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Abstract

We document the association between a firm's payout policy and its stock's liquidity. In particular, we show that dividend-paying firms have a more liquid market for their stock and measures of a stock's liquidity is positively linked to its probability of being a dividend payer. Furthermore, this link between dividends and liquidity is stronger when shareholders are more powerful. This is consistent with a mechanism in which payout decisions act as a commitment not to invest: by distributing cash, the firm reduces its potential for internal equity financing, raising its cost of capital and leading to less investment. Such a mechanism may lead to less volatile stock prices and potentially to a decrease in the adverse selection costs faced by liquidity-constrained shareholders, increasing stock price liquidity. When shareholders have more power, liquidity would be more strongly linked with dividends as managers would be more likely to pay dividends to meet shareholders' preference for liquidity.

Keywords: Liquidity, Dividend Payers, Adverse Selection Costs, Corporate Governance, Shareholder Power, Informed Trading.

JEL Classification: G14, G31, G35.

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I Introduction

Payout decisions have an impact but are also affected by liquidity conditions of shareholders. Most straightforwardly, distributing cash to shareholders increase their cash balance, and hence, relaxes their liquidity constraints. More interestingly, the decision to distribute cash may have a dynamic relationship with the properties of the stock price, and hence, the liquidity of the stock in the market place. Such a relationship could arise through the "commitment not to invest": distributing cash reduces the firm's potential for internal equity financing, raises the cost of external capital, and leads to less investment. In the extreme, a firm would pay cash out only when it envisions no worthy investment opportunities because internal financing is cheaper. With less investment and assuming cash flows from existing operations are always more predictable than flows from risky investment projects, uncertainty in payoffs would be reduced and stock price volatility may subside, decreasing the adverse selection costs faced by liquidity-constrained shareholders. In this paper, we present a toy model demonstrating this mechanism and empirically analyze the link between between payout policy and stock liquidity by adding liquidity variables to the list of firm characteristics that determine the propensity to pay dividends.

The novel part of the paper is the study of a corporate finance decision taking market microstructure elements into account. We consider a situation where shareholders' need for liquidity is linked to the firm's decision to pay dividends and/or engage in share repurchases. We think of shareholders as agents that face a trade-off between expected returns and liquidity. In equilibrium, some firms are willing to forgo investments and accept potentially lower growth prospects in exchange for a more liquid market for their shares and they distribute cash.

If one interprets the decision to pay dividends as a pre-commitment to invest less in opportunities that are riskier than its existing operations, it is easy to see that by paying dividends a firm may be able to reduce its earnings volatility. In a market with informed agents, a(n uninformed) shareholder that is hit by a liquidity shock will face adverse selection when trading. Furthermore, these adverse selection costs will be lower the less risky the company is (an intuition reminiscent of Kyle (1985)). In other words, assymmetric information about the returns will play a bigger role when the investments undertaken are risky and the stock price, as a consequence, is more volatile. So, by paying dividends or repurchasing shares, a company would affect the volatility and liquidity of its stock. If shareholders do indeed care about liquidity and firms care about shareholders, we should observe an effect of liquidity on the decision to make payouts to shareholders.[1]

This reasoning leads to several testable conjectures. First, dividend-paying firms have a more liquid market. Therefore, measures of liquidity should be positively associated with the probability that a firm is a dividend payer. Second, payers are less volatile as they tend to use dividends as a commitment device and not to undertake risky investments. Accordingly, shareholders of firms with more investment opportunities face more volatile returns and higher adverse selection costs because of the uncertainty surrounding these investments. Finally, increased shareholder power leads to an increase in the likelihood that a firm is a payer as shareholders like more liquidity.[2]

Our empirical analysis closely follows the work of Fama and French (2001) (FF from now on). FF analyzes possible explanations for the decline in the number of dividend paying firms. They first identify the characteristics of dividend paying firms, and then ask if the decline can be explained by changes in the prevalence of these characteristics. They argue that even after controlling for the characteristics, which include size, profitability, and growth opportunities, the decline persists. In other words, the decline can be better explained by a generalized reduction in the propensity to pay, rather than by a change in the characteristics of firms. We build on their work arguing that potentially important variables were excluded from their analysis, namely liquidity measures and proxies for shareholder power. We do not, however, concentrate so much on the reasons for the decline, but rather on the variables that seem to be important in determining the likelihood of a firm being a dividend payer.

[1] Throughout the paper we focus on dividends but the results are also verified for share repurchases.

[2] One should think about this and the first implication together: Liquidity should be of greater importance for the decision to pay dividends for firms that have a high level of shareholder power.

The potential power to signal strategy and prospects to the market has been one of the main features of dividends analyzed in the literature.[3] We depart considerably from this approach by assuming that establishing its type is not the firm's main or sole concern in choosing their payout policy. Their decision of whether or not to pay dividends actually determines the characteristics of their payoffs. The interesting point, and the main object of analysis in this paper, is the fact that liquidity costs generated by asymmetric information differ across firms depending on whether they are dividend payers or not. Bhattacharya (1979) also argues that agents' liquidity needs may be related to the dividend payment decision. However, the mechanism leading to this result is different. In Bhattacharya (1979), agents' urgency comes from differing planning horizons, while here we think of it as coming from a shock. We focus on the interaction between the payout policy (and the availability of funds for investments) and the liquidity costs faced by shareholders and, consequently, the firm's final value.

Baker and Wurgler (2002a, b) analyze the impact of a measure of dividend premium on the decision to initiate payment. They develop a stylized behavioral model to suggest that the stock price premium carried by dividend-paying firms explains why firms decide to pay or stop paying dividends and present some suggestive evidence to support their theory. Their approach aims to explain the downward trend in the propensity to pay, hence they concentrate on the time series dimension.[4] Conversely, our approach is mostly concentrated on the cross-section variation as we are interested in explaining the decision to pay dividends as a function of firm characteristics. We propose a mechanism that can shed light into the existence of the dividend premium. Investors in need of liquidity may display a preference for the dividend payers and this preference can show up in the form of a premium on the dividend-paying stocks. Thus, the windfall created by shareholders' liquidity needs would be observationally equivalent to a dividend premium changing through time. Our results suggest that it may be the case that it is not the dividend premium that drives the

[3] See Bhattacharya (1979), Miller and Rock (1985), Makhija and Thompson (1986), Williams (1988), Benartzi, Michaely and Thaler (1997), and Allen and Michaely (2002), among others.

[4] Actually, using a variable such as dividend premium makes it impossible to use the cross-section variation.

propensity to pay, but rather that the liquidity gains from paying drives this propensity and at the same time leads to the dividend premium.

Benartzi, Michaely and Thaler (1997) test the information content of changes in dividends with respect to the earnings of the firm, which is a common implication in signaling models. The question is whether the firms are signaling a change expected to happen in the future or a change already realized in the past. Their result that firms are in fact signaling the past is consistent with our findings. There, firms that initiate or increase dividends have experienced an increase in earnings, but do not show unexpected increases in the future. Firms that cut dividends have experienced decrease in earnings in the past, but show increases in the future. Our story also asserts that, in order to pay dividends, the firm needs to have had positive earnings. However, in agreement with their findings, these firms are not expected to show any further increase in profitability, potentially because they are committing not to invest and potentially passing on profitable opportunities. Similarly, firms that decide not to pay dividends experience a decrease in earnings since funds are diverted to a risky investment opportunity. Again in conformity with their results, these firms are expected to show significant increase in earnings in the future. Hence, our hypothesis accords with results that have empirical support in the existing literature. Other implications, concerning the links between dividends and liquidity as well as between dividends and shareholder power are new and has received little attention making this paper one of the few documenting these relationships.

Banerjee, Gatchev, and Spindt (2007), in a coincident paper, also investigate the interaction between payout policy and stock market liquidity. They, however, conclude that there exists a negative relationship between dividends and stock market liquidity, interpreting this as a sign that investors view dividends and liquidity as substitutes. Yet, their empirical analysis is fragmented in the sense that all regressions are conducted in sub-samples distinguished by three different time periods (1963-1977, 1978-1992, 1993-2003). As we show, in the whole sample period, the sign of the relationship is reversed. Hence, we demonstrate that the interaction between dividends and stock market liquidity is not necessarily as it is depicted elsewhere in the literature. Moreover, the main feature that distinguishes this paper is the fact that we study an interesting channel that may have a bearing on this relationship, namely, the potential effect on investment decisions and stock price return distribution, beyond the straightforward channel that dividends can relax shareholders' liquidity constraints.

Harford, Mansi, and Maxwell (2008), in another coincident paper, look at the relationship between corporate governance and cash holdings. They find a somewhat counterintuitive result that poor governance quality is associated with low cash balances but that poorly-governed firms are less likely to initiate or increase dividends. Their explanation that managers at poorly-governed firms try to avoid high cash balances in order to divert attention from poor governance quality only partially fit the picture. We offer a novel explanation for the latter relationship where stronger shareholder rights are associated with higher propensity to pay dividends through the relation between dividend payment decision and stock market liquidity. Correspondingly, this is the first study, to the best of our knowledge, to demonstrate the interactive nature of the relationship between dividends and the combination of corporate governance and stock market liquidity.

The paper is organized as follows. Section II provides the background for the conjectures to be empirically tested. Section III presents the empirical analysis. Section IV concludes.

II The Liquidity-Payout Hypothesis

In this section, we introduce the main hypotheses and conjectures providing an intuitive explanation for the potential relevance of liquidity to payout policy. For a more formal presentation, we refer the interested reader to the appendix where we develop a model that delivers the implications discussed here. Note that the objective is to build an intuitive background for the relationships to be studied later rather than to construct a full-blown model of payout policy.

We think of an economy with a representative firm, whose stock is traded in an imperfectly competitive market. The firm is initially endowed with an average amount of D per share, in cash, seen as free cash-flow accumulated from previous activities. The decision faced by the manager is whether to pay out D as dividends or to hold on to the cash. If the firm pays dividends, then its final value is distributed as $\widetilde{V}_0$.[5] Otherwise, the firm will have an option to invest. With probability $1-p$, it has a profitable investment opportunity with cost D. With complementary probability p, no opportunity presents itself, and hence, there is no investment. If investment takes place, the firm's final value is given by a random variable $\widetilde{V}_I$. If no investment takes place, then its final value is given by $\widetilde{V}_0 + D$. Let $\widetilde{V}_g$ be the random variable that represents the mixture described above. More precisely, it is a lottery that with probability $1-p$ gives $\widetilde{V}_I$ and with complementary probability gives $\widetilde{V}_0 + D$. Under suitable conditions, one obtains that the variance of $\widetilde{V}_g$ is larger than that of $\widetilde{V}_0 + D$. In the end, we have a representative firm that chooses to be one of two types: non-payer or payer. A shareholder of the growth firm is entitled to $\gamma\widetilde{V}_g$ and a shareholder of the value firm is entitled to $\gamma\left(\widetilde{V}_0 + D\right)$, where γ is the number of shares a shareholder has.

The intuition behind the assumption that if a firm pays dividends it foregoes all possibility to invest is linked to the well-known theory of a pecking order in financing decisions, i.e., that internal equity is favored to external financing (see, e.g., Myers (1984)). The main idea is *not* that dividend paying firms have no access to financial markets, but rather that, for those firms that have little access to external financing, retained earnings may be the only way to invest at the margin. Hence, constrained firms that choose to pay are essentially foregoing all investment opportunities. This is consistent with the results in Fama and French (2002) showing that firms with higher dividend payout ratios invest less. Empirically, we would then expect that the characteristics of payers we identify below should be more pronounced for those firms that have limited access to cheap external financing. We address this issue directly in our econometric analysis.

Next, we introduce a potential need for liquidity on the part of the shareholders. What we have in mind is a situation where the market is a modification of Kyle (1985), where the

[5] Throughout the paper, payoffs represent what accrues to the holder of one share.

liquidity traders are now shareholders. More precisely, we assume that each shareholder has an additional demand (or supply) of $\widetilde{u}_k$, independently distributed of all other random variables. Therefore, if $\widetilde{u}_k < (>)0$, they might need to sell (buy) some shares in the market.

When hit by the liquidity shock, shareholders have to trade against informed agents and face a market with adverse selection costs. These costs are a function of the characteristics of the firm. In turn, it is the choice of the firm's type, payer or non-payer, that shapes these characteristics. Accordingly, when deciding to pay dividends, the firm would take the liquidity needs of its shareholders into account.

Given this description one can think about the dividend policy as a sort of commitment device. Once a payout is announced, the manager commits himself not to undertake or to limit exposure to risky investments. In other words, cash at hand is less risky than any project with uncertain outcome. This reduces the potential adverse selection (and trading) costs of liquidity-strapped shareholders.

Suppose the firm decides not to pay dividends and retain earnings. So, the option to invest is still viable and the firm is tagged as a non-payer and its stock is a risky asset paying $\widetilde{V}_g$ with price P_g. Similarly, the payer's stock is an asset paying $\widetilde{V}_0 + D$ with price P_v. In a Kyle-type framework, the depth of the market is inversely proportional to the firm's value volatility. Hence, intuitively, the more volatile the new investment opportunity, the lower is the stock's market depth. So, one can assert that "a non-payer's stock is as liquid as its growth opportunities are safe". The expected profit of the informed trader is proportional to the volatility of the firm's value. Since this is a zero-sum market, so is the aggregate loss to the shareholders. Based on these intuitions, we have the following:

Conjecture 1 *The market for non-paying firms is less liquid;*

Conjecture 2 *Non-paying firms have more volatile stock prices than payers;*

Conjecture 3 *Adverse selection costs are directly related to investment opportunities, that is, it is the possibility of risky investment that leads to higher adverse selection costs.*

A possible interpretation that could offer an intuitive insight into these conjectures is that dividend-paying firms offer the shareholders a more liquid stock to compensate for less favorable growth perspectives. This helps them hedge part of their liquidity shock. On the other hand, shareholders of a non-payer pay a price for higher expected returns by having to face thinner or less liquid markets.

Now, if the manager cares about shareholders, his decision to pay cash out will depend on liquidity measures. We think of the manager as attaching some weight, denoted by Ψ, to the shareholders' per-capita well-being and complementary weight on his own well-being. When deciding on whether or not to pay dividends, he maximizes a weighted average of his expected utility and shareholders' per-capita expected utility. One should think about this parameter as a measure of corporate governance. Boards of firms with strong governance will likely make sure that managers do not act selfishly and do indeed take into consideration shareholders' objective. At the same time, no matter how well governed a firm is, managers always have some degree of freedom that allows them to put some weight on their own utility. This leads to two more conjectures:

Conjecture 4 *The decision to pay dividends depends on liquidity, since liquidity is affected by dividend payment and shareholders care about liquidity;*

Conjecture 5 *The latter effect is more pronounced for well-governed firms.*

III Empirical Analysis

Here we assemble the main empirical conjectures developed above, explain the data we use to corroborate them, and present the results.

A Conjectures

We have five main empirical conjectures that can be tested against the data:

1. The first empirical conjecture that should be tested, as it underlies the hypothesis, is that dividend-paying firms have a more liquid market. We use several liquidity

measures to achieve robustness of results to the choice of this variable, explained in more detail in the next subsection.

2. Another prediction is that non-dividend-paying firms are more volatile. This follows primarily from the assumption that non-payers have a more volatile final value and/or earnings. Therefore, we present a test of whether firms that do not pay dividends have more volatile market-to-book ratios and earnings per assets. Finally, we also test whether stock prices of non-payers are more volatile than those of payers.

3. The links present in our hypotheses point to a relationship between adverse selection costs and investment. It is the commitment not to invest in risky opportunities, achieved through dividend payment, that reduces adverse selection costs. Therefore, we should observe a positive relationship between investment and adverse selection costs.

4. More directly, one has to test if liquidity helps explain dividend payment probability. To do that, we explore the relationship between liquidity and the probability of being a payer, carrying out a regression as in FF with the addition of liquidity as an explanatory variable.

5. In the extreme case, liquidity should only matter when shareholders' interests are taken into account by the management. So, shareholder power should help explain the likelihood of being a payer. In order to test this, we construct a proxy for Ψ using a measure of shareholder power in running the firm. Then, we modify our liquidity variables using this new measure, creating a variable that captures the ideas discussed above.

On top of that, one could argue that the effect of liquidity on the probability of being a payer should depend on access to financial markets, since constrained firms that pay dividends are committing to forego risky investment opportunities. We also address this in the empirical analysis. It is worth noting that our conjectures deal with the distribution of free cash flows, without distinguishing between dividend payments and share repurchases. From an empirical standpoint, one can argue that the implications listed above should hold for both types of cash distribution. To address this issue, we explore the relationship between liquidity and share repurchases as well, even though the bulk of our analysis concentrates on dividends.

B Data Description

Data mostly come from Compustat and CRSP. We use the selection criteria and variable derivations as described in FF. The Compustat sample for calendar year t is composed of the firms with fiscal year-ends in t that have available data for total assets, stock price and shares outstanding at the end of the fiscal year, income before extraordinary items, interest expense, dividends per share, and preferred dividends. In addition, to account for the value of preferred stock, the firms must have one of the following: preferred stock liquidating value, preferred stock redemption value, or preferred stock carrying value. To use as the book equity variable, we require the availability of either stockholder's equity, or liabilities, or common equity, and preferred stock par value. In order to be able to calculate the growth in assets, AG, total assets must be available in year t and $t-1$. Additionally, firms with book equity below \$250,000 or assets below \$500,000 are excluded from the sample. We also use balance sheet deferred taxes and investment tax credit, income statement deferred taxes, purchases of common and preferred stock, sales of common and preferred stock, and common treasury stock when available, but firms are not required to have these items available in order to be included in the sample. By constraining the corresponding CRSP share codes to be 10 or 11, we ensure that the firms in our Compustat sample are publicly traded. Moreover, we exclude the fiscal years when a firm fails to be in the CRSP database at its fiscal year-end. The CRSP sample consists of NYSE, AMEX, and NASDAQ securities with CRSP share codes of 10 or 11. Firms are required to have price and shares outstanding data available for December of year t in order to be included in the dataset for that year. Utilities and financial firms are excluded from both Compustat and CRSP samples. Practically, we extend the dataset used in FF by adding data for the period between 1999 and 2002 so that our data covers the years from 1963 to 2002.[6]

The dependent variable in the regressions is *pay*, which is a dummy that takes on the value of 1 if a company has paid dividends in a given year. More specifically, a firm is considered to be a dividend payer in calendar year t if the dividends per share are positive by the ex date in the last fiscal year that ends in year t. We construct the rest of the variables used in the regression analysis based on annual data according to the following derivations:

- Assets (A) = Total Assets;
- Book Equity (BE) = Stockholder's Equity [or Common Equity + Preferred Stock Par Value or A − Liabilities] − Preferred Stock Liquidating Value [or Preferred Stock Redemption Value, or Preferred Stock Par Value] + Balance Sheet Deferred Taxes and Investment Tax Credit if available − Post Retirement Asset if available;
- Market Equity (ME) = Stock Price × Shares Outstanding;
- Market-to-Book Ratio or Value per Assets ($VperA$) = $\frac{A-BE+ME}{A}$;
- Earnings Before Interest (E) = Earnings Before Extraordinary Items + Interest Expense + Income Statement Deferred Taxes if available;
- Profitability measured by the Ratio of Earnings to Assets ($EperA$) = $\frac{E}{A}$;
- Asset Growth (AG) = $\frac{A_t-A_{t-1}}{A}$.

The remaining set of variables in the regressions are computed using CRSP daily stock tapes. These include market capitalization percentile rank (*MCRank*) and measures of stock market liquidity. Measures of liquidity we use are:[7]

[6]We do not extend the dataset further as we want to refrain from any potential significant changes in the data that may have been introduced by the implementation of the Sarbanes-Oxley Act in response to the stock market downturn and corporate governance scandals afterwards.

[7]In addition to the liquidity measures mentioned here, we do robustness checks with several others. Specifically, we use turnover and the "liquidity-sensitivity" measure developed by Pastor and Stambaugh

- Effective bid-ask spread ($MeanSpread$);[8]

- Trading volume in logs ($MeanVolume$);

- Proportion of days in which the stock has a zero return ($PropZeroRet$);[9]

- Absolute percentage price change per dollar of trading volume or price impact of the order flow ($AmihudIlliq$).[10]

Table 1 presents the summary statistics. The table contains a correlation matrix for all the (il)liquidity variables. The variables seem to be correlated, albeit not too highly. And all, but one, correlations have the right sign. The only puzzling result is the positive correlation between the spread and volume measures, however, it is pretty close to zero.

To obtain a proxy for shareholder power, we follow the descriptions in Gompers, Ishii and Metrick (2003). The data come from Investor Responsibility Research Center (IRRC) publications. Company documents (charters, bylaws, etc.) are searched for the provision of certain corporate governance rules such as voting rights, director/officer protection and takeover defenses. Then, an index is formed by adding one point for each provision that presumably restricts shareholder rights. By construction, a higher value of the index means increasing managerial power. We merge the governance index variable, $GIndex$, to the Compustat/CRSP sample by matching according to firm permanent identification numbers. This dataset covers the period between 1991 and 2002. Based on this proxy for

(2003). These, however, do not produce results as significant as the ones presented. Turnover is recognized as a highly flawed measure of liquidity (see, for instance, Lee and Swaminathan (2000)). The liquidity-sensitivity measure, as Pastor and Stambaugh themselves point out, is not robust and varies a lot with different specifications. Hence, its suitability for our purposes is questionable.

[8] Spread measures derived from monthly tapes can be problematic. The value computed turns out to be a poor indicator of real costs associated with trading the stock because it reflects the difference between the lowest bid and highest ask over several days of trading. In regressions not reported here for brevity, we do use spread and volume measures derived from monthly tapes and obtain similar results.

[9] This measure follows Mei, Scheinkman and Xiong (2004) that uses the proportion of no-price-change days experienced by a stock in a time period as a measure negatively related to liquidity. They rely on the results of Lesmond, Ogden and Trzcinka (1999), where it is shown that this is an effective measure of liquidity for U.S. stocks.

[10] The last measure follows Amihud (2002) that calculates the average ratio of the daily absolute return to the dollar trading volume on that day to find the illiquidity of a stock. He aims to capture Kyle's concept of illiquidity. Similar measures based on returns and volume are used commonly in market microstructure literature.

shareholder power, we create a dummy variable called $DemDummy$, where $DemDummy$ is 1 if corporate governance index, $GIndex$, is smaller than or equal to 5 and 0 otherwise.

As a proxy for adverse selection costs, we use the degree of informed trading, a measure developed in Easley, Hvidkjaer and O'Hara (2002). This measure, PIN, is defined as the probability that the opening trade is information-based and is calculated using transactions data from the Institute for the Study of Security Markets (ISSM) and NYSE Trade and Quote (TAQ) database. The basic idea is to obtain the maximum likelihood estimates of the structural parameters in a sequential trading model for each stock on a yearly basis.[11] The sample consists of all NYSE/AMEX stocks for which the estimates were obtainable for the period between 1983 and 2001. In addition to using PIN as a control for adverse selection costs in the regressions where *pay* is the dependent variable, we also use it to test if the extent of adverse selection depends on investment opportunities as implied by our hypotheses.

Following FF, we use asset growth as a proxy for investment opportunities. We also use an alternative measure of investment opportunities, Inv, which is an augmented version (as recommended by Kaplan and Zingales (1997)) of what is defined as investment intensity by Rajan and Zingales (1998) and calculated as the ratio of capital expenditure to net property, plant, and equipment.

To address concerns that the effect of liquidity on the probability of being a payer depends on how constrained the firm is, we construct a measure of leverage, Lev, defined as the book value of long term debt divided by market equity (ME). We use two dummy variables to capture the firms with high leverage: hi_lev1,which takes the value of one for firm i at time t if Lev_{it} is above the average Lev at time t plus two standard deviations, and hi_lev2, which takes the value of one for firms that are in the highest quintile of Lev at time t. These dummies act as proxy for access to cheap external financing. The idea here is that highly leveraged firms would face high costs of external financing, especially in the bond market. So, these firms upon paying dividends would commit not to invest because

[11] We refer the reader to Easley, Hvidkjaer, and O'Hara (2002) for more details on this issue.

they would have no or little cheap funds available.

As mentioned before, we also use share repurchases to see if the relation between distribution of free cash flow and liquidity persists independently of the form of payout. Note that we are simply interested in the repurchases that would qualify as a substitute to dividends. Therefore, share repurchases carried out to create resources for employee stock option or ownership plans and for mergers and acquisitions should be excluded from our measure. For that matter, we calculate the annual change in treasury stock. We construct this variable by first calculating the difference in common treasury stock from year to year.[12] If we end up with a positive value, then we set the dummy variable for repurchases to 1 and 0 otherwise.

C Results

Our empirical strategy follows the framework of FF trying to understand the main determinants of the decision to pay dividends. Our major contributions come from the addition of liquidity and shareholder power variables to the explanatory variables guided by the intuition developed in Section II.

Table 2 presents evidence supporting our first conjecture. All four measures of liquidity used (spread, volume, proportion of days without a price change, and the price impact of order flow) endorse our results. Both spread and proportion of trading days with zero return are statistically lower for companies that pay dividends.[13] In a similar spirit, the price impact of order flow is significantly greater for non-payers. In that simple test, comparing the average daily trading volume for payers and non-payers also gives support to our prediction that companies that pay dividends would have more liquidity. An immediate concern is the impact of size on our measures even when the test is conducted on matched pairs. We would expect size to be relevant for all, but especially for trading volume. Thus, we conduct additional tests for liquidity differences between payers and non-payers

[12] One complication is caused by the fact that some companies use the retirement method. In those instances, we calculate the net repurchases by subtracting the sales of common and preferred stock from the purchases.

[13] Note that lower spread and lower proportion of zero return days both indicate more liquidity.

controlling for the firm size in OLS regressions. Actually, all measures still indicate that payers have a more liquid market in that case. So, for two companies of similar size, the stock of the one that pays dividends is likely to have a higher volume and smaller spread as well as it tends to be traded more frequently and the price impact of these trades would be less.

Table 3 exhibits evidence that firms that do not pay dividends are more volatile. In particular, both market-to-book and earnings per assets are more volatile for non-payers than for payers. These results support our reasoning that, if the firm does not pay dividends, it invests in an ex-ante profitable but risky project that adds to the volatility of its final asset value and hence market value. In line with the last part, the table also shows that the stock prices of non-payers are more volatile than those of payers.

In order to test our conjecture that more rigorous investment activity is associated with adverse selection costs, we estimate a model where PIN is the dependent variable and asset growth (proxy for investment opportunities, as in FF) is the explanatory variable with the addition of several other variables as controls. Table 4 presents the results of these tests for different specifications. The evidence is strikingly supportive of the hypothesis that investment is directly related to adverse selection. The results with the alternative investment opportunity measure, Inv, are qualitatively the same.

Table 5 explores the relationship between liquidity, as measured by spread, volume, proportion of zero return days, and the percent price change per dollar volume, and the probability of being a payer, as in FF, with the addition of liquidity as an explanatory variable. We run yearly logit regressions and report the average coefficients and their significance, following Fama and MacBeth (1973). We also reproduce the results from FF for easy comparison. We see that, even after controlling for the variables used by FF, we still obtain that the liquidity variable has additional explanatory power, while coefficients on the other variables are of similar value. Liquidity is strongly positively correlated with the probability of being a dividend payer.[14,15] Actually, liquidity exhibits a considerable impact as indicated by its relatively large coefficient when compared to the other variables. Economically, one standard deviation drop in the spread corresponds to a 2.22 percent increase, almost a quarter standard deviation, in the probability of being a dividend payer. When the proportion of zero return days is used as proxy, one standard deviation matches a 17.05 percent change, or almost two standard deviations. An interesting point is to realize that the coefficient of the size variable is the one that changes most dramatically when the liquidity proxy is added to the regressors.[16] Given that size and liquidity measures have a significant degree of correlation, we interpret this as a result of the size variable picking up the impact of liquidity in the absence of the liquidity proxies. We also notice that asset growth (proxy for investment) is lower for firms that pay dividends, supporting the idea that payers commit to avoid or reduce risky investment. In Table 6, we take a different econometric approach and provide panel data regression results, that conform with the results derived from the Fama-MacBeth average coefficients.

The results in Tables 4, 5 and 6 taken together provide strong support to our conjectures that dividend-paying firms essentially commit not to take or reduce investment in risky opportunities and this leads to reduced adverse selection and increased liquidity.

Additionally, as we argued before, this effect should be especially important for firms that have no access to cheap external financing. We test this extension using the dummy variables for highly leveraged firms (hi_lev1 and hi_lev2). Firms with these dummy variables equaling 1 are deemed to have higher cost of external financing and, if they pay dividends, they forego investment opportunities. Therefore, the relationship between dividend payments and liquidity should be more pronounced for these firms. The idea is that paying dividends constrains these firms chances to invest in new projects. By doing so,

[14] Notice that these are in effect measures of *illiquidity*, so a negative coefficient implies a positive relationship between liquidity and the probability of being a payer.

[15] Note that this findings is in stark contrast to Banerjee, Gatchev, and Spindt (2007), who analyze the relationship only in sub-periods rather than the whole sample. On a side note, their sample does not include NASDAQ firms and the size variable they use is not the same as the one used here and in Fama and French (2001), although these are unlikely to be the only reason for the difference in the results.

[16] In separate regressions, we use the logarithm of market capitalization as the measure of size. The results turn out to be virtually identical.

it reduces information asymmetries and improve liquidity. In summary, liquidity and the probability of being a payer are related, and the relation is stronger for highly leveraged firms.

In results not fully reported here for brevity (but available upon request from the authors), we find strong support for this conjecture. We run panel data regressions similar to the ones in Table 5 using spread and proportion of zero return days as our liquidity variables and adding to the set of explanatory variables the leverage dummy and then an interaction between the dummy and the liquidity variable. No matter which dummy we use, the results show that (i) highly-leveraged firms are less likely to be payers (that is, the leverage dummy is significantly and negatively related to the probability of being a payer); (ii) liquidity is even more important in explaining the probability of being a payer for highly-leveraged firms (that is, the interaction coefficient is significant, and negative and the coefficient on liquidity alone continues to be negative and significant). Therefore, the more liquid a firm's stock is, the more likely it is that the firm is a payer, and this relation is stronger if the firm has high leverage.

In order to address our last conjecture that the liquidity needs of shareholders matter in the decision to pay dividends if management cares about them, we construct interaction variables by multiplying the dummy for high shareholder power, $DemDummy$, by each measure of liquidity (spread, proportion of zero return days, trading volume, and absolute percentage price change per dollar trading volume) to obtain $LiqGovP = PropZeroRet \times DemDummy$, $LiqGovS = MeanSpread \times DemDummy$, $LiqGovV = MeanVolume \times DemDummy$, and $LiqGovA = AmihudIlliq \times DemDummy$. The idea behind these variables is that liquidity should matter when shareholders' interests are taken into account by the manager in making dividend payment decisions. Table 7 presents the results of logit regressions by year where we add, one at a time, four measures that proxy for the fact that shareholder power is of importance for the decision to pay dividends. Unfortunately, the data for the governance index starts in 1991, hence we have to limit our sample. We use two different samples: 1993-1998 (to compare with one of FF's results) and the whole sample 1991-2002. The results show that the interaction variable is indeed important in determining the likelihood of a firm being a payer when the bid-ask spread or the price impact of trades is used as a measure of stock illiquidity. The results are not as convincing with the trade-based measures. The proportion of trading days with zero return and the average trading volume do not produce significant coefficients in some specifications.[17] For statistical completeness, we also run panel data logit regressions and present the results in Table 8. Results stay basically the same with all measures of liquidity. We believe that price-related measures (spread and Amihud's price impact variables) are a better proxy for shareholders' liquidity needs, since they are more direct proxies for the adverse selection costs that shareholders incur when faced with a liquidity shock.

In order to establish a connection between these findings and Baker and Wurgler's work, we create a new variable: the difference in liquidity between payers and non-payers each year. The intention is to capture the potential to improve liquidity by paying dividends, in other words, to measure how much more liquidity a stock can enjoy if dividends start being paid. Hence, we call this "liquidity gains from paying". Then we calculate the correlation between this variable and Baker and Wurgler's dividend premium. It is interesting to notice that these variables are positively correlated: when dividend payers become more expensive relative to non-payers, there is also a high likelihood that dividend payers are becoming more liquid than non-payers.[18] So, it may be the case that it is not the dividend premium that drives the propensity to pay, but rather that the liquidity gains from paying drives this propensity and at the same time leads to the dividend premium.

[17] For robustness, we repeat this exercise with different cut-off points in the corporate governance index for the democracy portfolio. The results remain qualitatively the same. We also run additional regressions where we include both the interaction variable as well as the liquidity variable itself. Results suggest that, at least for spread, liquidity has a direct effect and an additional effect for high-shareholder-power firms. Put differently, liquidity matters and even more so for firms with strong shareholders. Using other measures of liquidity delivers mixed evidence.

[18] As an illustration, using spread as the measure of liquidity we have that the gains in liquidity (decrease in spread) have a correlation of 0.2103 with the equally-weighted dividend premium and of 0.2379 with the value-weighted premium. When we use proportion of zero return days, these numbers are even higher, 0.4885 and 0.3457, respectively. The reader should keep in mind that, since these measures are negatively related to liquidity, we measure the liquidity gains as the variable for non-payers minus the variable for payers (this is how much more liquid payers are relative to non-payers). So, the positive correlation means that, when payers become pricier, they also become more liquid.

As an additional robustness check, we employ a measure of informed-trading intensity to see whether our results are driven by the fact that dividend payers tend to be big stocks that are less likely to be prone to adverse selection due to informed traders. We use the PIN variable, the probability that the opening trade is information-based, constructed by Easley, Hvidkjaer and O'Hara (2002) to measure the intensity of informed-trading. As shown in Table 9, the liquidity variable still turns out to be significant. More interesting is to see that, through the whole sample period, PIN is insignificant when no liquidity and shareholder power variables enter the equation and its significance is not much affected with the inclusion of liquidity proxies alone. Nevertheless, PIN gains significance when the governance interaction variables are introduced. Looking at the sub-sample period, 1993-1998, reinforces this observation. Also interesting to note is the fact that the governance interaction variable using the trade-based liquidity proxy is not significant when the information content of trades is considered. These findings suggest that liquidity is relevant beyond its relation to noise trading and asymmetric information and that shareholder power is relevant to costs of trading rather than the level of trading activity itself.[19]

Table 10 briefly addresses our model's predictive power to complete comparison to FF. Using the average coefficients from 1963 to 1977, we calculate the predicted proportion of payers and compare it with the actual one. We summarize the results in a table of sum of squared residuals. For sake of comparison, we present FF's analogous results and cut the sample in 1998. The fit proves to be better than FF's, further suggesting that liquidity proxies capture information relevant to dividend payment behavior.

As a final note, we repeat the main regression analysis of Tables 5 and 6 using the repurchase dummy instead of the dividend payment dummy as the dependent variable. Satisfactorily enough, the results are qualitatively the same.[20] Hence, we confirm that our conjectures are valid for both types of distribution. An interesting interpretation is to note that repurchases are free from the prudent investor bias. To put it more precisely, some

[19] Average trading volume and the percent price change per dollar volume produce similar results. The results are excluded for brevity.

[20] The additional tables are excluded for sake of focus and brevity. The results are available upon request.

funds are required to hold companies that pay dividends. If it is true that these funds are also the ones that trade more frequently than the rest, then the shares of those companies would mechanically have higher liquidity due to higher trading activity. This might lead one to suspect that the relation between liquidity and being a dividend payer is merely a correlation rather than one that is driven by the dynamics explained in our conjectures. On the other hand, there is no requirement for funds to hold companies that engage in share repurchases. Hence, verifying that our results stand with repurchase data gives further support to our conjectures.

As for the results that have been tested elsewhere in the literature, we observe that in Benartzi, Michaely and Thaler (1997) firms are shown to be signaling the past, and this fits with the current paper. More precisely, in their paper, it is empirically shown that firms paying/increasing dividends have experienced an increase in earnings, but do not show unexpected increases in the future. On the other hand, firms that cut dividends experience decrease in earnings in the past, but show significant increases in the future. This evidence is consistent with the idea that dividend-paying firms have no investment opportunity worth their while, and that is why they payout. In order to pay dividends the firm needs to have a free cash-flow (D), hence needs to have experienced an increase in earnings. Nevertheless, in agreement with their findings, these firms are not expected to show any further increase (as mentioned, they have little growth prospects). Similarly, firms that decide not to pay dividends experience a decrease in earnings due to the fact that D in funds are diverted to the available investment opportunities. Since these investment opportunities are ex-ante profitable, we have that, in conformity with their results, these firms are expected to show significant increase in earnings in the future. In another study, Harford, Mansi, and Maxwell (2008) find that poorly-governed firms are unlikely to initiate or increase dividends, in line with our findings. Hence, part of our conjectures have empirical support in the existing literature. Yet, our findings in support of the conjecture that dividend payment probability and stock market liquidity are negatively related are in constrast with Banerjee, Gatchev, and Spindt (2007). Their empirical analysis looks only to sub-periods (1963-1977, 1978-

1992, 1993-2003) while we show that the sign of the relationship is reversed in the whole sample period. Therefore, we demonstrate that the interaction between dividends and stock market liquidity may be different than what has so far been depicted in the literature.

IV Conclusion

In this paper, we analyze the interaction between a firm's payout policy and its stock's market liquidity. We find that (i) dividend-paying firms have a more liquid market; (ii) non-payers are more volatile; (iii) there is a positive relationship between investment and adverse selection costs; (iv) liquidity is positively related to the propensity to pay dividends; (v) the relationship between liquidity and dividends is stronger for firms with stronger shareholder power. These findings are robust to different liquidity measures and several robustness checks. We offer a mechanism that could explain these results together: by distributing cash, the firm reduces its chances of exploiting investment opportunities as funds for internal financing are used up, which decreases the volatility of stock returns and adverse selection costs faced by liquidity-constrained shareholders, leading to more liquid markets for the firm's stock.

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A Appendix

The appendix presents a simple model to support the conjectures in the text. All proofs are omitted but available upon request.

Our economy has a representative firm, traded in an imperfectly competitive market. The firm is initially, at time $t = 0$, endowed with an average amount of D per share. The decision faced by the manager is whether to pay out D as dividends or to hold on to the cash. If the firm pays dividends, then its final value is distributed as $\widetilde{V}_0 \sim N(\mu, \sigma^2)$. Otherwise, the firm has an option to invest. With probability $1-p$, it has a profitable investment opportunity with cost D. With complementary probability p, no opportunity presents itself, and hence, there is no investment. If investment takes place, the firm's final value is given by a random variable $\widetilde{V}_I$ with C.D.F. $F(.)$ to be specified below. If no investment takes place, then its final value is given by $\widetilde{V}_0 + D$.[21] The intuition behind the assumption that paying dividends constrains firms not to invest was discussed in Section II.

Let $\widetilde{V}_g$ be the random variable that represents the mixture described above. More precisely, it is a lottery that with probability $1-p$ gives $\widetilde{V}_I$ and with complementary probability gives $\widetilde{V}_0 + D$. Then, we can prove the following proposition.

Proposition 1 *For p small enough, there exists a C.D.F. $F(.)$ such that $\widetilde{V}_g$ is distributed $N(\mu_I + \mu, \sigma_I^2 + \sigma^2)$.*

We assume that the parameter values satisfy the conditions for Proposition 1 and $F(.)$ is depicted accordingly. We further impose that $\mu_I > D$ so that the opportunity to wait and invest is ex-ante expected to be profitable. In other words, the option to invest is not worthless. Therefore, a firm that decides to keep its option to invest has $\widetilde{V}_g \sim N(\mu_I + \mu, \sigma_I^2 + \sigma^2)$ as its final value. Otherwise, it becomes a "payer". Since dividends are taxed at a higher rate than capital gains, we assume that only a fraction $\kappa \in (0, 1]$ of

[21] This description should be seen as a reduced form of a situation where there is a whole distribution over the set of possible investment opportunities and one of these materializes. The support of this set is such that some opportunities would be undertaken if presented to the manager, some would not. For all intents and purposes of this paper, this situation can be interpreted analogously to the one described in the text.

D accrues to the stockholders.[22]

We allow for the existence of K shareholders, that are assumed to be risk-neutral.[23] Each shareholder is endowed with γ shares of the company. So, if the company becomes a payer, each shareholder would get $\gamma\kappa D$ in dividends. Hence, we have a representative firm that chooses to be one of two types, non-payer or payer, and the payoffs to the shareholders are $\gamma\widetilde{V}_g$ and $\gamma\left(\widetilde{V}_0+\kappa D\right)$, respectively.

Next, we introduce a potential need for liquidity on the part of the shareholders by modelling the market as a modification of Kyle (1985), where the liquidity traders are now shareholders. More precisely, we assume that each shareholder has an additional demand (or supply) of $\widetilde{u}_k \sim i.i.d.N(0,\sigma_u^2)$, independently distributed of all other random variables. Therefore, if $\widetilde{u}_k < (>)0$, they might need to sell (buy) some shares in the market. The market participants are the shareholders, the informed trader, and the market maker.

We assume that when markets are open for trading no market participant (with the exception of the informed trader) has information concerning the investment opportunity. All agents observe if a firm has paid dividends or not, but they do not know whether or not it had a lucky draw of the investment lottery (profitable opportunity is present or not). The informed trader is specialized in the stock of a particular company and has perfect information concerning its payoff. The market maker observes the total order flow and behaves in a competitive manner as if facing free entry by other market makers. Hence, the market for the stock is exactly as in a Kyle-type model with the liquidity traders "supplying" $\widetilde{u}=\sum_{k=1}^{K}\widetilde{u}_k$.

Dividends are announced before there is any trading in the market, but paid when payoffs realize and only to early shareholders. Dividends are paid to agents that hold shares at that point. Hence, informed traders do not receive dividends and shareholders receive

[22] We introduce κ if one needs to discuss the tax code changes. From a parsimonious point of view, the results would not change if $\kappa = 1$.

[23] We also show that the main intuition is maintained when shareholders are risk-averse. These results are available upon request.

dividends only on their preexisting γ shares.[24,25] This is merely a simplifying assumption without any real consequences for the model. If dividends were paid earlier, shareholders might be able to use them to cover part of their liquidity needs, $\widetilde{u}_k$. Although the main intuition would remain, the analysis would be less straightforward. Alternatively, we could redefine $\widetilde{u}_k$ to mean liquidity needs above and beyond any money they might have, so $\widetilde{u}_k$ would represent how many shares they have to buy (sell) in the market. An equivalent way to think about this is that the dividends are paid out in the first period but stay in a non-interest-bearing account.

Since shareholders trade against informed agents when hit by the liquidity shock, they face a market with adverse selection costs. These costs will be shown to be a function of the characteristics of the firm. In turn, it is the choice of the firm's type, payer or non-payer, that shapes these characteristics. Accordingly, we also demonstrate that, when deciding to pay dividends, the firm takes the liquidity needs of its shareholders into account.

We first proceed with the analysis of the market equilibrium, and then analyze the decision of the firm regarding its type. But before, we present the main ingredients of the model in Figure 1 below. In a simple time-line, we start when a firm with K shareholders makes the decision to be a dividend payer or not. Then, the investment opportunities are presented and the firm takes on an investment opportunity if it has the resources to do so. This stage is observed by the informed trader, but not the other market participants. Finally, the shareholders are hit by liquidity shocks and trading takes place. Given this description one can think about the dividend (payout) policy as a sort of commitment device. Once a payout is announced, the manager commits himself not to undertake risky investments. This, as we show below, reduces the potential adverse selection (and trading) costs of liquidity-strapped shareholders.

[24] If they buy shares ($u_k > 0$), these are not going to receive dividends, and even if they sell some of their γ shares ($u_k < 0$), the amount paid is in proportion to γ.

[25] If informed traders already owned shares, they would also receive dividends. This would not change the results. We would only need to consider their net demand, i.e., if they had x shares and in the current equilibrium they demand y shares, then their "modified" market order would be $y - x$. As long as x is known by the market maker, the equilibrium would be exactly as described here. If x was unknown and viewed as random by the market maker, this could be modeled as additional noise trading. Either way, the qualitative results follow as below.

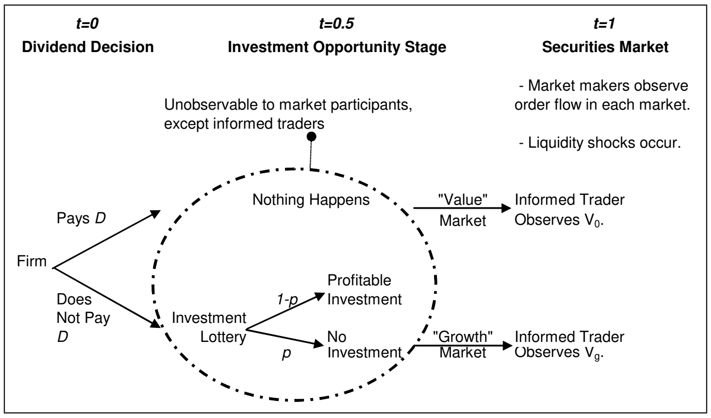

Figure 1: A Brief Description of the Model

0.1 Securities Market Equilibrium

Suppose the firm has decided not to pay dividends and retain earnings. So, the option to invest is still viable and the firm is now tagged as a non-payer. Using the notation laid out in the previous section, we derive the equilibrium in the non-payer market.[26] In the next section, we go back and look at the endogenous payout policy decision.

The non-payer's stock can be viewed as a risky asset paying $\widetilde{V}_g \sim N(\mu_I + \mu, \sigma_I^2 + \sigma^2)$. As mentioned above, we assume that an insider has knowledge of $\widetilde{V}_g$ before the rest of the market. The market maker observes $\widetilde{\beta}_g + \widetilde{u}$ where we let $\widetilde{\beta}_g$ denote the insider's demand for the growth stock. In what follows, we concentrate on linear equilibria. The insider's problem is then $\max_{\beta_g} \mathbb{E}\left[\beta_g\left(\widetilde{V}_g - P_g\right)|V_g\right]$, where he conjectures that $P_g = P_g\left(\beta_g + \widetilde{u}\right) = \mu_{P_g} + \lambda_g\left(\beta_g + \widetilde{u}\right)$. The market maker's problem is setting prices in a way that gives him zero expected profits, and he conjectures $\widetilde{\beta}_g = B_g + \alpha_g \widetilde{V}_g$. Therefore, in equilibrium two conditions must be satisfied:

1. *Profit Maximization*: $\mathbb{E}\left[\left(\widetilde{V}_g - P_g\left(\beta_g + \widetilde{u}\right)\right)\beta_g|V_g\right] \geq \mathbb{E}\left[\left(\widetilde{V}_g - P_g\left(\beta_g' + \widetilde{u}\right)\right)\beta_g'|V_g\right]$ for every β_g' and for any realization of the random variable in his information set.

2. *Semi-Strong Market Efficiency*: Prices are set by the market maker in a way that: $P_g\left(\widetilde{\beta}_g + \widetilde{u}\right) = \mathbb{E}\left[\widetilde{V}_g|\left(\widetilde{\beta}_g + \widetilde{u}\right)\right]$.

[26] As it will be clear soon, this part of the model is a slight modification of the market in Kyle (1985).

For a firm that pays dividends, the equilibrium conditions are qualitatively identical to the ones we have just explored, with the relevant notation being modified accordingly. We state the equilibrium for both payers and non-payers in the next proposition following the same lines as Proposition 1 in Kyle (1985).

Proposition 2 *A linear equilibrium of the market for the non-payer's stock has the following form*

$$P_g = \mu_{P_g} + \lambda_g \left(\widetilde{\beta}_g + \widetilde{u}\right); \qquad \widetilde{\beta}_g = B_g + \alpha_g \widetilde{V}_g,$$

where $\mu_{P_g} = \mu_I + \mu$, $\lambda_g = \frac{\sqrt{\sigma_I^2+\sigma^2}}{2\sigma_u\sqrt{K}}$, $B_g = -(\mu_I+\mu)\,\alpha_g$ *and* $\alpha_g = \frac{\sigma_u\sqrt{K}}{\sqrt{\sigma_I^2+\sigma^2}}$. *And, for the payer's stock we have*

$$P_v = \mu_{P_v} + \lambda_v \left(\widetilde{\beta}_v + \widetilde{u}\right); \qquad \widetilde{\beta}_v = B_v + \alpha_v \widetilde{V}_0,$$

where $\mu_{P_v} = \mu$; $\lambda_v = \frac{\sigma}{2\sigma_u\sqrt{K}}$; $B_v = -\mu\alpha_v$; $\alpha_v = \frac{\sigma_u\sqrt{K}}{\sigma}$.

The depth of the market for the non-payer's stock can therefore be seen to equal $\frac{1}{\lambda_g} = \frac{2\sigma_u\sqrt{K}}{\sqrt{\sigma_I^2+\sigma^2}}$. Hence, the more volatile the new investment opportunity, the lower is this stock's market depth. So, one can assert that, "a growth stock is as liquid as its growth opportunities are safe". We can also calculate the expected profit of the insider as $\pi_g = \frac{\sigma_u\sqrt{K}\sqrt{\sigma_I^2+\sigma^2}}{2}$. Since this is a zero-sum market, this is the aggregate loss to the shareholders of the growth firm. The depth of the market for the payer's stock is $\frac{1}{\lambda_v} = \frac{2\sigma_u\sqrt{K}}{\sigma}$. And, the aggregate losses of shareholders is given by $\pi_v = \frac{\sigma\sigma_u\sqrt{K}}{2}$. Now, we can compare the characteristics of each market/stock.

Proposition 3 (i) *Non-payers have more volatile stock prices than payers;*

(ii) *The market for non-payers is thinner (less liquid);*

(iii) *Adverse selection costs are higher in the market for non-payers' stocks.*

It should also be clear from the model that the investment opportunities of a company are the determinant of the degree of adverse selection. It is the growth opportunities of non-payers that leads to adverse selection. This observation coupled with Proposition 3 provides the theoretical underpinning of our first three conjectures. In the next section, we analyze the payout policy decision.

0.2 Dividend Payment Decision

Consider a firm that is managed by a manager, who cares about the well-being of the shareholders, as well as his own. His reward is a function of the company's final payoff. For simplicity, we assume that he owns m shares of the company. Differently than shareholders though, he is not hit by liquidity shocks.

We postulate that the manager attaches weight Ψ to the shareholders' per-capita well-being and complementary weight on his own well-being. This parameter characterizes the type of manager and in an economy with many firms can be thought to vary within the population of managers. When deciding on whether or not to pay dividends, he maximizes a weighted average of his expected utility and shareholders' per-capita expected utility (trading off generality for tractability, we assume that all agents are identical and risk-neutral). Furthermore, we make an assumption on the parameters of the problem to generate conflict between shareholders and managers. This implies that, in the current representative agent set-up, the shareholders as a group would be better off in a dividend-paying firm. However, as mentioned before, the decision whether to pay dividends or not is not under their control.[27]

Assumption 1: Let the parameters of the model satisfy

$$\frac{\sigma_u}{2\sqrt{K}}\left(\sqrt{\sigma_I^2+\sigma^2}-\sigma\right) > (\mu_I-\kappa D)\left(\frac{\sum_k \gamma_k}{K}\right). \tag{1}$$

The first expression on the left-hand side can be seen as the average liquidity risk.

[27] More importantly, in a slightly modified model we could have additional agents that prefer non-paying firms (for instance, agents with enough resources, without liquidity needs). Also, informed traders profit from trading on non-paying firms so, they would be willing to hold these firms. Therefore, types of firms would have positive demand. However, we do not model the choice of shareholders to hold payers or non-payers. We assume that some agents hold shares in a company and then this company, when it has enough retained earnings, must decide whether or not to pay dividends.

The second expression denotes the extra risk added by keeping the option to invest alive rather than paying dividends. On the right-hand side, we have the expected excess return from investment and average number of shares, respectively. In essence, Assumption 1 constraints the net gains, for shareholders, from having a stock with growth potential to be smaller than the net gains from holding a payer's stock and collecting dividend payments.

Given the previous discussion, we know that, if the firm becomes a payer, the aggregate payoff for its shareholders (excluding the manager) is $\sum_k \left[\gamma_k \left(\widetilde{V}_0 + \kappa D\right) + \widetilde{u}_k \left(\widetilde{V}_0 - P_v\right)\right]$, where the first term represents all their gains on pre-existing shares and the last term reflects aggregate adverse selection costs imposed on them by the fact that they face a market in which they trade against an informed trader. If we substitute for the functional form of the stock price and take unconditional expectations with respect to all random variables, we obtain the expected aggregate profits of shareholders of a dividend-paying firm

$$\Pi_v := \mathbb{E}\sum_k \left[\gamma_k \left(\widetilde{V}_0 + \kappa D\right) + \widetilde{u}_k \left(\widetilde{V}_0 - P_v\right)\right] = \sum_k \gamma_k \left(\mu + \kappa D\right) - \frac{\sigma \sigma_u \sqrt{K}}{2}.$$

One can follow exactly the same lines in order to obtain the expected aggregate profits for the shareholders if the manager decides to turn his company into a non-payer. This gives us

$$\Pi_g := \mathbb{E}\sum_k \left[\gamma_k \widetilde{V}_g + \widetilde{u}_k \left(\widetilde{V}_g - P_g\right)\right] = \sum_k \gamma_k \left(\mu + \mu_I\right) - \frac{\sqrt{\sigma_I^2 + \sigma^2}\sigma_u \sqrt{K}}{2}.$$

Finally, given the manager's objectives, he is only interested in two quantities, namely,

$$\Psi \frac{\Pi_v}{K} + (1-\Psi)\, m\left(\mu + \kappa D\right) \text{ and } \Psi \frac{\Pi_g}{K} + (1-\Psi)\, m\left(\mu + \mu_I\right).$$

The first expression is the weighted average of his and the shareholders' payoff of having the firm be a payer. The second expression is the counterpart for the case of a non-payer. We are now ready to provide the main results of this section.

Proposition 4 *A manager decides to pay dividends if and only if*

$$\Psi \frac{\sigma_u}{2\sqrt{K}} \left(\sqrt{\sigma_I^2 + \sigma^2} - \sigma \right) > (\mu_I - \kappa D) \left[m + \Psi \left(\frac{\sum_k \gamma_k}{K} - m \right) \right].$$

Notice that if $\Psi = 0$ the inequality in the proposition is violated, because $\mu_I > D > \kappa D$ by assumption. Therefore, a purely individualistic manager will never decide to pay dividends. On the other side of the spectrum, $\Psi = 1$, we have the opposite result. If a firm is managed by its own (potentially liquidity-constrained) shareholders, it always pays dividends. Furthermore, notice that the inequality can be rewritten as

$$\Psi \left[\frac{\sigma_u}{2\sqrt{K}} \left(\sqrt{\sigma_I^2 + \sigma^2} - \sigma \right) - (\mu_I - \kappa D) \left(\frac{\sum_k \gamma_k}{K} - m \right) \right] > (\mu_I - \kappa D)\, m.$$

Given (1), we know that the term inside the square brackets is positive. Hence, we can rewrite the inequality once more, as

$$\Psi > \frac{(\mu_I - \kappa D)\, m}{\frac{\sigma_u}{2\sqrt{K}} \left(\sqrt{\sigma_I^2 + \sigma^2} - \sigma \right) - (\mu_I - \kappa D) \left(\frac{\sum_k \gamma_k}{K} - m \right)} =: \Psi^*.$$

Then, we have the following corollary.

Corollary 1 *The decision to initiate dividends depends on how much weight the manager puts on the liquidity needs of the shareholders, i.e., the manager pays dividends if and only if* $\Psi > \Psi^* \in (0, 1)$.

To clarify the main intuition of the discussion so far, suppose that the average shareholder and the manager have identical stakes in the company, i.e., $\frac{\sum_k \gamma_k}{K} = m$. Under this specification, the condition for payment of dividends to be optimal simplifies to $\Psi > \frac{(\mu_I - \kappa D)m}{\frac{\sigma_u}{2\sqrt{K}}\left(\sqrt{\sigma_I^2+\sigma^2}-\sigma\right)} =: \Psi^{**} \in (0, 1)$. Notice that the denominator of Ψ^{**} is the per-capita amount saved by the shareholders due to a more liquid market for value stocks, and its numerator is proportional to their net gains from having a stock with growth potential. Hence, the higher the importance of having a liquid stock, the higher the denominator.

This lowers Ψ^{**} and it becomes more likely that the manager will pay dividends. On the other hand, as the investment opportunity becomes more profitable, the numerator increases decreasing the likelihood of the firm paying dividends.

So, the results above provide the final theoretical underpinning for our conjectures, more precisely, that liquidity matters for the decision to pay dividends and especially so if shareholders have more power (this summarizes conjectures 4 and 5).

Table 1. Summary Statistics

The table presents the descriptive statistics of the data set. Panel A shows the statistics for dividend payment behavior. *pay* is a dummy variable that takes on the value 1 if the firm has paid a dividend in a given year. Proportion of payers in the second row is calculated separately for each period in the sample, so on average 39.71% of firms pay dividends in a given year over the 41-year sample period. Panel B presents the statistics for the right-hand-side variables used in the regressions. AG is asset growth, $EperA$ is earnings per assets, $VperA$ is value per assets, $MCRank$ is size measured by the percent rank in market capitalization. Liquidity is measured by four alternative variables: the proportion of days in a month in which the company's stock does not experience a price change ($PropZeroRet$), the average daily spread over the month ($MeanSpread$), the average daily volume in logs over the month ($MeanVolume$), an illiquidity measure ($AmihudIlliq$) calculated as described in Amihud (2002). Panel C displays the corrrelation coefficients among these alternative liquidity measures.

Panel A. Dividend Payment Tendency

	NObs	Mean	StdDev
pay (=1 if payer)	148,403	0.3937	0.4886
Proportion of payers	41	0.3971	0.1711

Panel B. Main Variables in the Regressions

	Payers (P)			Non-Payers (NP)			All		
Variable	NObs	Mean	StdDev	NObs	Mean	StdDev	NObs	Mean	StdDev
AG	54,682	0.08	0.23	74,153	0.01	5.67	128,836	0.04	4.30
$EperA$	54,047	0.09	0.07	81,539	-0.04	0.34	135,586	0.01	0.27
$VperA$	56,657	1.40	0.97	83,860	2.19	3.04	140,517	1.87	2.46
$MCRank$	50,206	0.60	0.28	77,832	0.44	0.27	128,038	0.50	0.29
$PropZeroRet$	58,382	0.24	0.20	89,924	0.30	0.23	148,306	0.28	0.22
$MeanSpread$	58,260	0.03	0.04	88,807	0.09	0.13	147,067	0.07	0.10
$MeanVolume$	51,081	12.51	2.45	80,449	11.73	2.63	131,530	12.03	2.59
$AmihudIlliq$	51,080	1.78	17.66	80,437	14.18	108.22	131,517	9.37	85.56

Panel C. Correlation Between Liquidity Measures

$$\rho = \begin{bmatrix} 1 & - & - & - \\ \rho_{21} & 1 & - & - \\ \rho_{31} & \rho_{32} & 1 & - \\ \rho_{41} & \rho_{42} & \rho_{43} & 1 \end{bmatrix} = \begin{bmatrix} 1 & - & - & - \\ 0.1105 & 1 & - & - \\ -0.6747 & 0.0118 & 1 & - \\ 0.2711 & 0.1442 & -0.3413 & 1 \end{bmatrix},$$

where ρ_{ij} is the correlation between variable i and variable j ($1 = PropZeroRet$, $2 = MeanSpread$, $3 = MeanVolume$, $4 = AmihudIlliq$)

Table 2. Testing Liquidity Differences

The table presents a test of the conjecture that firms that pay dividends are more liquid than non-paying firms. Payers and non-payers are distinguished based on the *pay* variable that takes on the value 1 if the firm has paid a dividend in a given year and are matched based on their asset growth (AG) and size ($MCRank$, measured as the percent rank in market capitalization). We use four alternative measures of liquidity. First, as the primary measure, we use the proportion of days in a month in which the company's stock does not experience a price change ($PropZeroRet$). Second, we use the average daily spread ($MeanSpread$). Third, we use the average daily volume in logs ($MeanVolume$). Finally, we use an illiquidity measure ($AmihudIlliq$), calculated as described in Amihud (2002). The test using $PropZeroRet$ is a binomial test, while the others are conventional tests of the differences in the mean of two populations. The final column shows the 95 % confidence interval for the difference in liquidity (non-payers' liquidity minus payers' liquidity). The lower panel of the table shows the results of the testing the same conjecture after controlling for size, where the respective liquidity measure is regressed on size, $MCRank$, the dividend payment dummy, *pay*, and a constant. Hence, the intercept corresponds to the coefficient on the dummy plus the constant for payers, and just the constant for non-payers. The t-statistic reported in the last column is for the coefficient on the dividend payment dummy.

Panel A. Matched Pairs

	Payers (P)		Non-Payers (NP)		Test	
Variable	Mean	Std Dev	Mean	Std Dev	Result	Conf. Interval
$PropZeroRet$	0.243	0.197	0.304	0.233	NP less liq.	(0.056,0.066)
$MeanSpread$	0.034	0.037	0.088	0.126	NP less liq.	(0.053,0.055)
$MeanVolume$	12.511	2.453	11.729	2.634	NP less liq.	(-0.819,-0.744)
$AmihudIlliq$	1.779	17.658	14.182	108.22	NP less liq.	(11.159,13.646)

Panel B. Regression with Control for Size

	Payers (P)		Non-Payers (NP)		$MCRank$-Controlled "Test"	
Variable	Intercept	Std Dev	Intercept	Std Dev	Result	t-stat
$PropZeroRet$	0.3536	0.0023	0.4402	0.0019	NP less liq.	-17.91
$MeanSpread$	0.1256	0.0013	0.2574	0.0015	NP less liq.	-50.05
$MeanVolume$	8.3774	0.0120	8.1647	0.0202	NP less liq.	14.72
$AmihudIlliq$	7.6577	0.5776	42.9611	0.7232	NP less liq.	-8.55

Table 3. Testing Volatility Differences

The table tests the implication that payers are less volatile than non-payers using three variables: Earnings per assets ($EperA$), value per assets ($VperA$) and the firms' stock price. Payers and non-payers are distinguished based on the *pay* variable that takes on the value 1 if the firm has paid a dividend in a given year and are matched based on their asset growth (AG) and size ($MCRank$, measured as the percent rank in market capitalization). Panel A shows the results of a test comparing the variance across two sub-samples, payers versus non-payers, ignoring the time dimension so payers in any given year are assumed to share the same properties. Panel B, in contrast, compares the volatility of a typical payer to that of a typical non-payer through time, where "typical" refers to a company characterized by the average value of the variable of interest ($EperA$, $VperA$, or $Price$) at every point in time. For robustness, we repeat the tests with the median values and obtain similar results (results not reported for brevity). The number reported in the last column is the upper bound of a 99% confidence interval constructed for the ratio of standard deviation of relevant variable for payers over that for non-payers. The upper bound being below 1 indicates that payers are less volatile. Panel C summarizes the significance of the coefficient on *pay* in a regression where volatility over the sample period is regressed on the average values of pay dummy, size, asset growth, and an industry dummy.

Panel A. Total Dispersion

	Payers (P)	Non-Payers (NP)	Test	
Variable	Std Dev	Std Dev	Result	Boundary
$EperA$	0.064	0.335	P less volatile	0.192
$VperA$	0.966	3.042	P less volatile	0.318
$Price$	23.644	591.57	P less volatile	0.040

Panel B. Dispersion Across Time

	Payers (P)	Non-Payers (NP)	Test	
Variable	Std Dev	Std Dev	Result	Boundary
$EperA$	0.011	0.068	P less volatile	0.162
$VperA$	0.250	0.566	P less volatile	0.442
$Price$	7.308	8.249	P less volatile	0.886

Panel C. Regression

	Volatility regressed on *pay* and controls		
Variable	Coefficient	Std Dev	t-stat
$EperA$	-0.099	0.001	-89.92
$VperA$	-0.854	0.010	-84.92
$Price$	-7.948	2.043	-3.89

Table 4. Analyzing the Relationship between Investment and Adverse Selection

The table presents the results of panel data regressions where we use PIN, a measure of adverse selection defined as the probability that the opening trade is information-based and measured by the fraction of orders that arise from informed traders, as the dependent variable and asset growth (AG) as a proxy for investment and control for earnings per assets ($EperA$), value per assets ($VperA$), size (measured by $MCRank$ defined as percent rank in market capitalization), and measures of liquidity ($PropZeroRet$ and $AmihudIlliq$). We also use an alternative measure of investment (Inv) as defined in Rajan and Zingales (1998) instead of AG for robustness. We refer the reader to Easley, Hvidkjaer and O'Hara (2002) for detailed information on the construction of PIN from transactions data. PIN is available for the period between 1983 and 2001. The absolute value of robust t-statistics are in parentheses and * means significant at 10%; ** significant at 5%; *** significant at 1%.

Panel Data Regression Results: 1983-2001

	Dependent variable: PIN				
Specification	1	2	3	4	5
AG	0.015***	0.019***	0.015***		
	(7.75)	(10.38)	(7.84)		
$EperA$	0.015***	0.020***	0.017***	0.029***	0.026***
	(4.11)	(5.92)	(4.78)	(7.18)	(6.13)
$VperA$	-0.001**	0.001**	-0.001**	0.001	-0.001**
	(1.97)	(2.31)	(2.22)	(1.42)	(2.22)
$MCRank$	-0.144***	-0.103***	-0.142***	-0.100***	-0.139***
	(64.89)	(41.90)	(63.72)	(29.87)	(46.35)
$PropZeroRet$		0.146***		0.152***	
		(33.72)		(24.53)	
$AmihudIlliq$			0.021***		0.027***
			(4.04)		(3.66)
Inv				0.003***	0.002***
				(4.70)	(2.99)
Constant	0.297***	0.241***	0.293***	0.236***	0.287***
	(203.13)	(109.91)	(162.08)	(76.92)	(114.57)
Observations	27,857	27,857	27,857	13,654	13,654

Table 5. Analyzing the Relationship between Dividend Payment and Liquidity Fama-MacBeth Regressions

The table presents the results of logit regressions by year where we use the same set of variables as Fama and French (2001) with the exception that we add, one at a time, four alternative measures of liquidity. The dependent variable is *pay*, where a firm that paid dividends in a given year has a value of 1, a non-payer has a value of zero. *AG* is asset growth, *EperA* is earnings per assets, *VperA* is value per assets, *MCRank* is size measured by the percent rank in market capitalization. The four alternative liquidity measures are: the proportion of days in a month in which the company's stock does not experience a price change (*PropZeroRet*), the average daily spread over the month (*MeanSpread*), the average daily volume in logs over the month (*MeanVolume*), an illiquidity measure (*AmihudIlliq*) calculated as described in Amihud (2002). We present the means across years of the regression intercepts and slopes, and the absolute value of t-statistics for the means in parentheses. These statistics are defined as the mean of the coefficient divided by its standard error, that is, the time-series standard deviation of the regression coefficient divided by the square root of the number of years in the period, in line with Fama and MacBeth (1973). When calculating these averages, we use two different sample periods: the same as in FF (until 1998) and our whole sample. The first column, Specification 1, reproduces FF's results for ease of comparison. Specifications 2-5 display our results with *PropZeroRet*, *MeanSpread*, *MeanVolume*, *AmihudIlliq* as proxies for liquidity, respectively, for the same sample period, 1963-1998. Specifications 6-9 present our results for the extended sample period, 1963-2002. The t-statistics reported in the table are not adjusted. However, we recalculate these using Newey-West and Shanken corrections. The new t-statistics, although lower than the unadjusted counterparts, still indicate significance at virtually the same levels. We report the unadjusted statistics in order to be comparable to FF's results. * denotes significance at 10%; ** significance at 5%; *** significance at 1%. The R^2 presented is the average of the yearly regressions' R^2.

Fama-MacBeth Regression Results

	1963-1998					1963-2002			
	Dependent variable: *pay*								
Specification	1	2	3	4	5	6	7	8	9
AG	-0.97***	-0.88***	-0.79***	-0.76***	-0.88***	-0.88***	-0.79***	-0.77***	-0.88***
	(6.50)	(3.19)	(3.32)	(3.15)	(3.32)	(3.51)	(3.66)	(3.50)	(3.66)
EperA	10.47***	13.13***	9.38***	13.94***	13.49***	12.55***	8.56***	13.31***	12.87***
	(12.20)	(8.11)	(6.20)	(7.97)	(7.74)	(8.48)	(6.29)	(8.31)	(8.07)
VperA	-0.83***	-0.71***	-0.45***	-0.72***	-0.63***	-0.68***	-0.43***	-0.69***	-0.61***
	(16.93)	(13.49)	(12.87)	(14.60)	(14.23)	(13.70)	(12.72)	(14.94)	(14.58)
MCRank	5.03***	1.41***	2.38***	2.07***	1.77***	1.47***	2.37***	2.10***	1.79***
	(37.84)	(10.53)	(13.34)	(4.79)	(10.72)	(11.74)	(14.60)	(5.31)	(11.96)
PropZeroRet		-4.72***				-4.41***			
		(8.79)				(8.57)			
MeanSpread			-92.78***				-91.22***		
			(10.00)				(10.74)		
MeanVolume				0.70***				0.68***	
				(10.23)				(10.91)	
AmihudIlliq					-0.09***				-0.09***
					(5.91)				(6.09)
Constant	-0.48***	0.93***	2.03***	-6.32***	-0.28	0.68***	1.98***	-6.34***	-0.42**
	(4.17)	(3.70)	(8.25)	(12.94)	(1.48)	(2.67)	(8.78)	(14.25)	(2.27)
R^2	0.15	0.22	0.36	0.20	0.22	0.21	0.36	0.20	0.22
Observations	115,546	115,546	115,546	115,546	115,546	127,412	127,412	127,412	127,412

Table 6. Analyzing the Relationship between Dividend Payment and Liquidity Panel Data Results

The table presents the results of panel data logit regressions for Specifications 6-9 in Table 5. The dependent variable is *pay*, where a firm that paid dividends in a given year has a value of 1, a non-payer has a value of zero. AG is asset growth, $EperA$ is earnings per assets, $VperA$ is value per assets, $MCRank$ is size measured by the percent rank in market capitalization. The four alternative liquidity measures are: the proportion of days in a month in which the company's stock does not experience a price change ($PropZeroRet$), the average daily spread over the month ($MeanSpread$), the average daily volume in logs over the month ($MeanVolume$), an illiquidity measure ($AmihudIlliq$) calculated as described in Amihud (2002). The absolute value of robust t-statistics are in parentheses and * means significant at 10%; ** significant at 5%; *** significant at 1%.

Panel Data Regression Results: 1963-2002

	Dependent variable: *pay*			
Specification	1	2	3	4
AG	-0.18***	-0.31***	-0.15***	-0.19***
	(4.33)	(7.17)	(3.54)	(4.44)
$EperA$	7.64***	6.05***	7.67***	7.50***
	(39.31)	(30.84)	(39.45)	(39.39)
$VperA$	-0.57***	-0.50***	-0.53***	-0.54***
	(29.46)	(26.36)	(26.77)	(28.33)
$MCRank$	2.62***	2.48***	3.46***	2.97***
	(21.49)	(32.66)	(23.72)	(28.30)
$PropZeroRet$	-2.15***			
	(16.24)			
$MeanSpread$		-42.68***		
		(46.93)		
$MeanVolume$			-0.03*	
			(1.66)	
$AmihudIlliq$				-0.02***
				(13.96)
Constant	-2.41***	-1.11***	-3.17***	-3.10***
	(22.46)	(18.21)	(21.29)	(41.48)
Observations	127,412	127,412	127,412	127,412

Table 7. Adding Shareholder Power
Fama-MacBeth Regressions

The table presents the results of logit regressions by year where we use the same set of variables as Fama and French (2001) with the exception that we add, one at a time, four alternative measures that proxy for the fact that shareholder power is of importance for the decision to pay dividends. The dependent variable is *pay*, where a firm that paid dividends in a given year has a value of 1, a non-payer has a value of zero. AG is asset growth, $EperA$ is earnings per assets, $VperA$ is value per assets, $MCRank$ is size measured by the percent rank in market capitalization. The four alternative liquidity measures are: the proportion of days in a month in which the company's stock does not experience a price change ($PropZeroRet$), the average daily spread over the month ($MeanSpread$), the average daily volume in logs over the month ($MeanVolume$), an illiquidity measure ($AmihudIlliq$) calculated as described in Amihud (2002). The proxy for the impact of shareholder power in relation with liquidity is $LiqGovP$ ($LiqGovS$, $LiqGovV$, $LiqGovA$), an interaction variable constructed as $PropZeroRet \times DemDummy$ ($MeanSpread \times DemDummy$, $MeanVolume \times DemDummy$, $AmihudIlliq \times DemDummy$), where $DemDummy$ is 1 if corporate governance index, $GIndex$, is smaller than or equal to 5 and 0 otherwise. The governance index is a variable adapted from Gompers, Ishii and Metrick (2003). It is constructed using the incidence of 24 governance rules to proxy for the level of shareholder rights. The firms with strongest rights are called "democracy" firms. These democracy firms are the ones that have $DemDummy = 1$. The data for the governance index start in 1991, hence we have to limit the sample. We use two sub-samples: 1993-1998 (to compare with FF's results) and 1991-2002. We present the means across years of the regression intercepts and slopes, and the absolute value of t-statistics for the means in parentheses. These statistics are defined as the mean of the coefficient divided by its standard error, that is, the time-series standard deviation of the regression coefficient divided by the square root of the number of years in the period, in line with Fama and MacBeth (1973). The first column, Specification 1, reproduces FF's results for ease of comparison. Specifications 2-5 display our results with $PropZeroRet$, $MeanSpread$, $MeanVolume$, $AmihudIlliq$ as proxies for liquidity, respectively, for the same sample period, 1993-1998. Specifications 6-9 present our results for the extended sample period, 1991-2002. The t-statistics reported in the table are not adjusted. However, we recalculate these using Newey-West and Shanken corrections. The new t-statistics, although lower than the unadjusted counterparts, still indicate significance at virtually the same levels. We report the unadjusted statistics in order to be comparable to FF's results. * denotes significance at 10%; ** significance at 5%; *** significance at 1%. The R^2 presented is the average of the yearly regressions' R^2.

Fama-MacBeth Regression Results

	1993-1998					**1991-2002**			
	Dependent variable: *pay*								
Specification	1	2	3	4	5	6	7	8	9
AG	-1.75***	-0.58*	-0.57*	-0.31	-0.59*	-0.69***	-0.68***	-0.53***	-0.69***
	(9.95)	(1.89)	(1.91)	(1.34)	(1.87)	(3.82)	(3.78)	(3.04)	(3.79)
$EperA$	7.09***	5.71***	5.61***	5.48***	5.76***	6.37***	6.38***	5.71***	6.37***
	(21.78)	(10.46)	(10.51)	(6.85)	(10.58)	(10.12)	(10.02)	(12.75)	(10.20)
$VperA$	-0.65***	-0.16***	-0.15***	-0.16**	-0.17***	-0.16***	-0.15***	-0.19***	-0.17***
	(14.31)	(3.93)	(3.79)	(2.41)	(3.86)	(4.83)	(4.41)	(6.13)	(4.91)
$MCRank$	4.51***	1.90***	1.83***	1.67***	2.02***	1.77***	1.71***	1.40***	1.88***
	(34.25)	(9.71)	(11.20)	(7.35)	(11.48)	(10.53)	(11.02)	(10.13)	(11.05)
$LiqGovP$		0.10				-0.44			
		(0.09)				(0.61)			
$LiqGovS$			-20.86***				-24.03***		
			(5.04)				(8.39)		
$LiqGovV$				0.01				0.02**	
				(0.34)				(2.15)	
$LiqGovA$					-2.25**				-1.27**
					(2.12)				(2.02)
Constant	-1.33***	-0.45***	-0.35***	-0.35***	-0.54***	-0.41**	-0.32***	-0.22***	-0.49***
	(17.59)	(5.01)	(5.20)	(3.43)	(8.29)	(5.04)	(4.32)	(3.36)	(6.28)
R^2	0.11	0.06	0.06	0.05	0.06	0.06	0.07	0.05	0.06
Observations	11,014	11,014	11,014	11,014	11,014	31,475	31,475	31,475	31,475

Table 8. Adding Shareholder Power
Panel Data Results

The table presents the results of panel data logit regressions for Specifications 6-9 in Table 5. The dependent variable is *pay*, where a firm that paid dividends in a given year has a value of 1, a non-payer has a value of zero. AG is asset growth, $EperA$ is earnings per assets, $VperA$ is value per assets, $MCRank$ is size measured by the percent rank in market capitalization. The four alternative liquidity measures are: the proportion of days in a month in which the company's stock does not experience a price change ($PropZeroRet$), the average daily spread over the month ($MeanSpread$), the average daily volume in logs over the month ($MeanVolume$), an illiquidity measure ($AmihudIlliq$) calculated as described in Amihud (2002). The proxy for the impact of shareholder power in relation with liquidity is $LiqGovP$ ($LiqGovS$, $LiqGovV$, $LiqGovA$), an interaction variable constructed as $PropZeroRet \times DemDummy$ ($MeanSpread \times DemDummy$, $MeanVolume \times DemDummy$, $AmihudIlliq \times DemDummy$), where $DemDummy$ is 1 if corporate governance index, $GIndex$, is smaller than or equal to 5 and 0 otherwise. The governance index is a variable adapted from Gompers, Ishii and Metrick (2003). It is constructed using the incidence of 24 governance rules to proxy for the level of shareholder rights. The firms with strongest rights are called "democracy" firms. These democracy firms are the ones that have $DemDummy = 1$. The data for the governance index start in 1991, hence we have to limit the sample. The absolute value of robust t-statistics are in parentheses and * means significant at 10%; ** significant at 5%; *** significant at 1%.

Panel Data Regression Results: 1991-2002

	Dependent variable: *pay*			
Specification	1	2	3	4
AG	-0.32*	-0.23	-0.31*	-0.32**
	(1.95)	(1.23)	(1.87)	(1.98)
$EperA$	3.13***	4.11***	3.26***	3.23***
	(3.66)	(4.60)	(3.70)	(3.73)
$VperA$	-0.10	0.14**	-0.07	-0.10
	(1.28)	(2.01)	(0.78)	(1.24)
$MCRank$	5.35***	4.99***	5.23***	5.11***
	(10.41)	(8.70)	(10.63)	(10.53)
$LiqGovP$	-1.05			
	(0.66)			
$LiqGovS$		-35.40***		
		(5.51)		
$LiqGovV$			0.03	
			(1.28)	
$LiqGovA$				-0.18
				(1.56)
Constant	-3.42***	-2.87***	-3.27***	-3.19***
	(7.89)	(6.10)	(7.95)	(7.99)
Observations	38,475	38,475	38,475	38,475

Table 9. Adding Intensity of Informed Trading

The table presents the results of logit regressions with the same independent variables as in FF and the measures of liquidity, however, we add a new variable, PIN, to control for the degree of informed trading. PIN is a measure of adverse selection defined as the probability that the opening trade is information-based and measured by the fraction of orders that arise from informed traders. We refer the reader to Easley, Hvidkjaer and O'Hara (2002) for detailed information on the construction of PIN from transactions data. PIN is available for the period between 1983 and 2001. The dependent variable is pay, where a firm that paid dividends in a given year has a value of 1, a non-payer has a value of zero. AG is asset growth, $EperA$ is earnings per assets, $VperA$ is value per assets, $MCRank$ is size measured by the percent rank in market capitalization. The two alternative liquidity measures are: the proportion of days in a month in which the company's stock does not experience a price change ($PropZeroRet$) and the average daily spread over the month ($MeanSpread$). We also introdue proxies for the impact of shareholder power in relation with liquidity: $LiqGovP$ and $LiqGovS$, interaction variables constructed as $PropZeroRet \times DemDummy$ and $MeanSpread \times DemDummy$, respectively, where $DemDummy$ is 1 if corporate governance index, $GIndex$, is smaller than or equal to 5 and 0 otherwise. The governance index is a variable adapted from Gompers, Ishii and Metrick (2003). It is constructed using the incidence of 24 governance rules to proxy for the level of shareholder rights. The firms with strongest rights are called "democracy" firms. These democracy firms are the ones that have $DemDummy = 1$. The data for the governance index start in 1991, hence we have to limit the sample further when we use these interaction variables. Panel A displays the results from Fama-MacBeth regressions, where the means across years of the regression intercepts and slopes and the absolute value of t-statistics for the means (in parentheses) are summarized. These statistics are defined as the mean of the coefficient divided by its standard error, that is, the time-series standard deviation of the regression coefficient divided by the square root of the number of years in the period, in line with Fama and MacBeth (1973). Specifications 1-3 run from 1983 to 2001, and specifications 4-5 run from 1991 to 2001. To enhance comparability to FF's results, regressions over the period 1993-1998 are shown in specifications 6-10. The t-statistics reported in the table are not adjusted. However, we recalculate these using Newey-West and Shanken corrections. The new t-statistics, although lower than the unadjusted counterparts, still indicate significance at virtually the same levels. We report the unadjusted statistics in order to be comparable to FF's results. Panel B presents the results of panel data logit regressions for the same specifications as in Panel A. The absolute value of robust t-statistics are in parentheses. * denotes significance at 10%; ** significance at 5%; *** significance at 1%.

Panel A. Fama-MacBeth Regression Results

	Dependent variable: *pay*									
		1983-2001		**1991-2001**				**1993-1998**		
Specification	1	2	3	4	5	6	7	8	9	10
AG	-0.81***	-1.03***	-0.85***	-0.57***	-0.55***	-1.16***	-1.35***	-1.08***	-0.42	-0.40*
	(7.07)	(7.82)	(8.94)	(3.29)	(3.25)	(8.14)	(8.35)	(7.02)	(1.64)	(1.65)
$EperA$	6.68***	5.76***	3.91***	6.34***	6.36***	6.09***	5.60***	3.52***	5.59***	5.48***
	(22.26)	(19.53)	(11.51)	(9.64)	(9.52)	(23.46)	(19.29)	(10.45)	(10.59)	(10.58)
$VperA$	-0.29***	-0.35***	-0.09**	-0.15***	-0.13***	-0.31***	-0.35***	-0.10***	-0.16***	-0.15***
	(7.44)	(7.90)	(2.27)	(4.33)	(3.84)	(5.32)	(5.31)	(3.46)	(3.45)	(3.25)
$MCRank$	2.72***	0.68***	2.75***	0.44	0.40	2.04***	0.54**	2.10***	0.71***	0.66***
	(11.22)	(4.07)	(12.19)	(1.33)	(1.28)	(10.47)	(2.09)	(15.20)	(2.76)	(2.67)
PIN	-1.06	-1.36**	-0.38	-8.21***	-7.92***	-3.40***	-3.48***	-1.78***	-8.29***	-8.12***
	(1.40)	(2.11)	(0.55)	(9.05)	(9.39)	(5.82)	(5.98)	(4.62)	(14.87)	(16.08)
$PropZeroRet$		-6.97***					-5.62***			
		(15.76)					(8.72)			
$MeanSpread$			-19.15***					-19.53***		
			(19.25)					(16.11)		
$LiqGovP$				0.30					0.45	
				(0.36)					(0.39)	
$LiqGovS$					-4.10***					-3.39***
					(5.65)					(3.06)
Constant	-1.08***	1.80***	1.47***	1.84***	1.87***	-0.19	1.85***	1.93***	1.80***	1.85***
	(4.25)	(10.80)	(5.88)	(6.83)	(7.32)	(1.12)	(8.67)	(16.33)	(12.21)	(12.01)
Observations	27,857	27,857	27,857	10,009	10,009	6,794	6,794	6,794	6,794	6,794

Panel B. Panel Data Regression Results

	Dependent variable: *pay*									
	1983-2001			**1991-2001**		**1993-1998**				
Specification	1	2	3	4	5	6	7	8	9	10
AG	-0.28***	-0.28	-0.75**	-0.31*	-0.37***	-0.80***	-0.81***	-1.37***	-0.28	-0.66**
	(2.96)	(1.64)	(2.26)	(1.94)	(2.73)	(2.68)	(2.88)	(4.85)	(0.65)	(2.22)
$EperA$	4.05***	3.47***	2.78***	3.13***	3.04***	4.07***	4.05***	3.08***	3.12**	3.71***
	(11.04)	(4.00)	(7.81)	(3.65)	(3.48)	(5.16)	(4.98)	(4.51)	(2.51)	(2.80)
$VperA$	-0.36***	-0.07	-0.33**	-0.10	-0.03	-0.39***	-0.40***	-0.37***	-0.13	-0.14
	(9.37)	(0.81)	(3.46)	(1.25)	(0.26)	(4.08)	(3.67)	(4.02)	(0.81)	(0.82)
$MCRank$	6.89***	5.06***	8.05***	5.50***	7.56***	6.85***	5.65***	5.32***	4.31***	2.62***
	(33.93)	(9.65)	(13.76)	(10.42)	(11.01)	(14.92)	(9.12)	(10.02)	(5.13)	(2.60)
PIN	-0.03	0.99	-7.18***	1.58	-0.50	-2.73**	-2.12*	-2.37*	-2.14	-1.32
	(0.07)	(0.71)	(4.60)	(1.14)	(0.32)	(2.24)	(1.91)	(1.77)	(0.91)	(0.89)
$PropZeroRet$		-1.58***					-2.98***			
		(4.42)					(3.01)			
$MeanSpread$			-128.19***					-119.34***		
			(18.06)					(15.44)		
$LiqGovP$				1.01					2.03	
				(0.60)					(1.58)	
$LiqGovS$					-58.89***					-53.91**
					(6.25)					(2.09)
Constant	-3.75***	-3.39***	2.51***	-3.77***	-2.43***	-4.11***	-2.84***	-1.03***	-1.36	-0.43
	(19.96)	(6.29)	(4.36)	(7.14)	(4.65)	(8.98)	(4.46)	(3.65)	(1.57)	(0.65)
Observations	27,857	27,857	27,857	10,009	10,009	6,794	6,794	6,794	6,794	6,794

Table 10. Expected Versus Realized Proportion of Payers
An Out-of-Sample Analysis

The table presents the results of a prediction exercise. We first use all firms in our sample for each year of the 1963-77 base period to estimate logit regressions that explain whether a firm pays dividends based on the baseline specification with two alternative liquidity measures, *MeanSpread* and *PropZeroRet*, and obtain two different sets of coefficients. We then calculate the expected percent of payers in year t by applying the average logit coefficients for the 1963-77 base period to the explanatory variables for each firm at year t, summing over firms, dividing by the number of firms and multiplying by 100. Finally, we compute the error as predicted minus the observed percentage of payers. ERR_P ($\_S$) is the sum of squared errors based on the regressions using *PropZeroRet* (*MeanSpread*) as the liquidity measure and ERR_FF is the error reported by FF. We present the results for two sub-samples (78-98 and 82-98) to highlight the fact that our model performs much better in the 82-98 period. We also include the minimum improvement we achieve over FF (their error minus our highest error). We do not report the results using the whole sample (until 2002) to keep the results comparable to those of FF, but these are available upon request.

Period	ERR_P	ERR_S	ERR_FF	**Minimum Improvement**
1978-98	4868.73	5406.70	5656.42	249.72
1982-98	2884.57	3016.15	5592.46	2576.31