

# To pay or not to pay? The dividend dilemma of the liquid firm<sup>\*</sup>

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First Draft: November 2002  
Current Draft: September 2003

*JEL classification:* G35, G33

*Keywords:* Dividends; Payout policy; Liquidity; Trading friction

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We thank seminar participants at Tulane University and the 2003 European Financial Management Association Meetings in Helsinki, Finland, and David Blackwell, Valentin Dimitrov, John Graham, David Lesmond, Tom Noe, Nagpurnanand Prabhala and Venkat Subramaniam for helpful discussions and comments. The usual disclaimer applies.

# To pay or not to pay? The dividend dilemma of the liquid firm

## **Abstract**

We provide evidence that, as suggested by Miller and Modigliani (1961), a link exists between firm dividend policy and stock market liquidity. In the cross-section, owners of common stock with a less liquid market are more likely to receive dividend than owners of common stock with a more liquid market. These results persist across different time periods and across different liquidity measures. For the past quarter of a century the US stock market has experienced a notable decline in trading friction and a parallel increase in trading activity, both of which are associated with improved stock market liquidity. Using average cross-sectional estimates from 1963-1977 we are able to explain most of the declining “propensity” of firms to pay dividend established by Fama and French (2001).

## 1. Introduction

In their seminal work Miller and Modigliani (1961) formally develop the dividend irrelevance hypothesis. In perfect capital markets populated by rational investors, firm value is solely a function of the investment opportunities of the firm and should be independent of firm payout policy. Therefore, any payout policy would be optimal for the firm.

A large body of theoretical work has tried to evaluate the importance that managers and investors attach to firm dividend policy in light of the irrelevance proposition. The starting point of these studies is to violate some of the assumptions that characterize the perfect capital markets hypothesized by Miller and Modigliani.<sup>1</sup>

One notable assumption of the dividend irrelevance hypothesis, and one central to this paper, is that trading is frictionless. Investors can instantaneously invest or liquidate their investment in any stock without incurring any direct or indirect costs of trading and without changing the price of the underlying security. In markets without contemporaneous or future trading friction, rational investors with current or anticipated future liquidity needs can create (or rationally expect to create) homemade dividends by

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<sup>1</sup> For example, if investors are subject to taxes, differing tax rates for dividends versus capital gains could give rise to distinct dividend preferences among investors and possibly to differential tax clienteles (Elton and Gruber, 1970; Allen, Bernardo, and Welch, 2000). If, on the other hand, managers are better informed than investors about the prospects of the firm, they may find it optimal to signal favorable information about future earnings or risk through dividend payments (Bhattacharya, 1979; Miller and Rock, 1985; John and Williams, 1985; Allen, Bernardo, and Welch, 2000). A third line of research has focused on the agency problems described by Jensen and Meckling (1976). If contracting is incomplete then agency problems may lead managers to invest free cash in negative NPV projects for their own benefit. Dividend distributions minimize such value-destroying activities while imposing discipline on the management, possibly through monitoring (Grossman and Hart, 1982; Rozeff, 1982; Easterbrook, 1984; Shleifer and Vishny, 1986; Allen, Bernardo, and Welch, 2000). Shefrin and Statman (1984) argue that issues of self control, prospect theory, and regret aversion result in investor preference for cash dividends as opposed to capital gains. Finally, Baker and Wurgler (2002) develop a theory in which firm managers cater to the preferences of investors so that they pay dividend when dividend payers trade at a premium and do not pay dividend when dividend payers trade at a discount. See also Allen and Michaely (2001).

selling an appropriate amount of their holdings in the firm.<sup>2</sup> As a result, they will be indifferent between receiving a dollar of dividend and selling a dollar's worth of their investment. In markets with positive trading friction, however, investors with current or anticipated future liquidity needs may have a preference for dividend paying stocks. Additionally, to avoid potential uncertainty in future liquidity levels, risk-averse investors may prefer a predetermined dividend stream to a homemade dividend with uncertain cost attached to it.<sup>3</sup>

The liquidity of the firm's common stock also has several indirect implications for firm dividend policy. First, if there is no friction in trading shares, investors could use dynamic trading strategies and avoid excess taxation of dividends, thus leading to the dividend irrelevance hypothesis advanced by Miller and Modigliani.<sup>4</sup> Second, in markets characterized by low levels of liquidity, investors may have a stronger incentive to "vote by proxy" and demand dividends to reduce free cash in the hands of managers. In contrast, in liquid markets, investors may find it beneficial to "vote with their feet" rather than engage in costly negotiation with management. Third, if trading is costly, then investors with monitoring abilities may be less willing to incur the costs to become shareholders of the firm. In those cases, firm management may choose to

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<sup>2</sup> Reasons that can lead to investor's need for liquidation include portfolio rebalancing and consumption.

<sup>3</sup> The means through which investors align the actions of firm management with their demand could be either through enforcement, as suggested by La Porta, Lopez-de-Silanes, Shleifer, and Vishny (2000) or through the market valuations they attach to different payout policies, as argued by Baker and Wurgler (2002). Existing empirical evidence suggests that stock market liquidity does affect the valuation of stocks in the cross-section (see, for example, Amihud and Mendelson, 1986; Brennan and Subrahmanyam, 1996; and Brennan, Chordia, and Subrahmanyam, 1998) and through time (see, for example, Amihud, 2002; and Jones, 2002).

<sup>4</sup> As noted by Karpoff and Walkling (1990), dealers incur equal taxation on dividends and capital gains. Also, some financial institutions as pension funds and endowments pay no taxes on dividends and capital gains.

distribute dividends and at the same time access the markets for external financing more often so that outside lenders can monitor the firm (see Holmstrom and Tirole, 1993; Kahn and Winton, 1998; Maug, 1998). If, on the other hand, dividends are the means of attracting monitoring investors in the firm (e.g., Allen, Bernardo, and Welch, 2000) then low liquidity levels may induce firms to pay more dividends in order to successfully induce monitoring investors to overcome the trading friction of the market and buy the shares of the firm.

While a rigorous link between stock market liquidity and the dividend policy of the firm dates at least back to Miller and Modigliani (1961), current literature provides no conclusive empirical evidence on that issue.<sup>5</sup> As a result, the question of whether stock market liquidity is related to firm dividend policy remains largely an empirical one and its detailed investigation is the focus of the current study.

We perform our analysis while controlling for firm size, profitability, and growth opportunities. The use of these variables is consistent with the role of dividends in controlling the agency costs of free cash flow (Easterbrook, 1984; Jensen, 1986) and with a pecking-order model where firms avoid issuing securities due to asymmetric

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<sup>5</sup> Some indirect evidence is consistent with our main hypothesis. Ang, Blackwell, and Megginson (1991), for example, examine the dividend policies of twelve British investment trusts with two classes of shares outstanding. Both classes received dividends of equal value but one class received cash dividends while the other stock dividends. For their final period of 1975-1982 cash dividends and stock dividends were taxed at equal rates. Cash dividend shares were selling at large statistically significant premium and there was a virtually complete conversion of stock dividend shares into cash dividend shares. The presence of trading friction is the major suspect for this conversion. See also Karpoff and Walkling (1988, 1990), Michaely and Vila (1996), Koski and Michaely (2000), and Graham, Michaely, and Roberts (2003).

information costs (Myers and Majluf, 1984; Myers 1984) and other flotation costs.<sup>6</sup> We term these variables “firm characteristics” for the remainder of the paper.

We also control for the potential impact of dividend taxation relative to the taxation of capital gains, the repurchase policies of firms, the use of executive stock options, the use of convertible securities, and the debt level of firms. The relative taxation of dividends versus capital gains may influence the firm’s decision to pay dividend (see Miller and Modigliani, 1961). Share repurchase programs, on the other hand, consume cash in the hands of the firm. Hence, the implementation of such programs can affect other payout avenues, like cash dividends (e.g., Grullon and Michaely, 2002).

Additionally, share repurchases increase market activity so that, *ceteris paribus*, firms repurchasing shares in lieu of paying a dividend, will have more active stock markets.<sup>7</sup> To give credit to the current study, we should note that the attractiveness of open market share repurchases may itself depend on the liquidity of the market. Equity based compensation, such as stock options, may control agency problems between shareholders and managers (Jensen and Murphy, 1990; Lewellen, Loderer, and Martin, 1987; Mehran, 1995; Yermack, 1995) and may act as a substitute for dividends in that aspect. Also, cash dividends reduce the value of stock options (Merton, 1973). Since executive stock options are usually not dividend protected, their existence may give managers the incentive to reduce dividend payments (Lambert, Larcker, and Larcker,

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<sup>6</sup> See Fama and French (2001).

<sup>7</sup> Particularly, this is the case if firms undertake open market share repurchases. Jagannathan, Stephens, and Weisbach (2000) document that open market share repurchases constitute approximately 52% in 1985 and approximately 95% in 1995 of total share repurchases.

1989). Mehta (1976) argues that the dividend policy of firms is sensitive to whether there are convertible securities outstanding in the capital structure of the firm. Also, the use of convertible securities may also be a proxy for the growth opportunities of the firm. Mayers (1998) develops a framework, in which firms with high growth opportunities issue convertible bonds to lower the issuance costs of sequential financing. If firms with high growth opportunities have higher asymmetry in information, then Stein (1992) predicts that high growth firms are likely to issue convertible securities (in lieu of equity) in order to reduce current financing costs. As a result of the arguments above, we control for the use of convertible securities. Finally, the role of debt in resolving agency problems between firm managers and shareholders (Jensen, 1986) may be a substitute for the similar role of dividends. At the same time pecking-order models would suggest that firms with higher debt levels will be more reluctant to pay dividend due to the higher possibility of financial shortfall and costly security issues. Thus, we also control for the debt level of the firm.

The main results of the paper can be summarized as follows. First, we analyze the cross-sectional relation between a firm's stock market liquidity and its likelihood to pay dividend. We document that firms with less liquid markets (characterized by low trading activity, high proportionate bid-ask spreads, high bid-ask spread relative to depth, high proportion of zero trading days, and high price impact of order-flow) are more likely to pay dividend.

Second, we discuss the qualitative changes of the US stock markets and relate them to the declining proportion of dividend paying firms over time. The past four decades

have seen declining commission rates, declining bid-ask spreads, and a ten-fold increase in market activity. When we apply our 1963-1978 estimates to predict the proportion of dividend payers in more recent years, we document that higher market liquidity explains most of the lower “propensity” of firms to pay dividend documented by Fama and French (2001). The predictive accuracy of a model that includes a proxy for stock market liquidity is more pronounced for firms that are more likely to pay dividend based on their size, profitability, and growth opportunities and for firms with more liquid stock market. These results remain unchanged after we control for the additional potential aspects of firm dividend policy discussed above.

The rest of the paper we organize as follows. Section 2 describes the data, variable and the methodology of this study. Section 3 provides our cross-sectional results. Section 4 examines the changes in the qualities of security markets for the period of 1963-2001 and relates them to the changes in firm dividend policy. Section 5 reports the results from the robustness tests and Section 6 concludes.

## **2. Sample, variables, and methodology**

### *2.1. Sample*

We gather data from the Compustat annual files, the Center for Research in Security Prices (CRSP) monthly and daily files, the Trade and Quote (TAQ) database, and the CDA/Spectrum database of Thomson Financial. Compustat data availability limits our study period to 1963-2001. We exclude firms with Compustat Standard Industrial Classification codes (DNUM) between 6000-6999 (financials) and between

4900-4949 (utilities). We restrict our main sample to all firms with publicly traded common stock with CRSP share codes of 10 or 11 for which we can obtain the earnings-to-assets ratio, the market capitalization, the market-to-book ratio, the growth in assets from the previous year, and share turnover. Data requirements on additional variables used in some of the tests dictate the actual sample sizes of these tests.

## 2.2. Variables

In this section we outline the variables that we use in our empirical tests. The precise computation of these variables is presented in Table 1.

A firm is defined as a dividend payer in year  $t$  whenever Compustat reports positive dividend per share for the fiscal year ending in calendar year  $t$ .<sup>8</sup>

The first set of variables that we use to explain the dividend decision of firms is based on the size, profitability, and growth opportunities of the firm. We construct these variables as in Fama and French (2001). For a given year  $t$  and for every firm  $i$  the measure of firm size is equal to the percentage of NYSE firms with market capitalization lower than the market capitalization of firm  $i$ . The firm's market capitalization for year  $t$  is equal to the product of its share price and number of shares outstanding for June of year  $t$  as reported in the CRSP monthly files. This measure of firm size is constructed under the assumption that the NYSE market capitalization percentiles have the same implications for the dividend policy of the firm throughout

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<sup>8</sup> Our results do not change if we use CRSP data to identify dividend-paying firms by comparing returns including distributions to returns excluding distributions, as in Fama and French (2001).

the examined period. The profitability and growth opportunities proxies are calculated using Compustat data for the fiscal year ending in calendar year  $t$ . Firm profitability for year  $t$  we measure as earnings divided by assets for that year ( $E_t/A_t$ ). To proxy for growth opportunities we use the value-to-assets ratio of the firm for year  $t$  ( $V_t/A_t$ ) and the proportionate change in assets for year  $t$  ( $dA_t/A_t$ ).

The second set of variables that we use to explain the dividend decision of firms is aimed at capturing the market liquidity of the firm's common stock. In our cross-sectional analysis we use several proxies of stock market liquidity. Three of the measures are directly related to the trading activity in a firm's common stock, one measure is a proxy for the firm's proportionate bid-ask spread, one measure is the ratio of the proportionate bid-ask spread to dollar depth, and one is related to the price impact of trades.<sup>9</sup>

The trading activity in the stock of the firm has both theoretical as well as empirical appeal as a measure of liquidity. Constantinides (1986) shows that larger fixed transaction costs broaden the region of no transaction while Amihud and Mendelson (1986) develop a model where assets with higher bid-ask spreads have longer holding periods, thus lower trading activity. Additionally, Stoll (1978) and Stoll (2000) argue that a measure of trading activity plays an important role in explaining the cross-sectional variation in bid-ask spreads both in historic and current data. Stock market

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<sup>9</sup> One may argue that firms that pay dividend reduce the trading incentives of their investors so that there will be an artificial link between firm dividend policy and trading activity. Such an effect, however, will be bounded by the dividend yield of the firm, which in 1998 is on average around 1.5% (Allen and Michaely, 2001). The difference in annual share turnover between non-payers and payers in the same year is equal to 70 percentage points (150% minus 80%). Clearly, even the upper bound of the bias, the dividend yield, should be negligible for the purpose of this study.

trading activity also has implications for the execution risk of an investor where firms with higher trading activity have lower execution risk, all else equal. Our first measure of trading activity is the annual share turnover -- the ratio of number of shares traded to number of shares outstanding for calendar year  $t$  from Compustat ( $TURN_t$ ).<sup>10</sup> Share turnover is used in other research as a proxy for the liquidity of a firm's common stock.<sup>11</sup> Because of its theoretical and empirical appeal, we use share turnover to proxy for liquidity when we analyze the relation between liquidity and dividend payers over time. In these tests we assume that share turnover has relatively constant implications for the dividend policy of firms over time. We construct two additional proxies for the trading activity in a stock using the annual traded dollar volume in the stock ( $DVOL_t$ )<sup>12</sup> and the proportion of days with zero traded volume as a negative measure of trading activity ( $NOTRD_t$ ).<sup>13</sup>

We also employ the proportionate quoted bid-ask spread for June of year  $t$  as another measure of trading friction ( $PS_t$ ).<sup>14</sup> Additionally, we divide proportionate spread by dollar depth to construct a combined measure of liquidity ( $PS_t/D_t$ ) as in Chordia, Shivakumar, and Subrahmanyam (2003).<sup>15</sup> Bid-ask spread and depth data are obtained

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<sup>10</sup> Using CRSP data gives similar results. However, CRSP has trading volume for Nasdaq stocks only after 1982.

<sup>11</sup> See Datar, Naik, and Radcliffe (1998) and Chordia, Subrahmanyam, and Anshuman (2001).

<sup>12</sup> See Brennan, Chordia, and Subrahmanyam (1998) and Chordia, Subrahmanyam, and Anshuman (2001).

<sup>13</sup> See Glosten and Milgrom (1985), Kyle (1985), Constantinides (1986), Dumas and Luciano (1991).

<sup>14</sup> The quoted relative bid-ask spread has been used extensively in the literature as a proxy for trading friction. See Stoll (2000) and the references therein.

<sup>15</sup> This variable is intended to proxy for the average proportionate spread liquidity providers require for a dollar of provided depth.

from the TAQ database, which provides data on exchange-listed stocks for the period of 1993-2001.<sup>16</sup>

Our final proxy for liquidity is the illiquidity ratio ( $ILLIQ_t$ ). This measure, or its inverse (the Amivest measure of liquidity), is used in existing research to proxy for the depth of the market and the impact of order-flow on stock prices as analyzed by Kyle (1985).<sup>17</sup> It is calculated as the average ratio of absolute daily return to daily dollar volume using data from the CRSP daily files.

We next construct several variables to assess the importance of and control for the potential impact of taxes, share repurchases, stock options, convertible securities, and debt level on the dividend policy of the firm. We create a firm-specific variable that attempts to control for different tax clienteles across firms. We use the CDA/Spectrum database, based on f13 filings, to calculate the proportion of institutional ownership by institution type for June of year  $t$  for the period of 1980-1998.<sup>18</sup> There are five institution types as defined by CDA/Spectrum that include banks, insurance companies, investment companies, investment advisors, and university endowments and pension funds. We proxy for the proportion of the firm owned by tax-advantaged institutions, as

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<sup>16</sup> Effective, rather than quoted bid-ask spreads, should be a better measure of trading friction. Stoll (2000), however, documents a cross-sectional correlation of 0.9921 between quoted and effective bid-ask spreads for NYSE/AMEX stocks and 0.9946 for Nasdaq stocks.

<sup>17</sup> See, for example, Cooper, Groth, and Avera (1985), Berkowitz, Logue, and Noser (1988), Knez and Ready (1996), Amihud, Mendelson, and Lauterbach (1997), Berkman and Eleswarapu (1998), and Amihud (2002).

<sup>18</sup> Thomson Financial notes that after 1998 the allocation of institutions across the different types is wrong.

far as dividends are concerned, by the proportionate ownership of banks, insurance companies, university endowments, and pension funds.<sup>19</sup>

The second control variable involves share repurchases. Share repurchases we measure using Compustat data as the total expenditure on the purchase of common and preferred stock in year  $t$  minus any reduction in the value of net preferred stock outstanding ( $REP_t$ ). This measure is available from 1971 and is also used by Grullon and Michaely (2002).<sup>20</sup>

The third control variable is related to the existence of stock options and convertible securities. To proxy for the existence of stock options we use from Compustat the number of shares reserved for conversion for the exercise of stock options in year  $t$ . We construct a dummy variable equal to 1.0 if the number of shares reserved for conversion for the exercise of stock options is positive and 0.0 otherwise ( $CONV\_SO_t$ ). This variable is available after 1984. We also use a second variable to proxy for the existence of total shares reserved for conversion for stock options, convertible securities, and warrants in a similar manner ( $CONV_t$ ). This second variable is available from the start of our estimation period of 1963. Both variables are available up to 1995 when Compustat discontinued reporting them.

Our final control involves the short-term and long-term debt levels of the firm in year  $t$  using Compustat data. We calculate the firm's short-term debt ( $STD_t/A_t$ ) and long

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<sup>19</sup> The distinction between dividends and capital gains is less significant for financial institutions, many of which are exempt from all taxes. Also, corporations have tax related reason to prefer dividends over capital gains. The effective tax rate on dividends received by large corporations is 10.5%, whereas they have to pay a rate of 35% on fully realized capital gains. See also Allen and Michaely (2001).

<sup>20</sup> The measure of share repurchases developed by Fama and French (2001) gives similar results.

term-debt ( $LTD_t/A_t$ ) levels using Compustat data for the fiscal year ending in calendar year  $t$ .

[Insert Table 1 about Here]

### 2.3. *Methodology*

We use annual cross-sectional logistic regressions between 1963 and 2001 to estimate the sensitivity of firm dividend policy to firm characteristics and the different proxies of liquidity of the firm's common stock. We report the average coefficient estimates for several time periods to assess the importance of the variables for the dividend policy of the firm and their robustness over time. In our robustness tests in the cross-section we also include the control variables whenever they are available.

When we analyze the predictive ability of the models over time we use the 1963-1977 average coefficient estimates and apply them to future data to evaluate the performance of the different models in predicting the proportion of dividend payers for the later period of 1978-2001. When control variables are available in the 1963-1977 estimation period we include them in the logistic regressions to evaluate the robustness of our results both in the cross-section and through time. In cases where control variables are not available in the 1963-1977 period, we use historic estimates of the main predictors of dividend payers -- firm characteristics and share turnover -- and evaluate the predictive ability of the different models across portfolios formed on the control variables under interest for later periods. The second approach allows us to analyze whether the control variables under examination are indeed relevant for the

dividend policy of the firm and to also evaluate the robustness of the link between firm stock market liquidity and the likelihood of dividend.

### **3. Empirical evidence in the cross-section**

#### *3.1. Firm characteristics, stock market liquidity, and firm likelihood to pay dividend*

In this section we perform annual logistic regressions to explain the dividend decision of firms. In Table 2 we present the average coefficient estimates for three periods (1963-1977, 1978-1992, and 1993-2001) and perform tests closely related to Fama and French (2001).

As explanatory variables, we first use proxies for firm size, firm profitability, and firm growth opportunities. Results are presented in Panel A of Table 2, columns (1), (5) and (9). The estimates are similar to the ones reported by Fama and French (2001). Larger and more profitable firms are more likely to pay dividends, while firms with higher growth opportunities are less likely to do so.

We then add the different measures of liquidity to the set of explanatory variables. The results with share turnover are presented in Panel A while the results with all other measures are presented in Panel B of Table 2. Columns (2), (6), and (10) of Panel A of Table 2 show that share turnover is negatively related to the likelihood of dividend payment. The coefficient estimate is significant at the 1% level for the three examined periods and its variation over time is in line with the time variation of the other coefficients. The 1963-1977 coefficient estimate of  $-1.51$  suggests that (using the average proportion of dividend payers of 0.7 for that period) one percentage point

increase in share turnover results in approximately 1.06 percentage points decrease in the likelihood of the firm to pay dividend. In later periods the impact of share turnover on the likelihood of dividend declines. One percentage point increase in share turnover results in approximately 0.49 (1978-1992) and 0.26 (1993-2001) percentage points decline in the likelihood of the firm to pay dividend.

We next allow for different coefficient estimates of share turnover for two portfolios of firms. The first portfolio consists of firms that are less likely to pay dividend based on firm characteristics while the second portfolio consists of firms that are more likely to pay dividend based on firm characteristics. The estimates are given in columns (3), (7), and (11). We find that the likelihood of dividend is more sensitive to share turnover for the portfolio of firms that are more likely to pay based on firm characteristics. For 1963-1978, one percentage point increase in share turnover results in approximately 0.96 percentage points decrease in the likelihood of dividend for firms that are less likely to pay based on firm characteristics. In contrast, one percentage point increase in share turnover for firms that are more likely to pay, based on their characteristics, results in a decrease in the likelihood to pay dividend by 1.55 percentage points. This evidence is consistent with the notion that shareholder demand for dividend is more relevant for the dividend policy of firms with lower costs of issuing dividend. In other words, if it is prohibitively costly for the firm to provide dividend (i.e. small firms with no profit and high growth opportunities) then stock market liquidity may have little or no effect on the dividend policy of the firm.

It is a well-known fact that Nasdaq trading volume is overstated relative to the trading volume on NYSE and AMEX. For that reason, we also allow for separate coefficient estimates of share turnover for firms that are traded on NYSE/AMEX and for firms that are traded on Nasdaq – columns (4), (8), and (12). Our previous results carry on to both NYSE/AMEX and Nasdaq stocks for all the examined periods. Therefore, we conclude that the overstatement of Nasdaq trading volume is not driving the negative link between stock market liquidity and the firm likelihood to pay dividend.<sup>21</sup>

The rest of our liquidity measures are also related to the likelihood of dividend payment in line with our hypothesis. Columns (1), (4), and (7) of Panel B of Table 2 show that firms with higher illiquidity ratio are more likely to pay dividend. This relation is significant at the 1% level for the three time periods that we examine. Similarly, firms with lower traded dollar volume, higher proportion of days with no trading, higher proportionate bid-ask spread, and higher proportionate bid-ask spread relative to depth are more likely to pay dividend. All examined liquidity measures are significant at the 1% level except for proportionate bid-ask spread relative to depth, which is significant at the 5% level.

[Insert Table 2 about Here]

The evidence presented in this section divulges a consistent picture. After controlling for the impact of firm characteristics on firm dividend policy, we find that

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<sup>21</sup> We have also used 70% of Nasdaq trading volume when calculating share turnover without estimating different coefficients for the different exchanges. The main results of the paper, in this or the following sections, do not change dramatically.

holders of common shares that have a less liquid market are also more likely to receive dividend. This link is robust across the 40 years of data we have and across different measures of market liquidity.

#### **4. Stock market liquidity and dividend payers over time**

##### *4.1. Changes in market liquidity from 1963 to 2001*

In this section we analyze, within the limitations of data availability, the significant changes in the qualities of U.S. stock markets that have taken place between 1963 and 2001. We elaborate on several aspects related to stock market liquidity where the two broad issues under interest are (i) changes in regulations and the resulting changes in the competitive environment in the industry and (ii) changes in several measures of marketwise trading friction and trading activity.

##### *4.1.1. Regulatory changes and their impact on the competitive environment*

The principle of self-regulation, set forth by the Securities Exchange Act of 1934, largely allowed the NYSE to manage itself.<sup>22</sup> Prior to 1975 the cartel on NYSE was characterized by fixed commission rates, limited entry, and rules that prohibited price-cutting and limited brokerage services per seat. Potential competition from other exchanges in the trading of NYSE listed stocks was reduced through additional

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<sup>22</sup> Commission rates were increased regularly with the acceptance of the SEC. Even though direct rulemaking authority was given to the SEC in certain cases, the power of the SEC to request changes was not used until December 5, 1968. In 1968 SEC pressures forced the NYSE to adopt a volume discount on transactions over 1,000 shares. In 1971 commissions on the excess of any order over \$500,000 were determined “as mutually agreed” (See Stoll, 1979; Stoll, 1985; Huang and Stoll, 1996).

means.<sup>23</sup> The Maloney Act of 1938 explicitly prohibited the NASD from imposing fixed minimum commission rates in the OTC market. However, in the 1960s and 1970s, it was a violation of the NASD's rules for an NASD member to provide a customer with an actual quote.<sup>24</sup> Price schedules and information barriers make it harder for investors to access critical market information, thus decreasing the liquidity of the market.

After a period of extensive hearings and studies, the Securities Acts Amendments of 1975 and Rule 19b-3 became effective on May 1, 1975. The amendments resulted in the abolishment of fixed commission rates and mandated a national market system for securities in which competitive forces would play a much more significant role.

The deregulation of the industry was accompanied by the emergence and expansion of discount brokers that offered lower commission rates to customers who already knew which securities they wished to buy or sell.<sup>25</sup> Apart from lower commission rates, immediate execution and execution reports were major dimensions in advertising the services of such brokers.<sup>26</sup> In recent years the emergence of "Internet Brokers" has led to even more competition in the industry.

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<sup>23</sup> Until 1976, the rules of AMEX prohibited trading in NYSE issues. During the summer of 1976, the NYSE and AMEX, under pressure from the SEC, changed their rules to permit dual trading in issues listed on the other exchange. Such a development, however, did not necessarily lead to improved competition, as most members of AMEX were members of NYSE (See Stoll, 1979; Stoll, 1985; Huang and Stoll, 1996).

<sup>24</sup> Instead, member firms were only allowed to disclose a representative quote of the approximate market price. Professionals, however, could readily obtain the actual market quotes (See Stoll, 1979; Stoll, 1985; Huang and Stoll, 1996).

<sup>25</sup> The deep discount brokers represent the extreme in discount brokerage. Such brokers offer no frills, such as analyst reports, but as a result their commissions are significantly reduced.

<sup>26</sup> Other strategies aimed at client ease of access to broker services. Charles Schwab, for example, has steadily increased the number of domestic offices from seven in 1977 to 415 by the end of 2000. A similar trend is observed in the retail market share of discount brokers. (See <http://www.schwab.com/>; Bianco, 1986; and Schares, 1985)

#### 4.1.2. *Trading costs and market activity*

Stoll (1979) reports that by the first quarter of 1976 the SEC estimated that commissions of institutional firms were 31.6% below what they would have been under fixed commissions. Jones (2002), on the other hand, estimates average commission rates of around 0.80% in the 1960-1980 period. His estimates show that average commissions steadily declined to 0.10% by 2000.<sup>27</sup> Jones (2002) also examines the bid-ask spreads of the stocks in the DJIA and documents that “spreads have fallen dramatically over the last twenty years.”<sup>28</sup> The evidence suggests that the average proportionate quoted bid-ask spread in the 1960-1980 period was approximately 0.60% while by the end of the 1990’s it had fallen steadily to around 0.20%.<sup>29</sup> Part of the drop is due to the decline in the tick size from 1/8<sup>th</sup> to 1/16<sup>th</sup> by June of 1997. Combining commissions and bid-ask spread costs, Jones (2002) documents that total one-way costs decreases from around 1.30% in the 1960-1980 period to around 0.20% in 2000.<sup>30</sup> The above outlined changes in the competitive environment of security markets and the direct costs of trading were combined with a dramatic increase in trading activity. Average annual share turnover increased from approximately 25% in 1963 to around

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<sup>27</sup> Appendix A presents an example.

<sup>28</sup> As argued by Jones and Lipson (2001) and Stoll (1979), spreads alone need not be a sufficient statistic of market liquidity.

<sup>29</sup> Huang and Stoll (1996) examine a sample of 343 S&P500 stocks listed on NYSE between 1987 and 1991. They conclude: “Our overall evidence indicates that the NYSE’s executions quality has improved over the period 1987 to 1991. However, the improvement on the competing regional exchanges and the NASD is even more dramatic, resulting in the smaller execution cost differentials between the NYSE and its competitors.”

<sup>30</sup> Other trading costs included federal and state transfer taxes. For a transaction of 500 shares at \$20/share the 1960-1980 federal plus state transfer taxes would have been an average of \$30 for a stock with no par value. On October 1, 1981, transfer taxes were eliminated. In other words, transfer taxes in this example have declined from an average of 0.30% to 0.00%. (See Jones, 2002)

175% in 2000.<sup>31</sup> The decline in trading costs and the increase in trading activity suggest that indeed the liquidity of the stock market has improved over time.

[Insert Figure 1 about Here]

#### *4.2. Stock market liquidity and the proportion of dividend payers - a graphical interpretation*

In this section we look at the general trends of stock market liquidity, as proxied by the average share turnover, and the proportion of dividend paying firms. Figure 2 indicates that the steady increase in liquidity after 1978 is accompanied by a steady decline in the proportion of dividend payers. We also find that improved liquidity in the late 1960's is also accompanied by a decline in the proportion of dividend payers, albeit with some delay. Such a delay may be observed if dividends are "sticky" so that firms that already pay dividend are less flexible in their dividend decisions. If this were the case, then the delay should be less pronounced for firms that do not pay dividend in year  $t-1$ .

[Insert Figure 2 about Here]

To further investigate this issue, we evaluate the dividend decision for firms that did not pay dividend in year  $t-1$ . Figure 3 reveals that dividend initiation (and resumption) rates are negatively related to the liquidity of the stock market. We also observe that changes in stock market liquidity and dividend initiation rates are closely aligned over

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<sup>31</sup> In the median firm investors exchanged approximately 17% of the shares outstanding in 1964. This number for 2000 was around 114%.

time. Such evidence seems consistent with the stickiness of dividends for firms that already pay dividends.

[Insert Figure 3 about Here]

Finally, when we analyze the dividend decisions of firms that pay dividend in year  $t-1$ , we see that dividend omission rates are somewhat higher after 1978. However, this result does not seem to be as pronounced as the decline in dividend initiation rates for the sample of non-payers and former payers.

[Insert Figure 4 about Here]

These initial results are consistent with the notion that stock market liquidity is related to the proportion of dividend payers over time and suggest that the declining proportion of dividend payers may be explained by improved market liquidity. The link seems to be more pronounced for firms that do not pay dividend in year  $t-1$ , i.e. firms that Fama and French (2001) find to be the main source of the decline of dividend payers.<sup>32</sup>

#### *4.3. The predictive ability of improved market liquidity*

In this section we analyze the ability of improved market liquidity to predict the proportion of dividend payers for the period of 1978-2001. In the base model we use the estimated coefficients from column (1) of Table 2, Panel A to predict the proportion of dividend payers based on firm characteristics. In the second model we add share

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<sup>32</sup> Jones (2002) documents a correlation between spreads and dividend yield of 0.63. This observation is also consistent with the idea that there is a positive relation between the trading friction in a stock and its payout policy.

turnover as an explanatory variable so that we use the estimated coefficients from column (2) of Table 2, Panel A to predict the proportion of dividend payers. In the third model we use the coefficient estimates from column (3) of Table 2, Panel A where we allow for differential impact of market liquidity on firms that are less likely and firms that are more likely to pay based on their firm characteristics. And finally, in the fourth model we use the estimates from column (4) of Table 2, Panel A where we control for the overstatement of trading volume on Nasdaq relative to NYSE/AMEX. The actual and the predicted proportion of dividend payers for the four models are presented in Table 3.

[Insert Table 3 about Here]

When we analyze the predictive ability of the four models we see that the model that takes into account market liquidity significantly decreases the difference between the predicted payers estimated from the base model and the actual payers. In 2000, for example, the difference between predicted and actual payers is 26.17 percentage points using the original model based only on firm characteristics. This difference declines to 11.46 percentage points when market liquidity is taken into account. The improvement in predictive ability is marginal when we allow for differential impact of liquidity on the portfolios of less likely and more likely payers - the predictive error in 2000 is reduced to 9.42 percentage points. Interestingly, the model in which we allow for different coefficient estimates of market liquidity for Nasdaq and NYSE/AMEX has even better predictive ability, reducing the error to 8.41 percentage points.

The results in this section are consistent with the hypothesis that improved market liquidity is one of the reasons for the decline in dividend paying firms. These results, furthermore, complement our cross-sectional results that the likelihood of dividend is negatively related to the market liquidity of common stocks. For the remainder of the paper we use only the model in which market liquidity is allowed to impact firm dividend policy in an unconditional way with one necessary exception. Since this specification is the most conservative one, both logically and empirically, the results we present next should be even stronger if we were to analyze the other two models.

#### *4.4. The predictive ability of improved market liquidity across portfolios based on liquidity and firm characteristics*

In this section we first analyze the predictive ability of the different models for two portfolios based on the market liquidity of the firm's common stock. We then analyze the predictive ability of the different models for two portfolios based on the likelihood of dividend as predicted by firm characteristics.

In Panel A of Table 4 we create two portfolios based on the median share turnover for the 1963-1977 estimation period. The sample size of firms with low share turnover decreases dramatically over time due to the increase in share turnover for the average firm documented above. The model based only on firm characteristics results in higher prediction error for the portfolio of high turnover stocks. This result is consistent with our hypothesis, because the portfolio of stocks with high share turnover has a more pronounced trend of increasing liquidity while the liquidity is bounded from above for

the portfolio firms with low share turnover due to the choice of a 1963-1977 cut-off point. When we add liquidity as an explanatory variable we see that the predictive ability improves for the portfolio of more liquid (high turnover) stocks so that we actually observe a reversal in the predictive error – the predictive error now is lower for the portfolio of stocks with higher share turnover.

We next divide our 1993-2001 sample into two portfolios based on the median proportionate quoted bid-ask spread for 1993. Panel B of Table 4 shows that the proportion of dividend payers declines steadily for the portfolio of firms with low bid-ask spreads. Interestingly, the proportion of dividend payers for the portfolio of firms with high bid-ask spreads has actually increased over the 1993-2001 period. This trend is in contrast with the overall evidence of declining “propensity” of firms to pay dividends. An upward trend in dividend payers should be more likely for firms with less liquid stock markets, so this result is consistent with the notion that the likelihood of dividend is positively affected by decrease in stock market liquidity. When we examine the predictive ability of the model based only on firm characteristics we see that the higher prediction error in general is for the portfolio of firms with low proportionate quoted bid-ask spreads. In 2000, for example, the difference between predicted and actual percent is 27.81 percentage points for the low-spread portfolio and 19.98 percentage points for the high-spread portfolio. When we add stock market liquidity as an explanatory variable for the firm’s dividend decision, we again observe a reversal in the predictive power across the two portfolios so that now the portfolio with lower proportionate bid-ask spread results in the smaller prediction error.

[Insert Table 4 about Here]

We now create two portfolios of firms based their firm characteristics. Firms that are more likely to pay dividend (a predicted probability above 80%), based on firm characteristics and average estimates from the 1963-1977 period enter into the first portfolio. The second portfolio consists of firms that are less likely to pay dividend (a predicted probability below 80%) based on firm characteristics. In the tests to follow, we allow stock market liquidity to differentially influence the dividend choice of firms in the two portfolios for understandable reasons. The results are presented in Table 5.

Trying to predict dividend payers based only on firm characteristics results in higher predictive error for the portfolio of firms that are more likely to pay – larger, more profitable firms, and firms with fewer growth opportunities. This result is to be expected in view of the findings of Fama and French (2001) that firms with the characteristics of payers are less inclined to pay dividend in more recent years. Any plausible explanation of the phenomenon documented by Fama and French (2001) should reduce the predictive error for the portfolio of firms that are more likely to pay dividend more dramatically than for the portfolio of firms that are less likely to pay based on their own characteristics. Adding liquidity as an explanatory variable in fact produces a reversal in predictive ability so that now the predictive error is lower the portfolio of firms that are more likely to pay based on firm characteristics. The reduction in the predictive error for the portfolio of firms that are more likely to pay dividend based on firm characteristics is noteworthy. In 2001, for example, the

predictive error of the base model is 38.75 percentage points while the predictive error when we control for liquidity virtually disappears (0.62 percentage points).

[Insert Table 5 about Here]

We summarize the above discussion by concluding that a model that attempts to predict dividend payers based on firm characteristics fails to perfectly predict the proportion of dividend payers in more recent years. More important for our discussion, such a model is less accurate when applied to firms that have more liquid stock markets and firms that are more likely to pay based on their firm characteristics. Controlling for stock market liquidity improves the overall predictability of the model. The predictability is improved more significantly for firms with more liquid stock markets and firms that, for a given level of stock market liquidity, are more likely to pay dividend. These findings complement our results in Section 3 and further support our conjecture that stock market liquidity is relevant for firm dividend policy and that improved market liquidity has influenced firms with characteristics of payers to not pay dividends in more recent years.<sup>33</sup>

## **5. Robustness tests**

### *5.1. Taxes and clientele effects*

In this section we attempt to address the issue of whether our results over time are not driven by changes in the tax environment. The Tax Reform Act of 1986 reduced the

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<sup>33</sup> When we use the portfolio approach of Fama and French (2001) we obtain a similar pattern in the overall predictive ability of the two models under consideration. The overall difference between predicted and actual payers, however, is larger than it is when using the logistic predictive model.

tax advantage of capital gains versus dividends.<sup>34</sup> Evidence of the reduced tax cost of dividends is presented in Figure 5. This would suggest that the likelihood of firms to pay dividends should have increased rather than decreased and, it appears that our qualitative results are not driven by tax considerations.

[Insert Figure 5 about Here]

To further address the possibility that tax liabilities of investors are a major driver of the declining proportion of dividend payers we create two portfolios based on ownership of tax-advantaged institutions, where the first portfolio consists of firms with 0.0% ownership of banks, insurance companies, pension funds, and university endowments. The second portfolio consists of all firms with at least 25.0% ownership of banks, insurance companies, pension funds, and university endowments. Firms with high ownership of banks, insurance companies, pension funds and university endowments appear to be more likely to pay a dividend than firms with low ownership of such institutions. Furthermore, the decline in the proportion of dividend payers in the portfolio with more tax-advantaged institutions is less dramatic than the decline in dividend payers for a portfolio of firms with low ownership of such institutions.

The model based on firm characteristics has better predictive ability for the sample of firms with high ownership of tax-advantaged clientele as compared to a sample of firms with low ownership of tax-advantaged clientele. Controlling for liquidity improves the predictive ability of the model for both portfolios, but the improvement is even more notable for the portfolio with high ownership of tax-advantaged institutions.

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<sup>34</sup> Similar evidence is provided by Baker and Wurgler (2003).

In fact, for the portfolio with high ownership of tax-advantaged institutions the predictive error of our model is close to zero.<sup>35</sup> Since the portfolio of firms with high ownership of investors with tax advantage for dividend income has a investor clientele that is less sensitive to dividend taxation it is less likely that the improvement in the predictive ability of the model is due to taxes rather than the inclusion of liquidity as an explanatory variable.

[Insert Table 6 about Here]

## 5.2. *Share repurchases*

Next we show that increased market activity improves the predictive ability of the model for a portfolio of firms that do not repurchase shares in year  $t$ . We allocate firms into two portfolios based on whether the firm has a positive number of common shares repurchased in year  $t$  or not. The decline in dividend payers for the portfolio of firms that do not repurchase shares is more dramatic than for the portfolio of firms that did. Additionally, the predictive error of the model based on firm characteristics is similar across the two portfolios.

These findings are consistent with Fama and French (2001), who argue that share repurchases are performed by firms that are also likely to pay dividends, so lower “propensity” to pay is not driven by increasing share repurchase activity. Note that improved stock market liquidity results in better predictive ability for both the portfolio

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<sup>35</sup> We obtain similar results when the cut-off point is 20.0% or 30.0% ownership of tax-advantaged institutions rather than 25.0%.

of firms with no share repurchases (under interest) and for the portfolio of firms with share repurchases. These results support our hypothesis that the effect of market liquidity on firm likelihood to pay dividend over time is important and is not entirely driven by the increasing use of share repurchase programs.

[Insert Table 7 about Here]

One can argue that share repurchases increase market activity, particular given the fact that large part of the repurchases are open market repurchases. In order to investigate this we subtract an estimate of the number of shares repurchased in year  $t$  from the number of traded shares for each firm  $i$  in year  $t$ . Since Compustat reports repurchase amounts in dollar terms, “repurchased shares” is equal to repurchased dollar amount divided by price per share at the end of year  $t$ . Also, Compustat has repurchase data from 1971, so our base estimation period becomes 1971-1977. Panel A of Table 8 shows the coefficient estimates when we use the adjusted measure of share turnover to predict dividend payers. Panel B of the same table shows that adding this new measure of market activity still improves the predictive ability of the base model, so the main conclusions of the previous sections remain unchanged.<sup>36</sup>

[Insert Table 8 about Here]

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<sup>36</sup> Using data from 1971-1977, instead of 1963-1977, for the estimation of the determinants of dividends generally results in lower prediction errors.

### 5.3. *Stock options and convertible securities*

The use of stock options may have an impact on the willingness of management to pay dividend. Also, options may result in better corporate governance and thus act as a substitute for the similar role of dividend. To check the robustness of our results, we construct a dummy variable that indicates whether the firm has issued stock options. We then analyze the predictive ability of the two models for the portfolio of firms with no shares reserved for the exercise of stock options and with positive number of such shares. Again we find that adding market liquidity to the set of explanatory variables improves the predictive ability of the model across the two portfolios. However, the predictive error is always larger for the portfolio of firms with positive number of shares reserved for conversion for the exercise of stock options. This finding suggests that the probability of a firm to pay dividend is related to the existence of stock options and that there may be an omitted variable in the logistic regression.

[Insert Table 9 about Here]

To remedy that, we construct a dummy variable that indicates whether the firm has shares reserved for conversion for the exercise of stock options, for conversion of convertible securities, or for warrants. We include this dummy variable as one of our explanatory variables when predicting the probability of the firm to pay a dividend. The results are presented in Table 10, Panel A. We find that firms with positive number of shares reserved for conversion are less likely to pay dividends than firms with no such shares. Nevertheless, stock market liquidity is still significantly negatively related to the probability of the firm to pay dividend.

When we add the conversion dummy to our model its predictive ability is improved. However, a model that includes trading activity still performs better than a model that does not. Interestingly, a model that includes both share turnover and the conversion dummy seems to perform well when explaining the future proportion of dividend payers. The sample, however, is truncated at 1995 so that these results are inconclusive. In 1993, for example, the predictive error is 6.28 percentage points, while in 1995 it is 8.28 percentage points. These results are presented in Table 10, Panel B.

[Insert Table 10 about Here]

#### *5.4. Debt level*

Our final control involves the debt level of the firm. It is possibly that firms are substituting the monitoring role of dividend through undertaking more debt. The results in Panel A of Table 11 show that, in the cross-section, firms with higher debt levels are less likely to pay dividend. These results are consistent with the monitoring role of debt financing. Additionally, short-term debt has larger impact on the dividend decision of the firm. This result is also consistent with the notion that more frequent access to the external capital markets (as proxied by short-term versus long-term debt) result in better monitoring. In spite of their significance in the cross-section, firm debt level does not have predictive ability in explaining the declining proportion of dividend payers over time. This lack of improvement in predictability is mostly due to the minor changes in firm debt level over time in our sample. Liquidity, on the other hand, is still a

significant and important determinant of the proportion of dividend payers both in the cross-section and over time.

[Insert Table 11 about Here]

### 5.5. *Comprehensive cross-sectional regression*

For the last test in this study we perform a comprehensive logistic regression to explain which firms will pay dividends while including a comprehensive set of explanatory variables. We estimate the probability of a firm to pay dividend as a function of all variables that we have analyzed so far. Table 12 reports the results. We do not find any major changes in the results we have presented so far. All explanatory variables -- including firm characteristics, market liquidity, and the other control variables -- are significantly related to the dividend choice of the firm and have the expected signs. Larger firms, more profitable firms, and firms with less growth opportunities are more likely to pay dividend. Firms performing share repurchases are more likely to pay while firms that have positive number of share for the conversion of securities, warrants, and the exercise of stock options are less likely to pay dividend. Firms with higher levels of short-term and long-term debt are again less likely to pay. Institutional ownership is positively related to the probability to pay, while at the same time this link is stronger for institutions with relative dividend tax-advantage. And finally, holders of common shares with less liquid market are more likely to receive dividend than holders of common shares with more liquid market.

[Insert Table 12 about Here]

## **6. Conclusion**

We hypothesize that, all else equal, the liquidity of a firm's common stock is related to its payout policy. Firms with more liquid stock markets will have lower incentives to distribute cash dividend to their shareholders and vice versa. The declining "propensity" of firms to pay dividend is significantly related to the notable changes in the qualities of US security markets. A period of fewer dividend payers is also characterized by lower trading costs and increased market activity. We further present evidence that our results are not driven by changes in tax-induced preferences, changes in share repurchase policies, changes in debt levels, or changes in the use of convertible securities and the managerial compensation structure of the firm. Our empirical results extend existing research by relating the stock market characteristics of a security and its payout policy. This line of thought, for example, suggests that reactions to dividend announcements should be more notable for less liquid stocks since changes in dividend policy may have implications about the liquidity provisions of the underlying security.

Our paper is an empirical investigation for the existence of a link between corporate dividend policy and stock market liquidity. It does not distinguish between different explanations of why liquidity is important. This question, we hope, will find its answer in future research.

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## Appendix A

If an investor wanted to trade 500 shares of a \$20/share stock in 1963 he would have paid a commission of \$135, or approximately 1.35%. The commission for the same trade in 1975, before deregulation, would have been \$226. As a comparison, \$135 in 1963 would have increased to \$243 if inflated by the Consumer Price Index (CPI). Stoll (1979) also documents that changes in commission schedules prior to May 1, 1975, closely followed the CPI. In 1979 the commission for the trade with a full service broker would have been an average of \$210, while with a discount broker it would have been \$116. As a comparison, the CPI would have raised the 1963 commission of \$135 to around \$336. By 1995 the CPI would have raised the commission to around \$673. However, full service brokers were charging on average \$237, while discount brokers were charging \$65. By 2000 the expansion of the Internet had resulted in even lower trading commissions ranging from \$9.99 per trade for Datek to around \$30 for Merrill Lynch Direct, Morgan Stanley, and Charles Schwab.<sup>37</sup>

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<sup>37</sup> Commissions prior to 1975 are calculated using the NYSE fixed commission schedule published in the NYSE fact book. Commissions for 1979 are obtained from Financial World, November 1979. Commissions for 1995 are obtained from Fortune, December 25, 1995. 2000 commissions were obtained from Forbes, 2000. Commissions for 2000 were obtained from each broker's web site.

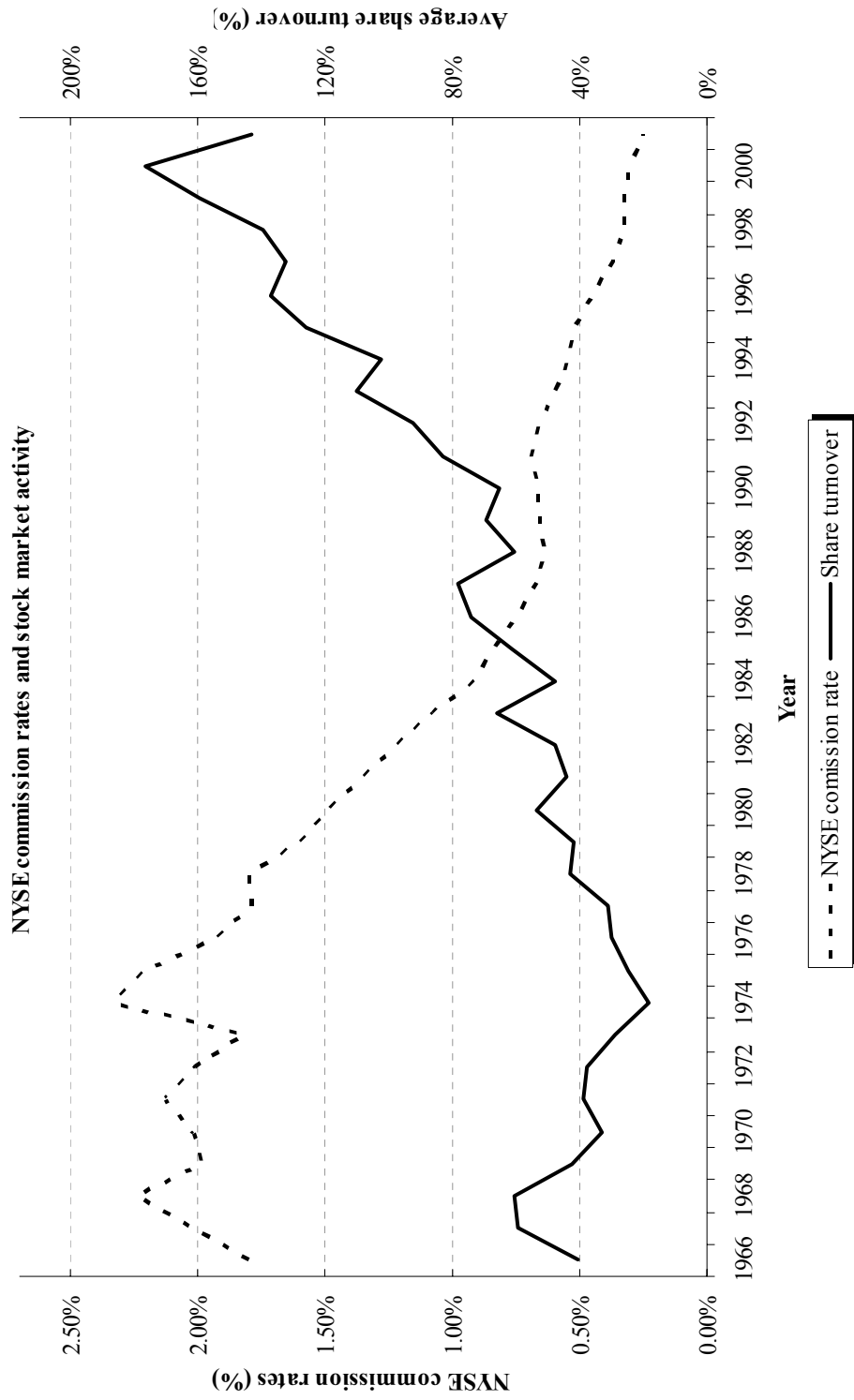


Fig. 1. Annual commission revenues of NYSE members and annual dollar volume on the exchange between 1966 and 2000 are obtained from the NYSE Fact Book. The annual NYSE commission rate is equal to total commission revenues divided by total dollar volume on NYSE for a given year. The sample used to calculate the average share turnover consists of all firms with publicly traded common stock on NYSE, AMEX, or Nasdaq with available information in the CRSP monthly files and the Compustat annual files. Share turnover is the ratio of shares traded to shares outstanding for calendar year t.

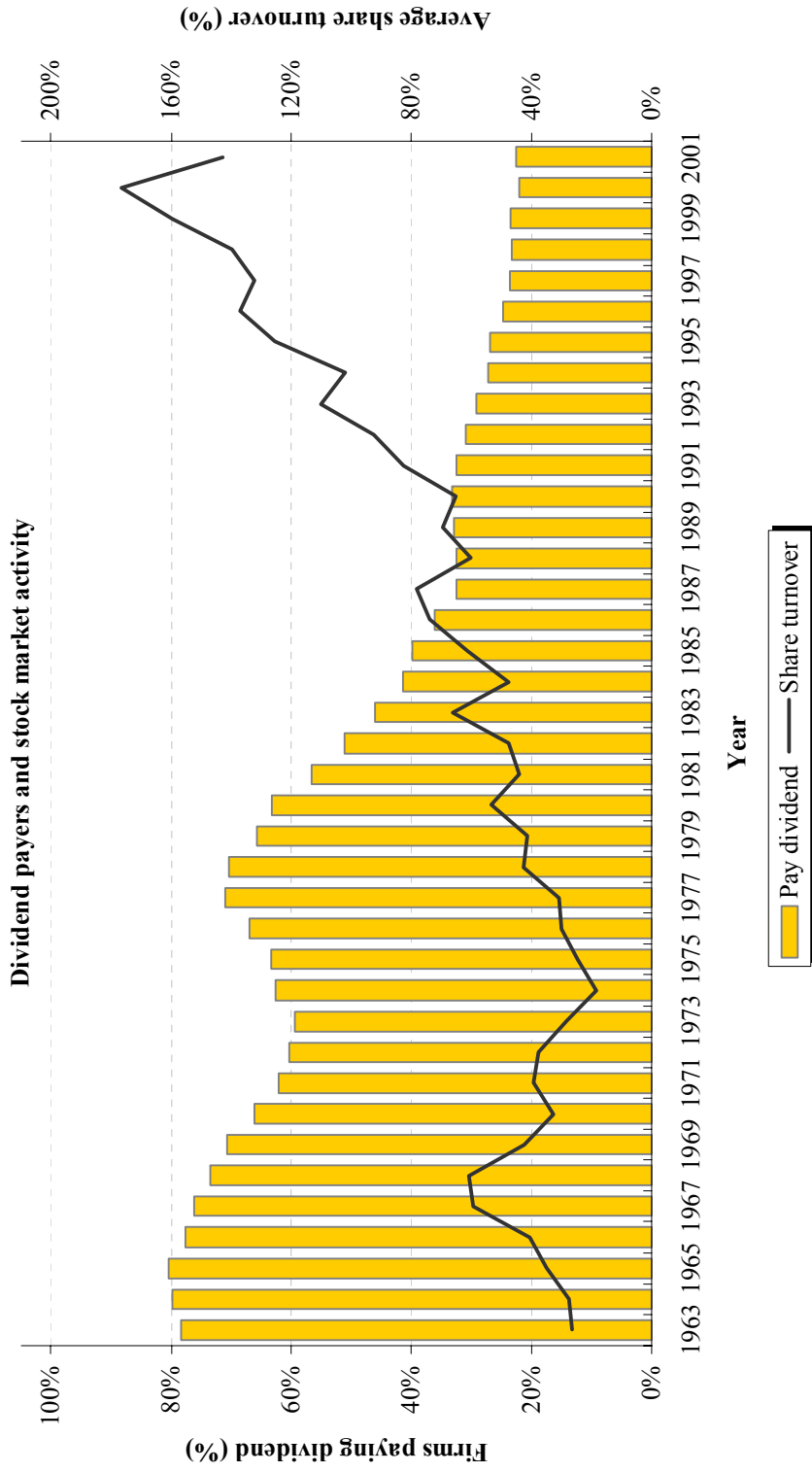


Fig. 2. The sample consists of all firms with publicly traded common stock on NYSE, AMEX, or Nasdaq with available information in the CRSP monthly files and the Compustat annual files. Dividend payers (%) is the proportion of firms that paid dividend in fiscal year t. Average share turnover (%) is the average percentage ratio of shares traded to shares outstanding for calendar year t.

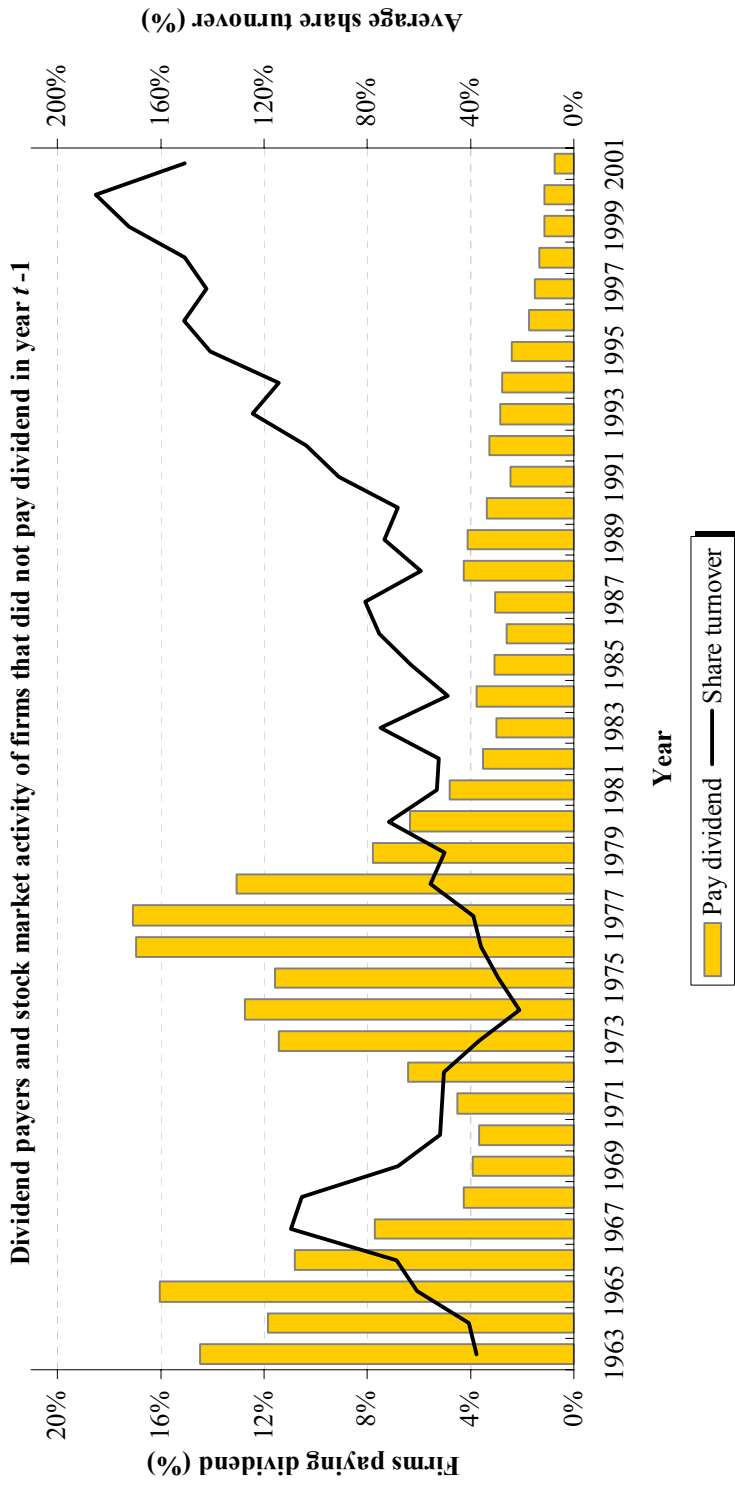


Fig. 3. The sample consists of all firms with publicly traded common stock on NYSE, AMEX, or Nasdaq with available information in the CRSP monthly files and the Compustat annual files that did not pay dividend in fiscal year  $t-1$ . Firms paying dividend (%) represents the proportion of firms that pay dividend in year  $t$ . Average share turnover (%) is the average percentage ratio of shares traded to shares outstanding for the sample for calendar year  $t$ .

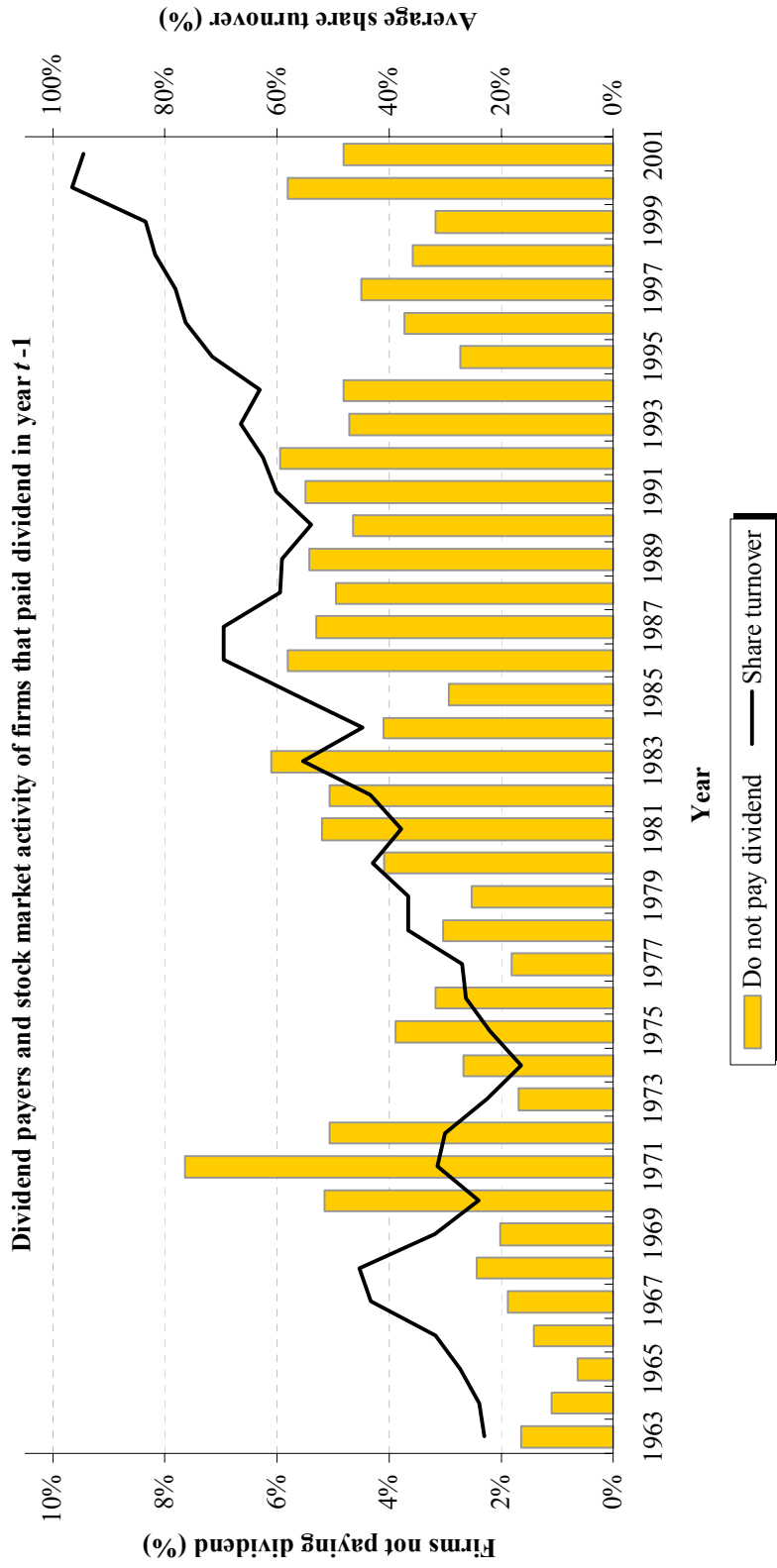


Fig. 4. The sample consists of all firms with publicly traded common stock on NYSE, AMEX, or Nasdaq with available information in the CRSP monthly files and the Compustat annual files that paid dividend in fiscal year  $t-1$ . Firms not paying dividend (%) represents the proportion of firms that do not pay dividend in year  $t$ . Average share turnover (%) is the average percentage ratio of shares traded to shares outstanding for the sample for calendar year  $t$ .

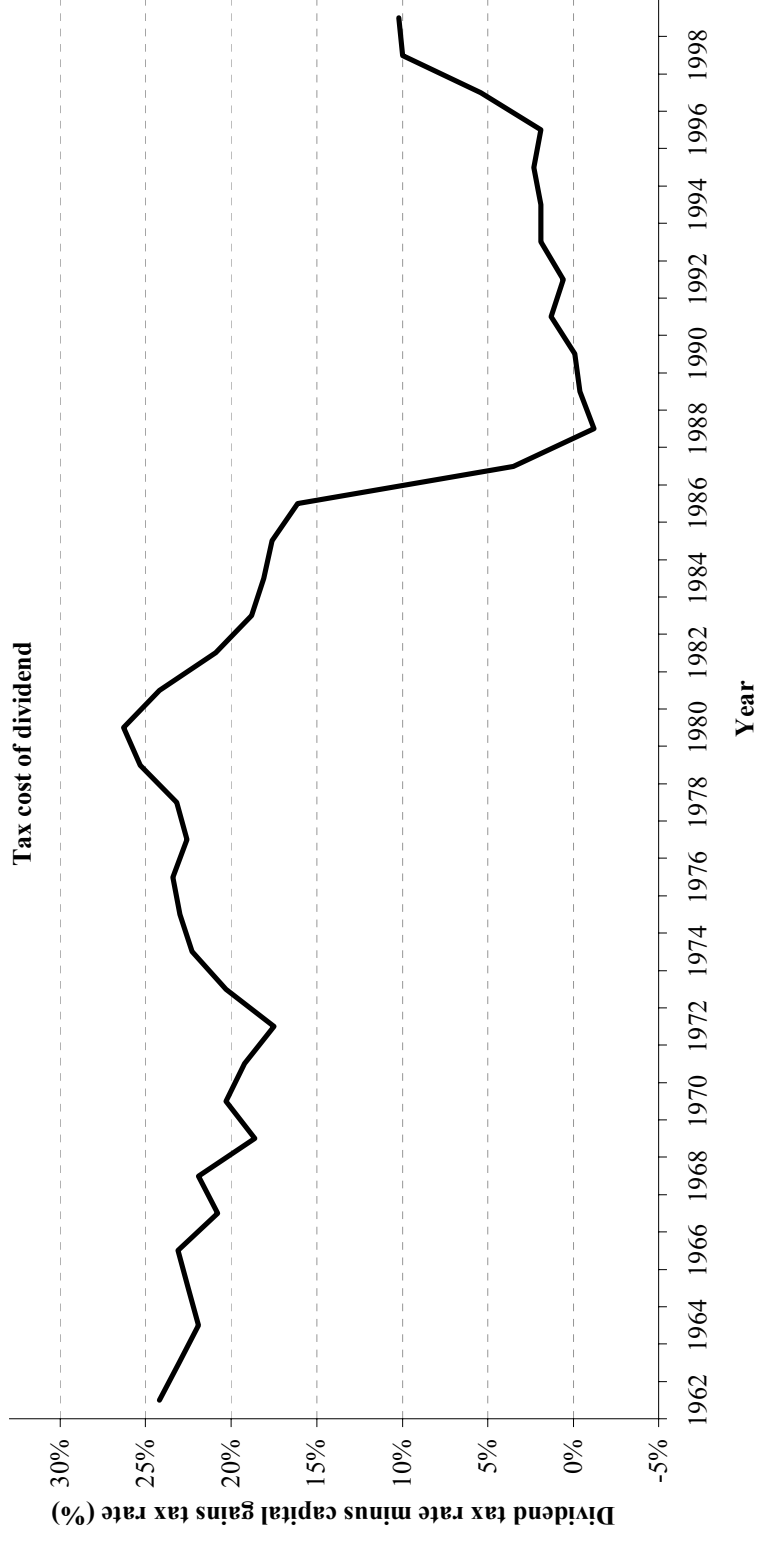


Fig. 5. Dollar weighted average marginal income and long-term capital gains tax rates for individuals are obtained from <http://www.nber.org/~taxsim>. The figure presents the difference between the dividend tax rate (%) and the capital gains tax rate (%). For more detail see Feenberg and Coutts (1993).

Table 1  
Variable definitions

All data is obtained from the Compustat annual files except where indicated. Compustat item numbers are presented in parenthesis. For Compustat variables,  $t$  refers to the fiscal year that ends in calendar year  $t$ .

Variable	Definition
Dividend Payer	A firm is defined as a dividend payer in year $t$ whenever Compustat reports positive Dividends Per Share (26) for the fiscal year ending in calendar year $t$ . Otherwise a firm is defined as a non-payer.
$NYP_t$	The proportion (in %) of NYSE firms with lower market capitalization of common stock in June of year $t$ . Share price and number of shares outstanding for June of year $t$ are obtained from the CRSP monthly files.
$E_t/A_t$	[Earnings Before Extraordinary Items (18) + Interest Expense (15) + Income Statement Deferred Taxes (50) if available] divided by Assets (6).
Preferred Stock	Preferred Stock Liquidating Value (10) [or Preferred Stock Redemption Value (56), or Preferred Stock Par Value (130)].
Book Equity	Stockholder's Equity (216) [or Common Equity (60) + Preferred Stock Par Value (130), or Assets (6) – Liabilities (181)] – Preferred Stock + Balance Sheet Deferred Taxes and Investment Tax Credit (35) if available – Post Retirement Assets (330) if available.
$V_t/A_t$	[Assets (6) – Book Equity + Stock Price (199) times Common Shares Outstanding (25)] divided by Assets (6).
$dA_t/A_t$	[Assets $_t$ (6) – Assets $_{t-1}$ (6)] divided by Assets $_t$ (6).
$TURN_t$	Common Shares Traded (28) divided by Common Shares Outstanding (25) [or Shares Traded divided by Shares Outstanding for year $t$ from the CRSP monthly files when Compustat measure is more than 10,000%].
$PS_t$	For every quote in the TAQ database we estimate the proportionate quoted spread as two times (Ask – Bid) / (Ask + Bid). We then calculate the average proportionate quoted spread for each day using all (but at least five) quotes between 9:30 a.m. and 4:00 p.m. The final proxy for the proportionate quoted spread is equal to the natural logarithm of 252 times the average daily estimates for June of year $t$ .
$PS_t/D_t$	Equal to the natural logarithm of the ratio of proportionate bid-ask spread to dollar depth. For every quote in the TAQ database we estimate the quoted dollar depth as (Ask × Shares at Ask + Bid × Shares at Bid) / 2. We then average this measure for each day using all (but at least five) quotes between 9:30 a.m. and 4:00 p.m. Dollar depth is then equal to 252 times the average daily estimates for June of year $t$ expressed in 1996 US dollars.
$DVOL_t$	Natural logarithm of [0.01 + Share Price (24) times Common Shares Traded (28) divided by the 1996 Consumer Price Index].
$ILLIQ_t$	We use the CRSP daily files to compute this variable. For every trading day in year $t$ , we divide the absolute return by the dollar volume. Dollar volume is expressed in 1996 US dollars using the Consumer Price Index. We then create the illiquidity variable by averaging the daily estimates over all trading days of year $t$ and then taking natural logarithm. If there are less than 30 daily observations for a given year this variable is missing.
$NOTRD_t$	For a given year $t$ , this variable is equal to the proportion of days with non-positive trading volume on the CRSP daily files. The variable is missing if there are less than 30 daily observations in a given year.
$CONV\_SO_t$	Equal to 1.0 if there is a positive number of Common Shares Reserved for Conversion for the exercise of Stock Options (215) and 0.0 otherwise. This variable is available between 1984 and 1995.
$CONV_t$	Equal to 1.0 if there is a positive number of Common Shares Reserved for Conversion (40) and 0.0 otherwise. This variable is available up to 1995.
$REP_t$	Purchase of Common and Preferred Stock (115) + min[Change in Preferred Stock Redemption Value (56), 0].
$ATURN_t$	$TURN_t$ minus {Share Repurchases divided by [Stock Price (24) times by Common Shares Outstanding (25)]}.
Institutional Ownership	We obtain the number of shares held by institution type from the CDA/Spectrum database of Thomson Financial. The date of record is June of year $t$ . We then divide by the number of shares outstanding in June of year $t$ as reported by the CRSP monthly files to get the proportionate holdings of a given institution type.
$STD_t/A_t$	Debt in Current Liabilities (34) divided by Assets (6).
$LTD_t/A_t$	Long-term Debt (9) divided by Assets (6).

Table 2  
Estimates from logistic regressions to explain dividend payers

For each year  $t$  between 1963 and 2001 we estimate logistic regressions to explain whether a firm pays dividend in year  $t$ . As explanatory variables we use the proportion of NYSE firms with lower market capitalization ( $NYP_t$ ), the earnings-to-assets ratio ( $E_t/A_t$ ), the market-to-book ratio ( $V_t/A_t$ ), and the growth rate of assets ( $dA_t/A_t$ ). We refer to these four variables as “firm characteristics.” We then add several characteristics of the firm’s common stock that proxy for the stock’s market liquidity. In Panel A we add the share turnover for year  $t$  ( $TURN_t$ ). We also allow for different coefficients of share turnover for firms that are less likely ( $TURN\_L_t$ ) and for firms that are more likely ( $TURN\_M_t$ ) to pay dividend based on firm characteristics. Firms that have an estimated probability below 80% to pay, based on their firm characteristics and the average coefficient estimates from the 1963-1977 period, are classified as less likely to pay. Firms, for which this probability is above 80%, are classified as more likely to pay. Finally, we allow for different coefficients of share turnover for firms listed on NYSE/AMEX ( $TURNNY_t$ ) and for firms that are listed on Nasdaq ( $TURNNA_t$ ). In Panel B we further use the illiquidity ratio ( $ILLIQ_t$ ), the traded dollar volume, ( $DVOL_t$ ), the proportion of non-trading days ( $NOTRD_t$ ), the proportionate bid-ask spread ( $PS_t$ ), and the ratio of the proportionate bid-ask spread to the quoted dollar depth ( $PS_t/D_t$ ) as explanatory variables. When we use the illiquidity ratio, the proportionate bid-ask spread, and the ratio of proportionate spread to dollar depth we also include the natural logarithm of the share price for June of year  $t$  as a control for microstructure effects resulting from minimum tick size rules. The table reports the average estimated coefficient for a given period and the  $t$ -statistic of whether the average estimate is significantly different from zero. <sup>a, b, c</sup> indicate significance respectively at the 1%, 5%, and 10% level from a two-tailed  $t$ -test. We also report the average number of firms used in the regressions. \*Share turnover for Nasdaq firms is available from 1973 onward so this average is based on five annual estimates.

Panel A. Dependent variable is the likelihood of the firm to pay dividend in year $t$												
	1963-1977				1978-1992				1993-2001			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Intercept	-0.20 (-1.62)	0.24 (1.64)	0.19 (1.25)	0.24 (1.59)	-0.55 <sup>b</sup> (-2.97)	-0.25 (-1.35)	-0.30 (-1.67)	-0.29 (-1.59)	-1.45 <sup>a</sup> (-16.88)	-0.96 <sup>a</sup> (-17.25)	-0.98 <sup>a</sup> (-17.91)	-0.96 <sup>a</sup> (-17.56)
$NYP_t$	4.19 <sup>a</sup> (29.06)	4.22 <sup>a</sup> (17.11)	4.64 <sup>a</sup> (20.70)	4.18 <sup>a</sup> (17.55)	5.29 <sup>a</sup> (53.38)	6.10 <sup>a</sup> (41.59)	6.48 <sup>a</sup> (39.68)	5.81 <sup>a</sup> (38.10)	4.12 <sup>a</sup> (21.20)	4.97 <sup>a</sup> (39.11)	5.10 <sup>a</sup> (32.27)	4.73 <sup>a</sup> (21.69)
$V_t/A_t$	-0.77 <sup>a</sup> (-8.28)	-0.68 <sup>a</sup> (-8.01)	-0.73 <sup>a</sup> (-9.38)	-0.68 <sup>a</sup> (-8.04)	-0.83 <sup>a</sup> (-14.15)	-0.70 <sup>a</sup> (-12.29)	-0.74 <sup>a</sup> (-11.72)	-0.65 <sup>a</sup> (-12.23)	-0.57 (-13.11)	-0.40 <sup>a</sup> (-17.52)	-0.42 <sup>a</sup> (-15.32)	-0.38 <sup>a</sup> (-12.76)
$dA_t/A_t$	-0.90 <sup>a</sup> (-3.26)	-0.47 <sup>c</sup> (-1.82)	-0.54 <sup>b</sup> (-2.04)	-0.46 <sup>c</sup> (-1.77)	-0.65 <sup>a</sup> (-7.02)	-0.40 <sup>a</sup> (-5.38)	-0.46 <sup>a</sup> (-5.67)	-0.35 <sup>a</sup> (-5.26)	-1.29 (-5.91)	-0.94 <sup>a</sup> (-4.66)	-0.96 <sup>a</sup> (-4.78)	-0.91 <sup>a</sup> (-4.74)
$ETOA_t$	15.41 <sup>a</sup> (12.27)	15.13 <sup>a</sup> (13.43)	15.83 <sup>a</sup> (13.40)	15.17 <sup>a</sup> (13.58)	7.24 <sup>a</sup> (16.40)	7.24 <sup>a</sup> (15.35)	7.76 <sup>a</sup> (13.99)	7.30 <sup>a</sup> (15.35)	6.52 (27.63)	5.80 <sup>a</sup> (22.02)	6.02 <sup>a</sup> (20.11)	5.71 <sup>a</sup> (20.85)
$TURN_t$		-1.51 <sup>a</sup> (-9.61)				-1.11 <sup>a</sup> (-20.98)				-1.03 <sup>a</sup> (-24.42)		
$TURN\_L_t$			-1.37 <sup>a</sup> (-7.11)				-0.98 <sup>a</sup> (-28.66)				-0.99 <sup>a</sup> (-18.03)	
$TURN\_M_t$			-2.21 <sup>a</sup> (-11.53)				-1.38 <sup>a</sup> (-12.82)				-1.11 <sup>a</sup> (-24.70)	
$TURNNY_t$				-1.45 <sup>a</sup> (-9.78)				-0.81 <sup>a</sup> (-9.93)				-0.89 <sup>a</sup> (-11.26)
$TURNNA_t$				-2.21 <sup>a,*</sup> (-10.74)				-1.30 <sup>a</sup> (-18.75)				-1.10 <sup>a</sup> (-27.47)
Average Firms		1,694				3,287				4,107		

Panel B. Dependent variable is the likelihood of the firm to pay dividend in year  $t$

	1963-1977			1978-1992			1993-2001				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Intercept	2.99 <sup>a</sup> (4.58)	0.65 <sup>b</sup> (2.56)	-0.57 <sup>a</sup> (-4.15)	0.41 (1.06)	-0.40 <sup>b</sup> (-2.57)	-0.55 <sup>b</sup> (-2.40)	-0.74 <sup>b</sup> (-2.91)	-0.59 <sup>a</sup> (-5.57)	-1.65 <sup>a</sup> (-20.41)	-2.03 <sup>a</sup> (-6.01)	-1.47 <sup>c</sup> (-2.05)
NYP <sub><i>t</i></sub>	3.12 <sup>a</sup> (11.30)	5.79 <sup>a</sup> (41.03)	4.63 <sup>a</sup> (32.03)	3.67 <sup>a</sup> (20.69)	6.07 <sup>a</sup> (20.21)	5.15 <sup>a</sup> (25.82)	3.64 <sup>a</sup> (12.37)	6.90 <sup>a</sup> (21.21)	4.40 <sup>a</sup> (20.47)	2.27 <sup>a</sup> (9.24)	2.33 <sup>a</sup> (13.27)
V <sub><i>t</i></sub> /A <sub><i>t</i></sub>	-0.75 <sup>a</sup> (-9.31)	-0.72 <sup>a</sup> (-7.77)	-0.72 <sup>a</sup> (-9.44)	-0.86 <sup>a</sup> (-9.83)	-0.81 <sup>a</sup> (-12.37)	-0.84 <sup>a</sup> (-10.52)	-0.60 <sup>a</sup> (-16.77)	-0.47 <sup>a</sup> (-13.11)	-0.56 <sup>a</sup> (-13.93)	-0.57 <sup>a</sup> (-13.74)	-0.59 <sup>a</sup> (-15.90)
dA <sub><i>t</i></sub> /A <sub><i>t</i></sub>	-1.47 <sup>a</sup> (-4.98)	-0.50 <sup>c</sup> (-2.17)	-0.67 <sup>b</sup> (-2.21)	-1.12 <sup>a</sup> (-6.03)	-0.58 <sup>a</sup> (-6.48)	-0.47 <sup>b</sup> (-2.92)	-1.66 <sup>a</sup> (-6.45)	-1.01 <sup>a</sup> (-4.74)	-1.24 <sup>a</sup> (-5.74)	-1.79 <sup>a</sup> (-7.27)	-1.83 <sup>a</sup> (-7.44)
ETOA <sub><i>t</i></sub>	10.74 <sup>a</sup> (7.82)	15.45 <sup>a</sup> (13.07)	15.45 <sup>a</sup> (12.47)	4.52 <sup>a</sup> (10.16)	7.41 <sup>a</sup> (15.93)	7.56 <sup>a</sup> (12.45)	5.17 <sup>a</sup> (17.09)	6.54 <sup>a</sup> (24.73)	6.50 <sup>a</sup> (27.92)	5.19 <sup>a</sup> (13.92)	5.28 <sup>a</sup> (14.55)
ILLIQ <sub><i>t</i></sub>	0.54 <sup>a</sup> (9.39)			0.32 <sup>a</sup> (17.30)			0.23 <sup>a</sup> (7.54)				
DVOL <sub><i>t</i></sub>		-0.35 <sup>a</sup> (-6.93)			-0.10 <sup>a</sup> (-3.31)			-0.38 <sup>a</sup> (-14.81)			
NOTRD <sub><i>t</i></sub>			5.06 <sup>a</sup> (3.26)			0.37 <sup>a</sup> (5.17)			1.53 <sup>a</sup> (9.82)		
PS <sub><i>t</i></sub>										0.46 <sup>a</sup> (3.78)	
PS <sub><i>t</i></sub> /D <sub><i>t</i></sub>											0.18 <sup>b</sup> (2.53)
Average Firms	1,376	1,693	1,377	2,710	3,273	2,913	4,106	4,098	4,112	3,797	3,797

Table 3

Actual and predicted percent of dividend payers using average logistic regression estimates from 1963-1977

For each year between 1963 and 1977 we estimate logistic regressions to explain whether a firm pays dividend in year  $t$ . As explanatory variables in model (1) we use the proportion of NYSE firms with lower market capitalization ( $NYP_t$ ), the earnings-to-assets ratio ( $E_t/A_t$ ), the market-to-book ratio ( $V_t/A_t$ ), and the growth rate of assets ( $dA_t/A_t$ ). We refer to these four variables as “firm characteristics.” In model (2) we add share turnover ( $TURN_t$ ) as an explanatory variable. In model (3) we estimate different slope coefficients for share turnover for firms that are less likely ( $TURN\_L_t$ ) and for firms that are more likely ( $TURN\_M_t$ ) to pay dividend based on firm characteristics. Firms that have an estimated probability below 80% to pay, based on their firm characteristics and the average coefficient estimates from the 1963-1977 period, are classified as less likely to pay. Firms, for which this probability is above 80%, are classified as more likely to pay. In model (4) we allow for different coefficients of share turnover for firms listed on NYSE/AMEX ( $TURN_{NYSE,t}$ ) and for firms that are listed on Nasdaq ( $TURN_{NASDAQ,t}$ ). Firms is the number of firms for a given year. Actual Percent is the actual percent of payers in a given year. For each model, we estimate the individual firm’s probability to pay dividend using the average coefficients from 1963-1977 and the values of the explanatory variables for year  $t$  in the logistic regression. We then average these probabilities across firms to estimate the Predicted Percent of payers in a given year  $t$ .

	Actual		(1)		(2)		(3)		(4)	
	Firms	Percent	Predicted	Predicted	Predicted	Predicted	Predicted	Predicted	Predicted	Predicted
			Percent	– Actual	Percent	– Actual	Percent	– Actual	Percent	– Actual
1978	2,737	70.30	70.65	0.35	68.85	-1.44	68.16	-2.14	66.88	-3.41
1979	2,920	65.72	68.54	2.82	67.49	1.77	66.84	1.12	65.53	-0.19
1980	2,901	63.22	66.78	3.56	63.37	0.15	62.54	-0.68	61.17	-2.05
1981	3,023	56.60	64.46	7.86	63.27	6.67	62.62	6.02	61.13	4.53
1982	3,132	51.15	59.96	8.81	57.95	6.80	57.06	5.91	55.71	4.56
1983	3,238	46.11	53.47	7.36	48.41	2.30	47.62	1.51	45.75	-0.36
1984	3,435	41.37	55.51	14.14	54.08	12.71	53.11	11.74	51.31	9.94
1985	3,379	39.92	52.23	12.31	47.54	7.61	46.57	6.65	44.41	4.49
1986	3,450	36.23	49.17	12.94	42.33	6.10	41.25	5.02	38.89	2.66
1987	3,676	32.48	48.79	16.30	41.18	8.70	40.10	7.61	37.70	5.22
1988	3,581	32.42	51.97	19.55	48.09	15.67	47.10	14.68	44.81	12.39
1989	3,453	32.96	51.47	18.52	45.39	12.44	44.28	11.32	41.98	9.03
1990	3,392	33.28	54.43	21.14	48.80	15.52	47.86	14.57	45.42	12.13
1991	3,403	32.41	50.93	18.51	43.43	11.01	42.59	10.18	40.39	7.98
1992	3,585	30.85	50.07	19.22	41.13	10.28	40.56	9.71	37.92	7.07
1993	3,804	29.23	47.92	18.69	37.22	7.99	36.58	7.35	33.91	4.67
1994	4,159	27.24	48.96	21.72	39.34	12.10	38.53	11.29	35.75	8.51
1995	4,225	26.84	48.24	21.40	36.55	9.71	35.82	8.98	33.27	6.43
1996	4,520	24.76	46.35	21.59	33.99	9.24	33.17	8.41	30.82	6.06
1997	4,516	23.65	45.97	22.32	33.52	9.87	32.56	8.91	30.37	6.72
1998	4,371	23.31	47.30	23.99	34.43	11.12	33.30	9.98	31.17	7.86
1999	4,043	23.50	47.85	24.35	35.29	11.79	33.97	10.47	32.22	8.72
2000	3,895	22.05	48.22	26.17	33.51	11.46	31.48	9.42	30.46	8.41
2001	3,435	22.59	45.76	23.17	32.62	10.02	30.63	8.04	30.36	7.77

Table 4

Actual and predicted percent of dividend payers for two portfolios based on share turnover and bid-ask spread using average logistic regression estimates from 1963-1977

For each year between 1963 and 1977 we estimate a logistic regression to explain whether a firm pays dividend in year  $t$ . As explanatory variables in (1) and (3) we use the proportion of NYSE firms with lower market capitalization ( $NYP_t$ ), the earnings-to-assets ratio ( $E_t/A_t$ ), the market-to-book ratio ( $V_t/A_t$ ), and the growth rate of assets ( $dA_t/A_t$ ). We refer to these four variables as “firm characteristics.” In (2) and (4) we also add share turnover for year  $t$  ( $TURN_t$ ) as an explanatory variable. We next create two portfolios based on share turnover ( $TURN_t$ ) and based on the proportionate bid-ask spread ( $PS_t$ ) - Panel A and Panel B respectively. For share turnover, portfolios are created using the average of its 50<sup>th</sup> percentile for the 1963-1977 period. When we create portfolios using the proportionate bid-ask spread we use its 50<sup>th</sup> percentile for 1993. Firms is the number of firms in a portfolio for a given year. Actual Percent is the actual percent of payers in a given portfolio. We estimate the individual firm’s probability to pay dividend using the average coefficients from 1963-1977 and the values of the explanatory variables for year  $t$  in the logistic model. We then average these probabilities across the firms in a given portfolio for a given year  $t$  to estimate the Predicted Percent of payers for that portfolio in that year.

Panel A

	Low share turnover						High share turnover					
	Actual		(1)		(2)		Actual		(3)		(4)	
			Predicted	Predicted	Predicted	Predicted			Predicted	Predicted		
	Firms	Percent	Percent	- Actual	Percent	- Actual	Firms	Percent	Percent	- Actual	Percent	- Actual
1978	1,063	73.85	69.08	- 4.76	74.30	0.46	1,674	68.04	71.64	3.60	65.39	- 2.65
1979	1,211	68.54	67.39	- 1.14	73.00	4.46	1,709	63.72	69.35	5.62	63.58	- 0.14
1980	934	67.24	65.25	- 1.99	70.53	3.29	1,967	61.31	67.50	6.19	59.97	- 1.34
1981	1,028	64.49	64.34	- 0.15	69.72	5.23	1,995	52.53	64.52	11.99	59.95	7.42
1982	1,046	51.43	55.61	4.17	60.85	9.42	2,086	51.01	62.15	11.14	56.50	5.49
1983	658	49.39	50.19	0.79	55.70	6.31	2,580	45.27	54.31	9.04	46.55	1.28
1984	1,059	41.17	49.50	8.33	55.17	14.00	2,376	41.46	58.18	16.73	53.60	12.14
1985	839	36.47	43.67	7.20	48.58	12.11	2,540	41.06	55.06	14.00	47.19	6.13
1986	691	29.38	38.82	9.44	44.00	14.62	2,759	37.95	51.77	13.82	41.91	3.97
1987	685	29.78	38.95	9.17	44.24	14.46	2,991	33.10	51.04	17.94	40.48	7.38
1988	1,091	29.24	43.32	14.08	49.09	19.85	2,490	33.82	55.76	21.94	47.65	13.83
1989	905	30.28	43.36	13.09	49.06	18.79	2,548	33.91	54.35	20.45	44.09	10.18
1990	1,020	30.10	47.00	16.91	52.39	22.29	2,372	34.65	57.62	22.97	47.26	12.61
1991	929	28.63	44.10	15.47	49.56	20.93	2,474	33.83	53.49	19.66	41.12	7.29
1992	749	34.45	46.23	11.78	52.11	17.66	2,836	29.90	51.09	21.18	38.23	8.33
1993	581	39.93	46.81	6.88	52.87	12.94	3,223	27.30	48.13	20.82	34.40	7.10
1994	617	37.44	48.34	10.90	54.67	17.23	3,542	25.47	49.07	23.60	36.67	11.20
1995	528	38.64	49.88	11.25	56.19	17.55	3,697	25.16	48.00	22.85	33.75	8.59
1996	452	38.27	48.49	10.22	54.55	16.28	4,068	23.25	46.11	22.86	31.71	8.46
1997	400	36.75	47.43	10.68	53.85	17.10	4,116	22.38	45.83	23.45	31.55	9.17
1998	367	33.51	48.23	14.72	54.50	20.99	4,004	22.38	47.22	24.84	32.59	10.22
1999	313	35.78	52.13	16.35	58.13	22.35	3,730	22.47	47.49	25.03	33.37	10.90
2000	299	30.10	52.21	22.11	57.90	27.80	3,596	21.38	47.89	26.50	31.49	10.10
2001	496	24.60	44.16	19.56	49.54	24.94	2,939	22.25	46.03	23.77	29.76	7.51

Panel B

	Low proportionate bid-ask spread						High proportionate bid-ask spread					
	Actual		(1)		(2)		Actual		(3)		(4)	
			Predicted	Predicted	Predicted	Predicted			Predicted	Predicted		
	Firms	Percent	Percent	- Actual	Percent	- Actual	Firms	Percent	Percent	- Actual	Percent	- Actual
1993	1,555	51.64	68.14	16.50	51.48	- 0.16	1,554	11.71	33.32	21.60	24.73	13.02
1994	1,647	49.12	70.94	21.82	55.62	6.50	1,763	11.12	33.33	22.21	25.71	14.60
1995	2,081	41.18	63.62	22.44	46.11	4.93	1,531	10.65	31.76	21.11	23.88	13.24
1996	2,558	34.64	57.61	22.97	40.55	5.92	1,548	10.14	30.13	19.99	22.49	12.35
1997	2,546	34.52	58.12	23.60	40.57	6.05	1,681	8.98	29.59	20.61	22.86	13.88
1998	2,933	30.41	55.72	25.31	38.53	8.12	1,403	8.84	30.19	21.35	26.02	17.19
1999	2,691	30.43	54.95	24.51	38.72	8.28	1,340	9.40	33.58	24.17	28.25	18.85
2000	2,408	25.91	53.72	27.81	34.06	8.15	1,477	15.84	39.34	23.50	32.64	16.79
2001	1,986	16.87	42.25	25.38	25.46	8.59	1,439	30.65	50.63	19.98	42.40	11.76

Table 5

Actual and predicted percent of dividend payers for two portfolios based on firm ability to pay using average logistic regression estimates from 1963-1977

For each year between 1963 and 1977 we estimate a logistic regression to explain whether a firm pays dividend in year  $t$ . As explanatory variables in (1) and (3) we use the proportion of NYSE firms with lower market capitalization ( $NYP_t$ ), the earnings-to-assets ratio ( $E_t/A_t$ ), the market-to-book ratio ( $V_t/A_t$ ), and the growth rate of assets ( $dA_t/A_t$ ). We refer to these four variables as “firm characteristics.” In (2) and (4) we add share turnover as an explanatory variable while estimating different slope coefficients for share turnover for firms that are less likely ( $TURN\_L_t$ ) and for firms that are more likely ( $TURN\_M_t$ ) to pay dividend based on firm characteristics. Firms that have an estimated probability below 80% to pay, based on their firm characteristics and the average coefficient estimates from the 1963-1977 period, are classified as less likely to pay. Firms, for which this probability is above 80%, are classified as more likely to pay. We report the results separately for the two portfolios of firms - those that are less likely and those that are more likely to pay based on firm characteristics. Firms is the number of firms in a portfolio for a given year. Actual Percent is the actual percent of payers in a given portfolio. We estimate the individual firm’s probability to pay dividend using the average coefficients from 1963-1977 and the values of the explanatory variables for year  $t$  in the logistic model. We then average these probabilities across the firms in a given portfolio for a given year  $t$  to estimate the Predicted Percent of payers for that portfolio in that year.

	Less likely to pay dividend based on firm characteristics						More likely to pay dividend based on firm characteristics					
	Actual		(1)		(2)		Actual		(3)		(4)	
			Predicted	Predicted	Predicted	Predicted			Predicted	Predicted		
Firms	Percent	Percent	- Actual	Percent	- Actual	Firms	Percent	Percent	- Actual	Percent	- Actual	
1978	1,690	57.40	57.30	-0.09	56.38	-1.02	1,047	91.12	92.19	1.07	87.17	-3.95
1979	1,862	52.26	55.10	2.84	54.91	2.66	1,058	89.41	92.18	2.77	87.84	-1.58
1980	1,846	48.70	52.49	3.79	49.51	0.81	1,055	88.63	91.78	3.15	85.33	-3.30
1981	1,961	41.71	49.56	7.85	48.97	7.25	1,062	84.09	91.97	7.88	87.82	3.73
1982	2,140	36.50	45.26	8.76	44.32	7.83	992	82.76	91.68	8.92	84.53	1.77
1983	2,424	33.66	40.71	7.04	36.29	2.63	814	83.17	91.48	8.31	81.36	-1.81
1984	2,497	27.47	41.96	14.49	41.51	14.03	938	78.36	91.56	13.21	83.99	5.63
1985	2,581	27.35	40.13	12.78	36.51	9.15	798	80.58	91.38	10.80	79.11	-1.46
1986	2,685	24.10	37.24	13.14	31.78	7.69	765	78.82	91.06	12.23	74.47	-4.36
1987	2,893	20.50	37.30	16.80	31.16	10.67	783	76.76	91.22	14.46	73.10	-3.66
1988	2,705	19.41	39.35	19.94	36.86	17.45	876	72.60	90.94	18.34	78.74	6.14
1989	2,634	20.05	39.17	19.12	34.40	14.35	819	74.48	91.05	16.56	76.04	1.55
1990	2,505	20.16	41.44	21.28	37.51	17.35	887	70.35	91.10	20.75	77.07	6.72
1991	2,636	20.86	39.36	18.50	33.30	12.44	767	72.10	90.67	18.57	74.51	2.41
1992	2,832	19.17	39.29	20.11	31.36	12.18	753	74.77	90.62	15.86	75.20	0.43
1993	3,065	19.35	37.68	18.33	28.25	8.91	739	70.23	90.43	20.20	71.11	0.88
1994	3,283	17.09	37.79	20.70	29.43	12.34	876	65.30	90.83	25.53	72.62	7.32
1995	3,382	17.21	37.56	20.35	27.32	10.11	843	65.48	91.09	25.61	69.90	4.42
1996	3,618	15.42	35.26	19.83	24.55	9.12	902	62.20	90.84	28.65	67.76	5.56
1997	3,621	14.31	34.92	20.62	24.39	10.09	895	61.45	90.67	29.21	65.57	4.12
1998	3,466	14.34	36.06	21.72	25.85	11.51	905	57.68	90.37	32.69	61.84	4.16
1999	3,128	13.46	35.33	21.87	25.02	11.56	915	57.81	90.65	32.83	64.57	6.76
2000	2,906	12.42	33.77	21.35	22.97	10.55	989	50.35	90.68	40.33	56.47	6.12
2001	2,665	14.26	32.92	18.66	24.44	10.18	770	51.43	90.18	38.75	52.04	0.62

Table 6

Actual and predicted percent of dividend payers for two portfolios based on tax-advantaged institutional ownership using average logistic regression estimates from 1963-1977

For each year between 1963 and 1977 we estimate a logistic regression to explain whether a firm pays dividend in year  $t$ . As explanatory variables in (1) and (3) we use the proportion of NYSE firms with lower market capitalization ( $NYP_t$ ), the earnings-to-assets ratio ( $E_t/A_t$ ), the market-to-book ratio ( $V_t/A_t$ ), and the growth rate of assets ( $dA_t/A_t$ ). We refer to these four variables as “firm characteristics.” In (2) and (4) we also add share turnover for year  $t$  ( $TURN_t$ ) as an explanatory variable. We next create two portfolios based on the institutional ownership of the firm. The first portfolio consists of firms with low ownership of tax-advantaged institutions - all firms with 0% ownership of banks, insurance companies, pension funds, and university endowments. The second portfolio consists of firms with high ownership of tax-advantaged institutions - all firms with more than 25% ownership of banks, insurance companies, pension funds, and university endowments. Firms is the number of firms in a portfolio for a given year. Actual Percent is the actual percent of payers in a given portfolio. We estimate the individual firm’s probability to pay dividend using the average coefficients from 1963-1977 and the values of the explanatory variables for year  $t$  in the logistic model. We then average these probabilities across the firms in a given portfolio for a given year  $t$  to estimate the Predicted Percent of payers for that portfolio in that year.

	Low ownership of tax-advantaged institutions						High ownership of tax-advantaged institutions					
			(1)		(2)				(3)		(4)	
	Firms	Actual Percent	Predicted Percent	- Actual	Predicted Percent	- Actual	Firms	Actual Percent	Predicted Percent	- Actual	Predicted Percent	- Actual
1980	1,274	44.98	43.28	- 1.70	43.06	- 1.92	258	92.25	87.52	- 4.73	89.06	- 3.19
1981	1,293	37.66	40.98	3.31	42.47	4.80	256	93.36	87.36	- 6.00	89.40	- 3.96
1982	1,269	32.70	39.52	6.82	40.67	7.96	237	88.19	86.31	- 1.88	86.97	- 1.22
1983	1,228	28.75	32.98	4.23	31.97	3.23	246	88.62	82.45	- 6.17	81.97	- 6.64
1984	1,240	22.26	33.27	11.02	34.98	12.72	240	87.50	85.29	- 2.21	86.38	- 1.12
1985	1,158	21.16	32.00	10.84	31.59	10.44	248	86.69	83.38	- 3.32	82.70	- 3.99
1986	938	18.87	30.38	11.51	29.60	10.73	285	84.56	82.74	- 1.82	79.86	- 4.70
1987	1,040	16.54	29.22	12.68	27.60	11.06	239	82.01	81.28	- 0.72	78.30	- 3.71
1988	495	3.43	22.57	19.13	25.00	21.57	332	79.52	84.27	4.75	83.10	3.58
1989	441	3.85	20.84	16.99	22.22	18.37	367	78.75	81.19	2.44	78.71	- 0.03
1990	445	3.37	25.38	22.01	26.82	23.45	314	79.62	82.51	2.89	81.21	1.59
1991	496	3.63	21.42	17.79	21.67	18.04	287	81.88	81.03	- 0.85	81.36	- 0.52
1992	435	5.29	21.33	16.04	20.68	15.39	311	80.06	80.02	- 0.05	79.25	- 0.81
1993	480	5.42	19.34	13.92	16.16	10.74	317	78.55	79.11	0.56	77.27	- 1.28
1994	473	3.81	18.31	14.51	16.03	12.23	454	73.13	79.61	6.49	76.33	3.20
1995	561	5.35	18.13	12.78	14.97	9.62	367	74.11	78.64	4.53	75.12	1.00
1996	563	7.46	19.80	12.34	16.98	9.52	304	68.09	75.24	7.15	70.88	2.79
1997	508	4.53	20.44	15.91	16.77	12.24	277	67.87	75.26	7.39	70.48	2.61
1998	447	4.25	22.45	18.19	18.58	14.33	241	62.24	72.55	10.31	65.87	3.63

Table 7

Actual and predicted percent of dividend payers for two portfolios based on repurchased shares using average logistic regression estimates from 1963-1977

For each year between 1963 and 1977 we estimate a logistic regression to explain whether a firm pays dividend in year  $t$ . As explanatory variables in (1) and (3) we use the proportion of NYSE firms with lower market capitalization ( $NYP_t$ ), the earnings-to-assets ratio ( $E_t/A_t$ ), the market-to-book ratio ( $V_t/A_t$ ), and the growth rate of assets ( $dA_t/A_t$ ). We refer to these four variables as “firm characteristics.” In (2) and (4) we also add share turnover for year  $t$  ( $TURN_t$ ) as an explanatory variable. We next create two portfolios based on the share repurchase policy of the firm for year  $t$ . The first portfolio consists of all firms with no shares repurchased in year  $t$  ( $REP_t = 0$ ). The second portfolio consists of all firms with positive number of shares repurchased in year  $t$  ( $REP_t > 0$ ). Firms is the number of firms in a portfolio for a given year. Actual Percent is the actual percent of payers in a given portfolio. We estimate the individual firm’s probability to pay dividend using the average coefficients from 1963-1977 and the values of the explanatory variables for year  $t$  in the logistic model. We then average these probabilities across the firms in a given portfolio for a given year  $t$  to estimate the Predicted Percent of payers for that portfolio in that year.

	No repurchase						Repurchase					
			(1)		(2)				(3)		(4)	
	Actual	Predicted	Predicted	Predicted	Predicted	– Actual	Actual	Predicted	Predicted	Predicted	Predicted	– Actual
Firms	Percent	Percent	– Actual	Percent	– Actual	Firms	Percent	Percent	– Actual	Percent	– Actual	
1978	2,095	69.26	70.12	0.86	67.77	– 1.49	642	73.68	72.36	– 1.31	72.40	– 1.28
1979	2,181	63.04	67.26	4.22	65.75	2.71	739	73.61	72.29	– 1.32	72.61	– 1.01
1980	2,235	60.45	65.60	5.15	61.46	1.01	666	72.52	70.72	– 1.80	69.79	– 2.73
1981	2,310	53.25	62.81	9.56	60.98	7.73	713	67.46	69.82	2.36	70.72	3.26
1982	2,319	46.53	57.27	10.74	54.86	8.33	813	64.33	67.65	3.32	66.76	2.43
1983	2,482	43.07	51.42	8.35	46.06	2.99	756	56.08	60.21	4.12	56.15	0.06
1984	2,551	35.55	52.02	16.47	50.71	15.16	884	58.14	65.56	7.42	63.80	5.66
1985	2,441	34.45	48.37	13.92	43.59	9.13	938	54.16	62.29	8.13	57.82	3.66
1986	2,529	30.29	45.63	15.34	38.56	8.28	921	52.55	58.92	6.37	52.68	0.13
1987	2,494	23.78	42.78	19.00	35.84	12.06	1,182	50.85	61.46	10.62	52.44	1.59
1988	2,350	23.74	45.87	22.12	42.38	18.64	1,231	48.98	63.61	14.62	58.97	9.99
1989	2,474	25.10	46.98	21.88	40.66	15.56	979	52.81	62.84	10.03	57.35	4.54
1990	2,328	23.67	48.35	24.68	42.42	18.75	1,064	54.32	67.73	13.41	62.76	8.44
1991	2,434	25.02	46.20	21.18	38.73	13.71	969	50.98	62.78	11.80	55.22	4.24
1992	2,745	24.81	46.12	21.31	36.89	12.08	840	50.60	62.97	12.38	54.98	4.39
1993	2,919	23.88	43.72	19.84	32.77	8.90	885	46.89	61.79	14.90	51.91	5.01
1994	3,179	20.35	44.33	23.98	34.26	13.91	980	49.59	63.99	14.39	55.80	6.21
1995	3,135	19.07	42.98	23.91	31.18	12.11	1,090	49.17	63.35	14.18	51.99	2.82
1996	3,307	16.30	39.87	23.57	27.60	11.30	1,213	47.82	64.01	16.20	51.43	3.61
1997	3,190	14.67	39.16	24.49	26.65	11.98	1,326	45.25	62.35	17.10	50.05	4.80
1998	2,749	13.35	38.60	25.25	26.42	13.07	1,622	40.20	62.05	21.85	48.01	7.81
1999	2,384	12.92	38.35	25.43	26.53	13.61	1,659	38.70	61.51	22.81	47.87	9.17
2000	2,406	10.81	37.43	26.62	23.41	12.61	1,489	40.23	65.66	25.43	49.84	9.61
2001	2,082	14.27	38.08	23.82	25.92	11.65	1,353	35.40	57.57	22.16	42.92	7.52

Table 8

Actual and predicted percent of dividend payers using average logistic regression estimates from 1971-1977 and adjusting for share repurchases

In Panel A, for each year between 1971 and 1977 we estimate a logistic regression to explain whether a firm pays dividend in year  $t$ . As explanatory variables in (1) we use the proportion of NYSE firms with lower market capitalization ( $NYP_t$ ), the earnings-to-assets ratio ( $E_t/A_t$ ), the market-to-book ratio ( $V_t/A_t$ ), and the growth rate of assets ( $dA_t/A_t$ ). In (2) we also add share turnover for year  $t$  ( $TURN_t$ ) as an explanatory variable. In (3), (4), and (5) share turnover is calculated net of shares repurchased for year  $t$  ( $ATURN_t$ ). Panel A reports the average estimated coefficients for a given period and their  $t$ -statistics in parenthesis. <sup>a, b, c</sup> indicate significance at the 1%, 5%, and 10% level respectively from a two-tailed  $t$ -test. Panel B reports the actual and predicted percent of payers based on the different models. Firms is the number of firms in a given year. Actual Percent is the percent of payers in a given year  $t$ . The Predicted Percent of payers in a given year  $t$  we estimate by using the average coefficients from 1971-1977 and the values of the explanatory variables for each firm for year  $t$  in the logistic model. In (1) the explanatory variables are the above-discussed firm characteristics. In (2) we add share turnover ( $TURN_t$ ) as an explanatory variable. In (3) share turnover ( $TURN_t$ ) is substituted with the measure of share turnover that is adjusted for share repurchases ( $ATURN_t$ ).

Panel A. Dependent variable is the likelihood of the firm to pay dividend in year  $t$

	1971-1977			1978-1992	1993-2001
	(1)	(2)	(3)	(4)	(5)
Intercept	-0.21 (-0.90)	0.14 (0.88)	0.10 (0.60)	-0.30 (-1.59)	-0.98 <sup>a</sup> (-16.71)
$NYP_t$	4.49 <sup>a</sup> (22.21)	4.85 <sup>a</sup> (15.29)	4.80 <sup>a</sup> (15.67)	5.99 <sup>a</sup> (41.14)	4.96 <sup>a</sup> (39.30)
$V_t/A_t$	-0.97 <sup>a</sup> (-5.98)	-0.88 <sup>a</sup> (-6.03)	-0.88 <sup>a</sup> (-5.99)	-0.72 <sup>a</sup> (-11.69)	-0.40 <sup>a</sup> (-17.03)
$dA_t/A_t$	-0.41 (-1.19)	-0.01 (-0.02)	0.04 (0.14)	-0.39 <sup>a</sup> (-5.07)	-0.91 <sup>a</sup> (-4.68)
$ETOA_t$	12.59 <sup>a</sup> (7.43)	13.28 <sup>a</sup> (7.45)	13.13 <sup>a</sup> (7.28)	7.26 <sup>a</sup> (14.45)	5.76 <sup>a</sup> (21.49)
$TURN_t$		-1.97 <sup>a</sup> (-18.94)			
$ATURN_t$			-1.77 <sup>a</sup> (-16.23)	-0.97 <sup>a</sup> (-8.77)	-1.03 <sup>a</sup> (-24.44)

Panel B. Actual and predicted dividend payers based on 1971-1977 estimates

	Firms	Actual Percent	(1)		(2)		(3)	
			Predicted Percent	Predicted - Actual	Predicted Percent	Predicted - Actual	Predicted Percent	Predicted - Actual
1978	2,717	70.67	64.47	-6.19	60.33	-10.33	60.97	-9.70
1979	2,861	66.79	62.43	-4.36	59.39	-7.41	59.99	-6.81
1980	2,891	63.37	59.79	-3.57	54.32	-9.05	54.92	-8.45
1981	3,009	56.86	57.82	0.95	54.70	-2.16	55.21	-1.65
1982	3,131	51.17	53.74	2.57	49.38	-1.78	49.99	-1.18
1983	3,234	46.13	46.69	0.56	39.22	-6.91	39.96	-6.18
1984	3,420	41.55	49.32	7.77	45.51	3.96	46.20	4.65
1985	3,370	40.00	46.13	6.13	38.85	-1.15	39.69	-0.31
1986	3,437	36.37	43.45	7.08	33.80	-2.57	34.83	-1.54
1987	3,656	32.66	43.17	10.51	32.62	-0.04	33.87	1.21
1988	3,574	32.48	46.15	13.67	39.73	7.25	40.64	8.15
1989	3,445	33.03	45.24	12.21	36.64	3.60	37.45	4.41
1990	3,386	33.34	48.66	15.32	40.65	7.31	41.51	8.17
1991	3,393	32.51	44.94	12.43	35.43	2.92	36.13	3.62
1992	3,567	31.01	43.84	12.84	33.15	2.14	33.86	2.85
1993	3,790	29.34	41.51	12.17	29.17	-0.17	29.91	0.57
1994	4,136	27.37	43.05	15.68	31.31	3.94	32.17	4.80
1995	4,215	26.90	42.04	15.14	28.78	1.88	29.66	2.76
1996	4,497	24.82	40.46	15.65	26.52	1.70	27.43	2.61
1997	4,507	23.70	39.75	16.06	25.53	1.83	26.51	2.81
1998	4,369	23.32	41.78	18.46	26.50	3.18	27.75	4.43
1999	4,043	23.50	42.57	19.08	27.57	4.07	28.99	5.49
2000	3,894	22.06	43.57	21.51	25.80	3.74	27.34	5.28
2001	3,435	22.59	40.80	18.21	25.09	2.50	26.19	3.60

Table 9

Actual and predicted percent of dividend payers for two portfolios based on the existence of stock options using average logistic regression estimates from 1963-1977

For each year between 1963 and 1977 we estimate a logistic regression to explain whether a firm pays dividend in year  $t$ . As explanatory variables in (1) and (3) we use the proportion of NYSE firms with lower market capitalization ( $NYP_t$ ), the earnings-to-assets ratio ( $E_t/A_t$ ), the market-to-book ratio ( $V_t/A_t$ ), and the growth rate of assets ( $dA_t/A_t$ ). We refer to these four variables as “firm characteristics.” In (2) and (4) we also add share turnover for year  $t$  ( $TURN_t$ ) as an explanatory variable. We next create two portfolios based on the number of shares reserved for conversion in year  $t$  for the exercise of stock options ( $CONV\_SO_t$ ). The first portfolio consists of all firms with no shares reserved for conversion in year  $t$ . The second portfolio consists of all firms with positive number of shares reserved for conversion in year  $t$ . Firms is the number of firms in a portfolio for a given year. Actual Percent is the actual percent of payers in a given portfolio. We estimate the individual firm’s probability to pay dividend using the average coefficients from 1963-1977 and the values of the explanatory variables for year  $t$  in the logistic model. We then average these probabilities across the firms in a given portfolio for a given year  $t$  to estimate the Predicted Percent of payers for that portfolio in that year.

	No shares reserved for conversion for the exercise of stock options						Positive number of shares reserved for conversion for the exercise of stock options					
			(1)		(2)				(3)		(4)	
	Actual	Predicted	Predicted	Predicted	Predicted	Predicted	Actual	Predicted	Predicted	Predicted	Predicted	Predicted
Firms	Percent	Percent	– Actual	Percent	– Actual	Firms	Percent	Percent	– Actual	Percent	– Actual	
1984	1,254	42.03	52.61	10.58	52.31	10.29	2,181	40.99	57.17	16.18	55.10	14.11
1985	603	48.59	53.69	5.10	53.65	5.06	2,776	38.04	51.92	13.88	46.21	8.17
1986	588	46.43	50.20	3.77	47.95	1.52	2,862	34.14	48.96	14.83	41.18	7.04
1987	601	44.09	49.95	5.86	47.33	3.24	3,075	30.21	48.56	18.35	39.97	9.76
1988	562	43.59	53.90	10.30	53.17	9.58	3,019	30.34	51.61	21.27	47.14	16.80
1989	547	41.32	52.31	10.99	49.93	8.61	2,906	31.38	51.32	19.93	44.54	13.16
1990	520	40.58	56.03	15.45	54.03	13.45	2,872	31.96	54.14	22.17	47.86	15.89
1991	496	41.33	51.96	10.63	48.91	7.58	2,907	30.89	50.75	19.86	42.49	11.60
1992	488	43.44	54.34	10.89	50.70	7.26	3,097	28.87	49.40	20.53	39.62	10.76
1993	520	42.50	53.82	11.32	47.67	5.17	3,284	27.13	46.99	19.86	35.57	8.44
1994	586	39.42	54.79	15.37	48.87	9.45	3,573	25.24	48.01	22.76	37.77	12.53
1995	670	37.01	51.86	14.85	43.87	6.86	3,555	24.92	47.55	22.63	35.17	10.25

Table 10

Actual and predicted percent of dividend payers using average logistic regression estimates from 1963-1977 and controlling for total shares reserved for conversion

For each year between 1963 and 1995 we estimate a logistic regression to explain whether a firm pays dividend in year  $t$ . As explanatory variables in (1) and (3) we use the proportion of NYSE firms with lower market capitalization ( $NYP_t$ ), the earnings-to-assets ratio ( $E_t/A_t$ ), the market-to-book ratio ( $V_t/A_t$ ), the growth rate of assets ( $dA_t/A_t$ ), and a dummy indicating whether there is a positive number of shares reserved for conversion ( $CONV_t$ ). In (2) and (4) we also add share turnover for year  $t$  ( $TURN_t$ ) as an explanatory variable. Panel A reports the average estimated coefficients for a given period and their  $t$ -statistics in parenthesis. <sup>a, b, c</sup> indicate significance at the 1%, 5%, and 10% level respectively from a two-tailed  $t$ -test. Panel B reports the actual and predicted percent of payers based on the different models. Firms is the number of firms in a given year. Actual Percent is the percent of payers in a given year  $t$ . The Predicted Percent of payers in a given year  $t$  we estimate by using the average coefficients from 1963-1977 and the values of the explanatory variables for each firm for year  $t$  in the logistic model.

Panel A. Dependent variable is the likelihood of the firm to pay dividend in year  $t$ 

	1963-1977		1978-1995	
	(1)	(2)	(3)	(4)
Intercept	0.37 <sup>b</sup> (2.36)	0.68 <sup>a</sup> (4.03)	-0.19 (-1.35)	-0.01 (-0.10)
$NYP_t$	4.33 <sup>a</sup> (33.64)	4.34 <sup>a</sup> (19.47)	5.26 <sup>a</sup> (49.40)	6.00 <sup>a</sup> (41.53)
$V_t/A_t$	-0.77 <sup>a</sup> (-8.70)	-0.69 <sup>a</sup> (-8.46)	-0.80 <sup>a</sup> (-16.23)	-0.66 <sup>a</sup> (-12.84)
$dA_t/A_t$	-0.75 <sup>b</sup> (-2.95)	-0.38 (-1.58)	-0.67 <sup>a</sup> (-7.41)	-0.40 <sup>a</sup> (-6.02)
$ETO_{A_t}$	15.03 <sup>a</sup> (12.53)	14.86 <sup>a</sup> (13.49)	7.04 <sup>a</sup> (18.84)	6.99 <sup>a</sup> (17.01)
$TURN_t$		-1.42 <sup>a</sup> (-8.88)		-1.07 <sup>a</sup> (-24.13)
$CONV_t$	-0.85 <sup>a</sup> (-19.93)	-0.71 <sup>a</sup> (-13.86)	-0.57 <sup>a</sup> (-9.98)	-0.42 <sup>a</sup> (-7.17)

Panel B. Actual and predicted dividend payers based on 1963-1977 estimates

	Firms	Actual Percent	(1)		(2)	
			Predicted Percent	Predicted - Actual	Predicted Percent	Predicted - Actual
1978	2,737	70.30	67.62	-2.67	66.36	-3.93
1979	2,920	65.72	65.84	0.12	65.25	-0.47
1980	2,901	63.22	64.49	1.27	61.62	-1.60
1981	3,023	56.60	62.69	6.09	61.80	5.20
1982	3,132	51.15	57.96	6.81	56.28	5.13
1983	3,238	46.11	51.26	5.15	46.84	0.73
1984	3,435	41.37	53.00	11.63	51.96	10.59
1985	3,379	39.92	49.75	9.82	45.69	5.77
1986	3,450	36.23	46.80	10.56	40.71	4.48
1987	3,676	32.48	46.25	13.77	39.48	6.99
1988	3,581	32.42	49.16	16.74	45.88	13.46
1989	3,453	32.96	48.57	15.61	43.26	10.31
1990	3,392	33.28	51.53	18.25	46.62	13.33
1991	3,403	32.41	48.03	15.61	41.41	9.00
1992	3,585	30.85	47.08	16.23	39.21	8.36
1993	3,804	29.23	45.02	15.79	35.52	6.28
1994	4,159	27.24	46.14	18.89	37.59	10.35
1995	4,225	26.84	45.61	18.77	35.12	8.28

Table 11

Actual and predicted percent of dividend payers using average logistic regression estimates from 1963-1977 and controlling for short- and long-term debt

For each year between 1963 and 2001 we estimate a logistic regression to explain whether a firm pays dividend in year  $t$ . As explanatory variables in (1), (3), and (5) we use the proportion of NYSE firms with lower market capitalization ( $NYP_t$ ), the earnings-to-assets ratio ( $E_t/A_t$ ), the market-to-book ratio ( $V_t/A_t$ ), the growth rate of assets ( $dA_t/A_t$ ), the proportion of short-term debt to assets ( $STD_t/A_t$ ) and the proportion of long-term debt to assets ( $LTD_t/A_t$ ). In (2), (4), and (6) we also add share turnover for year  $t$  ( $TURN_t$ ) as an explanatory variable. Panel A reports the average estimated coefficients for a given period and their  $t$ -statistics in parenthesis. <sup>a, b, c</sup> indicate significance at the 1%, 5%, and 10% level respectively from a two-tailed  $t$ -test. Panel B reports the actual and predicted percent of payers. Firms is the number of firms while Actual Percent is the percent of payers in a given year  $t$ . The Predicted Percent of payers in a given year  $t$  we estimate by using the average coefficients from 1963-1977 and the values of the explanatory variables for each firm for year  $t$  in the logistic model.

Panel A. Dependent variable is the likelihood of the firm to pay dividend in year  $t$

	1963-1977		1978-1992		1993-2001	
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.87 <sup>a</sup> (7.99)	1.22 <sup>a</sup> (8.85)	0.05 (0.22)	0.38 (1.76)	-1.18 <sup>a</sup> (-9.05)	-0.47 (-5.33)
$NYP_t$	4.26 <sup>a</sup> (33.02)	4.31 <sup>a</sup> (19.10)	5.27 <sup>a</sup> (48.33)	6.10 <sup>a</sup> (36.73)	4.22 <sup>a</sup> (21.53)	5.17 <sup>a</sup> (40.90)
$V_t/A_t$	-0.83 <sup>a</sup> (-9.46)	-0.74 <sup>a</sup> (-9.29)	-0.91 <sup>a</sup> (-14.82)	-0.78 <sup>a</sup> (-12.97)	-0.63 <sup>a</sup> (-11.99)	-0.48 <sup>a</sup> (-17.38)
$dA_t/A_t$	-0.61 <sup>c</sup> (-2.10)	-0.22 (-0.79)	-0.60 <sup>a</sup> (-6.25)	-0.33 <sup>a</sup> (-4.31)	-1.26 <sup>a</sup> (-5.85)	-0.87 <sup>a</sup> (-4.62)
$ETOA_t$	13.54 <sup>a</sup> (10.38)	13.45 <sup>a</sup> (11.05)	6.78 <sup>a</sup> (19.62)	6.81 <sup>a</sup> (17.85)	6.49 <sup>a</sup> (29.64)	5.67 <sup>a</sup> (23.95)
$TURN_t$		-1.40 <sup>a</sup> (-9.03)		-1.13 <sup>a</sup> (-21.64)		-1.08 <sup>a</sup> (-25.16)
$STD_t/A_t$	-2.72 <sup>a</sup> (-9.19)	-2.50 <sup>a</sup> (-7.94)	-2.70 <sup>a</sup> (-14.31)	-2.92 <sup>a</sup> (-16.46)	-1.16 <sup>a</sup> (-3.34)	-2.08 <sup>a</sup> (-7.73)
$LTD_t/A_t$	-3.45 <sup>a</sup> (-11.79)	-3.26 <sup>a</sup> (-10.91)	-1.54 <sup>a</sup> (-11.49)	-1.56 <sup>a</sup> (-17.33)	-0.89 <sup>a</sup> (-5.79)	-1.46 <sup>a</sup> (-12.19)

Panel B. Actual and predicted dividend payers based on 1963-1977 estimates

	Actual		(1)		(2)	
	Firms	Percent	Predicted Percent	Predicted - Actual	Predicted Percent	Predicted - Actual
1978	2,729	70.30	70.26	-0.04	68.82	-1.48
1979	2,909	65.72	67.63	1.91	66.84	1.12
1980	2,893	63.22	66.14	2.92	63.20	-0.02
1981	3,011	56.60	64.59	7.99	63.63	7.03
1982	3,131	51.15	60.38	9.23	58.70	7.55
1983	3,233	46.11	54.95	8.84	50.22	4.11
1984	3,429	41.37	56.98	15.61	55.85	14.48
1985	3,373	39.92	53.44	13.52	49.15	9.23
1986	3,443	36.23	50.37	14.14	44.06	7.83
1987	3,667	32.48	49.86	17.38	42.77	10.29
1988	3,577	32.42	52.60	20.18	49.18	16.76
1989	3,447	32.96	52.23	19.27	46.60	13.64
1990	3,391	33.28	55.13	21.85	49.94	16.66
1991	3,403	32.41	52.45	20.04	45.19	12.78
1992	3,585	30.85	52.57	21.72	43.62	12.77
1993	3,804	29.23	50.91	21.68	40.07	10.84
1994	4,155	27.24	51.83	24.59	42.12	14.88
1995	4,225	26.84	50.44	23.60	38.62	11.78
1996	4,520	24.76	48.83	24.07	36.16	11.40
1997	4,513	23.65	48.09	24.44	35.57	11.92
1998	4,371	23.31	48.79	25.48	35.96	12.65
1999	4,043	23.50	48.64	25.14	36.15	12.65
2000	3,895	22.05	49.46	27.41	34.45	12.40
2001	3,435	22.59	47.48	24.89	34.16	11.57

Table 12

Estimates from logistic regressions to explain dividend payers controlling for institutional ownership, share repurchases, shares reserved for conversion, and leverage

For each year between 1980 and 1995 we estimate a logistic regression to explain whether a firm pays dividend in year  $t$ . As explanatory variables we use the proportion of NYSE firms with lower market capitalization ( $NYP_t$ ), the earnings-to-assets ratio ( $E_t/A_t$ ), the market-to-book ratio ( $V_t/A_t$ ), the growth rate of assets ( $dA_t/A_t$ ), share turnover for year  $t$  ( $TURN_t$ ), the proportions of shares owned by of banks, insurance companies, pension funds, and university endowments ( $INST\_TA_t$ ), the proportion of shares owned by investment advisors and investment companies ( $INST\_NTA_t$ ), the proportion of dollar amount of shares repurchased to assets ( $REP_t/A_t$ ), a dummy indicating whether there is a positive number of shares reserved for conversion ( $CONV_t$ ), the proportion of short-term debt to assets ( $STD_t/A_t$ ), and the proportion of long-term debt to assets ( $LTD_t/A_t$ ). The table reports the average estimated coefficients for a given period and their  $t$ -statistics in parenthesis. <sup>a</sup> indicates significance at the 1% level from a two-tailed  $t$ -test.

	Coefficient estimate	$t$ -statistic
Intercept	0.17	(0.89)
$NYP_t$	4.77 <sup>a</sup>	(28.49)
$V_t/A_t$	-0.64 <sup>a</sup>	(-10.06)
$dA_t/A_t$	-0.33 <sup>c</sup>	(-5.35)
$ETOA_t$	6.20 <sup>a</sup>	(17.97)
$TURN_t$	-1.22 <sup>a</sup>	(-22.46)
$INST\_TA_t$	4.16 <sup>a</sup>	(8.87)
$INST\_NTA_t$	1.56 <sup>a</sup>	(7.66)
$REP_t/A_t$	1.82 <sup>a</sup>	(3.12)
$CONV_t$	-0.46 <sup>a</sup>	(-6.55)
$STD_t/A_t$	-2.54 <sup>a</sup>	(-15.08)
$LTD_t/A_t$	-1.44 <sup>a</sup>	(-15.19)