DIV_ID = 1 being the lowest-dividend-payers and DIV_ID = 5 being the highest-dividend payers. In the last panel (marked ALL), the reported numbers are the median values of median or mean Tobin's q for individual years over 1971-2005. N is the number of observations.

	Median Tobin's q DIV_ID						Mean Tobin's q DIV_ID						N DIV_ID					
E(DIV)_ID	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5
2005																		
1	1.79	1.87	1.11	1.13	1.52	1.59	2.31	1.86	1.31	1.83	1.90	2.39	288	5	6	5	6	5
2	1.45	1.31	1.25	1.64	1.41	2.19	1.74	1.54	1.55	2.16	1.61	3.06	244	14	15	14	15	14
3	1.45	1.33	1.48	1.35	1.52	1.55	1.80	1.31	1.56	1.86	1.80	2.26	208	21	22	22	22	21
4	1.41	1.30	1.17	1.38	1.31	1.69	1.73	1.47	1.38	1.65	1.49	2.08	157	31	32	32	32	32
5	1.30	1.14	1.24	1.31	1.30	1.85	1.70	1.29	1.51	1.39	1.40	2.35	54	52	52	53	52	52
1995																		
1	1.45	1.18	1.34	1.37	1.25	1.38	1.96	2.45	1.84	1.61	1.39	1.94	331	8	9	9	9	9
2	1.22	1.14	1.55	1.27	1.08	1.30	1.68	1.39	1.74	1.66	1.03	1.96	277	19	20	20	20	20
3	1.16	1.26	1.11	1.16	1.36	1.40	1.52	1.39	1.38	1.25	1.40	1.70	245	26	26	26	26	26
4	1.32	1.18	1.17	1.30	1.23	1.78	1.62	1.35	1.34	1.56	1.57	2.24	135	48	48	49	48	48
5	1.46	1.22	1.25	1.36	1.44	1.69	1.90	1.44	1.36	1.49	1.56	1.90	39	67	67	68	67	67
1985																		
1	1.18	1.72	1.25	1.05	1.20	1.31	1.51	2.76	1.31	1.26	1.33	2.30	270	6	7	7	7	6

2	1.08	1.06	1.24	1.02	1.15	1.31	1.25	1.17	1.41	1.14	1.49	1.62	185	23	24	24	24	24
3	1.11	1.05	1.17	1.22	1.24	1.18	1.30	1.25	1.32	1.23	1.41	1.66	100	40	41	41	41	41
4	1.22	1.06	1.13	1.17	1.17	1.22	1.46	1.22	1.33	1.29	1.31	1.43	45	51	52	52	52	52
5	1.55	1.06	1.16	1.16	1.25	1.74	1.89	1.22	1.31	1.31	1.46	1.96	9	59	59	59	60	58
1975																		
1	0.85	0.82	0.96	0.90	0.88	0.99	0.97	0.89	0.95	1.17	0.96	1.04	142	13	13	13	13	13
2	0.87	0.92	0.80	0.83	0.79	0.86	0.97	0.90	0.80	0.90	0.87	1.04	60	29	30	30	30	29
3	0.86	0.88	0.87	0.81	0.81	0.91	1.13	0.95	0.98	0.88	0.93	1.08	26	36	36	37	36	36
4	1.33	0.89	1.01	0.95	0.94	0.99	1.53	1.02	1.20	1.07	1.10	1.35	6	40	41	40	41	40
5	1.41	1.03	0.96	1.30	1.33	2.43	1.83	1.27	1.22	1.51	1.51	2.36	5	40	40	41	41	40
ALL																		
1	1.17	1.20	1.11	1.06	1.20	1.27	1.55	1.61	1.31	1.26	1.50	1.65	35	35	35	35	35	35
2	1.10	1.05	1.07	1.06	1.12	1.23	1.41	1.20	1.29	1.24	1.30	1.54	35	35	35	35	35	35
3	1.12	1.05	1.07	1.13	1.18	1.23	1.36	1.18	1.20	1.24	1.34	1.53	35	35	35	35	35	35
4	1.20	1.07	1.12	1.16	1.18	1.34	1.49	1.25	1.27	1.34	1.37	1.70	35	35	35	35	35	35
5	1.46	1.13	1.19	1.28	1.29	1.65	1.86	1.31	1.42	1.44	1.50	1.96	35	35	35	35	35	35

Table 6

Relation between Tobin's q and dividends for the extended dataset that includes share repurchasing firms

For each individual year over 1971-2005, the table reports the median and mean Tobin's q (Panels, A and B, respectively) for six groups of firms classified by the amount of dividends. This table is constructed the same way as Table 2 except that share repurchasing firms are added to the dataset here. Each year's sample is partitioned into non-dividend-payers (DIV_ID = 0) and dividend-payers. Dividend-payers are further partitioned into five groups by the amount of dividends, with DIV_ID = 1 being the lowest-dividend-payers and DIV_ID = 5 being the highest-dividend payers. In Panel C, *, ** and *** indicate two-tailed significance at the 10%, 5% and 1% levels, respectively.

DIV_ID	0	1	2	3	4	5
	Panel A: Median value of Tobin's q					
1971	1.202	1.064	1.036	1.241	1.230	1.878
1972	1.066	1.039	1.017	1.148	1.183	1.839
1973	0.870	0.850	0.865	0.932	0.953	1.376
1974	0.802	0.812	0.792	0.794	0.842	1.045
1975	0.853	0.855	0.859	0.887	0.916	1.255
1976	0.904	0.903	0.908	0.958	0.995	1.399
1977	0.960	0.908	0.900	0.936	1.017	1.270
1978	1.010	0.947	0.929	0.930	1.001	1.263
1979	1.052	0.959	0.939	0.951	1.042	1.271
1980	1.123	1.002	0.979	1.014	1.052	1.314
1981	1.026	0.962	0.980	0.967	1.021	1.285
1982	1.035	0.999	0.991	1.043	1.013	1.192
1983	1.198	1.083	1.156	1.172	1.187	1.320
1984	1.077	1.017	1.046	1.083	1.133	1.291
1985	1.119	1.068	1.090	1.164	1.227	1.313
1986	1.150	1.073	1.165	1.234	1.290	1.332
1987	1.096	1.056	1.099	1.177	1.214	1.345
1988	1.096	1.079	1.168	1.217	1.246	1.364
1989	1.100	1.103	1.154	1.257	1.277	1.433
1990	1.016	1.013	1.043	1.114	1.187	1.280
1991	1.112	1.073	1.129	1.181	1.234	1.445
1992	1.168	1.121	1.144	1.250	1.313	1.553
1993	1.304	1.194	1.279	1.355	1.344	1.644
1994	1.232	1.136	1.222	1.295	1.314	1.596
1995	1.311	1.171	1.249	1.334	1.321	1.625
1996	1.361	1.195	1.317	1.342	1.396	1.626
1997	1.426	1.291	1.371	1.473	1.473	1.765
1998	1.185	1.157	1.239	1.321	1.343	1.662
1999	1.192	1.078	1.126	1.226	1.270	1.546
2000	1.126	1.097	1.096	1.156	1.276	1.488
2001	1.212	1.115	1.139	1.224	1.286	1.586
2002	1.094	1.066	1.101	1.149	1.216	1.524
2003	1.403	1.164	1.254	1.390	1.355	1.651
2004	1.513	1.217	1.267	1.388	1.524	1.867
2005	1.565	1.207	1.359	1.420	1.544	1.925
	Panel B: Mean value of Tobin's q					
1971	1.532	1.267	1.365	1.558	1.587	2.617

1972	1.467	1.253	1.317	1.451	1.537	2.839
1973	1.123	1.006	1.010	1.163	1.285	1.930
1974	0.892	0.854	0.845	0.912	0.991	1.323
1975	0.981	0.935	0.977	1.009	1.109	1.522
1976	1.047	0.955	1.010	1.045	1.115	1.584
1977	1.083	0.946	0.974	1.012	1.110	1.431
1978	1.171	1.016	1.003	1.029	1.093	1.438
1979	1.397	1.087	1.096	1.051	1.184	1.480
1980	1.728	1.253	1.197	1.198	1.233	1.634
1981	1.390	1.117	1.075	1.113	1.177	1.465
1982	1.388	1.164	1.148	1.218	1.196	1.462
1983	1.570	1.236	1.338	1.338	1.365	1.566
1984	1.293	1.154	1.194	1.194	1.330	1.504
1985	1.362	1.242	1.238	1.317	1.413	1.703
1986	1.393	1.239	1.320	1.378	1.476	1.759
1987	1.317	1.172	1.233	1.400	1.383	1.654
1988	1.311	1.186	1.291	1.364	1.440	1.631
1989	1.403	1.244	1.255	1.368	1.479	1.791
1990	1.294	1.159	1.262	1.256	1.357	1.655
1991	1.517	1.312	1.334	1.477	1.457	1.929
1992	1.517	1.330	1.417	1.449	1.581	1.967
1993	1.637	1.407	1.535	1.539	1.550	2.006
1994	1.559	1.300	1.360	1.444	1.485	1.842
1995	1.762	1.376	1.460	1.528	1.563	1.993
1996	1.752	1.450	1.543	1.500	1.591	1.978
1997	1.796	1.547	1.609	1.685	1.780	2.141
1998	1.599	1.500	1.445	1.621	1.632	2.171
1999	1.984	1.434	1.357	1.569	1.556	2.054
2000	1.749	1.432	1.247	1.521	1.664	2.005
2001	1.637	1.372	1.305	1.433	1.595	1.980
2002	1.357	1.182	1.258	1.302	1.460	1.832
2003	1.773	1.372	1.395	1.668	1.681	2.052
2004	1.847	1.504	1.465	1.590	1.851	2.293
2005	1.948	1.408	1.552	1.608	1.874	2.433

Panel C: Test for difference in Tobin's q between key subgroups

	Based on annual *median* q for a given subgroup			
	mean	median	t-stat.	signed rank .
(DIV_ID=5) - (DIV_ID=0)	0.332	0.332	14.50***	315***
(DIV_ID=5) - (DIV_ID=1)	0.414	0.400	16.00***	315***
(DIV_ID=0) - (DIV_ID=1)	0.082	0.061	5.90***	304***
(DIV_ID=5) - (DIV_ID=3)	0.310	0.301	13.86***	315***
(DIV_ID=0) - (DIV_ID=3)	-0.022	-0.035	-1.78*	-119**
	Based on annual *mean* q for a given subgroup			
	mean	median	t-stat.	signed rank
(DIV_ID=5) - (DIV_ID=0)	0.374	0.345	7.91***	308***
(DIV_ID=5) - (DIV_ID=1)	0.607	0.573	13.52***	315***
(DIV_ID=0) - (DIV_ID=1)	0.233	0.214	10.76***	315***
(DIV_ID=5) - (DIV_ID=3)	0.496	0.453	12.96***	315***
(DIV_ID=0) - (DIV_ID=3)	0.122	0.098	4.98***	253***

Table 7
Dividend-value relation for eight stock markets outside the U.S.
For each of the eight countries (except for New Zealand), the table shows the median and mean values for the median Tobin's q calculated for firms in each dividend payout group (DIV_ID = 0, 1, 2, 3, 4 & 5) in a given year over 1994-2005. To construct the table, each year's sample in a given country is divided into non-dividend-payers (DIV_ID = 0) and dividend-payers. Dividend-payers are further divided into five groups by the amount of dividends, with DIV_ID = 1 being the lowest-dividend-payers and DIV_ID = 5 being the highest-dividend payers. Then the median Tobin's q is calculated for each of the six groups in that given year. Cell values reported here are the median and mean values for those medians. For New Zealand, we divide entire firm-years over 1994-2005 into six subgroups, instead of grouping firms in each individual year; this is due to the lack of sufficient number of firms for this country. Thus cell values for New Zealand represent the median and mean values for q values for each subgroup of firm-years. Avg N (N) are the average number (the number of) firm-years in each dividend group over the sample period.

DIV_ID	0	1	2	3	4	5
Australia						
Median	1.358	1.065	1.189	1.306	1.442	2.411
Mean	1.354	1.111	1.222	1.307	1.496	2.28
Avg N	125	32	33	32	33	32
Canada						
Median	1.364	1.26	1.192	1.301	1.419	1.458
Mean	1.453	1.252	1.254	1.363	1.454	1.538
Avg N	233	21	22	21	22	21
France						
Median	1.256	1.053	1.156	1.245	1.463	1.982
Mean	1.287	1.044	1.166	1.247	1.506	1.975
Avg N	129	47	48	48	48	47
Germany						
Median	1.212	1.084	1.164	1.276	1.403	1.745
Mean	1.336	1.091	1.138	1.292	1.377	1.793
Avg N	198	41	41	41	41	41
Japan						
Median	1.627	1.122	1.311	1.414	1.628	2.299
Mean	1.689	1.138	1.282	1.402	1.615	2.259
Avg N	398	425	426	426	426	425
U.K.						
Median	0.971	0.797	0.865	1.017	1.206	1.813
Mean	0.958	0.81	0.88	1.008	1.193	1.652
Avg N	247	93	93	93	93	93
Hong Kong						
Median	1.078	0.975	0.962	0.97	1.01	1.174
Mean	1.123	1.009	1.016	1.032	1.07	1.246
Avg N	171	42	42	42	42	42
New Zealand						
Median	1.101	1.068	1.237	1.503	1.885	2.668
Mean	1.707	1.092	1.276	1.561	1.896	2.828
N	103	71	71	72	71	71

Figure 1

Box-plot for the median firm values (Tobin's q) for DIV_ID = 0, 1, 2, 3, 4 & 5

This figure shows the box-plot for the median Tobin's q (Q) for six groups of firms, DIV_ID = 0, 1, 2, 3, 4 & 5, for the pooled sample over the period 1971-2005. In creating this box-plot, each year's sample is partitioned into non-dividend-payers (DIV_ID = 0) and dividend-payers. Dividend-payers are further partitioned into five groups by the amount of dividends, with DIV_ID = 1 being the lowest-dividend-payers and DIV_ID = 5 being the highest-dividend payers. For each individual year over the sample period, we then calculate the median Tobin's q for each of the six groups. The box-plot is constructed based on those median Tobin's q's. For example, for a given firm group, the center horizontal line in each box is the median of the thirty-five annual medians for that group. Similarly, the bottom and top of each box are the 25th and 75th percentiles. The high and low ends of each whisker are the maximum and minimum.