Contribution of Dividends to Firm Value: Cross-sectional Variations across Market Imperfections and Firm Characteristics

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Abstract

This paper investigates how dividend policies affect a firm value according to complex interactions of different market imperfections or firm characteristics. We consider the level of information asymmetry, agency problems, corporate governance, a firm's stage in its life cycle, transaction costs, and irrationality of investors to show how firm value and dividend policies are related with respect to these factors. We find that dividend payout increases firm value in general and much more when the agency problem is severe. However, we find that dividend payout becomes irrelevant to firm value under specific situations; with high level of information asymmetry, with strong corporate governance, or in early stage of its life cycle. The results provide an answer to the question of why some extant empirical studies argue that dividend is relevant and others not.

Keywords: Dividends; Firm Value; Market Imperfections; Firm Characteristics

JEL classification: G30; G34; G35

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1. Introduction

Does dividend policy affect firm value? Numerous empirical studies have been conducted to show whether a firm's dividend policy can change the firm value. These studies are based upon two opposing dividend theories, namely, the dividend irrelevance or relevance theory. Miller and Modigliani (1961), under certain assumptions, argue that dividend policy is irrelevant to firm value. When a firm pays more dividends, it actually reduces its retained earnings and capital gains and hence leaves shareholder wealth unchanged. Several empirical studies provide evidence in support of the dividend irrelevance hypothesis (Black and Scholes, 1974; Miller and Scholes, 1978, 1983; Hess, 1981; Miller, 1986; Bernstein, 1996). On the other hand, various studies present the opposite results indicating that the stock market reacts positively to cash disbursements. Especially, firm value moves positively with dividend initiations or increases, but negatively to dividend eliminations or decreases (Pettit, 1972; Aharony and Swary, 1980; Dann, 1981; Vermaelen, 1981; Asquith and Mullins, 1983; Brickley, 1983, Howe, He, and Kao, 1992; Denis, Denis, and Sarin, 1994; Lie, 2000). In other words, dividend policy seems to contribute to firm value. So, there still exists an ongoing debate on dividend policy, which has not even come close to being solved.

This paper focuses on the critical issue of whether dividend policy is relevant or irrelevant and aims to answer to the question of why empirical studies provide seemingly contradictory results. Baker, Saadi, and Dutta (2008) suggest that dividend policy is sensitive to factors such as market frictions, firm characteristics, corporate governance, and legal environments. According to Baker, Powell, and Veit (2002), most studies focus on each market imperfection or firm characteristic individually. As Baker et al. (2002) argue, however, interactions of these market frictions and firm characteristics exist and affect the relation between dividend and firm

value. Thus, concentrating on a single market condition or a firm characteristic in a study cannot provide a decisive explanation about the relation between dividend and firm value. A promising approach in understanding the role of dividends on firm value involves combining various market environments and firm characteristics and investigating their interactions at the same time (Baker et al., 2002). Therefore, in this study, we analyze the valuation impact of dividends with substantial variation in market situation, firm characteristics, and their interactions.

The dividend irrelevance theory is based on the premise that a firm's dividend policy is independent of the firm value in the context of a perfect capital market with rational investors (Miller and Modigliani, 1961). However, without M&M's idealized world of economic theory, the issue of dividend irrelevance deserves more debate. Such market imperfections as information asymmetries between insiders and outsiders, conflicts of interest between managers and shareholders, transaction costs, flotation costs, differential tax rates, and irrational investor behavior seemingly make the dividend decision relevant (Baker, et al., 2002; Baker, et al., 2008). Baker et al. (2002) also argue that firm characteristics, such as profitability, size, and availability of cash, could be the key factors that affect dividend policy. Since imperfections and firm characteristics affect firms differently, the effect of dividends on firm value can vary substantially from one firm to another. Therefore, the optimal dividend policy for each firm should be unique since each firm faces its own combination of different market imperfections and firm characteristics.

Our paper contributes to the existing dividend literature in a number of ways. First, we offer new empirical evidence on whether dividend policy is relevant or irrelevant depending on various interactions of market imperfections and firm characteristics. Extant literature mostly studies the direct relation between dividends payments and firm value considering only a single

firm characteristic e.g., corporate governance. However, our findings suggest that there are important complex interactions of market imperfections and firm characteristics in valuation effect of dividends on firm value.

Second, our paper directly tests the relation between dividend policy and firm value under different market situations and firm characteristics. A vast empirical literature mostly analyzes the relation between various firm characteristics and dividend policy itself, e.g. the relation between corporate governance and sizes of dividend payments (La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 2000). Even though a firm determines its dividend policy according to its firm characteristics, it is still an empirical question that the implemented dividend policy actually increases its firm value considering the interactions among firm characteristics, business environment, and dividend policy. Therefore, it is necessary to directly explore the effect of dividends on firm value depending on market imperfections or firm characteristics. In this study, we find the different impact of dividends on firm value under various situations a firm faces.

Third, our paper contributes to the dividend signaling literature that firms set higher dividends to signal their prospects to shareholders (Miller and Rock, 1985; John and Williams, 1985; Kumar, 1988). According to these studies, a firm with higher level of information asymmetry tends to increase the dividends. However, higher dividend could raise expected external financing costs and this relation is much stronger with higher information asymmetry (Rozeff, 1982). Following these arguments, we investigate two counteracting effects of dividends to firm value; positive effect through reducing information asymmetry by acting as a signal and negative effect due to raising expected external financing costs. We find that, with higher level of information asymmetry, dividend is irrelevant to firm value. This finding seems to be inconsistent with the results of some event studies supportive of signaling hypothesis.

However, we need to be cautious when interpreting this result. As argued in Fama and French (1998), contrary to event studies focusing on the effect of unexpected changes, cross-sectional regressions like our study focus on longer term changes in value. It suggests that, in the short term as in event studies, dividends seem to signal the future prospects to shareholders. Conversely, dividend payout, in the long term as in our tests, actually increases external financing cost and offsets positive signaling effect, which in turn is irrelevant to firm value with high information asymmetry.

The first set of results focus on the effect of dividend policy to firm value with information asymmetries and agency problem. We apply empirical methods from Fama and French (1998), Pinkowitz et al. (2006), and Haw, Ho, Hu, and Zhang (2011) to determine whether total payout is irrelevant to firm value depending information asymmetries or agency problem. Firstly, an agency problem causes managers to pursue their own interests, and the free cash flow causes an agency problem between managers and shareholders (Jensen and Meckling, 1976; Frankfurter, Schmidt, and Topalov, 2002). According to the free cash flow model, dividend is a way to remove free cash flows from managerial control in firms and reduces a firm's agency problems (Easterbrook, 1984; Jensen, 1986; Zwiebel, 1996). Thus, the market reacts positively to the prospect of the reduced agency cost. Secondly, Myers and Majluf (1984) assume that information asymmetry between insiders and outside investors exist, which is the basis of the dividend signaling model. According to the dividend signaling model, dividends reduce information asymmetry by acting as a credible signal from corporate insiders to the outsiders (Bhattacharya, 1979; Miller and Rock, 1985; John and Williams, 1985). However, more dividends may force managers to depend on more external financing in future investment projects and can generate external financing costs. If the primary capital market is under-

developed or if severe information asymmetry exists, more dividends can raise the cost of external financing (Rozeff, 1982). Therefore, dividends generate two counteracting effects: positively by reducing information asymmetry and negatively by raising expected external financing costs. Thus, in this paper, we investigate the effect of dividends on firm value when exist conflicts of interest between managers and shareholders and information asymmetry between insiders and outsiders. We find that dividend payout increases firm value in general and much more when the agency problem is severe. This finding confirms that dividend payout lessens agency problems and eventually improves firm value. Between the two counteracting effects of information asymmetry, our results are supportive of the hypothesis that dividend payment raises expected external financing costs. Even though dividend generally increases firm value, the firm value and dividend payout are irrelevant because of the expected higher external financing costs when information asymmetry is high.

The second part of this paper investigates the role of corporate governance in the relation between dividends and firm value. Agency theory predicts that managers would expropriate cash and would not invest extra cash in profitable business, especially, in the absence of effective governance mechanisms (Baker, 2002). As La Porta, Lopez-de-Silanes, Shleifer, and Vishny (2000) show, firms experience more pressure to pay dividends in countries with poor investor protection because firm resources are more likely to be consumed as private benefits. Pinkowitz, Stulz, and Williamson (2006) argue that dividends contribute more to firm value in countries with weaker investor protection. Using this argument, this paper investigates in a firm level whether corporate governance plays a key role in relation between dividends and firm value using U.S. firm data.

Furthermore, corporate governance systems and agency problems can interactively affect a firm's optimal dividend policy. It is argued that efficient corporate governance systems including monitoring management and shareholder protection can suppress managers' agency problems (La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 2000; Jiraporn and Ning, 2006; Chae, Kim, and Lee, 2009). The preceding discussion suggests that dividends contribute less to firm value even when firms have substantial free cash flows if the firms have strong corporate governance. On the other hand, whenever a firm pays out cash, it may face additional external financing costs in the future (Rozeff, 1982). One way for a firm to reduce additional external financing costs is establishing its reputation not to expropriate shareholders. La Porta et al. (2000) argue that one of the most effective ways to build reputation is paying dividends. Also, they suggest that a firm with stronger corporate governance already has a better reputation, thus the firm does not need to pay higher dividends. As a result, the decision to distribute cash to shareholders can be irrelevant to firm value when firms have stronger corporate governance and higher external financing costs. We find that effective firm-level corporate governance could mitigate the free cash flow problems from the managers' pursuit of private benefit of controls and consequently decrease the contribution of dividends to firm value. Our investigation shows that dividend payout is less effective in increasing firm value for a company with stronger corporate governance as in the country level test by Pinkowitz, et al. (2006). We argue that dividends contribute less to firm value when firms have substantial free cash flows and strong corporate governance. We also find that dividend payments may have no impact on the firm value when the degree of information asymmetry is stronger and firms have better corporate governance.

Our third question of interest is whether the relation between dividends and firm value depends on a firm's stage in its life cycle. According to the firm life cycle theory of dividends, a young firm faces a relatively large investment opportunity set and faces substantial hurdles in raising capital from external sources (Mueller, 1972). As a consequence, the young firm will retain cash instead of paying dividends to shareholders (Fama and French, 2001; Bulan, Subramanian, and Tanlu, 2007; DeAngelo, DeAngelo, and Stulz, 2006; DeAngelo and DeAngelo, 2007; Denis and Osobov, 2008). Since young firms should not payout dividends based upon the firm life cycle theory of dividends, optimal payout decision is only for the firms at the mature stages of their life cycles. Therefore, we hypothesize that a firm's value is negatively related to dividends if firms stay at the initial stages of their life cycle. Firms with higher dividends have higher firm value after reaching maturity in their life cycles. The coefficient tests show that the dividend increase in young firms cannot improve firm value. Even with high free cash flow, a young firm cannot increase its value by increasing dividend payout. The life cycle theory tends to negate the free cash flow hypothesis.

Next, as MM (1961) assume a perfect capital market, most arguments against irrelevance focus on market imperfections. One of the important market imperfections is transaction costs. Without transaction costs, shareholders should be indifferent between receiving cash payments or capital gains. However, with transaction costs, shareholders will care about dividend payout. Banerjee, Gatchev, and Spindt (2007) argue that dividend payments allow investors cash out and to avoid transaction costs, measured by illiquidity, at the same time. Viswanath, Kim, and Pandit (2002) also explore the market reaction to dividend changes as a function of the liquidity level and the correlation between dividend policy and liquidity. Therefore, we investigate how the transaction costs might affect the relation between the dividends and firm value since the level of

transaction costs is critical for establishing irrelevancy. We use Amihud (2002) liquidity measure as a proxy of the transaction costs. Surprisingly, when liquidity is high (transaction cost is low), dividend payouts seem to significantly increase firm value. This result is contrary to the implication of previous literature such as Banerjee et al. (2007), Viswannath et al. (2002), and others.

Finally, Miller and Modigliani (1961) assume that investors are rational. However, in real world financial markets, investors are sometimes irrational and this irrational behavior of investors can be a key factor that affects the dividend policies of firms (Baker et al., 2002). Based upon the catering theory by Baker et al. (2002), irrational investors prefer cash dividend to potential capital gain resulted from no-dividend payment or stock repurchase. Therefore, managers, following needs of irrational investors, could pay cash dividend larger than its optimal level. This non-optimal level of dividends will destroy firm value. Thus, we investigate whether behavioral considerations may play a role in influencing the relation between dividends and firm value. Using a proxy for investor irrationality, we find that irrationality itself does not play a role in the relation between dividend and firm value.

The remainder of this article is organized as follows. Section 2 explains the data and methodology. The empirical results are shown in section 3. Section 4 presents several robustness checks, and finally, section 5 concludes.

2. Data and methodology

2.1. Data

The initial sample in this study is intersection of several databases; CRSP, Compustat, Investor Responsibility Research Center's (IRRC) corporate governance database,

CDA/Spectrum database, and Institutional Brokers Estimate System (IBES). The IRRC collects data on corporate governance provisions from various sources, such as annual reports, proxy statements, and SEC 10-Q and 10-K documents. The IRRC provides information about various takeover protections at the individual firm level as in 1990, 1993, 1995, 1998, 2000, 2002, and 2004. Its initial coverage in the 1990 database included companies in the Standard and Poor's 500 Index and others that are followed by major news media (e.g., Fortune). Its coverage has expanded to smaller companies over time. Approximately 1,500 companies are covered in a given year. We use the data from 1993, 1995, 1998, 2000, 2002, and 2004. Even though the data for 1990 are available, we exclude the data from 1990 as Jiraporn and Ning (2006) do. The definitions of some variables are changed between data sets in 1990 and in 1993 by the IRRC. Using these data, Gompers, Ishii, and Metrick (2003) construct a corporate governance index that we use in this study. Various studies use the governance index by Gompers, Ishii, and Metrick (2003) to measure corporate governance, e.g., Jiraporn, Kim, Davidson, and Singh(2006), Dittmar and Mahrt-Smith(2007), and Jiraporn and Ning(2006), etc. Share prices and number of shares outstanding are taken from CRSP, and cash dividend, payout amount and our control variables are taken from CRSP and COMPUSTAT. We use the forecast error in earnings and standard deviation of these forecasts, which are available through the Institutional Brokers Estimate System (IBES).

Firms, in the financial industry (SIC codes 6000-6999) and the utility industry (SIC codes 4900-4999), are excluded because these industries are subject to unique regulations and have different characteristics of their accounting information compared to those in other industries. We exclude firms that do not have data on the governance index in the Investor Responsibility Research Center (IRRC).

2.2. Methodology

To investigate whether the contribution of dividends to firm value depends on firm characteristics, we augment the valuation regression model developed by Fama and French (1998), Pinkowitz et al. (2006), and Haw, Ho, Hu, and Zhang (2011). We include variables of market imperfection or firm characteristics such as agency costs, information asymmetry, corporate governance, firm age, transaction costs, and irrationality of investors and we also include relevant interactions terms. The basic regression model is as follows:

$$
\begin{aligned}
V_{i,t} = \; & \alpha + \beta_1 D_{i,t} + \beta_2 D * FD_{i,t} + \beta_3 D * FCF * FD_{i,t} + \beta_4 dD_{i,t} + \beta_5 dD_{i,t+1} + \beta_6 E_{i,t} + \beta_7 dE_{i,t} \\
& + \beta_8 dE_{i,t+1} + \beta_9 dNA_{i,t} + \beta_{10} dNA_{i,t+1} + \beta_{11} RD_{i,t} + \beta_{12} dRD_{i,t} \\
& + \beta_{13} dRD_{i,t+1} + \beta_{14} I_{i,t} + \beta_{15} dI_{i,t} + \beta_{16} dI_{i,t+1} + \beta_{17} dC_{i,t} + \beta_{18} dC_{i,t+1} \\
& + \beta_{19} Rep_{i,t} + \beta_{20} dRep_{i,t} + \beta_{21} dRep_{i,t+1} + \beta_{22} dV_{i,t+1} \\
& + \sum \delta_i \, IndustryDummies + \sum \eta_i YearDummies + \varepsilon_{i,t}
\end{aligned}
$$

where X_t is the level of variable X in year t divided by the level of book value of assets in year t; dX_t is the change in the level of X from year t-1 to year t, $X_t - X_{t-1}$, divided by book value of assets in year t; dX_{t+1} is the change in the level of X from year t to year t+1, $X_{t+1} - X_t$, divided by book value of assets in year t; V is the market to book ratio, (average market equity value in t plus total liability) over total asset; D is cash dividend; E is earnings before interest and tax; NA is non-cash assets defined as total assets minus cash and cash equivalents; RD is research and development expenses; I is interest expenses; C is cash and cash equivalents; Rep is the dollar amount spent on repurchases. When RD is missing, we set it equal to zero.

To examine whether firm characteristics play a key role in relation between dividends and firm value, we construct dummy variables for proxies of firm characteristics. First, we include free cash flow measured by operating income minus taxes, interests expenses, and preferred and common dividends scaled by book assets, as a proxy for the perceived likelihood of agency conflicts (Lehn and Poulsen, 1989). FCF is a dummy variable with the value of 1 if free cash flow exceeds sample median, or 0 otherwise. Second, we measure forecast error as a proxy for the level of a firm's information asymmetry by Krishnaswami and Subramaniam (1999), defined as the ratio of the absolute difference between the forecast earnings and the actual earnings per share to the price per share at the beginning of the month. IA is a dummy variable, equal to 1 if the forecast error is above the sample median, and equal to 0, otherwise. Third, we use the Gompers, Ishii, and Metrick (2003) corporate governance index (GINDEX) to represent corporate governance. Gompers, Ishii, and Metrick establish that more anti-takeover provisions are an indication of poor corporate governance. $GOOD$ is a dummy variable with the value of 1 if the reciprocal of GINDEX (=1/GINDEX) exceeds sample median, or 0 otherwise. Fourth, we use firm age as the proxy for the firm's life-cycle stage. $YOUNG$ is a dummy variable, equal to 1 if the firm age is below the sample median, and equal to 0, otherwise. Fifth, we include the liquidity measure by Amihud (2002) as a proxy of transaction costs. Amihud (2002) propose an illiquidity measure, which is defined as the absolute daily return divided by daily trading volume times stock price. LIQ is a dummy variable with the value of 1 if the Amihud illiquidity measure is below sample median, or 0 otherwise. Finally, we use the institutional churn rate by Gaspar, Massa, and Matos (2005) to make a proxy for irrationality of investors. We, first, obtain the institutional churn rate for each company, which is the average of the institutions' churn rates weighted by each institution's holding percentage, as in Gaspar, Massa, and Matos (2005). This

institutional churn rate for a stock is a negative proxy for individuals' trading of that stock. To consider the irrationality of investors, we use the log of the inverse of the institutional churn rate. *IRRATIONAL* is a dummy variable, equal to 1 if the log of the inverse of the institutional churn rate is above the sample median, and equal to 0, otherwise. We control for industry effects by including dummy variables for each industry using one-digit SIC codes, and we also include year dummy variables. We employ pooled regressions with standard errors adjusted for heteroskedasticity after performing the Durbin-Watson test for autocorrelation. In Table 1, we summarize descriptive statistics of variables.

- Insert Table 1 about here -

3. Understanding the contribution of dividends to firm value

3.1. Contribution of dividends to firm value depending on free cash flow and information asymmetry

We investigate whether the relation between dividend payments and firm value depends on the degree of free cash flow problem and information asymmetries using various specifications of the valuation regression. The results are presented in Table 2. The coefficients of dividend payments (b1) are positive and statistically significant for all regression specifications. This indicates that dividends contribute firm values in the firms without severe free cash flow problem or information asymmetry problem. To examine the impact free cash flow and information asymmetry, we interact the dividend variable with dummy variables that take the value of 1 if the measures of free cash flow or information asymmetry are higher than the respective median values of the whole sample. Consistent with the prediction, free cash flow problem affects the degree of contribution of dividend payments to firm value. In regression (1), the coefficient of

the interaction term with dividends and the dummy variable indicating higher free cash flow (b2) is positively significant and the sum of b1 and b2 is statistically significant at 1% level, which indicates that the contribution of dividends to firm value is stronger for firms with higher free cash flow problem. Also information asymmetry problem affects the relation between dividends and firm value though in the opposite direction to the prediction. In regression (2), the coefficient of the interaction term with dividends and the dummy variable indicating higher degree of information asymmetry (b3) is negatively significant and the absolute value is similar to the coefficient of dividends. Furthermore, the sum of b1 and b3 is close to zero and not statistically significant. These results suggest that dividend payments contribute to firm values only for the firms with low level of information asymmetry problem. These results for free cash flow and information asymmetry problems still hold when we consider the two factors concurrently in regression (3). In the previous analysis, we show that generally the positive relation between dividends payments and firm values exists in the subsample of firms with higher dividend payments. In order to incorporate this finding, we interact the variables of interests in table 2, which are b2 and b3 with a dummy variable that takes the value of 1 if the dividend payments are higher than the median value. The estimated coefficient of the interaction term with the dividends variable and dummies for higher free cash flow and dividend in regression (4), which is b5 is 9.31 and statistically significant and the coefficient of interaction term with dividends and free cash flow dummy (b2) becomes negative and statistically insignificant. This indicates that the larger contribution of dividends to firm value for the firms with higher free cash flow problem is valid only when the firms pay higher dividends. The coefficient test reported at the bottom of Table 2 confirms this interpretation. This effect of higher dividend payments, however, does not work in the case of information asymmetry. In

regression (5), the coefficient of the interaction term with the dividends variable and dummies for information asymmetry and higher dividend (b6) is 10.36 and statistically significant at 5% level. However, the coefficient of interaction term with dividends and information asymmetry (b3) become larger in absolute size and consequently the sum of b1, b3, and b6 is positive but statistically insignificant.

- Insert Table 2 about here -

3.2. Contribution of dividends to firm value depending on corporate governance

We analyze the impact of firm-level corporate governance on the relation between dividend payments and firm value. The regression specifications using dummy and interactions are in line with those in Table 2. The results of analysis are summarized in Table 3. The coefficients of dividend payments (b1) are positively significant for all regression specifications. This is the base case and the interaction terms examine the different slopes for the dividend variables across the subsamples. We interact the dividend payments variable and a dummy variable that take the value of 1 if the measures of firm-level corporate governance are higher than the respective median values (this means more effective firm-level corporate governance) in regression (1). The coefficient of the interaction term with dividends and the dummy variable indicating better firm-level corporate governance (b2) is -3.13 and statistically significant. In the same time, the coefficient test confirms that the sum of b1 and b2 is 2.56 and significant at 1% level. These numbers are consistent with the prediction that effective firm-level corporate governance could mitigate the free cash flow problems from the managers' pursuit of private benefit of controls and consequently decrease the contribution of dividends to firm value.

In regressions (2) through (4), we examine interactions with dividends, better corporate governance and three dummy variables indicating higher level of free cash flow, information asymmetry problem, and dividend payments. In regression (2), the estimated coefficient of the interaction term with the dividends variable, better corporate governance, and a dummy variable for higher free cash flow (b3) is positive but not significant, which confirms again the results in regression (1). The coefficient in regression (3), which is b4, is -4.80 and significant at 5% level. Also, the coefficient test reported at the bottom of the table shows that the sum of b1 and b2 is 3.12 and statistically significant but the sum of b1, b2, and b4 is -1.69 and insignificant. Combining these results provides an insight into the function of information asymmetry that dividend payments may have no impact on the firm value when the degree of information asymmetry is stronger, which is in line with the results in Table 2.

The estimated coefficient of the interaction term with dividends, better corporate governance, and higher dividend payments (b5) in regression (4), is 19.32 and statistically significant indicating that even when we control the firm-level corporate governance, the contribution of dividend payments to firm value increased with the level of dividend payments.

- Insert Table 3 about here -

3.3. Contribution of dividends to firm value depending on lifecycle

We look for the possibility that the life cycle theory of dividend can be applied to our analysis framework. Specifically, we test whether the contribution of dividends to firm value varies across different stages of firms' life cycle. We use similar regression specifications with previous analyses. Table 4 provides the results of regressions. The coefficient of the interaction term with dividend payments and a dummy variable, which is the proxy for the firms life cycle

stage and takes the value of 1 if the firm is not a mature firm (b2) is -5.40 and statistically significant at 1% level. The sum of b1 and b2 is 0.98 but insignificant, suggesting that the positive relation between dividends and firm value is valid only for mature firms. This regression result is consistent with the life cycle theory of dividends. DeAngelo, DeAngelo, and Stulz (2006) argue that if mature firms do not pay dividend then the cash holding could be enormous and the level of debt could be trivial and consequently extreme discretions may be left to managers. In this case the lower level of dividend payments of mature firms will cause the higher level of free cash flow problem and we can expect that the positive contribution of dividends to firm value.

As we did in table 3, we examine interactions with dividends, life cycle stage and three dummy variables concerning free cash flow, information asymmetry, and level of dividend payments in regressions (2) through (4). In regression (2), the coefficient of the interaction term with the dividends variable, younger firm, and a dummy variable for higher free cash flow (b3) is negative and not significant. This evidence shows when we focus on the non-mature firms, the degree of free cash flow problem does not affect the relation between dividend payments and firm value. The results using information asymmetry variable are consistent with those of previous tables in that dividend payments appear to have no relation with the firm value when there is higher level of information asymmetry. Also the results in regression (4) where we employ the dummy variable indicating higher level of dividend payments are similar to the previous ones. Even with the control for life cycle stage, we can observe the positive relation between dividend payments and firm value for the firms with higher level of dividends.

- Insert Table 4 about here -

3.4. Contribution of dividends to firm value depending on transaction costs

Using the valuation regression specifications, we study the effect of liquidity on the contribution of dividends to firm value. We summarized the results in Table 5. The analysis results in regression (1) shows that the positive relation between firm value and dividend payments works only for the firms with higher liquidity. The estimated coefficient of dividend payments (b1) is small in absolute value (-0.24) and statistically insignificant. Meanwhile, the coefficient of the interaction term with dividends and a dummy variable taking the value of 1 if the firm's liquidity measure is higher than the median value of the sample (b2) is 6.60 and highly significant. Also the sum of b1 and b2 is 6.36 and significant at 1% level. In regressions (2) through (4), we employ again the regression specifications using dummy variables concerning free cash flow, information asymmetry, and the level of dividends payments, payments. In regression (2), the coefficient of the interaction term with the dividends variable, higher liquidity, and a dummy variable for higher free cash flow (b3) is 6.85 and significant at 1% level. This number indicates that the additional contribution of dividends to firm value resulting from the higher level of free cash flow still valid when we control the effect of liquidity. The results in regression (3) using the information asymmetry dummy are again in line with the previous results because when the degree of information asymmetry problem is stronger, the relation between firm value and dividend payments disappears. The estimated coefficient (b5) and the results of coefficients test in regression (4) suggest that the positive impact of higher liquidity on the dividends' contribution to firm value comes from the firms with higher liquidity and higher level of dividend payments.

- Insert Table 5 about here -

3.5. Contribution of dividends to firm value depending on irrationality of investors

We examine whether the relation between dividends and firm value is affected by the degree of investor irrationality. Table 6 presents the results of analysis. The estimated coefficients of dividend (b1) are positively significant at 1% level for all four regression specifications. In regression (1), the coefficient of the interaction term with dividends and a dummy variable that takes the value of 1 if the firm's investor irrationality measured as log of the inverse of the institutional churn rate is higher than the median value (b2) is negative and statistically insignificant. This supports the notion that investor irrationality has no impact on the relation between firm value and dividends payments, which is inconsistent with the prediction. The results in regression (2) and (4), however, show that things are more complicated than they appear to be. When we divide the subsample of firms with higher investor irrationality again into two smaller subsamples based on the free cash flow (level of dividends), all the coefficients of interaction terms are statistically significant and also all the results of coefficient tests are significant. This indicates that investor irrationality weaken the contribution of dividends to firm value when the firms has lower level of free cash flow (dividend payments)

- Insert Table 6 about here -

4. Conclusion

This paper investigates how dividend policies affect a firm value according to different market imperfections and firm characteristics. We analyze the level of information asymmetry, agency problems, corporate governance, a firm's stage in its life cycle, transaction costs, and irrationality of investors to show how firm value and dividend policies are related under these factors. Previous literature mostly analyzes the relation between various firm characteristics and dividend policy itself. In this study, we directly show the different impact of dividend on firm

value under different situations a firm faces.

We find several interesting empirical facts. Firstly, the relation between dividend and firm value is different according to the level of dividend. When the level of dividend is large, the conventional positive relation between dividend and firm value is sustained. In companies whose dividend levels are below the median of dividend, dividend and firm value have even negative relation. Secondly, if a firm has more free cash flow, dividend increases firm value as argued by the free cash flow hypothesis. However, with higher level of information asymmetry, dividend cannot increase firm value contrary to the signaling hypothesis. Dividend can improve firm value, but only with a lower level of information asymmetry. This finding implicates that dividend payout actually increases need for external financing and that the cost of external financing is higher enough to offset positive signaling effect by dividend. Thirdly, with strong corporate governance, dividend payout does not increase firm value as much as with weak corporate governance. This company-wise finding is consistent with extant literature about the role of corporate governance such as the country level study of Pinkowitz et al. (2006). Furthermore, we offer new empirical evidence about the interaction between the role of corporate governance and information asymmetry. We find that, in a better governed company with high information asymmetry (i.e., with high external financing costs), dividend payout is irrelevant to firm value. Fourth, in young firms, dividend does not seem to increase firm value. Extant literature about the life cycle hypothesis argues that young firms, facing higher external financing constraints, do not pay dividends as much as old firms. Our finding is consistent with the life cycle hypothesis and directly indicates that dividend decision by young firms is irrelevant to firm value. Fifth, our results show that dividend payout of a more liquid company increases its firm value more than an illiquid company. This finding is contradictory to the implication of

extant literature that cash dividend is more beneficial than retaining earnings to increase capital gain if a firm's share is illiquid and hence transaction cost is high.

Based upon all results of our analyses, we conclude that dividend relevancy cannot be asserted without considering market imperfections and firm characteristics. Fundamentally, dividend payout helps to reduce shareholders' concern about agency problems and increase firm value. However, when a firm faces high information asymmetry, holds strong corporate governance, or stays in its initial stage in its life cycle, dividend payout seems to be irrelevant to firm value. Therefore, a firm should understand its unique situations and characteristics to decide its optimal dividend policy maximizing its firm value.

Reference

Aharony, Joseph, and Itzhak Swary. 1980. Quarterly Dividend and Earnings Announcements and Stockholders' Returns: An Empirical Analysis. Journal of Finance 35:1, 1–12.

Amihud, Y., 2002, Illiquidity and Stock Returns: Cross-Section and Time-Series Effects. Journal of Financial Markets 5, 31-56.

Asquith, Paul, and David Mullins. 1983. The Impact of Initiating Dividend Payments on Shareholders' Wealth. Journal of Business 56:1, 77–96.

Baker, H. Kent, 2009, Dividends and Dividend Policy (Ed.), Kolb Series in Finance, Wiley.

Baker, H. Kent, Gary E. Powell, and E. Theodore Veit. 2002. Revisiting the Dividend Puzzle: Do All the Pieces Now Fit? Review of Financial Economics 11:4, 241–261.

Baker, H. Kent, Samir Saadi, and Shantanu Dutta. 2008. Impact of Financial and Multinational Operations on Manager Perceptions of Dividends. Global Finance Journal 19:2, 171–186.

Banerjee, S., Gatchev, V.A., Spindt, P.A., 2007. Stock market liquidity and firm dividend policy. Journal of Financial and Quantitative Analysis 42, 369–398.

Bulan, Laarni, Narayanan Subramanian, and Lloyd Tanlu. 2007. On the Timing of Dividend Initiations. Financial Management 36:4, 31–65.

Banerjee, S., Gatchev, V. A. and Spindt, P. A., 2005, Stock Market Liquidity and Firm Dividend Policy, Journal of Financial and Quantitative Analysis, forthcoming.

Bhattacharya, Sudipto. 1979. Imperfect Information, Dividend Policy, and 'the Bird in the Hand' Fallacy. Bell Journal of Economics 10:1, 259–270.

Black, Fischer, and Myron S. Scholes, 1974, The Effects of Dividend Yield and Dividend Policy on Common Stock Prices and Returns, Journal of Financial Economics 1, 1-22.

Bernstein, P.L., 1996, Dividends: The Puzzle, Journal of Applied Corporate Finance 9, 16-22.

Brickley, James A. 1983. Shareholder Wealth, Information Signaling and the Specially Designated Dividend: An Empirical Study. Journal of Financial Economics 12:2, 187–209.

Chae, J., Kim, S., and Lee, E. J., 2009, How corporate governance affects payout policy under agency problems and external financing constraints, Journal of Banking and Finance.

Dann, Larry. 1981. Common Stock Repurchases: An Analysis of Returns to Bondholders and Shareholders. Journal of Financial Economics 9:2, 113–138.

DeAngelo, Harry, and Linda DeAngelo. 2006. The Irrelevance of the MM Dividend Irrelevance Theorem. Journal of Financial Economics 79:2, 293–315.

DeAngelo, Harry, Linda DeAngelo, and Ren´e Stulz. 2008. Seasoned Equity Offerings, Market Timing, and the Corporate Lifecycle. Working Paper, University of California, Los Angeles.

Denis, David J., and Igor Osobov. 2008. Why Do Firms Pay Dividends? International Evidence on the Determinants of Dividend Policy. Journal of Financial Economics 89:1, 62–82.

Denis, David J., Diane K. Denis, and Atulya Sarin. 1994. The Information Content of Dividend Changes: Cash Flow Signaling, Overinvestment, and Dividend Clienteles. Journal of Financial and Quantitative Analysis 29:4, 567–587.

Dittmar, A., Mahrt-Smith, J., 2007. Corporate governance and the value of cash holdings. Journal of Financial Economics 83, 599-634.

Easterbrook, F., 1984. Two agency cost explanations of dividends. American Economic Review 74, 650-659.

Fama, Eugene F., and Kenneth R. French, 1998, Taxes, financing decisions, and firm value, Journal of Finance 53, 819–843.

Fama, Eugene G., and Kenneth R. French. 2001. Disappearing Dividends: Changing Firm Characteristics or Lower Propensity to Pay? Journal of Financial Economics 60:1, 3–43.

Frankfurter, G., Schmidt, H. and Topalov, M., 2002, The perception of dividends by management, Journal of Behavioral Finance, vol. 3, no. 4, 202-217.

Gaspar, J.-M., M. Massa, and P. Matos, 2005, Shareholder Investment Horizons and the Market for Corporate Control, Journal of Financial Economics 76 (1), 135-165.

Gompers, P., Ishii, J., Metrick, A., 2003. Corporate governance and equity prices. Quarterly Journal of Economics 118, 107–155.

Haw, In-Mu, Simon S.M. Ho, B. Hu, and Xu Zhang, 2011, The contribution of stock repurchases to the value of the firm and cash holdings around the world, Journal of corporate finance 17, 152-166.

Hess, Patrick J., ed., 1981. The Dividend Debate: 20 Years of Discussion, In The Revolution in Corporate Finance, 1992 (Blackwell Publishers, Cambridge, Massachusetts).

Howe, Keith, M., Jia He, and G. Wenchi Kao. 1992. One-Time Cash Flow Announcements and Free Cash-Flow Theory: Share Repurchases and Special Dividends. Journal of Finance 47:5, 1963–1975.

Jensen, M., 1986. Agency cost of free cash flow, corporate finance, and takeovers. American Economic Review Papers and Proceedings 76, 323-329.

Jensen, M., Meckling, W., 1976. Theory of firm: Managerial behavior, agency costs and ownership structure. Journal of Financial Economics 3, 305-360.

Jiraporn, P., Ning, Y., 2006. Dividend policy, shareholder rights, and corporate governance. Working paper, Pennsylvania State University.

Jiraporn, P., Kim, Y., Davidson, W., Singh, M., 2006. Corporate governance, shareholder rights and firm diversification: An empirical analysis. Journal of Banking and Finance 30, 947-963.

John, Kose, and JohnWilliams. 1985. Dividends, Dilution, and Taxes: A Signaling Equilibrium. Journal of Finance 40:4, 1053–1070.

Krishnaswami, S., Subramaniam, V., 1999. Information asymmetry, valuation, and the corporate spin-off decision. Journal of Financial Economics 53, 73-112.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R., 2000. Agency problems and dividend policies around the world. Journal of Finance 55, 1-33.

Lehn, K., Poulsen, A., 1989. Free cash flow and stockholder gains in going private transactions. Journal of Finance 44, 771-787.

Lie, Eric. 2000. Excess Funds and Agency Problems: An Empirical Study of Incremental Disbursements. Review of Financial Studies 13:1, 219–247.

Miller, Merton H., 1986, Behavioral Rationality in Finance: The Case of Dividends, Journal of Business 59, 451-468.

Miller, Merton H., and Franco Modigliani, 1961, Dividend Policy, Growth, and the Valuation of Shares, Journal of Business 34, 411-433.

Miller, Merton, and Kevin Rock. 1985. Dividend Policy under Asymmetric Information. Journal of Finance 40:4, 1031–1052.

Miller, Merton H., and Myron S. Scholes, 1978, Dividends and Taxes, Journal of Financial Economics 6, 333-264.

Miller, Merton H., and Myron S. Scholes, 1982, Dividend and Taxes: Some Empirical Evidence, Journal of Political Economy 90, 1118-1141.

Mueller, Dennis C. 1972. A Life Cycle Theory of the Firm, Journal of Industrial Economics 20:3, 199–219.

Myers, S., Majluf, N., 1984. Corporate financing and investment decisions when firms have information that investors do not have. Journal of Financial Economics 13, 187-221.

Pettit, R. Richardson, 1972, Dividend Announcements, Security Performance, and Capital Market Efficiency, Journal of Finance 27, 993-1007.

Pinkowitz, Lee, Ren´e Stulz, and Rohan Williamson. 2006. Does the Contribution of Corporate Cash Holdings and Dividends to Firm Value Depend on Governance? A Cross-Country Analysis. Journal of Finance 61:6, 2725–2751.

Rozeff, M., 1982. Growth, beta and agency cost as determinants of dividend payout ratios. Journal of Financial Research 5, 249-259.

Vermaelen, Theo. 1981. Common Stock Repurchases and Market Signaling. Journal of Financial Economics 9:2, 139–183.

Viswanath, P. V., Yu Kyung Kim, and Jayant Pandit. 2002. Dilution, Dividend Commitments and Liquidity: Do Dividend Changes Reflect Information Signaling? Review of Quantitative Finance and Accounting 18:4, 359–379.

Zwiebel, J., 1996. Dynamic capital structure under managerial entrenchment. American Economic Review 86, 1197-1215.

Table 1

Descriptive statistics

The sample includes 3,488 firm/year from 1993, 1995, 1998, 2000, 2002, and 2004. V is market to book ratio, (average market equity value in a year + total liability) over total asset; D is cash dividend; E is EBIT, earnings before interest and tax; NA is non-cash assets, total assets minus cash and cash equivalents; RD is research and development expenses; I is interest expense; C is cash and cash equivalents; and REP is the dollar amount spent on repurchases. V, D, E, NA, RD, I, C, and REP are standardized by firm size (book value of total asset). Free cash flow is measured by operating income minus taxes, interests expenses, and preferred and common dividends scaled by book assets. FOREER is the ratio of the absolute difference between the forecast earnings and the actual earnings per share to the price per share at the beginning of the month. GINDEX is Governance Index by Gompers, Ishii, and Metrick (2003). Age means a firm's age. ICR is the churn rate by Gaspar et al. (2005). INDIV is log (1/ICR).

	Mean	Stdev	Min	Median	Max
V	1.7348	0.7636	0.4239	1.5136	8.5479
Firm size ($Mil.)	5,065	22,658	17	1,078	750,507
D	0.0121	0.0193	0.0000	0.0059	0.5804
E	0.1018	0.0715	-0.2467	0.1010	0.2992
NA	0.9258	0.0890	0.1704	0.9599	1.0000
RD	0.0258	0.0459	0.0000	0.0000	0.6048
I	0.0172	0.0152	0.0000	0.0146	0.1345
C	0.0742	0.0890	0.0000	0.0401	0.8296
REP	0.0220	0.0437	0.0000	0.0012	0.5116
Free Cash Flow	0.1207	0.0759	-0.4664	0.1175	0.7538
FORERR	0.1106	1.4266	0.0000	0.0200	78.0000
1/Gindex	0.1226	0.0492	0.0556	0.1111	0.5000
Age	34.1497	14.1614	6.0000	34.0000	54.0000
ICR	0.1566	0.0337	0.0001	0.1563	0.3790
INDIV	1.8897	0.3569	0.9703	1.8557	9.2440

Table 2

Contribution of dividends to firm value: free cash flow conflicts versus information asymmetries

The sample includes 3,488 firm/year from 1993, 1995, 1998, 2000, 2002, and 2004. We estimate pooled regressions where X_t is the level of variable X in year t over the level of assets in year t; dX_t is the change in the level of X fro m year t-1 to year t, $X_t - X_{t-1}$, divided by assets in year t; dX_{t+1} is the change in the level of X from year t to year $t+1$, $X_{t+1} - X_t$, divided by assets in year t; V is the market to book ratio, (average market equity value in t plus total liability) over total asset; D is cash dividend; E is earnings before interest and tax; NA is non-cash assets defined as total assets minus cash and cash equivalents; RD is research and development expenses; I is interest expenses; C is c ash and cash equivalents; Rep is the dollar amount spent on repurchases. When RD is missing, we set it equal to zer o. FCF is a dummy variable with the value of 1 if free cash flow exceeds sample median, or 0 otherwise. Free cash flow is measured by operating income minus taxes, interest expenses, and preferred and common dividends scaled by book assets. IA is a dummy variable, equal to 1 if the forecast error is above the sample median, and equal to 0, otherwise. We measure forecast error as the ratio of the absolute difference between the forecast earnings and the actual earnings per share to the price per share at the beginning of the month. *HIGHD* is a dummy variable with the value of 1 if D exceeds sample median, or 0 otherwise. Dummy variables for year and industry are included. ADJRSQ is the value of adjusted R-square. Numbers in ( ) are t-statistics by using standard errors adjusted for heteroskedasticity. Coefficient tests show whether the sum of the coefficients is significantly different from 0 by the Wald test. Numbers in [ ] denote *p*-values.

Dep. variable: V_t	(1)	(2)	(3)	(4)	(5)
Intercept	0.9450	0.9709	1.0275	0.9857	0.9961
	(9.27)	(7.72)	(9.20)	(10.19)	(8.08)
D_t *(b1)*	2.2047	4.4329	2.2288	4.2202	5.9084
	(3.04)	(5.85)	(3.10)	(4.32)	(5.40)
D_t*FCF_t *(b2)*	5.6206		5.9157	-2.7210	
	(5.07)		(5.26)	(-0.61)	
D_t*IA_t*(b3)*		-4.6605			-14.5178
		(-2.79)			(-2.73)
D_t* FCF_t * IA_t *(b4)*			-4.4898		
			(-1.82)		
D_t* FCF_t *$HIGHD_t$ *(b5)*				9.3110	
				(2.21)	
D_t*IA*$HIGHD_t$ *(b6)*					10.3625
					(2.06)
FCF_t	0.0262		0.0276	0.0331	
	(1.05)		(1.11)	(1.22)	
IA_t		-0.0749	-0.0992		-0.0628
		(-2.54)	(-4.04)		(-2.01)
$HIGHD_t$				-0.1436	-0.0900
				(-5.41)	(-3.04)
dD_t	-0.4313	-0.7818	-0.4488	-0.6750	-0.9591
	(-1.95)	(-3.09)	(-2.25)	(-3.19)	(-2.62)
dD_{t+1}	0.9534	1.9609	0.9495	1.6719	2.5186
	(1.45)	(2.13)	(1.48)	(1.79)	(2.13)
E_t	5.2739	5.5022	5.1601	5.2813	5.5295
	(15.11)	(16.39)	(14.70)	(15.10)	(16.47)
dE_t	-0.7150	-0.6748	-0.6445	-0.7137	-0.6746
	(-3.14)	(-3.00)	(-2.91)	(-3.12)	(-2.98)
dE_{t+1}	2.2149	2.2293	2.1491	2.2078	2.2196
	(8.58)	(8.55)	(8.32)	(8.57)	(8.48)
dNA_t	0.0383	0.0167	0.0264	0.0259	0.0064
	(0.39)	(0.17)	(0.27)	(0.27)	(0.07)
dNA_{t+1}	0.2857	0.2742	0.2847	0.2816	0.2711
	(3.28)	(3.16)	(3.29)	(3.24)	(3.14)
RD_t	6.7863	6.7675	6.7188	6.5652	6.6464
	(20.43)	(20.23)	(20.24)	(19.76)	(19.92)
dRD_t	-2.2680	-2.1938	-2.1369	-2.2449	-2.1691

	(-2.98)	(-2.88)	(-2.82)	(-2.94)	(-2.84)
dRD_{t+1}	2.2803	2.3524	2.3147	2.1978	2.3365
	(2.92)	(3.00)	(2.98)	(2.81)	(2.99)
IE_t	-2.9548	-2.8027	-2.5859	-3.4639	-3.1155
	(-3.27)	(-3.09)	(-2.87)	(-3.78)	(-3.42)
dI_t	-3.2058	-3.6399	-3.5436	-3.1231	-3.5971
	(-1.64)	(-1.92)	(-1.85)	(-1.62)	(-1.91)
dI_{t+1}	0.3693	0.5080	0.4532	0.3048	0.5480
	(0.16)	(0.22)	(0.20)	(0.13)	(0.24)
dV_{t+1}	-0.3732	-0.3741	-0.3725	-0.3743	-0.3748
	(-6.44)	(-6.48)	(-6.46)	(-6.50)	(-6.53)
dC_t	0.1949	0.1839	0.2248	0.1846	0.1741
	(0.84)	(0.79)	(0.97)	(0.80)	(0.75)
dC_{t+1}	0.4963	0.5046	0.4960	0.5059	0.5137
	(2.42)	(2.46)	(2.43)	(2.48)	(2.51)
REP_t	2.3802	2.4991	2.4031	2.3678	2.4982
	(5.88)	(6.18)	(5.98)	(5.92)	(6.21)
$dREP_t$	-0.6621	-0.7781	-0.7229	-0.6670	-0.7891
	(-2.39)	(-2.82)	(-2.62)	(-2.43)	(-2.87)
$dREP_{t+1}$	0.8731	0.8624	0.8527	0.8696	0.8587
	(2.94)	(2.77)	(2.90)	(3.02)	(2.80)
YEAR DUMMY	YES	YES	YES	YES	YES
INDUSTRY DUMMY	YES	YES	YES	YES	YES
ADJRSQ	0.4776	0.4752	0.4811	0.4811	0.4767
Coefficient tests					
b1+b2	7.8254		8.1445	1.4992	
	[0.0001]		[0.0001]	[0.7111]	
b1+b3		-0.2275			-8.6094
		[0.8880]			[0.1530]
b1+b2+b4			3.6547		
			[0.1261]		
b1+b2+b5				10.8101	
				[0.0001]	
b1+b3+b6					1.7531
					[0.3094]

Table 3

Contribution of dividends to firm value depending on corporate governance

The sample includes 3,488 firm/year from 1993, 1995, 1998, 2000, 2002, and 2004. We estimate pooled regressions where X_t is the level of variable X in year t over the level of assets in year t; dX_t is the change in the level of X fro m year t-1 to year t, $X_t - X_{t-1}$, divided by assets in year t; dX_{t+1} is the change in the level of X from year t to year $t+1$, $X_{t+1} - X_t$, divided by assets in year t; V is the market to book ratio, (average market equity value in t plus total liability) over total asset; D is cash dividend; E is earnings before interest and tax; NA is non-cash assets defined as total assets minus cash and cash equivalents; RD is research and development expenses; I is interest expenses; C is c ash and cash equivalents; Rep is the dollar amount spent on repurchases. When RD is missing, we set it equal to zer o. FCF is a dummy variable with the value of 1 if free cash flow exceeds sample median, or 0 otherwise. Free cash flow is measured by operating income minus taxes, interest expenses, and preferred and common dividends scaled by book assets. IA is a dummy variable, equal to 1 if the forecast error is above the sample median, and equal to 0, otherwise. We measure forecast error as the ratio of the absolute difference between the forecast earnings and the actual earnings per share to the price per share at the beginning of the month. *HIGHHD* is a dummy variable with the value of 1 if D exceeds sample median, or 0 otherwise. $GOOD$ is a dummy variable with the value of 1 if the reciprocal of GINDEX (=1/GINDEX) exceeds sample median, or 0 otherwise. GINDEX is Gompers, Ishii, and Metrick (2003) corporate governance index. Dummy variables for year and industry are included. ADJRSQ is the value of adjusted R-square. Numbers in ( ) are t-statistics by using standard errors adjusted for heteroskedasticity. Coefficient tests show whether the sum of the coefficients is significantly different from 0 by the Wald test. Numbers in [ ] denote *p*-values.

Variable	(1)	(2)	(3)	(4)
Intercept	0.8341	0.8440	0.9233	0.8663
	(7.74)	(8.80)	(7.66)	(7.82)
D_t *(b1)*	5.6896	6.0963	5.6817	7.8293
	(6.92)	(7.25)	(6.96)	(7.48)
D_t* $GOOD_t$ *(b2)*	-3.1268	-3.8103	-2.5639	-23.0506
	(-3.35)	(-4.09)	(-2.68)	(-4.98)
D_t* $GOOD_t$ * FCF_t *(b3)*		2.6916		
		(1.48)		
D_t* $GOOD_t$ * IA_t *(b4)*			-4.8049	
			(-2.42)	
D_t* $GOOD_t$ *HIGHD *(b5)*				19.3242
				(4.31)
$GOOD_t$	0.0951	0.0894	0.0989	0.1172
	(4.10)	(3.78)	(4.24)	(4.73)
FCF_t		0.0903		
		(4.29)		
IA_t			-0.1051	
			(-4.37)	
$HIGHD_t$				-0.1141
				(-4.21)
dD_t	-0.5986	-0.5758	-0.6976	-0.7890
	(-2.97)	(-2.99)	(-3.65)	(-3.65)
dD_{t+1}	1.5781	1.4072	1.7256	2.2650
	(2.00)	(1.82)	(2.09)	(2.18)
E_t	5.5755	5.1956	5.4606	5.6090
	(16.80)	(14.82)	(16.27)	(16.93)
dE_t	-0.7088	-0.7009	-0.6437	-0.7090
	(-3.14)	(-3.11)	(-2.92)	(-3.12)
dE_{t+1}	2.2866	2.2443	2.2192	2.2915
	(8.83)	(8.74)	(8.56)	(8.82)
dNA_t	0.0243	0.0310	0.0140	0.0175
	(0.25)	(0.32)	(0.14)	(0.18)
dNA_{t+1}	0.2768	0.2846	0.2733	0.2735
	(3.19)	(3.28)	(3.17)	(3.17)
RD_t	6.7820	6.7439	6.6985	6.5770

	(20.29)	(20.28)	(20.06)	(19.76)
dRD_t	-2.2323	-2.1987	-2.1085	-2.2092
	(-2.96)	(-2.90)	(-2.80)	(-2.92)
dRD_{t+1}	2.3298	2.3316	2.3735	2.2683
	(2.99)	(3.00)	(3.05)	(2.91)
IE_t	-2.8259	-2.5088	-2.4879	-3.2110
	(-3.11)	(-2.77)	(-2.74)	(-3.50)
dI_t	-3.4545	-3.3123	-3.7193	-3.3719
	(-1.79)	(-1.71)	(-1.96)	(-1.77)
dI_{t+1}	0.6762	0.7902	0.7079	0.8036
	(0.30)	(0.35)	(0.31)	(0.35)
dV_{t+1}	-0.3726	-0.3759	-0.3706	-0.3751
	(-6.43)	(-6.50)	(-6.43)	(-6.53)
dC_t	0.1758	0.1878	0.1971	0.1659
	(0.75)	(0.80)	(0.85)	(0.71)
dC_{t+1}	0.5032	0.5026	0.4972	0.4970
	(2.45)	(2.46)	(2.43)	(2.44)
REP_t	2.4047	2.3786	2.4015	2.3821
	(5.92)	(5.87)	(5.95)	(5.92)
$dREP_t$	-0.6748	-0.6564	-0.7117	-0.6986
	(-2.44)	(-2.37)	(-2.57)	(-2.53)
$dREP_{t+1}$	0.8545	0.8706	0.8319	0.8513
	(2.77)	(2.89)	(2.71)	(2.79)
YEAR DUMMY	YES	YES	YES	YES
INDUSTRY DUMMY	YES	YES	YES	YES
ADJRSQ	0.4733	0.4765	0.4773	0.4771
Coefficient tests				
b1+b2	2.5627	2.2860	3.1179	-15.2213
	[0.0017]	[0.0109]	[0.0002]	[0.0015]
b1+b2+b3		4.9775		
		[0.0008]		
b1+b2+b4			-1.6870	
			[0.4352]	
b1+b2+b5				4.1029
				[0.0001]

Table 4

Contribution of dividends to firm value depending on the firm life cycle

The sample includes 3,488 firm/year from 1993, 1995, 1998, 2000, 2002, and 2004. We estimate pooled regressions where X_t is the level of variable X in year t over the level of assets in year t; dX_t is the change in the level of X fro m year t-1 to year t, $X_t - X_{t-1}$, divided by assets in year t; dX_{t+1} is the change in the level of X from year t to year t +1, $X_{t+1} - X_t$, divided by assets in year t; V is the market to book ratio, (average market equity value in t plus total liability) over total asset; D is cash dividend; E is earnings before interest and tax; NA is non-cash assets defined as total assets minus cash and cash equivalents; RD is research and development expenses; I is interest expenses; C is c ash and cash equivalents; Rep is the dollar amount spent on repurchases. When RD is missing, we set it equal to zer o. FCF is a dummy variable with the value of 1 if free cash flow exceeds sample median, or 0 otherwise. Free cash flow is measured by operating income minus taxes, interest expenses, and preferred and common dividends scaled by book assets. IA is a dummy variable, equal to 1 if the forecast error is above the sample median, and equal to 0, otherwise. We measure forecast error as the ratio of the absolute difference between the forecast earnings and the actual earnings per share to the price per share at the beginning of the month. *HIGHD* is a dummy variable with the value of 1 if D exceeds sample median, or 0 otherwise. $YOUNG$ is a dummy variable, equal to 1 if the firm age is below the sample median, and equal to 0, otherwise. Dummy variables for year and industry are included. ADJRSQ is the value of adjusted R-square. Numbers in ( ) are t-statistics by using standard errors adjusted for heteroskedasticity. Coefficient tests show whether the sum of the coefficients is significantly different from 0 by the Wald test. Numbers in [ ] denote *p*-values.

Variable	(1)	(2)	(3)	(4)
Intercept	0.8862	0.8879	0.9726	0.8994
	(7.67)	(8.82)	(7.51)	(8.07)
D_t *(b1)*	6.3784	6.7422	6.3776	7.2117
	(5.88)	(5.94)	(5.94)	(4.99)
D_t* $YOUNG_t$ *(b2)*	-5.3950	-5.1871	-4.8331	-13.3397
	(-3.66)	(-3.15)	(-3.36)	(-2.63)
D_t* $YOUNG_t$ * FCF_t *(b3)*		-0.7584		
		(-0.38)		
D_t* $YOUNG_t$ * IA_t *(b4)*			-5.5702	
			(-2.56)	
D_t* $YOUNG_t$ *HIGHD (b5)*				8.2773
				(1.73)
$YOUNG_t$	0.1576	0.1583	0.1581	0.1582
	(6.04)	(6.07)	(6.15)	(5.87)
FCF_t		0.0997		
		(4.62)		
IA_t			-0.1048	
			(-4.38)	
$HIGHD_t$				-0.0585
				(-1.84)
dD_t	-0.8525	-0.8847	-0.9061	-0.9596
	(-2.81)	(-2.63)	(-2.75)	(-2.82)
dD_{t+1}	2.3486	2.4184	2.3783	2.6967
	(2.10)	(2.06)	(2.15)	(2.14)
E_t	5.5772	5.2170	5.4624	5.5971
	(16.89)	(14.91)	(16.38)	(16.98)
dE_t	-0.7237	-0.7250	-0.6552	-0.7279
	(-3.12)	(-3.13)	(-2.90)	(-3.13)
dE_{t+1}	2.2270	2.1942	2.1675	2.2253
	(8.59)	(8.51)	(8.35)	(8.56)
dNA_t	0.0109	0.0153	-0.0007	0.0080
	(0.11)	(0.16)	(-0.01)	(0.08)
dNA_{t+1}	0.2622	0.2672	0.2574	0.2626
	(3.02)	(3.08)	(2.99)	(3.03)
RD_t	6.5397	6.5056	6.4665	6.4326
	(19.43)	(19.38)	(19.24)	(18.79)

dRD_t	-2.2444	-2.2402	-2.1104	-2.2584
	(-2.95)	(-2.92)	(-2.78)	(-2.96)
dRD_{t+1}	2.1982	2.1999	2.2618	2.1686
	(2.80)	(2.80)	(2.89)	(2.76)
IE_t	-2.8969	-2.6012	-2.5258	-3.1132
	(-3.22)	(-2.89)	(-2.82)	(-3.44)
dI_t	-3.4801	-3.2806	-3.7373	-3.4011
	(-1.83)	(-1.71)	(-2.00)	(-1.80)
dI_{t+1}	0.4026	0.5571	0.5089	0.4836
	(0.18)	(0.25)	(0.23)	(0.21)
dV_{t+1}	-0.3688	-0.3718	-0.3671	-0.3698
	(-6.41)	(-6.48)	(-6.41)	(-6.43)
dC_t	0.1933	0.2045	0.2173	0.1858
	(0.83)	(0.88)	(0.94)	(0.80)
dC_{t+1}	0.4810	0.4828	0.4842	0.4846
	(2.37)	(2.38)	(2.38)	(2.39)
REP_t	2.4476	2.4277	2.4619	2.4472
	(6.08)	(6.06)	(6.16)	(6.09)
$dREP_t$	-0.7567	-0.7413	-0.8093	-0.7705
	(-2.73)	(-2.68)	(-2.93)	(-2.78)
$dREP_{t+1}$	0.8742	0.8781	0.8498	0.8737
	(2.87)	(2.94)	(2.80)	(2.87)
YEAR DUMMY	YES	YES	YES	YES
INDUSTRY DUMMY	YES	YES	YES	YES
ADJRSQ	0.4779	0.4806	0.4814	0.4786
Coefficient tests				
b1+b2	0.9835	1.5551	1.5445	-6.1280
	[0.3371]	[0.1891]	[0.1443]	[0.1622]
b1+b2+b3		0.7967		
		[0.6363]		
b1+b2+b4			-4.0257	
			[0.1706]	
b1+b2+b5				2.1493
				[0.0635]

Table 5

Contribution of dividends to firm value depending on market illiquidity

The sample includes 3,488 firm/year from 1993, 1995, 1998, 2000, 2002, and 2004. We estimate pooled regressions where X_t is the level of variable X in year t over the level of assets in year t; dX_t is the change in the level of X fro m year t-1 to year t, $X_t - X_{t-1}$, divided by assets in year t; dX_{t+1} is the change in the level of X from year t to year $t+1$, $X_{t+1} - X_t$, divided by assets in year t; V is the market to book ratio, (average market equity value in t plus total liability) over total asset; D is cash dividend; E is earnings before interest and tax; NA is non-cash assets defined as total assets minus cash and cash equivalents; RD is research and development expenses; I is interest expenses; C is c ash and cash equivalents; Rep is the dollar amount spent on repurchases. When RD is missing, we set it equal to zer o. FCF is a dummy variable with the value of 1 if free cash flow exceeds sample median, or 0 otherwise. Free cash flow is measured by operating income minus taxes, interest expenses, and preferred and common dividends scaled by book assets. IA is a dummy variable, equal to 1 if the forecast error is above the sample median, and equal to 0, otherwise. We measure forecast error as the ratio of the absolute difference between the forecast earnings and the actual earnings per share to the price per share at the beginning of the month. *HIGHD* is a dummy variable with the value of 1 if D exceeds sample median, or 0 otherwise. LIQ is a dummy variable with the value of 1 if the Amihud (2002) illiquidity measure is below sample median, or 0 otherwise. Amihud illiquidity measure is defined as the absolute daily return divided by daily trading volume times stock price. Dummy variables for year and industry are included. ADJRSQ is the value of adjusted R-square. Numbers in ( ) are t-statistics by using standard errors adjusted for heteroskedasticity. Coefficient tests show whether the sum of the coefficients is significantly different from 0 by the Wald test. Numbers in [ ] denote *p*-values.

Variable	(1)	(2)	(3)	(4)
Intercept	0.6883	0.7472	0.7015	0.7205
	(6.79)	(9.04)	(6.39)	(6.82)
D_t *(b1)*	-0.2350	-0.5007	-0.1515	1.1928
	(-0.16)	(-0.42)	(-0.10)	(0.73)
D_t*LIQ_t *(b2)*	6.5977	4.3048	6.8599	-5.4164
	(4.28)	(3.31)	(4.31)	(-1.58)
D_t*LIQ_t*FCF_t *(b3)*		6.8526		
		(5.81)		
D_t*LIQ_t*IA_t *(b4)*			-4.6171	
			(-2.45)	
D_t*LIQ_t*$HIGHD_t$ *(b5)*				11.5178
				(3.90)
LIQ_t	0.1691	0.1642	0.1757	0.2059
	(5.90)	(6.16)	(6.08)	(6.84)
FCF_t		-0.0369		
		(-1.60)		
IA_t			-0.0051	
			(-0.18)	
$HIGHD_t$				-0.0800
				(-2.24)
dD_t	-1.2066	-0.9164	-1.2713	-1.2594
	(-4.04)	(-5.20)	(-3.67)	(-3.57)
dD_{t+1}	2.5838	1.2505	2.7084	3.0994
	(1.96)	(1.40)	(1.97)	(1.93)
E_t	5.9339	5.7162	5.8769	5.9127
	(17.23)	(16.54)	(16.86)	(17.10)
dE_t	-1.7715	-1.7366	-1.7309	-1.7741
	(-4.66)	(-4.64)	(-4.50)	(-4.65)
dE_{t+1}	2.1860	2.1233	2.1623	2.1475
	(6.99)	(6.91)	(6.92)	(6.86)
dNA_t	-0.0633	-0.0555	-0.0743	-0.0721
	(-0.46)	(-0.40)	(-0.54)	(-0.53)
dNA_{t+1}	0.1334	0.1449	0.1379	0.1288
	(1.54)	(1.68)	(1.59)	(1.49)
RD_t	4.7867	4.8341	4.7318	4.6053

	(10.87)	(11.12)	(10.75)	(10.36)
dRD_t	1.8567	1.7476	1.9177	1.7373
	(1.63)	(1.54)	(1.69)	(1.52)
dRD_{t+1}	1.4079	1.2303	1.3996	1.3338
	(1.42)	(1.29)	(1.41)	(1.33)
IE_t	-2.3962	-2.6079	-2.4382	-2.6834
	(-2.35)	(-2.55)	(-2.40)	(-2.63)
dI_t	-2.7728	-2.8800	-2.8929	-2.5025
	(-1.44)	(-1.48)	(-1.51)	(-1.31)
dI_{t+1}	-0.5529	-0.7144	-0.5646	-0.4317
	(-0.19)	(-0.24)	(-0.19)	(-0.15)
dV_{t+1}	-0.2063	-0.2063	-0.2095	-0.2058
	(-3.68)	(-3.69)	(-3.73)	(-3.68)
dC_t	0.1026	0.1125	0.0809	0.1096
	(0.39)	(0.44)	(0.31)	(0.42)
dC_{t+1}	0.2257	0.2065	0.2348	0.2294
	(1.07)	(1.00)	(1.12)	(1.10)
REP_t	2.8804	2.6918	2.8732	2.8333
	(6.79)	(6.36)	(6.77)	(6.70)
$dREP_t$	-0.6378	-0.5816	-0.6739	-0.6100
	(-2.46)	(-2.26)	(-2.58)	(-2.33)
$dREP_{t+1}$	1.2479	1.1569	1.2267	1.2434
	(4.65)	(4.37)	(4.57)	(4.63)
YEAR DUMMY	YES	YES	YES	YES
INDUSTRY DUMMY	YES	YES	YES	YES
ADJRSQ	0.5587	0.5676	0.5605	0.5613
Coefficient tests				
b1+b2	6.3627	3.8040	6.7084	-4.2236
	[0.0001]	[0.0001]	[0.0001]	[0.1508]
b1+b2+b3		10.6566		
		[0.0001]		
b1+b2+b4			2.0913	
			[0.1950]	
b1+b2+b5				7.2942
				[0.0001]

Table 6

Contribution of dividends to firm value depending on investor irrationality

The sample includes 3,488 firm/year from 1993, 1995, 1998, 2000, 2002, and 2004. We estimate pooled regressions where X_t is the level of variable X in year t over the level of assets in year t; dX_t is the change in the level of X fro m year t-1 to year t, $X_t - X_{t-1}$, divided by assets in year t; dX_{t+1} is the change in the level of X from year t to year $t+1$, $X_{t+1} - X_t$, divided by assets in year t; V is the market to book ratio, (average market equity value in t plus total liability) over total asset; D is cash dividend; E is earnings before interest and tax; NA is non-cash assets defined as total assets minus cash and cash equivalents; RD is research and development expenses; I is interest expenses; C is c ash and cash equivalents; Rep is the dollar amount spent on repurchases. When RD is missing, we set it equal to zer o. FCF is a dummy variable with the value of 1 if free cash flow exceeds sample median, or 0 otherwise. Free cash flow is measured by operating income minus taxes, interest expenses, and preferred and common dividends scaled by book assets. IA is a dummy variable, equal to 1 if the forecast error is above the sample median, and equal to 0, otherwise. We measure forecast error as the ratio of the absolute difference between the forecast earnings and the actual earnings per share to the price per share at the beginning of the month. *HIGHD* is a dummy variable with the value of 1 if D exceeds sample median, or 0 otherwise. $IRRATIONAL$ is a dummy variable, equal to 1 if the log of the inverse of the institutional churn rate is above the sample median, and equal to 0, otherwise. The institutional churn rate is measured following Gaspar, Massa, and Matos (2005). Dummy variables for year and industry are included. ADJRSQ is the value of adjusted R-square. Numbers in ( ) are t-statistics by using standard errors adjusted for heteroskedasticity. Coefficient tests show whether the sum of the coefficients is significantly different from 0 by the Wald test. Numbers in [ ] denote *p*-values.

Variable	(1)	(2)	(3)	(4)
Intercept	0.9251	0.9438	1.0099	0.9596
	(8.14)	(9.13)	(7.98)	(8.43)
D_t *(b1)*	4.4421	4.8579	4.4634	7.0738
	(5.06)	(5.45)	(5.13)	(6.25)
D_t*$IRRATIONAL_t$ *(b2)*	-0.8989	-2.0254	-0.8445	-21.4757
	(-0.91)	(-2.08)	(-0.84)	(-5.52)
D_t*$IRRATIONAL_t$*FCF_t *(b3)*		4.0345		
		(2.79)		
D_t*$IRRATIONAL_t$*IA_t *(b4)*			-1.4130	
			(-0.69)	
D_t*$IRRATIONAL_t$*$HIGHD_t$ *(b5)*				19.5388
				(5.43)
$IRRATIONAL_t$	-0.0402	-0.0492	-0.0378	-0.0001
	(-1.73)	(-2.10)	(-1.62)	(-0.00)
FCF_t		0.0756		
		(3.40)		
IA_t			-0.1042	
			(-4.06)	
$HIGHD_t$				-0.1305
				(-4.58)
dD_t	-0.6422	-0.5476	-0.6633	-0.8502
	(-3.31)	(-2.84)	(-3.49)	(-3.44)
dD_{t+1}	1.6562	1.3263	1.6744	2.3723
	(2.00)	(1.75)	(2.02)	(2.16)
E_t	5.6571	5.2943	5.5384	5.6759
	(16.81)	(14.91)	(16.27)	(16.90)
dE_t	-1.1309	-1.1201	-1.0232	-1.1269
	(-3.43)	(-3.43)	(-3.11)	(-3.44)
dE_{t+1}	2.2402	2.1930	2.1898	2.2401
	(8.35)	(8.21)	(8.14)	(8.38)
dNA_t	0.0396	0.0467	0.0309	0.0327
	(0.37)	(0.43)	(0.29)	(0.31)
dNA_{t+1}	0.2615	0.2705	0.2573	0.2632
	(2.92)	(3.01)	(2.88)	(2.95)
RD_t	6.7688	6.7334	6.7087	6.5143

	(20.01)	(20.06)	(19.77)	(19.10)
dRD_t	-1.4166	-1.3783	-1.3959	-1.3615
	(-1.70)	(-1.65)	(-1.66)	(-1.63)
dRD_{t+1}	2.6641	2.6685	2.6785	2.6031
	(3.32)	(3.35)	(3.35)	(3.27)
IE_t	-2.9122	-2.5968	-2.5664	-3.3468
	(-3.17)	(-2.84)	(-2.79)	(-3.63)
dI_t	-2.5835	-2.4625	-2.9121	-2.3121
	(-1.22)	(-1.16)	(-1.39)	(-1.11)
dI_{t+1}	0.0097	0.0022	0.1409	-0.0669
	(0.00)	(0.00)	(0.06)	(-0.03)
dV_{t+1}	-0.3575	-0.3590	-0.3571	-0.3614
	(-6.04)	(-6.07)	(-6.05)	(-6.15)
dC_t	0.2959	0.3152	0.3116	0.2889
	(1.18)	(1.26)	(1.25)	(1.16)
dC_{t+1}	0.5115	0.5112	0.5067	0.5082
	(2.47)	(2.48)	(2.46)	(2.48)
REP_t	2.4412	2.4023	2.4591	2.4383
	(5.89)	(5.82)	(5.94)	(5.96)
$dREP_t$	-0.6629	-0.6273	-0.7154	-0.6733
	(-2.40)	(-2.28)	(-2.58)	(-2.45)
$dREP_{t+1}$	0.9044	0.9267	0.8794	0.9157
	(2.86)	(2.99)	(2.80)	(2.90)
YEAR DUMMY	YES	YES	YES	YES
INDUSTRY DUMMY	YES	YES	YES	YES
ADJRSQ	0.4700	0.4740	0.4727	0.4745
Coefficient tests				
b1+b2	3.5432	2.8325	3.6189	-14.4019
	[0.0001]	[0.0009]	[0.0001]	[0.0014]
b1+b2+b3		6.8670		
		[0.0001]		
b1+b2+b4			2.2059	
			[0.3147]	
b1+b2+b5				5.1369
				[0.0001]