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Payout Policy

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Payout Policy

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Abstract

This paper surveys the literature on payout policy. We start with a description of the Miller-Modigliani payout irrelevance proposition, and then consider the effect of relaxing the assumptions on which it is based. We consider the role of taxes, asymmetric information, incomplete contracting possibilities, and transaction costs. The accumulated evidence indicates that changes in payout policies are not motivated by firms' desire to signal their true worth to the market. Both dividends and repurchases seem to be paid to reduce potential overinvestment by management. We also review the issue of the form of payout and the increased tendency to use open market share repurchases. Evidence suggests that the rise in the popularity of repurchases increased overall payout and increased firms' financial flexibility.

1. Introduction

How much cash should firms give back to their shareholders? And what form should payment take? Should corporations pay their shareholders through dividends or by repurchasing their shares, which is the least costly form of payout from a tax perspective? Firms must make these important decisions over and over again (some must be repeated and some need to be reevaluated each period), on a regular basis.

Because these decisions are dynamic they are labeled as *payout policy*. The word "policy" implies some consistency over time, and that payouts, and dividends in particular, do not simply evolve in an arbitrary and random manner. Much of the literature in the past forty years has attempted to find and explain the pattern in payout policies of corporations.

The money involved in these payout decisions is substantial. For example, in 1999 corporations spent more than $350b on dividends and repurchases and over $400b on liquidating dividends in the form of cash spent on mergers and acquisitions.[1]

Payout policy is important not only because of the amount of money involved and the repeated nature of the decision, but also because payout policy is closely related to, and interacts with, most of the financial and investment decisions firms make. Management and the board of directors must decide the level of dividends, what repurchases to make (and the mirror image decision of equity issuance), the amount of financial slack the firm carries (which may be a non-trivial amount; for example, at the end of 1999, Microsoft held over $17b in financial slack), investment in real assets, mergers and acquisitions, and debt issuance. Since capital markets are neither perfect nor complete, all of these decisions interact with one another.

Understanding payout policy may also help us to better understand the other pieces in this

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[1] Data on dividend and repurchases are from CRSP and Compustat. Data on cash M&A activity (for U.S. firms as acquirers only) is from SDC.

puzzle. Theories of capital structure, mergers and acquisitions, asset pricing, and capital budgeting all rely on a view of how and why firms pay out cash.

Six empirical observations play an important role in discussions of payout policies:

1. Large, established corporations typically pay out a significant percentage of their earnings in the form of dividends and repurchases.

2. Historically, dividends have been the predominant form of payout. Share repurchases were relatively unimportant until the mid-1980s, but since then have become an important form of payment.

3. Among firms traded on organized exchanges in the U.S., the proportion of dividend-paying firms has been steadily declining. Since the beginning of the 1980s, most firms have initiated their cash payment to shareholders in the form of repurchases rather than dividends.

4. Individuals in high tax brackets receive large amounts in cash dividends and pay substantial amounts of taxes on these dividends.

5. Corporations smooth dividends relative to earnings. Repurchases are more volatile than dividends.

6. The market reacts positively to announcements of repurchase and dividend increases, and negatively to announcements of dividend decreases.

The challenge to financial economists has been to develop a payout policy framework where firms maximize shareholders' wealth and investors maximize utility. In such a framework payout policy would function in a way that is consistent with these observations and is not rejected by empirical tests.

The seminal contribution to research on dividend policy is that of Miller and Modigliani (1961). Prior to their paper, most economists believed hat the more dividends a firm paid, the more valuable the firm would be. This view was derived from an extension of the discounted dividends approach to firm valuation, which says that the value V_0 of the firm at date 0, if the first dividends are paid one period from now at date 1, is given by the formula:

$$V_0 = \sum_{t=1}^{\infty} \frac{D_t}{(1 + r_t)^t} \qquad (1)$$

where

D$_t$ = the dividends paid by the firm at the end of period t

r$_t$ = the investors' opportunity cost of capital for period t

Gordon (1959) argued that investors' required rate of return r_t would increase with retention of earnings and increased investment. Although the future dividend stream would presumably be larger as a result of the increase in investment (i.e., D_t would grow faster), Gordon felt that higher r_t would overshadow this effect. The reason for the increase in r_t would be the greater uncertainty associated with the increased investment relative to the safety of the dividend.

Miller and Modigliani (1961) pointed out that this view of dividend policy incomplete and they developed a rigorous framework for analyzing payout policy. They show that what really counts is the firm's investment policy. As long as investment policy doesn't change, altering the mix of retained earnings and payout will not affect firm's value. The Miller and Modigliani framework has formed the foundation of subsequent work on dividends and payout policy in general. It is important to note that their framework is rich enough to encompass both dividends and repurchases, as the only determinant of a firm's value is its investment policy.

The payout literature that followed the Miller and Modigliani article attempted to reconcile the indisputable logic of their dividend irrelevance theorem with the notion that both

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managers and markets care about payouts, and dividends in particular. The theoretical work on this issue suggests five possible imperfections that management should consider when it determines dividend policy:

(i) *Taxes* If dividends are taxed more heavily than capital gains, and investors cannot use dynamic trading strategies to avoid this higher taxation, then minimizing dividends is optimal.

(ii) *Asymmetric Information* If managers know more about the true worth of their firm, dividends can be used to convey that information to the market, despite the costs associated with paying those dividends. (However, we note that with asymmetric information, dividends can also be viewed as bad news. Firms that pay dividends are the ones that have no positive NPV projects in which to invest.)

(iii) *Incomplete Contracts* If contracts are incomplete or are not fully enforceable, equityholders may, under some circumstances, use dividends to discipline managers or to expropriate wealth from debtholders.

(iv) *Institutional Constraints*. If various institutions avoid investing in non- or low-dividend-paying stocks because of legal restrictions, management may find that it is optimal to pay dividends despite the tax burden it imposes on individual investors.

(v) *Transaction Costs*.   If dividend payments minimize transaction costs to equityholders (either direct transaction costs or the effort of self control), then positive dividend payout may be optimal.

In section 2 we elaborate further on some of the empirical observations about corporate payout policies. Section 3 reviews the Miller and Modigliani analysis. Subsequent sections recount the literature that has relaxed their assumptions in various ways.

2. Some Empirical Observations on Payout Policies

In the previous section we state six important empirical findings about corporate payout policies. Table 1 and Figure 1 illustrate the first observation that corporations pay out a substantial portion of their earnings. Table 1 shows that for U.S. industrial firms, dollar expenditures on both dividends and repurchases have increased over the years.

The table also illustrates the second empirical observation above. It shows that dividends have been the dominant form of payout in the early period, but that repurchases have become more and more important through the years. For example, during the 1970s the average dividend payout was 38% and the average repurchase payout was 3%. By the 1990s the average dividend payout was 58% and the average repurchase payout was 27%. From these numbers it appears U.S. corporations paid out over 80% of their earnings to shareholders.[2] Clearly, payments to shareholders through dividends and repurchases represent a significant portion of corporate earnings. However, we note that these numbers are tilted towards large firms since we calculate payout as: $(\Sigma Div / \Sigma Earnings)$. In addition, aggregate earnings (i.e., the denominator) contain many negative earnings. This is especially true in the later period, when more and more small, not yet profitable, firms registered on Nasdaq. When we calculate payout for each firm and then average across firms (equal weighted) the overall payout relative to earnings is around 25%. (Grullon and Michaely, 2002, Figure 1).

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2 See also Dunsby (1993) and Allen and Michaely (1995).

To further illustrate the second observation, Figure 1 shows the evolution of dividend yield (total dividends over market value of equity), repurchase yield (repurchases over market value of equity) and payout yield (dividends plus repurchases over market value of equity) since the early 1970s. Whether we examine repurchases relative to earnings or to the market value of the firm, it is clear that repurchases as a payout method were not a factor until the mid-1980s. It is interesting that in the 1990s, firms' average total yield remained more or less constant while the dividend yield declined and the repurchase yield increased.

The third observation is that dividends are now being paid by fewer firms. As we can see in Figure 2, Fama and French (2001) show that the proportion of firms that pay dividends (among all CRSP listed firms) has fallen dramatically over the years, regardless of their earnings level. Prior to the 1980's firms that initiated a cash payment usually did so with dividends. But since the beginning of the 1980s, most firms have initiated cash payments with repurchases. Figure 3 documents this observation for U.S. industrial firms. We define a cash distribution initiation as the first time after 1972 that a firm pays dividends and/or repurchases shares. Figure 3 shows that the proportion of firms that initiated a cash distribution by using only share repurchases increased from less than 27% in 1974 to more than 81% in 1998. Share repurchase programs have now become the preferred method of payout among firms initiating cash distributions to their equityholders. (For earlier evidence on trend in repurchases see Bagwell and Shoven, 1989)

The fourth observation is that individuals pay substantial taxes on the large amounts of dividends that they receive. We collected information from the Federal Reserve's Flow of Funds Accounts for the United States, and from the IRS, SOI Bulletin about total dividends paid and the amounts received by individuals and corporations for the years 1973-1996. Table 2 presents

the results. In most of the years in our sample (1973-1996) individuals received more than 50% of the dividends paid out by corporations. Moreover, most of these dividends were received by individuals in high tax brackets (those with annual gross income over $50,000).

Peterson, Peterson, and Ang (1985) conducted a study of the tax returns of individuals in 1979. More than $33b of dividends were included in individuals' gross income that year. The total of dividends paid out by corporations in 1979 was $57.7b, so individuals received over two-thirds of that total. The average marginal tax rate on these dividends received by individuals (weighted by dividends received) was 40%.

The fact that individuals pay considerable taxes on dividends has been particularly important in the dividend debate, because there appears to be a substantial tax disadvantage to dividends compared to repurchases. Dividends are taxed as ordinary income. Share repurchases are taxed on a capital gains basis. Since the tax rate on capital gains has usually been lower than the tax rate on ordinary income, investors had an advantage if firms repurchased, rather than paid dividends. Even after the 1986 Tax Reform Act (TRA) when the tax rates on ordinary income and capital gains were equal for several years, there was a tax disadvantage to dividends because capital gains were only taxed on realization. In the 2001 tax code, long-term capital gains are lower than ordinary income for most individual investors. For example, an investor in the highest marginal tax bracket pays 39.6% taxes on dividends and only 20% tax on long-term capital gains. Black (1976) calls the fact that corporations pay such large amounts of dividends despite the existence of another, relatively untaxed, payout method, the "dividend puzzle."

The fifth observation is that corporations smooth dividends. From Table 1, we can see that during the entire 1972-1998 period, aggregate dividends fell only twice (in 1992 and in 1998), and then only by very small amounts. On the other hand, aggregate earnings fell five

times during the same time period and the drop was larger. Unlike dividends, repurchases are more volatile and more sensitive to economic conditions. During the recession in the early 1970s, firms cut repurchases. They did this again during the recession of the early 1990s. Overall, between 1972 and –1998, aggregate repurchases fell seven times.

Firms usually increase dividends gradually and rarely cut them. Table 3 shows the number of dividend increases and decreases for over 13,000 publicly held issues, for the years 1971 to 2001 (Moody's dividend records, 1999 and S&P's dividend book, 2001). In each year, the number of dividend cuts is much smaller than the number of dividend increases. For example, in 1999, there were 1,763 dividend increases or initiations, but only 121 cuts or omissions.

In a classic study, Lintner (1956) showed that dividend-smoothing behavior was widespread. He started with over 600 listed companies and selected 28 to survey and interview. Linter did not select these companies as a statistically representative sample, but chose them to encompass a wide range of different situations.

Lintner made a number of important observations concerning the dividend policies of these firms. The first is that firms are primarily concerned with the stability of dividends. Firms do not set dividends de novo each quarter. Instead, they first consider whether they need to make any changes from the existing rate. Only when they have decided a change is necessary do they consider how large it should be. Managers appear to believe strongly that the market puts a premium on firms with a stable dividend policy.

Second, Lintner observed that earnings were the most important determinant of any change in dividends. Management needed to explain to shareholders the reasons for its actions, and needed to base its explanations on simple and observable indicators. The level of earnings

was the most important of these. Most companies appeared to have a target payout ratio; if there was a sudden unexpected increase in earnings, firms adjusted their dividends slowly. Firms were very reluctant to cut dividends.

Based on interviews of the 28 firms' management teams, Lintner reported a median target payout ratio of 50%. Despite the very small sample and the fact that the study was conducted nearly half a century ago, the target payout ratio is not far from what we present in table 1 for all U.S. industrial firms over a much longer time period.

Lintner's third finding was that management set dividend policy first. Other policies were then adjusted, taking dividend policy as given. For example, if investment opportunities were abundant and the firm had insufficient internal funds, it would resort to outside funds.

Lintner suggested that the following model captured the most important elements of firms' dividend policies. For firm i,

$$D^*_{it} = \alpha_i E_{it}, \tag{2}$$

$$D_t - D_{t-1} = a_i + c_i(D^*_{it} - D_{i(t-1)}) + u_{it}, \tag{3}$$

where for firm i

$\quad D^*_{it}$ = desired dividend payment during period t

$\quad D_{it}$ = actual dividend payment during period t

$\quad \alpha_i$ = target payout ratio

$\quad E_{it}$ = earnings of the firm during period t

$\quad a_i$ = a constant relating to dividend growth

$\quad c_i$ = partial adjustment factor

$\quad u_{it}$ = error term

This model was able to explain 85% of the dividend changes in his sample of companies.

Fama and Babiak (1968) undertook a comprehensive study of the Lintner model's performance, using data for 392 major industrial firms over the period 1946 through 1964. They also found the Lintner model performed well. Over the years, other studies have confirmed this.

The sixth observation is that the market usually reacts positively to announcements of increases in payouts and negatively to announcements of dividend decreases. This phenomenon has been documented by many studies, such as Pettit (1972), Charest (1978), Aharony and Swary (1980), and Michaely, Thaler, and Womack (1995) for dividends, and by Ikenberry, Lakonishok, and Vermaelen (1995) for repurchases. This evidence is consistent with managers knowing more than outside shareholders, and dividends and repurchases changes provide some information on future cash flows (e.g., Bhattacharya, 1979, or Miller and Rock, 1985), or about the cost of capital (Grullon, Michaely and Swaminathan, 2002, Grullon and Michaely 2000). The evidence is also consistent with the notion that when contracts are incomplete, higher payouts can sometimes be used to align management's interest with that of shareholders', as suggested by Grossman and Hart (1982), Easterbrook (1984) and Jensen (1986).

3. The Miller-Modigliani Dividend Irrelevance Proposition

Miller and Modigliani (1961) showed that in perfect and complete capital markets, a firm's dividend policy does not affect its value. The basic premise of their argument is that firm value is determined by choosing optimal investments. The net payout is the difference between earnings and investment, and is simply a residual. Because the net payout comprises dividends and share issues/repurchases, a firm can adjust its dividends to any level with an offsetting change in shares outstanding. From the perspective of investors, dividend policy is irrelevant,

because any desired stream of payments can be replicated by appropriate purchases and sales of equity. Thus, investors will not pay a premium for any particular dividend policy.

To illustrate the argument behind the theorem, suppose there are perfect and complete capital markets (with no taxes). At date t, the value of the firm is

$$V_t = \text{present value of payouts}$$

where payouts include dividends and repurchases. For ease of exposition, we initially consider the case with two periods, t and t + 1. At date t, a firm has

- earnings, E_t, (earned previously) on hand.

It must decide on

- the level of investment, I_t

- the level of dividends, D_t

- the amount of shares to be issued, ΔS_t (or repurchased if ΔS_t is negative)

The level of earnings at t + 1, denoted $E_{t+1}(I_t, \theta_{t+1})$, depends on the level of investment I_t and a random variable θ_{t+1}. Since t + 1 is the final date, all earnings are paid out at t + 1. Given complete markets, let

$$p_t(\theta_{t+1}) = \text{time t price of consumption in state } \theta_{t+1}$$

Then it follows that

$$V_t = D_t - \Delta S_t + \int p_t(\theta_{t+1})E_{t+1}(I_t, \theta_{t+1})d\theta_{t+1} \tag{4}$$

The sources and uses of funds identity says that in the current period t:

$$E_t + \Delta S_t = I_t + D_t \tag{5}$$

Using this to substitute for current payouts, $D_t - \Delta S_t$, gives

$$V_t = E_t - I_t + \int p_t(\theta_{t+1})E_{t+1}(I_t, \theta_{t+1})d\theta_{t+1} \tag{6}$$

From equation (6) we can immediately see the first insight from Miller and Modigliani's analysis. . Since E_t is given, the only determinant of the value of the firm is current investment I_t.

This analysis can be extended to the case with more than two periods. Now

$$V_t = E_t - I_t + V_{t+1} \tag{7}$$

where

$$V_{t+1} = E_{t+1}(I_t, \theta_{t+1}) - I_{t+1} + V_{t+2} \tag{8}$$

and so on, recursively. It follows from this extension that it is only the sequence of investments $I_t, I_{t+1}, ...$ that is important in determining firm value. Firm value is maximized by making an appropriate choice of investment policy.

The second insight from the Miller-Modigliani analysis concerns the firm's dividend policy, which involves setting the value of D_t each period. Given that investment is chosen to maximize firm value, the firm's payout in period t, $D_t - \Delta S_t$, must be equal to the difference between earnings and investment, $E_t - I_t$. However, the level of dividends, D_t, can take any value, since the level of share issuance, ΔS_t, can always be set to offset this. It follows that dividend policy does not affect firm value at all. It is only investment policy that matters.

The analysis above implicitly assumes 100% equity financing. It can be extended to include debt financing. In this case management can finance dividends by using both debt and equity issues. This added degree of freedom does not affect the result. As with equity-financed dividends, no additional value is created by debt-financed dividends, since capital markets are perfect and complete so the amount of debt does not affect the total value of the firm.

The third and perhaps most important insight of Miller and Modigliani's analysis is that it identifies the situations in which dividend policy can affect firm value. It could matter, not

because dividends are "safer" than capital gains, as was traditionally argued, but because one of the assumptions underlying the result is violated.

Perfect and complete capital markets have the following elements:

1. No taxes

2. Symmetric information

3. Complete contracting possibilities

4. No transaction costs

5. Complete markets

It is easy to see the role played by each of the above assumptions. The reason for Assumption 1 is clear. In the no-taxes case, it is irrelevant whether a firm pays out dividends or repurchases shares; what is important is $D_t - \Delta S_t$. If dividends and share repurchases are taxed differently, this is no longer the case. Suppose, for example, dividends are taxed at a higher rate than capital gains from share repurchases. Then it is optimal not to pay dividends, but instead to pay out any residual funds by repurchasing shares. In section 5 we discuss the issues raised by relaxing Assumption 1.

Assumption 2 is that all participants (including the firms) have exactly the same information set. In practice, this is rarely the case. Managers are insiders and are likely to know more about the current and future prospects of the firm than outsiders. Dividends can reveal some information to outsiders about the value of the corporation. Moreover, insiders might even use dividends to deliberately change the market's perception about the firm's value. Again, dividend policy can affect firm value. Sections 6.1 and 7.1 consider the effect of asymmetric information.

The complete contracting possibilities specified in Assumption 3 mean that there is no agency problem between managers and security holders, for example. In this case, motivating the decisions of managers is possible through the use of enforceable contracts. Without complete contracting possibilities, dividend policy could, for example, help ensure that managers act in the interest of shareholders. A high payout ratio cause management to be more disciplined in the use of the firm's resources and consequently increase firm value. We cover these issues in sections 6.2 and 7.2.

Assumption 4 concerns transaction costs. These come in a variety of forms. For example, firms can distribute cash through dividends and raise capital through equity issues. If flotation costs are significant, then every trip to the capital market will reduce the firm's value. This means changing dividend policy can change the value of the firm. By the same token, when investors sell securities and make decisions about such sales, the transaction costs that investors incur can also result in dividend policy affecting the value of the firm. Section 8 develops several transaction-cost-related theories of dividend policy.

Assumption 5 is that markets are complete. To illustrate why this is important, assume that because trading opportunities are limited, there are two groups with different marginal rates of substitution between current and future consumption. By adjusting its dividend policy, a firm might be able to increase its value by appealing to one of these groups. The literature has paid very little attention to explanations such as these for dividend policy. Nevertheless, these explanations could be important if some investors wish to buy stocks with a steady income stream, and markets are incomplete because of high transaction costs. Further analysis in this area might provide some insights into dividend policy.

Another issue that is central to our survey is the form of the payout. One area of significant growth in the literature is related to the role of repurchases as a form of payout, not only because repurchases have become more popular (Table 1), but also because of the research concerning the reasons for repurchases and the interrelation between dividends and repurchases. In section 4 we define corporate payout, both conceptually and empirically. In section 9 we review in detail the recent developments concerning repurchases.

4. How Should We Measure Payout?

The Miller and Modigliani framework defines payout policy as the net payout to shareholders. However, most empirical work measures payout only by the amount of dividends the firms pay. Such studies do not consider repurchases. Neither do they factor in either net payout (accounting for capital raising activities) or cash spent on mergers and acquisitions.

If we wish to find out how much cash corporations pay out (relative to their earnings) at the aggregate level, we need to consider some of the aggregate measures, such as the one presented in Table 1, namely, aggregate dividends plus aggregate repurchases relative to aggregate earnings. But even this measure is incomplete. First, shareholders also receive cash payouts from corporations through mergers and acquisitions that are accomplished through cash transactions. That is, shareholders of the acquired firms receive a cash payment that can be viewed as a liquidating (or final) dividend.

Using data from SDC, Table 4 presents the magnitude of such payments. For each year we calculate the total dollar amount that was paid to U.S. corporations in all cash M&A deals. (Note that this figure is a lower bound, since it does not account for deals in which payment was partially in cash and partially in stocks.) The amount is not trivial and it does vary by year. This

type of liquidating dividend seems to have a significant weight in the aggregate payout of U.S. corporations. For example, in 1999, proceeds from cash M&As were more than the combined cash distributed to shareholders through dividends and repurchases combined.

Our next measure accounts not only for the outflow of funds from corporations to their shareholders, but also for the inflow of funds. Columns 3 and 4 in Table 4 present the dollar amount of capital raised by U.S. corporations through SEOs and IPOs. Column 5 reports the net amount (cash from M&As minus proceeds from IPOs and SEOs). It is clear that these are significant amounts. When we compare Tables 1 and 4, we see that in the last decade these amounts are as large as the cash payments through dividends and repurchases combined. We are also interested to see its impact on the overall aggregate payout. Clearly, in some years the aggregate payout is higher than after-tax earnings.

One can also define the aggregate payout as the total transfer of cash from the corporate sector to the private sector. This definition contains three elements: dividends paid to individual investors, repurchase of shares from individual investors, and net cash M&A activity where the proceeds are going to the private sector.

Using this definition and information from the *IRS Statistics of Income* and the *Federal Reserve Flow of Funds* publications, we can recalculate a rough measure of the total payout to the private sector over the years. We base this measure on the total dividends, repurchases, and cash M&A activity. We assume that the proportional holdings of each group (individuals, corporations and institutions) is the same for all firms in the economy.

In Table 2, we calculate the portion of shares held by individual investors (using information from Table L-312 from the *Federal Reserve Flow of Funds*).[3] Using this ratio, we

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[3] Total dividends are taken from Table F-7 (distribution of national income) of the Flow of Funds Accounts of the U.S. The portion of dividends received by individuals is from Table 1 of the SOI Bulletin, Winter 1999-2000.

can approximate the portion of repurchased shares and net cash M&As that went to the private sector. For example, in 1995, the private sector received $94b in dividends (see Table 2), $82b in cash M&As (57.9% of shares owned by individuals multiplied by $143b of net cash M&As, see Tables 2 and 4), and roughly $50b in repurchases (57.9% of shares owned by individuals multiplied by $72.3b of repurchases; see Tables 1 and 2). We note that out of total cash payments to the private sector of around $219b, less than half is through "formal" dividends. Table 5 presents the cash payout that goes to the private sector (dividends, repurchases, and net cash M&As) for the various years.

These issues have not received much attention in the literature. We believe they should. It is difficult to take a position on payout policy before we correctly measure it.

An equally interesting issue is to analyze the payout, its components, and the relation between payout and earnings at the firm level. For example, we think it would be interesting to investigate the type of firm that gives its shareholders liquidating dividends, and how such dividends relate to other types of payout. Analyzing the interaction between total payout, dividends, and the recent surge in repurchases would also require information on individual firms' payout policies. But at the firm level, there may be another problem in the definition of payout relative to earnings, since a significant portion of firms have negative earnings. For these firms, it is not possible to define a total payout ratio, a repurchase payout ratio, or a dividend payout ratio.

Our discussion highlights several important points. First, in our opinion, the main issue is not whether one measure is better than another. Instead, we ask, what is the question that we are trying to answer? This question in turn should have an impact on which definition of payout we use.

The issue of how to define payout is also very relevant to the excess volatility literature. For example, Ackert and Smith (1993) showed that the results of variance-bound tests depend on how we measure cash distributions to shareholders. When they used only stated dividends, they found evidence of excess volatility. When the payout measure included share repurchase and takeover distributions as well, they did not find evidence of excess volatility. It is likely that using the net total payout to investors will add some variability to cash flows. It may also reduce even further the discrepancy between cash flow volatility and price volatility. In our opinion, this issue is worthy of further research.

Second, it is clear that most of the finance literature has analyzed the payout policy question using only the very narrow definition of dividend payout. Some studies have attempted to analyze repurchase payout. But with only a few exceptions, the literature does not cover the issue of total payout, its composition, and determination. This lacuna is understandable, given the fact that over many years, dividends were the most prominent form of payout. But this is not so anymore. Thus, to a great extent our review article reflects the current literature. We devote more space and put more emphasis on dividends relative to the other forms of payouts. We hope future research will explore the other aspects of payout policy and their implications.

5. Taxes

Much of the literature on payout policy focuses on the importance of taxes, and tries to reconcile several of the empirical observations discussed in our introduction. Firms pay out a large part of their earnings as dividends; many of the recipients are in high tax brackets. Firms did not traditionally use repurchases as a method of payout. The basic aim of the tax-related

literature on dividends has been to investigate whether there is a tax effect: All else equal, we ask if firms that pay out high dividends are less valuable than firms that pay out low dividends.

Two basic ideas are important to understanding how to interpret the results of these investigations:

1. Static clientele models:

    (i) Different groups, or "clienteles," are taxed differently. Miller and Modigliani (1961) argued that firms have an incentive to supply stocks that minimize the taxes of each clientele. In equilibrium, no further possibilities for reducing taxes will exist and all firms will be equally priced.

    (ii) A particular case (labeled as the simple static model) is when all investors are taxed the same way, and capital gains are taxed less than dividend income. In this case, the optimal policy is not to pay dividends. Firms with high dividend yields would be worth less than equivalent firms with low dividend yields.

2. Dynamic clientele model: If investors can trade through time, tax liabilities can be reduced even further. The dividend-paying stock will end up (just before the ex-dividend day) in the hands of those who are taxed the least when the dividend is received. Such trades will be reversed directly after the ex-day.

The empirical studies of dividend policy have tried to distinguish between the different versions of these models by attempting to identify one or more of the following:

    (i) Is there a tax effect so that low-dividend-paying stocks are more valuable than high dividend stocks?

(ii)   Do static tax clienteles exist so that the marginal tax rates of high-dividend stockholders are lower than those of low-dividend stockholders?

(iii)   Do dynamic tax clienteles exist so that there is a large volume around the ex-dividend day, and low-tax-rate investors actually receive the dividend?

This literature has traditionally been divided into CAPM-based studies and ex-dividend day studies. In our view, more insight is gained by comparing static to *dynamic* models. In the static models, investors trade only once. Thus, with the objective of minimizing taxes (keeping all else constant), investors must make a long-term decision about their holdings. The buy-and-hold CAPM studies, such as Litzenberger and Ramaswamy (1979), and Miller and Scholes (1982), fall into this category. The Elton and Gruber (1970) study is similar in that respect. Investors are allowed to trade only once, either on the cum-day or on the ex-day, but not on both. As we shall show, a static view is appropriate when transaction costs are exceedingly high, or when tax payments have been reduced to zero in the static clientele model.

In contrast, in dynamic models, investors are allowed to take different positions at different times. These models take into account risk, taxes, and transaction costs. Just before the ex-day, dividend-paying stocks can flow temporarily to the investors who value them the most.

5.1 Static models

First, we look at the special case in which all investors are taxed in the same way and the tax rate on dividend income is higher than the tax rate on capital gains income. In otherwise perfect capital markets, the optimal policy is to pay no dividends. Equityholders are better off receiving profits through repurchases or selling their shares so that they pay capital gains taxes rather than the higher taxes on dividends. Most U.S. corporations have not followed this

scenario. For a long time, many firms have paid dividends regularly and have rarely repurchased their shares. On the face of it, this behavior is puzzling, especially if we believe that agents in the market place behave in a rational manner. The basic assumption of this simple static model is that for all investors there is a substantial tax disadvantage to dividends because they are taxed (heavily) as ordinary income, while share repurchases are taxed (lightly) as capital gains.

But even if the statutory tax rates on dividends and capital gains were equal (and usually, they have not been), from a tax perspective receiving unrealized capital gains is superior to dividend payments.

The first reason is that capital gains do not have to be realized immediately, and thus the associated tax can be postponed. An investor's ability to postpone may generate considerable value. Imagine a stock with an expected annual return of 15%, and an investor with a marginal tax rate of 20% on long-term capital gains. Say the investor has $1000 and an investment horizon of ten years, and consider whether she should realize gains at the end of each year or wait and realize all gains at the end of the tenth year. Under the first strategy, her final wealth would be $3,106. Under the second strategy it would be $3,436, a substantial difference.

Second, investors can choose when to realize capital gains (unlike dividends, for which they have no choice in the timing). In a more formal setting, Constantinides (1984) showed that investors should be willing to pay for this option to delay capital gains realization, and labeled it the "tax timing option."

In reality, of course, not all investors are taxed as individuals. Many financial institutions, such as pension funds and endowments, do not pay taxes. They have no reason to prefer capital gains to dividends, or vice versa. Individuals hold stocks directly or indirectly, and so do corporations. One of the principal reasons corporations hold dividend-paying stocks as

both a form of near-cash assets and as an investment is because under the U.S. tax code, a large fraction of intercorporate dividends are exempt from taxation, but intercorporate (or government) interest payments are not. Under the old tax code, only 15% of dividends, deemed taxable income, were taxed, so the effective tax rate on dividends received was 0.15 x 0.46 (marginal corporate tax rate) = 6.9%. But corporations had to pay the full amount of taxes on any realized gains. Under the current tax code, 30% of dividends are taxed.[4]

In a clientele model, taxpayers in different groups hold different types of assets, as illustrated in the stylized example below. Individuals hold low-dividend-payout stocks. Medium-dividend-payout firms are owned by people who can avoid taxes, or by tax-free institutions. Corporations own high-dividend-payout stocks. Firms must be indifferent between the three types of stock, or they would increase their value by issuing more of the type that they prefer.

How are assets priced in this model? Since firms must be indifferent between the different types of assets, the assets must be priced so they are equally desirable. To show how this works, we use the following example:

Suppose there are three groups that hold stocks:

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[4] Prior to the 1986 Tax Reform Act (TRA), individual investors who held a stock for at least six months paid a lower tax on capital gains (20%) than on ordinary dividends (50%). The TRA eliminated all distinctions between capital gains and ordinary income. However, it is still possible to defer taxes on capital gains by not realizing the gains. Before the 1986 TRA, a corporation that held the stock of another corporation paid taxes on only 15% of the dividend. Therefore, the effective tax rate for dividend income was 0.15 x 0.46 = 0.069. After the TRA, the corporation income tax rate was reduced to 34%. The fraction of the dividend exempted from taxes was also reduced to 70%. The effective tax rate for dividend income was therefore increased to 0.3 x 0.34 = 0.102. In both time periods, the dividend exemption could be as high as 100% if the dividend-paying corporation was a wholly owned subsidiary of the dividend-receiving corporation.

(i)   Individuals who are in high tax brackets and pay high taxes on dividend-paying stocks. These investors are subject to a 50% tax rate on dividend income and a 20% tax rate on capital gains.

(ii)   Corporations whose tax situation is such that they pay low taxes on stocks that pay dividends. Their tax rate on dividend income is 10% and is 35% on capital gains.

(iii)   Institutions that pay no taxes. Their opportunity cost of capital, determined by the return available in investment other than securities, is 10%.

Assume that these groups are risk neutral, so risk is not an issue. All that matters is the after-tax returns to the stocks. (We note that in this stylized market, a tax clientele is a result of both the risk neutrality assumption *and* the trading restrictions.)

There are three types of stock. For simplicity, we assume that each stock earnings per share of $100. The only difference between these shares is the form of payout. Table 6 describes the after-tax cash flow for each group if they held each type of stock.

In this example, individuals with high tax brackets will hold low-payout shares, corporations will hold the high-payout shares, and institutions will be prepared to hold all three. The asset holdings of these three groups are shown in Table 7.

To show why the shares must all have the same price, if the price of low-payout shares was $1050 and the prices of the high- and medium-payout stocks was $1000, what would happen? High- and medium-payout firms would have an incentive to change their dividend policies and increase the supply of low-payout stocks. This change would put downward pressure on the price of low payout stock. What amount of stock do investors demand? Individuals would still be prepared to buy the low-payout stock, since $80/$1050 = 7.62%,

which is greater than the 6.5% ($65/$1000) they would obtain from holding medium-payout stocks, or the 5% ($50/$1000) they would obtain from holding low-payout stocks. What about institutions? They' will not be prepared to hold low-payout stocks, since the return on them is $100/$1050 = 9.52%. This return is less than the 10% ($100/$1000) they can get on the other two stocks and the opportunity cost they obtain from holding foreign assets, so they will try to sell. Again, there is downward pressure on the price of low-payout stock. Therefore, the price must fall from $1050 to $1000 for equilibrium to be restored. A similar argument explains why the prices of other stocks are also $1000. Thus, in equilibrium, the price is independent of payout policy and dividend policy is irrelevant, as in the original Miller and Modigliani theory.[5]

Several studies have attempted to distinguish between the case of the static model in which everybody is taxed the same, and the static *clientele* model in which investors are taxed differently. Perhaps the easiest way to make the distinction is to investigate the relation between the marginal tax rates of stockholders and the amount of dividends paid.

Blume, Crockett, and Friend (1974) found some evidence from survey data that there is a modest (inverse) relation between investors' tax brackets and the dividend yield of the stocks they hold. Lewellen, Stanley, Lease and Schlarbaum (1978), using individual investor data supplied by a brokerage firm, found very little evidence of this type of effect. Both studies indicate that investors in high tax brackets hold substantial amounts of dividend-paying stock.

Table 2 corroborates these findings for the last 30 years. It is evident that individuals in high tax brackets hold substantial amounts of dividend-paying stocks. There is no evidence that their dividend income relative to capital gains income is lower than that of investors in low tax

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[5] The equilibrium here is conceptually different from the one in Miller (1977). Miller presents an equilibrium in which there is a strict clientele. In the equilibrium here, potential arbitrage by institutions ensures one price for all stocks, regardless of their dividend policy. The existence of a strict tax-clientele is inconsistent with no-arbitrage. See also Blume (1980).

brackets. According to the clientele theory, this phenomenon should not occur. For example, firms should be able to increase their value by switching from a policy of paying dividends to repurchasing shares.

Elton and Gruber (1970) sought to identify the relation between marginal tax rates and dividend yield by using ex-dividend date price data. They argued that when investors were about to sell a stock around its ex-dividend date, they would calculate whether they were better off selling just before it goes ex-dividend, or just after. If they sold before the stock went ex-dividend, they got a higher price. Their marginal tax liability was on the capital gain, represented by the difference between the two prices. If they sold just after, the price would have fallen because the dividend had been paid. They would receive the dividend plus this low price, and their marginal tax liability would be their personal tax rate times the dividend. In this setting, we can make a direct comparison between the market valuation of after-tax dividend dollars and after-tax capital gains dollars. In equilibrium, stocks must be priced so that individuals' marginal tax liabilities are the same for both strategies.

Assuming investors are risk neutral and there are no transaction costs, it is necessary that:

$$P_B - t_g \left(P_B - P_0 \right) = \overline{P}_A - t_g \left(\overline{P}_A - P_0 \right) + D \left(1 - t_d \right) \tag{9}$$

where

    P_B =   stock price cum-dividend (the last day the stock is traded with the dividend)

    $\overline{P}_A$ =   expected stock price on the ex-dividend day (the first day the stock is traded without the dividend)

    P_0 =   stock price at initial purchase

    D =   dividend amount

t_g = personal tax rate on capital gains

t_d = personal tax rate on dividends.

The left-hand side of (9) represents the after-tax receipts the seller would receive if he sold the stock cum-dividend and had bought it originally for P_0. The right-hand side represents the expected net receipts from sale on the ex-dividend day. Rearranging,

$$\frac{P_B - \overline{P}_A}{D} = \frac{1 - t_d}{1 - t_g}.$$ (10)

If there are clienteles with different tax brackets, the tax rates implied by the ratio of the price change to the dividend will differ for stocks with different levels of dividends. The implied tax rate will be greater the higher the dividend yield, and, hence, the lower the tax bracket of investors. Elton and Gruber find strong evidence of a clientele effect that is consistent with this relation.

5.1.1 The role of risk

In the simplest versions of the theories presented above, risk has been ignored. In practice, because risk is likely to be of primary importance, it must be explicitly incorporated in the analysis.

As Long (1977) pointed out, there is an implicit assumption in the argument of a tax clientele that when there is risk, there are redundant securities in the market. An investor can achieve the desired portfolio allocation in risk characteristics without regard to dividend yield. In other words, investors can create several identical portfolios in all aspects but dividend yield.

Keim (1985) presented evidence that stocks with different yields also have different risk characteristics. Zero-dividend-yield stocks and stocks with low –dividend –yields have

significantly higher betas than do high-yield stocks. This finding implies that it may be a nontrivial task to choose the optimal risk-return tradeoff while ignoring dividend yield.

Depending on the precise assumptions made, some models that incorporate risk are similar to the simple static model, in that there is a tax effect and dividend policy affects value. On the other hand, other models are similar to the static clientele model in that there is no tax effect and dividend policy does not affect value. Therefore, most of the literature has focused on the issue of whether or not there is a tax effect.

Brennan (1970) was the first to develop an after-tax version of the CAPM. Litzenberger and Ramaswamy (1979, 1980) extend his model to incorporate borrowing and short-selling constraints. In both cases, the basic result is that for a given level of risk, the compensation for a higher dividend yield is positively related to the differential taxes between dividends and capital gains:

$$E(R_{it} - R_{ft}) = a_1 + a_2 \beta_{it} + a_3 (d_{it} - R_{ft}) \qquad\qquad (11)$$

Equation (11) describes the equilibrium relation between a security's expected return $E(R_{it})$, its expected dividend yield (d_{it}), and its systematic risk (β_{it}). Finding a significantly positive a_3 is interpreted as evidence of a tax effect. That is, two stocks with the same risk exposure (same beta) will have the same expected return only if they have the same dividend yield. Otherwise, the stock with the higher dividend yield will have a higher expected return to compensate for the higher tax burden associated with the dividend.

Several researchers have tested such a relation, including Black and Scholes (1974), Blume (1980), Morgan (1982), Poterba and Summers (1984), Keim (1985), Rosenberg and Marathe (1979), Miller and Scholes (1982), Chen, Grundy, and Stambaugh (1990), and Kalay

and Michaely (2000). The empirical results are mixed. Several of these studies find a positive

yield coefficient, which they attribute to differential taxes.

Black and Scholes (1974) performed one of the earliest (and one of the most influential)

tests. Using annual data, and a slightly different version of equation (11), they tested the tax

effect hypothesis:

$$\widetilde{R}_i = \gamma_0 + [\widetilde{R}_m - \gamma_0]\beta_i + \gamma_1(d_i - d_m)/d_m + \varepsilon_i, \ i = 1,...,N \qquad (12)$$

where

$\widetilde{R}_i$ = the rate of return on the ith portfolio

γ_0 = an intercept term that should be equal to the risk-free rate, R_f, based on the CAPM

$\widetilde{R}_m$ = the rate of return on the market portfolio

β_i = the systematic risk of the ith portfolio

γ_1 = the dividend impact coefficient

d_i = the dividend yield on the ith portfolio, which is measured as the sum of dividends paid during the previous year divided by the end-of-year stock price

d_m = the dividend yield on the market portfolio measured over the prior 12 months

ε_i = the error term

To test the tax effect, Black and Scholes formed portfolios of stocks and used a long-run

estimate of dividend yield (the sum of prior-year dividends divided by year-end price). Their null

hypothesis was that the dividend-yield coefficient is not significantly different from zero. This

hypothesis cannot be rejected for the entire time period (1936 through 1966) or for any of the

ten-year subperiods. Black and Scholes concluded that "... it is not possible to demonstrate that

the expected returns on high yield common stocks differ from the expected return on low yield common stocks either before or after taxes."

In a series of studies, Litzenberger and Ramaswamy (1979, 1980, 1982) re-examined this issue.[6] Their experimental design differs from that of Black and Scholes (1974) in several important aspects. They use individual instead of grouped data, and they correct for the error in variables problems in the beta estimation by using maximum likelihood procedures. Perhaps most important, they classify stock into yield classes by using a monthly definition of dividend yield, rather than a long-term dividend yield definition as in Black and Scholes (1974).

The Litzenberger and Ramaswamy experiment involves three steps. First, they estimate the systematic risk of each stock for each one of the test months. The estimation uses the market model regression. Formally,

$$R_{it} - R_{ft} = a_{it} + \beta_{it}(R_{mj} - R_{fj}) + \varepsilon_{it} \quad j = t - 60,...,t-1, \quad (13)$$

where R_{mj} is the return on the market portfolio during period j, R_{ij} is the rate of return on stock i during period j, β_{it} is the estimated beta for stock i for period t, the riskless rate of interest during period t is R_{ft}, and ε_{it} is a noise term. The second stage uses the estimated beta for stock i during month t, β_{it}, and an estimate of stock i's expected dividend yield for month t, d_{it}, as independent variables in the following cross-sectional regression for month t:

$$R_{it} - R_{ft} = a_{1t} + a_{2t}\beta_{it} + a_{3t}(d_{it} - R_{ft}) + \varepsilon_i \quad i = 1...N \quad (14)$$

The experiment requires an ex-ante estimate of the test month dividend yield. They obtain the estimate of expected dividend yield for month t from past observations. For cases in which the dividends are announced at month t-1, the estimate is d_t/p_{t-1}.

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[6] The econometric technique used by Litzenberger and Ramaswamy to correct for the errors in variables problem represents a significant contribution to the empirical asset pricing literature. However, we do not review it here,

When the announcement and ex-date occur in month t, Litzenberger and Ramaswamy had to estimate the market's time t expected dividend as of the end of month t-1. The estimate they chose was the last dividend paid during the previous 12 months. If no dividends were paid during this period, they assumed that the expected dividend was zero.

They repeated the second step for every month included in the period 1936 to 1977. They estimated β_{it+1} by using the previous 60 months of data. They provided an updated estimate of the expected dividend yield for each stock for each one of the test months.

This sequence of cross-sectional regressions results in a time series of a_{3t}'s. The estimate of a_3 is the mean of this series. They compute the standard error of the estimate from the time series of the $a_{3t's}$ in a straightforward manner. Litzenberger and Ramaswamy (1979, 1980) found that a_3 was positive and significantly different from zero. Using MLE and GLS procedures, Litzenberger and Ramaswamy corrected for the error in variables and heteroskedasticity problems presented in the data. However, the empirical regularity they documented — a positive and statistically significant dividend yield coefficient —was not sensitive to which method they used. The various procedures yielded similar estimated coefficients with minor differences in the significance level. Litzenberger and Ramaswamy interpreted their finding as consistent with Brennan's (1970) after-tax CAPM. That is, the positive dividend yield coefficient was evidence of a dividend tax effect.

Miller and Scholes (1982) argue that the positive yield coefficient found by Litzenberger and Ramaswamy was not a manifestation of a tax effect, but an artifact of two information biases. First, Litzenberger and Ramaswamy's estimate of the next-month dividend yield could be correlated with month t information. Of the firms paying dividends, about 40% announced

given the focus of this chapter.

and paid the dividend (i.e., the ex-dividend day) in the same month. Using the Litzenberger and Ramaswamy yield definition assumes that the ex-dividend month is known a priori even for ex-months in which dividends were not declared in advance.

Second, Litzenberger and Ramaswamy ignored the potential effect of dividend omission announcements. An omission announcement, which is associated with bad news, will tend to bias upward the dividend yield coefficient, since it reduces the return of the zero yield group. The effect of these informational biases is the center of the debate between Litzenberger and Ramaswamy (1982) and Miller and Scholes (1982).

Miller and Scholes showed that when they included only dividends declared in advance in the sample, or when they defined the dividend yield as the dividend yield in month t-12, the yield coefficient was statistically insignificant. Based on these results, Miller and Scholes attributed the Litzenberger and Ramaswamy results to information, rather than tax effects.

Responding to this criticism, Litzenberger and Ramaswamy (1982) constructed a dividend yield variable that incorporated only such information as investors could possess at the time. Their sample contained only stocks that either declared in month t-1 and paid in month t, or stocks that paid in month t-1 and therefore were not likely to repay in the current month. Using the "information-free" sample, Litzenberger and Ramaswamy found the yield coefficient was positive and significant. Miller and Scholes remained unconvinced.

To resolve the informational issue, Kalay and Michaely (2000) performed the Litzenberger and Ramaswamy experiment on weekly data, excluding all weeks containing both the announcement and ex-day (3.4% of the sample). They also excluded all weeks containing dividend omission announcements. Nevertheless, they found a positive and significant yield coefficient, implying that information is not the driving force behind the Litzenberger and

Ramaswamy result. The question still remains whether the positive yield coefficient found by Litzenberger and Ramaswamy can be attributed to taxes. Kalay and Michaely (2000) argue that the single-period model derived by Brennan (1970) and Litzenberger and Ramaswamy (1979) predicts *cross-sectional* return variation as a function of dividend yield. In contrast, the Litzenberger and Ramaswamy test of Brennan's model is inadvertently designed to discover whether the ex-dividend period offers unusually large risk-adjusted returns (i.e., time-series return variation).

Litzenberger and Ramaswamy classified stocks as dividend-paying stocks only during the ex-dividend months. For example, they classify a stock that pays quarterly dividends to the zero dividend yield group in two thirds of the months. Therefore, when Litzenberger and Ramaswamy find a significant positive dividend yield coefficient in a Fama-Macbeth type test, it is not clear how to interpret these findings. Are their findings due to cross-sectional differences in dividend yield, which can then be interpreted as evidence consistent with the Brennan model, or are their results evidence of time-series variations in return between dividend-paying and non-dividend paying months? In other words, can we conclude from the Litzenberger and Ramaswamy results that higher-dividend-yield stocks show larger long-run (e.g., annual) risk-adjusted pretax returns (hereafter, cross-sectional return variations)? Or, do their results merely point out that stocks experience higher risk-adjusted pretax returns during their ex-month (hereafter, time-series return variations), and tell us little about the relation between long-run pretax risk-adjusted returns and yields? Time-series return variation, per se, is not evidence of a tax effect.

Since most stocks pay dividends quarterly, trying to avoid dividend income involves realizing short-term capital gains. Under U.S. tax laws, short-term capital gains are taxed as ordinary income. Thus, even though a long-term investor prefers long-term capital gains to

dividend income, he or she does not require a larger pretax risk-adjusted return during only the ex-dividend period. Therefore, the implications of the Brennan model, combined with the U.S. tax code, is that differences in tax rates between dividend income and long-term capital gains income should result in cross-sectional return variation. As do other studies (such as the ex-day studies), Kalay and Michaely find strong evidence of time-series return variation around the ex-day period. However, there is no evidence of cross-section return variation. This result does not support the Brennan's and Litzenberger and Ramaswamy's buy-and-hold models.

Another potential problem is whether some omitted risk factors (other than beta) that are correlated with dividend yield, rather than taxes, can explain the positive yield coefficient. As a first indication of the potential importance of some omitted risk factors, Miller and Scholes (1982) demonstrated that when the reciprocal of price, (1/P), is incorporated in the regression equation instead of the dividend yield, (D/P), its coefficient is still positive and significant. This issue was thoroughly investigated by Chen, Grundy, and Stambaugh (1990). Categorizing all dividend-paying stocks into 20 portfolios according to size and yield, they found that when they used a single risk factor, large firms with high dividend yield were the only ones to experience a positive yield coefficient; and when they used two risk factor models, the yield coefficient was significant for only one of the 20 portfolios.

As also suggested by Miller and Scholes (1982) and Hess (1983), Chen, Grundy, and Stambaugh (1990) presented evidence that dividend yield and risk measures were cross-sectionally correlated. When they allowed the risk measures to vary, they found that the yield coefficient was positive but insignificant. Chen, Grundy, and Stambaugh showed that the positive association between yield and their portfolios' returns could be explained by a time-varying risk premium that was correlated with yield. Thus, they concluded that there was no

reliable relation between cross-sectional variation in returns and dividend yield that is a consequence of a tax penalty.

Fama and French (1993) offer an interesting insight that is relevant to this issue. They argue that the yield coefficient might capture factors other than taxes, and that those other factors might affect assets' returns. They then show that when using the three-factor model, there is no trace of different intercepts among portfolios with different dividend yields.

Summing up, a growing body of evidence shows that within static, single-period equilibrium models, there is no convincing evidence of a significant cross-sectional relation between stocks' returns and their dividend yields. Perhaps a more promising avenue for investigating this issue is to examine a model that allows for dynamic trading around the ex-dividend day.

5.2 Dynamic models

An important development in the literature on taxes and dividends was the realization that investors could trade dynamically to reduce their tax liability. The first paper to emphasize this aspect was that of Miller and Scholes (1978). They argued that there were a number of dynamic strategies that allowed investors to avoid taxes, and that in perfect capital markets all taxes could be avoided. This observation brings us back to the case in which dividend policy is irrelevant. However, in practice, the transaction costs of pursuing these strategies appear to be too high to make them empirically significant.

An area where dynamic strategies appear to be more empirically relevant is trading around the ex-date. A number of studies, starting with Kalay (1982), have studied the implications of this strategy. We look at both types of approach.

5.2.1. Dynamic tax avoidance strategies

Miller and Scholes (1978) suggested an ingenious strategy for avoiding taxes. By borrowing and investing the proceeds with tax-free institutions, such as insurance companies or pension funds, investors could create an interest deduction that allowed them to avoid taxes. Since there were assets that were held to offset the borrowing, the position could be closed out at an appropriate point.

Several other dynamic tax avoidance strategies were suggested by Stiglitz (1983). If individuals can easily "launder" dividends so they 'do not have to pay taxes on them, then essentially, we are back in a Miller and Modigliani world, and dividend policy is irrelevant.

However, there is little evidence that investors are actually usually this or other such strategies. Peterson, Peterson, and Ang (1985) showed that individual investors' marginal tax on dividend income has been about double the marginal tax rate they pay on capital gains income. This evidence does not support a widespread use of tax avoidance strategies of the type described by Miller and Scholes. Rather, it suggests that the transaction costs of such strategies are too high to be useful to investors.

5.2.2. Dynamic ex-dividend day strategies

Several studies have considered dynamic trading strategies around the ex-dividend day. The basic idea is that investors can change their trading patterns around the ex-dividend day to capture or avoid the upcoming dividend. Kalay (1982) argued that in a risk-neutral world, without any restrictions or imperfections such as transaction costs, dynamic arbitrage could eliminate a tax effect in prices. Traders with the same tax rate on dividends and capital gains

will buy the stock before it goes ex-dividend and sell it just after. Without risk or transaction costs, the arbitrage will ensure that the price drop is equal to the dividend, i.e.,

$$\left(P_B - \overline{P}_A\right)/D = 1. \tag{15}$$

If there are transaction costs, and no price uncertainty, then $\left(P_B - \overline{P}_A\right)/D$ must lie within a range around one. This range will be larger the greater are transaction costs. However, Kalay (1982) did not explicitly account for the risk involved in the ex-day trading.

The framework used by Michaely and Vila (1995) describes the ex-day price formation within a dynamic equilibrium framework in which, because of taxes, agents have a heterogeneous valuation of a publicly traded asset. The intuition behind their model is that an investor equates the marginal benefit of trading that arises from being more heavily invested in the dividend-paying stock with the marginal cost that arises from the deviation from optimal risk sharing.

Agents trade because they have heterogeneous valuation of dividends relative to capital gains (on an after-tax basis). This framework incorporates short-term, corporate, and individual investors' desire to trade around the ex-dividend day. The model explicitly accounts for the risk involved in the trade, and concludes that it is not arbitrage, but equilibrium, that determines prices and volume. In other words, the existence of risk precludes pure arbitrage opportunities and prices are determined in equilibrium. Consequently, no trader will attempt to take an unlimited position in the stock, regardless of his or her tax preference.

The model illustrates that although two-period models like those of Brennan (1970) or Litzenberger and Ramaswamy (1979) adequately describe the effect of taxes on portfolio holdings in a static equilibrium, they mask a qualitative difference between models of financial markets with and without taxation, namely, optimal tax-induced trading. Because of the

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dynamic nature of the Michaely and Vila model, it is possible to derive volume and price behavior implications. As it turns out, they can extract the second moment of the heterogeneity distribution (i.e., the dispersion in the after-tax valuation of dividends) from the trading volume around the ex-day.

Using this framework, it is possible to show that in equilibrium, the expected price drop in relation to the dividend reflects the average preference of *all* traders, weighted by their risk tolerance and wealth, and the risk involved in the ex-dividend day transaction:

$$E(Pr) = \{P_c - E(P_e \mid P_c)\}/D = \bar{\alpha} - \frac{X(\sigma_\varepsilon^2/K)}{D} \qquad (16)$$

where

$E(Pr)$ = is the expected price drop in relation to the dividend amount (hereafter, "the premium")

P_c = the cum-day price

P_e = the ex-day price

D = the dividend amount

σ_ε^2 = the ex-day variance

K = the after-tax weighted average of investors' risk tolerance

X = the supply of securities

$\alpha_i = \dfrac{1 - T_d^i}{1 - T_g^i}$ = the relative tax preference of dividend relative to capital gains

$\bar{\alpha} = \dfrac{\sum\limits_{i=1}^{N} k_i \alpha_i}{\sum k_i}$ = the average of investors tax preferences (α_i) weighted by their risk tolerance

(k_i)

As it turns out, unless a perfect tax clientele exists in which different groups hold different stocks rather than just different quantities of the same stock, it is not possible to infer tax rates from price alone. However, we can infer the cross-sectional distribution of tax rates by using both price and volume data. By observing the premium alone, we can infer only the weighted–average relative tax rates, not the entire distribution of tax rates for the trading population. Michaely and Vila (1995) show that the second moment of the distribution could be extracted from the volume behavior on the ex-dividend day.7

This point can be illustrated by the following example. Assume that there are three groups of traders in the marketplace with a marginal rate of substitution between dividends and capital gains income of 0.75, 1.0, and 1.25, respectively. Assume further that the average price drop relative to the dividend amount is one. Using the standard analysis, we can conclude that the second group dominates the ex-dividend day price determination.

However, this conclusion might not be valid. For example, suppose that half of the traders are from the first group and half are from the third group, and both have the same effect on prices. This market composition will also result in a relative price drop equal to the dividend amount. The only way to distinguish between the two scenarios is by incorporating volume into the analysis. In the first case, there are no gains from trade, and therefore no excess volume on the ex-dividend day. In the second case, there are gains from trade, excess volume is observed, and the particular equilibrium point is at a relative price drop equal to one. The model allows the resreacher to distinguish between such cases.

$$AV = \frac{1}{2}\{D\sum_{i=1}^{N} |(\alpha^i - \overline{\alpha})(K^i / \sigma^2)|\},$$
(17)

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7 Boyd and Jagannathan (1994) provide a model in which proportional transactions costs faced by different classes of traders induce a non-linear relationship between ex-day price movement and dividend yield.

where AV is the abnormal trading volume on the ex-dividend day.

This framework also incorporates the Elton and Gruber (1970) and Kalay (1982) analyses in equation (17). Both analyses assume an arbitrage framework in the sense that the last term in equation (17) is zero, i.e., there is no risk involved in the trade. Elton and Gruber assume that for some exogenous reason (e.g., transaction costs), the only trade around the ex-day will be done by investors within the same tax clientele group. In other words, if there is a perfect holding clientele and all trading is done intra-group, then the relative price drop will reflect the marginal value of dividends relative to capital gains. (Note that in this scenario, the marginal and the weighted average values are the same.) In this case there are two reasons why there will be no abnormal trading volume around the ex-dividend day. First, since all trades are within the same clientele group, all relevant traders value the dividend equally, and there are no gains from trade. Second, there are no incentives for investors within the clientele group to delay or accelerate trades because of the upcoming dividends as, for example, suggested by Grundy (1985). In other words, Elton and Gruber suggest that taxes affect price, but do not locally affect investors' behavior [no extra trading, as in equation (17)]. Kalay takes the opposite view. Taxes affect behavior but not prices, i.e., through their trading the arbitrageurs will ensure that the price drop equals the dividend amount. Since Kalay uses the arbitrage framework, he can show that short-term investors may take an unlimited position in the stock as long as the expected price drop is not equal to the dividend amount.

Tests of these propositions have taken several forms. Most studies examine the price behavior and infer investors' preferences and behavior from prices. With only a few exceptions [Grundy (1985), Lakonishok and Vermaelen (1986), Michaely and Vila (1995, 1996), and Michaely and Murgia (1995)], researchers have devoted much less attention to a direct

examination by using volume to determine the effect of differential taxes on investors' trading behavior. Researchers have almost always found that the average price drop between the cum- and the ex-day is lower than the dividend amount [see Elton and Gruber (1970), Kalay (1982), Eades, Hess, and Kim (1984), and Poterba and Summers (1984), among others].[8] For example, Eades, Hess, and Kim (1984) find an excess return of 0.142% on the ex-dividend day and a cumulative excess return of 0.334% in the ten days surrounding the ex-day (day −5 to day +5, relative to the ex-dividend day). The positive abnormal return before the ex-day and the negative excess return after the ex-day indicate that investors who prefer dividends start to accumulate the stock several days before the event (its timing is known in advance). Likewise, the negative return after the event supports the notion that investors' selling after the ex-day is more gradual than we would predict in perfect markets.

Many of these studies also find that the average premium increases with dividend yield [see, for example, Elton and Gruber (1970), Kalay (1982), Lakonishok and Vermaelen (1986) and Boyd and Jagannathan (1994)]. This finding is consistent with tax clienteles. (The tax clientele we allude to can be either a holding clientele or a trading clientele. Only examination of trading volume can separate the two.) Corporations, which prefer dividends over capital gains, and tax free institutions, which are indifferent to the form of payment, hold high-yield stocks. The ex-day premium reflects those preferences. Eades, Hess, and Kim's (1984) findings of a premium greater than one for preferred stock is also consistent with this idea. That is, this group of stocks pays a high dividend yield, and the dominant traders of these stocks (at least around the ex-day) are the corporate traders, who prefer dividends.

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[8] For international evidence, see Kato and Loewenstein (1995) for the Japanese market, Lakonishok and Vermaelen (1983) for the Canadian market, and Michaely and Murgia (1995) for the Italian market.

Another way to examine the effect of taxes on ex-day price behavior is to examine the effect of tax changes. If taxes affect investors' decisions on buying or selling stocks around the ex-day, a change in the relative taxation of dividends to capital gains should affect prices. Poterba and Summers (1984) looked at the British market before and after tax changes and found evidence that indicated a tax effect. Barclay (1987) compared the ex-day price behavior prior to the introduction of federal taxes in 1913 with its behavior in the years 1962 to 1985. He found that the average premium was not significantly different from one before the enactment of the federal taxes, and significantly below one after. Barclay concluded that the higher taxes on dividends after 1913 caused investors to discount their value.

Michaely (1991) examined the effect of the 1986 Tax Reform Act (TRA) on ex-day stock price behavior. The 1986 TRA eliminated the preferential tax rates for long-term capital gains that had been adopted in 1921; dividend income and realized capital gains were taxed equally after the reform. If taxes are at work, we would expect the premium to be closer to one after the 1986 TRA. (The premium is defined as the price difference between the ex-day and the cum day, relative to the amount of dividend paid.) Surprisingly, this was not the case. The average premium, both before and after the TRA, was not lower than one. Comparing his results to the Elton and Gruber study, which used data from the 1960s, Michaely concludes that the change in the relative pricing of dividends between the 1960s and the 1980s was not because of taxes, but perhaps, because of the change in weights of the various trading groups. Facing lower transaction costs in the equity, options, and futures markets, institutional and corporate investors seem to trade more around the ex-day in the latter period. Thus, their preferences have a greater effect on the price formation. These results are summarized in Table 8.

Although in static models, such as Brennan (1970) or Elton and Gruber (1970), transaction costs can be safely ignored (since investors trade only once), in the dynamic models they are potentially much more important. If investors trade in and out of stocks because of taxes, the multiple rounds of trades could result in a nontrivial cost of transacting. Disregarding risk, Kalay (1982) showed that the "arbitrage" by the short-term traders would take place as long as the level of transaction costs was low enough. Indeed, Karpoff and Walkling (1988, 1990) showed that excess returns were lower for stocks with lower transaction costs. This is especially pronounced for stocks with high dividend yields, both on the NYSE/Amex and for Nasdaq stocks. In other words, corporations and short-term traders have a greater effect on the ex-day prices of stocks with lower levels of transaction costs.

When the risk involved in the ex-day trading is accounted for, the effect of transaction costs on trading is not as straightforward. Michaely, Vila, and Wang (1997) developed a formal model that incorporated the effect of both transaction costs and risk on ex-day prices and trading. As expected, they predicted that transaction costs would reduce the volume of trade.

More interesting is the interaction between transaction costs and risk. First, with or without transaction costs, risk reduces volume. However, unlike price, volume is negatively affected by the level of idiosyncratic risk. As the level of transaction costs increases, systematic risk negatively affects the volume of trade. The reason is simple. Without transaction costs, investors can afford to hedge all of the systematic risk. In the presence of transaction costs, the systematic risk is not completely hedged; therefore it affects the amount of trading.

Empirical evidence supports these results. Grundy (1985), Lakonishok and Vermaelen (1986), and Michaely and Vila (1996) show that the abnormal volume on and around the ex-day is significant. This evidence indicates that a perfect tax clientele where investors hold strictly

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different stocks, does not exist. (In a perfect clientele, no ex-day trading will take place, because each clientele group will strictly hold only stocks with the dividend yield appropriate to its type.) Moreover, the evidence questions the idea that the marginal tax rate can be inferred from prices alone.

Michaely and Vila (1996) show that both risk and transaction costs affect volume. They demonstrate that stocks with lower transaction costs experience higher abnormal volume, and that the differences are substantial. For example, between 1988 and −1990, stocks with a low average bid-ask spread experienced an abnormal trading volume of 556% compared with an abnormal trading volume of 78% for high-spread stocks. The differences were even larger when they looked at only stocks with high dividend yields, where the incentives to trade are larger. Moreover, they find that idiosyncratic risk significantly affects trading volume and that market risk has a greater effect (negative) on trading volume when the level of transaction costs is higher.

Some of these effects are captured in the following regression analysis:

$$CAV_i = 1.89 + 63.17(\frac{D}{P})_i - 0.49\frac{\sigma_i}{\sigma_m} - 0.37\beta_i + 0.134\ SIZE \tag{18}$$
$$(15.8)\ \ (8.5)\ \ \ \ \ \ \ (-18.2)\ \ \ \ (-9.3)\ \ \ \ (5.7)$$

where

CAV$_i$ is the cumulative abnormal volume in the 11 days around the ex-dividend day,

(D/P)$_i$ is the stock's dividend yield, calculated as the dividend amount relative to the cum-day price,

σ_i/σ_m is the idiosyncratic risk scaled by the market risk during the same time period,

β_i is the systematic risk, and

SIZE is the market value of equity, which is used as a proxy for the cross-sectional variation in transaction costs.

t-statistics are reported in parentheses.

Both the idiosyncratic risk and the systematic risk are negative (and significant). The idiosyncratic risk is about 35% higher (in absolute value) than the beta risk coefficient. The fact that both risk factors are significant indicates that investors do not hedge all of their risk exposure. If they did, the beta coefficient would have been zero. The reason for the incomplete hedging is transaction costs.

Koski and Michaely (2000) report that ex-day trading volume increases more in orders of magnitude when traders are able to arrange the cum-day/ex-day trading using non-standard settlement days. That is, by virtually eliminating the risk exposure and reducing transaction costs, volume increases significantly.

Koski and Michaely (2000) examine very large block trades around the ex-day. Block trades involve a large purchase and subsequent sale of the dividend-paying stock within minutes (with a different settlement day for each transaction). These trades are done through bilateral bargaining between the two parties involved, usually Japanese insurance companies on the buying side and a U.S. institution on the selling side. This procedure substantially reduces the risk exposure (and transaction costs) relative to "conventional" dividend-capture trading.[9]

As discussed earlier, examining prices alone may mask investors' tax preferences and the trading motives that are related to taxes. Kalay (1982), and Eades, Hess, and Kim (1984), and more recently Bali and Hite (1998) and Frank and Jagannathan (1998), have raised two additional obstacles in interpreting the ex-day price drop as evidence that differential taxes affect

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[9] Michaely and Murgia (1995) show that the trading volume of both block trades and non-block trades (on the Milan stock exchange) increases substantially for stocks with high dividend yield and low transaction costs. Their findings

prices and trading behavior. First, that discreteness in prices may cause a bias in measuring the ex-day price drop relative to the dividend. (Until recently, the minimum tick size was one eighth in the U.S.) These studies, and those by Dubofsky (1992) and Bali and Hite (1998), show that this bias may cause the average price drop to be less than the dividend amount. Second, that the high correlation between dividend yield and the dollar amount of dividend paid (high yield stocks tend to be stocks that pay large dividends) can also result in an association between relative price drop and dividend yields—the very same evidence that many studies have attributed to dividend clienteles. Eades, Hess and Kim (1984) and Frank and Jagannathan (1998) present supporting evidence. Frank and Jagannathan find that the average price drop is less than the dividend in Hong Kong, where dividends and capital gains are not taxed. Eades, Hess, and Kim (1984) find that the average price drop is less than the dividend for non-taxable distributions in the U.S. This collective evidence seems to indicate that institutional factors such as tick size play a role in the determination of the ex-day prices.

However, in light of the results of other studies, the conclusion that the entire ex-day price anomaly is driven by the tick size is unlikely. For example, Barclay (1987) finds that prior to the introduction of the income tax in the U.S., the average ex-day price drop was equal to the dividend amount, despite the fact that even then, prices were quoted in discrete multiples. Michaely (1991) also finds that the average price drop around the 1986 TRA was essentially equal to the dividend amount (see Table 8). Again, also during this time period, prices were quoted in one-eighth increments.

Green and Rydqvist (1999) conducted an experiment relevant to this issue using data on Swedish lottery bonds. Taxes in the lottery bond market lead investors to prefer cash to capital gains. Some of the friction identified in the literature, such as price discreteness, would work in

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support the notion that low transaction costs enhance ex-day trading.

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the opposite way. In addition, the activity of arbitrageurs is not an issue. Green and Rydqvist find that both the price drop around the ex-day and volume behavior around this event reflects the relative tax advantage of the cash distribution. Their findings support the interpretation of the ex-day price behavior as tax-motivated and that this behavior cannot be attributed to market frictions.

The information on volume behavior in the U.S. (Lakonishok and Vermaelen, 1986, Michaely and Vila, 1996) and other countries such as Italy (Michaely and Murgia, 1995), Japan (Kato and Lowenstein, 1995), and Sweden (Green and Rydqvist, 1999) also clearly indicates that there is abnormal activity around the ex-dividend day. The evidence also shows that the trading activity is positively related to the magnitude of the dividend and negatively related to the level of transaction costs and risk. The evidence is consistent with the notion that this trading activity is related to differential taxes.

5.3 Dividends and taxes – conclusions

Differential taxes affect both prices (at least around the ex-dividend day) and investors' trading decisions. In most periods examined, the average price drop is less than the dividend paid, implying a negative effect on value. The entire price behavior cannot be attributed to measurement errors or market frictions. However, it is also rather clear that market imperfections such as transaction costs, the inability to fully hedge, and price discreteness inhibit tax-motivated trading. Absent these imperfections, it is possble that no trace of the tax effect would show up in the pricing data. So, while in perfect and complete capital markets dividends may not affect value, this relation is much less clear in incomplete markets with transaction costs. The theory

and some of the empirical evidence indicate that taxes do matter, and that dividends reduce value when risk cannot be fully hedged and transactions are costly.

Overall, the evidence from the ex-day studies appears to indicate that from a tax perspective, dividends should be minimized. The volume of trade around these events is much higher than usual, indicating that the shares change hands from one investor ' group to the other. This evidence tells us that taxes affect behavior.

The facts also indicate that a pure dividend-related tax –clientele does not exist. First, there is clear evidence for intergroup ex-day trading that is motivated by taxes. It is also apparent that ex-day trading volume increases as the degree of tax heterogeneity among investors increases. This evidence suggests that as the benefits of trading increase, so does trading volume. Second, direct examination of individuals' tax returns indicates that throughout most of the period 1973-1999, individuals in high tax brackets receive substantial amounts of taxable dividends, which refutes the tax clientele argument. Third, there is no evidence that dividend changes indicate any significant clientele shift, as we would expect if dividend clienteles did exist.

One way of looking for evidence of clientele shifts is to see whether the turnover rate for firms that initiate or omit dividends shows a marked change following the announcement. Richardson, Sefcik, and Thompson (1986) do this for 192 firms that initiated dividends. They concluded that the volume response is primarily in response to the news contained in the initiation announcement rather than to a clientele shift. Michaely, Thaler, and Womack (1995) examined the turnover of both initiating and omitting firms. They concluded that the relatively minor increase in volume around the event and the absence of an increase in the six months thereafter was too low to be consistent with a significant clientele shift.

Michaely, Thaler and Womack also directly investigated whether the share of institutional ownership changed after dividend omission. For the 182 firms with available data, they found that the average institutional ownership was 30% in the three years prior to the omission and was 30.9% after. This evidence further supports the impression that dividend changes do not produce dramatic changes in ownership.

However, Brav and Heaton (1998) find a drop in institutional ownership around dividend omissions after the ERISA regulations took effect in 1974. Binay (2001) examines both initiations and omissions and reports a significant drop in institutional ownership after omissions and an increase in institutional ownership after initiations. Perez-Gonzalez (2000) looks at changes in firms' dividend policy as a result of tax reforms. He finds that dividend policy is much more affected by the tax reform when the largest shareholder is an individual than it is when the largest shareholder is an institution or when there is no large shareholder. Finally, Del Guercio (1996) examines the role of dividends in the portfolio selection of institutions. She finds that after controlling for several other factors such as market capitalization, liquidity, risk, and S&P ranking, dividend yield has no power in explaining banks' portfolio choice, and is a negative indicator in mutual funds' portfolio choice. Overall, her evidence indicates that the prudent man rule has a role in portfolio selection but that dividends do not play a major role in it.

In light of the above discussion, perhaps it is less surprising that tests of the static models with taxes have not been successful. These tests cannot accommodate dynamic trading strategies, which seem to be important in this context. In addition, time-varying risk may result in spurious positive yield coefficients (Chen, Grundy, and Stambaugh, 1990) and missing pricing factors can also result in a positive yield coefficient (Fama and French, 1993). As Naranjo, Nimalendran, and Ryngaert (1998) show, even when they do find a dividend yield effect, it is difficult to

attribute it to taxes, since it does not vary with relative taxation and is absent in large-cap stocks. Indeed, the ex-dividend day studies that account for these effects have been more successful in identifying the extent to which taxes affect prices and traders' behavior.

6. Asymmetric Information and Incomplete Contracts -- Theory

6.1 Signaling and adverse selection models

Capital markets are imperfect, but not just because individuals and corporations have to pay taxes. Another potentially important imperfection relates to the information structure: if insiders have better information about the firm's future cash flows, many researchers suggest that dividends might convey information about the firm's prospects: dividends might convey information not previously known to the market, or they may be used as a costly signal to change market perceptions concerning future earnings prospects.

Using the sources and uses of funds identity, and assuming the firm's investment is known, dividend announcements may convey information about current earnings (and maybe even about future earnings, if earnings are serially correlated) even in the absence of any signaling motive. Since investment is known, dividends are then the residual. Thus, larger-than-expected dividends imply higher earnings. Since the market does not know the current level of earnings, higher-than-anticipated earnings would lead to a positive stock price increase. (When we talk about dividends in this context, what we really mean is net dividends. We define these in section 4 as dividends plus repurchases minus equity issues.) This interpretation of dividend announcements is not new and originated with Miller and Modigliani (1961) and later to the more formal argument in Miller and Rock (1985).

However, it was not until the late 1970s and early 1980s that any signaling models were developed. The best known are those of Bhattacharya (1979), Miller and Rock (1985), and John and Williams (1985). The basic intuitive idea in all these models is that firms adjust dividends to signal their prospects. A rise in dividends typically signals that the firm will do better, and a decrease suggests that it will do worse. These theories may explain why firms pay out so much of their earnings as dividends. Thus, they are consistent with the first empirical observation.

However, in this context one of the central questions that arises is why firms use dividends, and not share repurchases or some other less costly means of signaling, to convey their prospects to investors.

Bhattacharya (1979) used a two-period model in which the firm's managers act in the original shareholders' interests. At time zero, the managers invest in a project. The managers know the expected profitability of this investment, but investors do not. At this time, the managers also "commit" to a dividend policy. At time 1, the project generates a payoff that is used to pay the dividends committed to at time zero. A crucial assumption of the model is that if the payoff is insufficient to cover the dividends, the firm must resort to outside financing and incur transaction costs in doing so.

At time zero, the managers can signal that the firm's project is good by committing to a large dividend at time 1. If a firm does indeed have a good project, it will usually be able to pay the dividend without resorting to outside financing and therefore will not have to bear the associated transaction costs. In equilibrium, it is not worthwhile for a firm with a bad project to do this, because it will have to resort to outside financing more often and thus will have to bear higher transaction costs. If the dividends are high enough, these extra costs will more than offset the advantage gained from the higher price received at time 1. Since the critical trade-off in the

model is between the transaction costs incurred by committing to a large dividend and the price paid at time 1, it follows that similar results hold when the dividends are taxed.

Just after the dividends are paid, the firm is sold to a new group of shareholders, which receives the payoff generated by the project at time 2. The payoffs in the two periods are independent and identically distributed. The price that the new shareholders are prepared to pay at time 1 depends on their beliefs concerning the profitability of the project.

Bhattacharya's model was a significant step forward. It is consistent with the observation that firms pay dividends even when these are taxed. However, Bhattacharya's model has been criticized on the grounds that it does not explain why firms use dividends to signal their prospects. It would seem that firms could signal better if they used share repurchases instead of dividends. This way of signaling would result in the same tradeoff between the transaction costs of resorting to outside financing and the amount received when the firm is sold, but it would result in lower personal taxes than when dividends are used.

Bhattacharya's model, like many dividend signaling models, has the feature that dividends and share repurchases are perfect substitutes for one another. It does not matter whether the "good" firm signals its value through repurchasing shares or paying dividends, because the end result will be the same: the payout increases the chances that the firm will need outside financing that is costly. Therefore, one of the implications of these models is that dividends and repurchases are perfect substitutes, an issue we return to in a later section.

Bhattacharya's model reveals both the strengths and weaknesses of the dividend signaling literature. Its main strength is that it is able to explain the positive market reaction to dividend increases and to announcements of share repurchases. The explanation is based on an intuitive notion that dividends tell us something about the firm's future prospects. The model is

internally consistent and assumes that both investors and management behave in a rational manner.

However, like many such models, several of its assumptions are subject to some criticism. For example, why would a management care so much about the stock price next period? Why is its horizon so short that it is willing to "burn money" (in the form of a payout) just to increase the value of the firm now, especially when the true value will be revealed next period? It is also not clear from this model why firms smooth dividends. Finally, why should a firm use dividends (or repurchases) to signal? It would be more dramatic to burn the money in the middle of Wall Street, and it might even be cheaper.

The dissatisfaction with early models led to the development of a number of alternative signaling theories. Miller and Rock (1985) also constructed a two-period model. In their model, at time zero firms invest in a project, the profitability of which cannot be observed by investors. At time 1, the project produces earnings and the firm uses these to finance its dividend payment and its new investment. Investors cannot observe either earnings or the new level of investment. An important assumption in the Miller and Rock model is that some shareholders want to sell their holdings in the firm at time 1, and that this factor enters managers' investment and payout decisions.

At time 2, the firm's investments again produce earnings. A critical assumption of the model is that the firm's earnings are correlated through time. This setting implies that the firm has an incentive to make shareholders believe that the earnings at time 1 are high so that the shareholders who sell will receive a high price. Since both earnings and investment are unobservable, a bad firm can pretend to have high earnings by cutting its investment and paying

out high dividends instead. A good firm must pay a level of dividends that is sufficiently high to make it unattractive for bad firms to reduce their investment enough to achieve the same level.

The Miller and Rock theory has a number of attractive features. The basic story, that firms shave investment to make dividends higher and signal high earnings, is entirely plausible. Unlike the Bhattacharya (1979) model, the Miller and rock theory does not rely on assumptions that are difficult to interpret, such as firms being able to commit to a dividend level.

What are its weaknesses? It is vulnerable to the standard criticism of signaling models that we discuss above. It is not clear that if taxes are introduced, dividends remain the best form of signal. It appears that share repurchases could again achieve the same objective, but at a lower cost.

In Bhattacharya (1979), the dissipative cost that allowed signaling to occur was the transaction cost of having to resort to outside financing. In Miller and Rock (1985), the dissipative costs arise from the distortion in the firm's investment decision. John and Williams (1985) present a model in which taxes *are* the dissipative cost. The theory thus meets the criticism that the same signal could be achieved at a lower cost if the firm were to repurchase shares instead. So while the Miller and Rock and the Bhattacharya models imply that dividends and repurchases are perfect substitutes, the John and Williams model implies that dividends and repurchases are not at all related. A firm cannot achieve its objective of higher valuation by substituting a dollar of dividends for a dollar of capital gains.

What is the reasoning behind this result? Like other models, John and Williams's starting point is the assumption that shareholders in a firm have liquidity needs that they must meet by selling some of their shares. The firm's managers act in the interest of the original shareholders and know the true value of the firm. Outside investors do not. If the firm is

undervalued when the shareholders must meet their liquidity needs, then these shareholders would be selling at a price below the true value. However, suppose the firm pays a dividend, which is taxed. If outside investors take this as a good signal, then the share price will rise. Shareholders will have to sell less equity to meet their liquidity needs and will maintain a higher proportionate share in the firm.

Why is it that bad firms do not find it worthwhile to imitate good ones? When dividends are paid, it is costly to shareholders because they must pay taxes on them. But there are two benefits. First, shareholders receive a higher price for the shares that are sold. Second, and more importantly, these shareholders retain a higher proportionate share in the firm. If the firm is actually undervalued, this higher proportionate share is valuable to the shareholder. If the managers' information is bad and the firm is overvalued, the opposite is true. It is this difference that allows separation. If dividends are costly enough, only firms that are actually good will benefit enough from the higher proportionate share to make it worthwhile bearing the cost of the taxes on the dividends.

John and Williams's model thus avoids the objection to most signaling theories of dividends. Firms do not repurchase shares to avoid taxes, because it is precisely the cost of the taxes that makes dividends desirable. This is clearly an important innovation.

What are the weaknesses of the John and Williams' theory? In terms of assumptions, they take it as a given that shareholders must meet their liquidity needs by selling their shares. They rule out the use of debt, either by the firm or the shareholders themselves. We could ask why the firm does not borrow and use the proceeds to repurchase its shares. Again, doing so would meet the liquidity needs of investors and would only be worthwhile if the firm's shares were undervalued. It should be possible to signal the firm's value costlessly by repurchasing shares

and thus increasing the proportionate share held by the firm. The Ross (1977) study shows that borrowing serves as a credible signal. Even if, for some reason, corporate borrowing is not possible, an alternative is for the investors to borrow on their personal accounts instead of selling shares. Again, this would allow them to meet their liquidity needs without incurring the cost of signaling.

It is also not obvious that the John and Williams model's empirical implications support dividend smoothing. The best way to extend the model over a longer time is not entirely clear. If firms' prospects do not change over time, then once a firm has signaled its type, no further dividend payments will be necessary and payouts can be made through share repurchases. If firms' prospects are constantly changing, which seems more plausible, and if dividends signal these, we would expect that dividends will also constantly change. This prediction of the model is difficult to reconcile with the observation that corporations smooth dividends, and in many cases do not alter them at all for long periods of time. We can also make the same criticism of the other signaling models. After the Miller and Rock (1985) and John and Williams (1985) papers, a number of other theories with multiple signals were developed. Ambarish, John, and Williams (1987) constructed a single-period model with dividends, investment, and stock repurchases. Williams (1988) developed a multi-period model with these elements and showed that in the efficient signaling equilibrium, firms typically pay dividends, choose their investments in risky assets to maximize net present value, and issue new stock. Constantinides and Grundy (1989) focused on the interaction between investment decisions and repurchase and financing decisions in a signaling equilibrium. With investment fixed, a straight bond issue cannot act as a signal, but a convertible bond issue can. When investment is chosen optimally rather than being fixed, this is no longer true; a straight bond issue can act as a signal.

Bernheim (1991) also provided a theory of dividends in which signaling occurs because dividends are taxed more heavily than repurchases. In his model, the firm controls the amount of taxes paid by varying the proportion of the total payout that is in the form of dividends, rather than repurchases. A good firm can choose the optimal amount of taxes to provide the signal. As with the John and Williams model, Bernheim's model does not provide a good explanation of dividend smoothing.

Allen, Bernardo, and Welch (2000) took a different approach to dividend signaling. As in the previous models, dividends are a signal of good news (i.e., undervaluation). However, in their model firms pay dividends because they are interested in attracting a better-informed clientele. Untaxed institutions such as pension funds and mutual funds are the primary holders of dividend-paying stocks because they are a tax-disadvantaged payout method for other potential stockholders.

Another reason for institutions to hold dividend-paying stocks is the restrictions in institutional charters, such as the "prudent man" rules that make it more difficult for many institutions to purchase stocks that pay either no dividends or low dividends. According Allen, Bernardo and Welsh (2000), the reason good firms like institutions to hold their stock is that these stockholders are better informed and have a relative advantage in detecting high firm quality. Low-quality firms do not have the incentive to mimic, since they do not wish their true worth to be revealed.

Thus, taxable dividends are desirable because they allow firms' management to signal the good quality of their firms. Paying dividends increases the chance that institutions will detect the firm's quality.

Another interesting feature of the Allen, Bernardo, and Welch model is that it does accommodate dividend smoothing. Firms that pay dividends are unlikely to reduce the amount of the dividend, because their clientele (institutions) are precisely the kind of investors that will punish them for it. Thus, they keep dividends relatively smooth.

As in the John and Williams model, the Allen, Bernardo, and Welch model involves a different role for dividends and repurchases. They are not substitutes. In fact, firms with more asymmetric information and firms with more severe agency problems will use dividends rather than repurchases.

Kumar (1988) provided a theory of dividend smoothing. In his model, the managers who make the investment decision know the true productivity type of the firm but the outside investors do not. Also, because they are less diversified the managers want to invest less than the outside investors. Managers will try to achieve lower investment by underreporting the firm's productivity type.

Kumar shows that there cannot be a fully revealing equilibrium in which dividends perfectly signal productivity. If there were such an equilibrium, shareholders could deduce the firm's true productivity type. However, this is inconsistent with managers underreporting.

A coarse signaling equilibrium can exist, though. Within an interval of productivity, Kumar shows that it is optimal for the different types of firm to cluster at a corresponding dividend level. This theory is consistent with smoothing, because small changes in productivity will not usually move a firm outside the interval, so its dividend will not change. Unfortunately, this theory does not explain why share repurchases, which are taxed less, are not used instead of dividends. Kang and Kumar (1991) have looked at the empirical relation between firm

productivity and the frequency of dividend changes. Their results are consistent with Kumar's analysis.

The signaling models discussed here are important contributions. They are also intuitively appealing. Firms that pay dividends, and especially firms that increase their dividends, are firms that are undervalued by the market. Thus, the most important prediction that is common to all of these models is that dividends convey good news about the firm's future cash flows.

The majority of the theoretical (and empirical) research has assumed that firms use dividend changes to signal changes in future earnings or cash flows. But given the less than enthusiastic empirical endorsement this prediction has received (as we describe in the next section), we might want to consider another possibility, that increases in dividends convey information about changes in risk rather than about growth in future cash flows..

By definition, the fundamental news about a firm must be about either its cash flows or its discount rates (risk characteristics). If the good news in a dividend increase is not about (expected) increases in future cash flow, then it might concern a decline in (systematic) risk.

Current dividend-signaling models have very little to say about the relation between dividend changes and risk changes. Grullon, Michaely, and Swaminathan (2002) present an alternative explanation, which they refer to as the "maturity hypothesis." They propose that there are several elements that contribute to firms becoming mature. As firms mature, their investment opportunity set shrinks, resulting in a decline in their future profitability. But perhaps the most important consequence of a firm becoming mature is a change in its (systematic) risk characteristics, specifically, a decline in risk. The decline in risk most likely occurs because the firm's assets in place have become less risky and/or the firm has fewer growth opportunities

available. Finally, the decline in investment opportunities generates an increase in free cash flows, leading to an increase in dividends. Thus, a dividend increase indicates that a firm has matured.

According to the maturity hypothesis, firms increase dividends when growth opportunities decline, which leads to a decrease in the firm's systematic risk and profitability. How, then, should the market react to a dividend increase? The dividend increase clearly contains at least two pieces of news. The good news is that the risk has decreased, and the bad news is that profits are going to decline. The positive market reaction implies that news about risk dominates news about profitability.

Another possibility is that because of agency considerations, investors treat dividend increases as good news, in spite of the declining profitability. For instance, if investors expect managers to squander the firm's wealth by overinvesting, then a dividend increase suggests that managers are likely to act more responsibly. Thus, in addition to the good news conveyed about a risk reduction, investors might interpret a dividend increase as good news per se (they reduce the overinvestment problem), and the stock price would rise. Modeling the dynamic relation between firms' dividend policy, investment opportunities, and cost of capital is still an unexplored path that could yield valuable new insights into the determination of corporate payout policy.

6.2 Incomplete contracts – Agency models

If we relax the assumption of complete (and fully enforceable) contracts, we realize that a firm is more than just a "black box." The different forces that operate within a firm can, at different points in time, pull it in different directions, and the interests of different groups within

a firm may conflict. The three groups that are most likely to be affected the most by a firm's dividend policy are stockholders, management, and bondholders.

The first conflict of interest that could affect dividend policy is between management and stockholders. As suggested by Jensen and Meckling (1976), managers of a publicly held firm could allocate resources to activities that benefit them, but that are not in the shareholders' best interest. These activities can range from lavish expenses on corporate jets to unjustifiable acquisitions and expansions. In other words, too much cash in the firm may result in overinvestment.

Grossman and Hart (1980), Easterbrook (1984), and Jensen (1986) have suggested a partial solution to this problem. If Equityholders can minimize the cash that management controls, they can make it much harder for management to go on (unmonitored) spending sprees. The less discretionary cash that management has, the harder it is for them to invest in negative NPV projects. One way to take unnecessary cash from the firm is to increase the level of payout.

We note that these theories suggest a significant departure from the original Miller and Modigliani assumption in that payout policy and investment policy are interrelated. Paying out cash would increase firm value by reducing potential overinvestments.

Cash payouts make an appealing argument, and as we will show, it also receives significant empirical support. But payouts also have several shortcomings. First, if managers want to overinvest, either to increase their power base by acquiring more firms, or simply to spend more on jets and hunting trips, what is the mechanism that will force them to commit to an action that will prevent them from doing so? Or is it the board of directors that forces them to change their payout policy? If so, what is the information structure and the enforcement mechanism between the board of directors and the management that allows the board to set the

appropriate dividend policy ex –ante, but not to monitor management's actions ex–post? Put another way, if the board (which we assume is independent of the management and cares about shareholders' best interests—a very strong assumption indeed) knows that management overinvests, why can't it monitor it better?

Several authors, most notably Zwiebel (1996), Fluck (1999), and Myers (2000), address this issue in the context of capital structure, but the basic insight for payout policy is straightforward. It must be in management's self-interest to maintain positive payout ex post. In contrast to the standard free cash flow stories, management voluntarily commits to pay out cash because of constant potential threat of some (limited) disciplinary actions. This is also the notion that the Allen, Bernardo and Welch (2000) paper brings to the payout policy issue. Their paper highlights the role of large outsider shareholders' constant monitoring role.

Another question asks why firms pay out in the form of dividends and not share repurchases, since the latter are a cheaper way to take money out of management hands. A related question is why monitor through payout and not debt? As Grossman and Hart (1980) and Jensen (1986) argue, a more effective mechanism to achieve this goal is to increase the level of debt. It is harder for management to renege on a debt commitment relative to a dividend commitment. This argument can also be applied to the choice of dividends versus repurchases. If we take as given the empirical observation that the market strongly dislikes dividend reductions and that management is therefore reluctant to reduce dividends, then dividends represent a more effective mechanism than repurchases to impose discipline.

Third, although the agency story offers a palatable explanation for dividend increases, it is much less so for dividend decreases. Firms increase their dividends when they have free cash flow, and the positive market reaction to the dividend announcement happens because the market

realizes that now management will have to be more disciplined in its action. But what about dividend cuts? One possibility is that management cuts dividends when cash flow, and hence free cash flow, has fallen. Another possibility is that management (or the board) cuts dividends when there are good investments, so the cut should also be greeted positively by the market. Needless to say, this does not happen. In this case, the good investments could be financed by debt.

The earlier work of Shleifer and Vishny (1986) and the more recent work by Allen, Bernardo and Welch (2000) provides a framework that can overcome the first two problems (management incentive to pre-commit and dividends as opposed to repurchases). Building on the work of Grossman and Hart (1980), Shleifer and Vishny (1986) suggested that because of conflict of interest, management should be monitored, and this monitoring must be done by large shareholders. The presence of such shareholders increases the value of the firm because of the monitoring role they play, and because they help facilitate takeover activities (even if they are not involved). Thus, the board has an incentive to induce major shareholders to take a position in the firm, especially if the firm is likely to have excess cash.

Given the favorable tax treatment of dividends by some large shareholders such as corporations, it is possible that dividends are paid to attract this type of clientele. Allen, Bernardo and Welch (2000) extend this analysis and show that a favorable tax rate for institutions relative to individuals is enough for those large shareholders to prefer dividend-paying stocks. This observation is important, since now the analysis can encompass not only corporations (as in Shleifer and Vishny), but also various types of tax-free institutions.

This clientele will increase the value to all shareholders, including individual shareholders, since it monitors the management and thereby increases the firm's value. Whether

indeed large shareholders are attracted to firms that pay dividends and much less to firms that repurchase their shares is an unresolved empirical issue that is worth pursuing.[10]

The second conflict of interest that may be affected by payout policy is between stockholders and bondholders. As Myers (1977) and Jensen and Meckling (1976) have argued, there are some situations in which equityholders might try to expropriate wealth from debtholders. This wealth expropriation could come in the form of excessive (and unanticipated) dividend payments. Shareholders can reduce investments and thereby increase dividends (investment-financed dividends), or they can raise debt to finance the dividends (debt-financed dividends). In both cases, if debtholders do not anticipate the shareholders' action, then the market value of debt will go down and the market value of equity will rise.

To summarize, in this section we presented two views of why dividends are paid. The first view is that dividends convey good news. The alternative view is that dividends are in themselves good news because they resolve agency problems. In the next section we review the corresponding empirical literature.

7. Empirical Evidence

7.1 Asymmetric information and signaling models

In their original paper, Miller and Modigliani suggested that if management's expectations of future earnings affects their decisions about current dividend payouts, then changes in dividends will convey information to the market about future earnings. This notion has been labeled as "the information content of dividends." As discussed earlier, this notion has

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[10] Based on potential conflict of interest between outside share holders and the minority shareholders who manage the firm, Fluck (1999) presents an interesting idea in which the more effective outsiders are in disciplining management, the more they receive in dividends. Thus, the better outsiders are at monitoring, either because of the resources they devote to it or because of their fractional ownership, more of the profits will be distributed to

been formalized in two ways: In the first, dividends are used as an ex-ante signal of future cash flow as, for example, in Bhattacharya (1979). In the second, dividends provide information about earnings as a description of the sources and uses of funds identity as, for example, in Miller and Rock (1985). The second alternative can be interpreted as saying that the fact that dividends convey information does not necessarily imply that they are being used as a signal. This distinction may be subtle, but it is crucially important in interpreting the empirical tests as supporting the signaling theory. Most, if not all, of the empirical tests we are aware of cannot help us to distinguish between these two alternatives.

The information/signaling hypotheses contain three important implications that have been tested empirically:

(i) Dividend changes should be followed by subsequent earnings changes in the same direction.

(ii) Unanticipated dividend changes should be accompanied by stock price changes in the same direction.

(iii) Unanticipated changes in dividends should be followed by revisions in the market's expectations of future earnings in the same direction as the dividend change.

It is important to note that all of the above implications are necessary, but not sufficient, conditions for dividend signaling. The condition that earnings changes will follow dividend changes is the most basic. If this condition is not met, we can conclude that dividends do not have even the potential to convey information—at least not about future cash flows, — let alone to signal.

Most of the empirical literature has concentrated on the second implication, that unexpected dividends changes are associated with price changes in the same direction. Therefore, we start our review by describing the empirical findings on the association between

shareholders.

dividend changes and price changes. For example, Pettit (1972) showed that a significant price increase follows announcements of dividend increases, and a significant price drop follows announcements of dividend decreases. Aharony and Swary (1980) showed that these price changes hold even after they controlled for contemporaneous earnings announcements. Using a comprehensive sample of dividend changes of at least 10% over the period 1967-1993, Grullon, Michaely, and Swaminathan (2002) found that the average abnormal return to dividend increases was 1.34% (a median of 0.95%) and the average abnormal market reaction to dividend decreases was −3.71% (a median of −2.05%).

Table 9 describes some of the characteristics of firms that change their dividends. Both dividend-increasing and decreasing firms are larger than the typical NYSE/Amex firm. During the last four decades (the sample is from 1963 to 1998), the average dividend-increasing firm has a dividend yield of 3.74% before the dividend increase and the average dividend-decreasing firm has a dividend yield of 3.29% prior to the dividend decrease. The change in dividend is greater (in absolute terms) for firms that decrease their dividends (-44.8% compared to 31.1%), but the frequency of a decrease is smaller (1358 compared to 6284).

Studies by Asquith and Mullins (1983) (dividend initiations), Healy and Palepu (1988), and Michaely, Thaler and Womack (1995) (dividend initiations and omissions) focused on extreme changes in dividend policy. Their research showed that the market reacts quite severely to those announcements. The average excess return is 3.4% for initiation and −7% for omissions.

It seems that the market has an asymmetric response to dividend increases and decreases (and for initiations and omissions), which implies that lowering dividends carries more informational content than increasing dividends, perhaps because reductions are more unusual, or because reductions are of greater magnitude. Michaely, Thaler, and Womack (1995) examined

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this issue and found that when they controlled for the change in yield, the announcement of an omission had a larger impact on prices than did an announcement of an initiation. They also reported that the effect of a unit change in yield (say, a 1% change in yield) had a greater effect on prices for initiations than it did for omissions. The price impact may explain, to some extent, why managers are so reluctant to cut dividends.

There seems to be general agreement that:

(1) Dividend changes are associated with changes in stock price of the same sign around the dividend change announcement.

(2) The immediate price reaction is related to the magnitude of the dividend.

(3) The price reaction is not symmetric for increases and reductions of dividends. Announcements of reductions per se have a larger price impact than announcements of increases.

Prices can tell us not only about the immediate market reaction to the dividend change, but also how the market perceived dividend-changing firms before the dividend change occurred and whether the market absorbed the information contained in the dividend change. It is clear that dividend-increasing firms have done well prior to the announcement and dividend-decreasing firms have not done as well. For example, for the period 1947-1967 Charest (1978) found an abnormal performance of around 4% in the year prior to the dividend increase month and a negative 12% for the dividend decreasing firms. Benartzi, Michaely, and Thaler (1997) documented an average 8.6% abnormal return in the year prior to a dividend increase and –28% for firms that decreased dividends. For dividend initiations and omissions, the magnitude of the pre-announcement price movement was even more pronounced (Michaely, Thaler and Womack, 1995).

What is perhaps more interesting and important, from both the corporate finance and the market efficiency perspectives, is the post-dividend-change performance. Charest (1978) found a 4% abnormal return in the two years after dividend increase announcements and a negative 8% for dividend-decreasing firms. Using the Fama-French three-factor model Grullon, Michaely and Swaminathan (2002) reported a three-year abnormal return of 8.3% for dividend increases, which is significant. They did not detect any abnormal performance for dividend-decreasing firms. Not surprisingly, the post-dividend abnormal performance was even more pronounced for initiations and omissions. Michaely, Thaler and Womack (1995) reported a market-adjusted return of almost 25% in the three years after initiations and a negative abnormal return of 15% in the three years after omissions.

The post-dividend announcement drift is both encouraging and disturbing from the signaling-theory perspective. It is encouraging because it is consistent with the implication that dividend changes have some useful informational content. It is disturbing because it implies that even if firms try to signal through dividends, the market does not "get it"—or at least it does not get the full extent of the signal. Otherwise, the entire price reaction would have happened right after the announcement. The fact that the market doesn't get it (better future earnings or cash flows) is problematic, since the models described above rely on the rationality assumption. Investors and firms use the information at their disposal in the best possible way. The long-term drift does not support this assumption. In other words, if investors do not understand the signal, there is no incentive for those firms to use a costly signal.

Our next step is to examine the fundamental implication of the signaling models-- that dividend changes and future earnings changes move in the same direction. Watts (1973) was among the first to test the proposition that the knowledge of current dividends improves the

predictions of future earnings, over and above knowledge of current and past earnings. Using 310 firms with complete dividends and earnings information for the years 1946-67, and annual definitions of dividends and earnings, Watts tested whether earnings in year t+1 could be explained by the current (year t) and past (year t-1) levels of dividend and earnings. For each firm in the sample, Watts estimated the current and past dividend coefficients (while controlling for earnings). Although he found that the average dividend coefficients across firms were positive, the average *t*-statistic was very low. In fact, only the top 10% of the coefficients were marginally significant. Using changes in levels yielded similar results. He concluded that: "... in general, if there is any information in dividends, it is very small."

Gonedes (1978) reached a similar conclusion. Penman (1983) also finds that after controlling for management's future earnings forecast, there was not much information conveyed by dividend changes themselves. Interestingly, Penman also reports that many firms with improved future earnings did not adjust their dividends accordingly.

Somewhat more in line with the theory are Healy and Palepu's (1988) results. For their sample of 131 firms that initiated dividend payments, earnings had increased rapidly in the past and continued to increase for the following two years. However, for their sample of 172 firms that omitted a dividend payment, the results were the opposite of what signaling theory predicts. Earnings declined in the year in which the omission announcement took place, but then improved significantly in the next several years. For a sample of 35 firms that increased their dividends by more than 20%, Brickley (1983) found a significant earnings increase in the year of and the year after the dividend increase.

Perhaps we can attribute the somewhat mixed results on the relation between current changes in dividends and future changes in earnings to the limited number of firms used in most

of these studies. Another factor that makes the task difficult is knowing how to model unexpected earnings.

Using a large number of firms and events over the period 1979-1991 and several definitions of earnings innovations, Benartzi, Michaely, and Thaler (1997) investigate the relation between dividend changes and future changes in earnings. They measure earnings changes relative to the industry average changes in earnings that they adjusted for earnings momentum and for mean reversion in earnings. Two robust results emerge. First, there is a very strong lagged and contemporaneous correlation between dividend changes and earnings changes. When dividends are increased earnings *have* gone up. There is no evidence of a positive relation between dividend changes and future earnings changes. In the two years following the dividend increase, earnings changes were unrelated to the sign and magnitude of the dividend change.

The results were strong but perverse for dividend decreases. Like Healy and Palepu (1988), Benartzi, Michaely, and Thaler (1997) find a clear pattern of earnings increase in the two years following the dividend cut. Using a sample of firms that changed their dividends by more than 10%, Grullon, Michaely and Swaminathan (2002) confirmed these results. They show that not only do future earnings not continue to increase, but that the level of firms' profitability decreases in the years following announcement of dividend increases. Figure 4 presents these results. The figure shows that firms move from a period of increasing ROA before the dividend increase to a period of declining ROA after the dividend increase.

Nissim and Ziv (2001) offer yet another look at this problem. They attempt to explain future innovation in earnings by the change in dividend, like Benartzi, Michaely, and Thaler (1997). They argue that a good control for mean reversion is the ratio of earnings to the book value of equity (ROE) and add it as an additional explanatory variable. They advocate the

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inclusion of ROE to improve the model of expected earnings, and to fix what they call an "omitted correlated variables". Rather than adopting the natural convention of assigning a dividend change to the year in which it actually takes place, Nissim and Ziv change this convention by assigning dividend changes that occur in the first quarter of year t+1 to year t. Since we know that dividends are very good predictor of past and current earnings, this change is bound to strengthen the association between dividend changes and earnings growth in year 1. Indeed using this methodology, the dividend coefficient is significant in about 50% of the cases when next year's earning is the dependent variable. When using the more conventional methodology, it is significant in only 25% of the years. When using several independent variables in addition to ROE, Benartzi, Michaely, and Thaler (1997) do not find any significant relation between current changes in dividends and future changes in earnings.

Using the Fama and French (2000) modified partial adjustment model to control for the predictable component of future earnings changes based on lagged earnings levels and changes, Benartzi, Grullon, Michaely, and Thaler (2002) re-examine the relation between dividends and earnings changes. Fama and French explicitly model the time-series of earnings in a way that captures the empirical fact that earnings changes are more mean-reverting in the tails. They show that their model explains the evolution of earnings much better than a model with a uniform rate of mean reversion. We have thus adopted their methods to investigate this problem.11 . The model is the following:

$$(E_\tau - E_{\tau-1}) / B_{-1} = \beta_0 + \beta_1 R\Delta DIV_0 + (\gamma_1 + \gamma_2 NDFED_0 + \gamma_3 NDFED_0 * DFE_0 + \gamma_4 PDFED_0 * DFE_0) * DFE_0$$
$$+ (\lambda_1 + \lambda_2 NCED_0 + \lambda_3 NCED_0 * CE_0 + \lambda_4 PCED_0 * CE_0) * CE_0 + \varepsilon_\tau$$

$$(19)$$

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11 See Fama and French (2000) for a detailed discussion of this econometric model.

In this equation DFE_0 is equal to $ROE_0 - E[ROE_0]$, where $E[ROE_0]$ is the fitted value from the cross-sectional regression of ROE_0 on the log of total assets in year -1, the market-to-book ratio of equity in year -1, and ROE_{-1}. CE_0 is equal to $(E_0 - E_{-1})/B_{-1}$. $NDFED_0$ ($PDFED_0$) is a dummy variable that takes the value of 1 if DFE_0 is negative (positive) and 0 otherwise, and $NCED_0$ ($PCED_0$) is a dummy variable that takes the value of 1 if CE_0 is negative (positive) and 0 otherwise. As discussed in Fama and French (2000), the dummy variables and squared terms in Equation 19 are included to capture the fact that large changes in earnings revert faster than small changes and that negative changes revert faster than positive changes. It is important to control for these non-linearities in the behavior of earnings because assuming linearity when the true functional form is non-linear has the same consequences as leaving out relevant independent variables.

The Benartzi, Grullon, Michaely, and Thaler (2002) estimation of equation 19 is presented inn Table 10. They find no evidence that dividend changes contain information about future earnings growth. The coefficient for RΔDIV is not statistically different from zero when either year 1 earnings changes or year 2 earnings changes are the dependent variables. Furthermore, even for predictions of first year earnings growth, the coefficient for the dividend change is significant at the 10% level in only 4 out of the 34 years of the sample. For year 2 earnings it is significantly positive at the 10% level in just 5 out of the 34 years. As documented in previous studies, this evidence suggests that dividend changes are very unreliable predictors of future earnings.

The overall accumulated evidence does not support the assertion that dividend changes convey information about future earnings. Miller (1987) summarized the empirical findings this way: "…dividends are better described as lagging earnings than as leading earnings". Maybe, as

Miller and Rock (1985) suggested, dividends convey information about current earnings through the sources and uses of funds identity, not because of signaling. At the minimum, the empirical findings on the long-term price drift and the lack of positive association between dividend changes and future changes in earnings raise serious questions about the validity of the dividend signaling models. If firms are sending a signal through dividends, it is not a signal about future growth in earnings or cash flows, and the market doesn't get the message. Why would firms waste money by paying a costly dividend to send a signal that investors do not receive?

In an interesting paper, DeAngelo, DeAngelo and Skinner (1996) examined 145 firms whose annual earnings growth declined in year zero, after at least nine years of consecutive earnings growth. Thus, year zero represented the first earnings decline in many years. Their test focused on the year zero dividend decision, which could have conveyed a lot of information to outsiders by helping the market to assess whether the decline in earnings was permanent or transitory. DeAngelo, DeAngelo and Skinner found no evidence that favorable dividend decisions (i.e., dividend increases) represented a reliable signal of superior future earnings performance. There was no evidence of positive future earnings surprises (and even some indications of negative earnings surprises) for the 99 firms that increased their dividends. Not only did the dividend-increasing firms not experience positive earnings surprises in subsequent years in absolute terms, their earnings performance was no better than those firms that did not change their dividend. Overall, there was no evidence that dividends had provided a useful signal about future earnings.

None of us know for sure what market expectations are, either about prices or about earnings. But in the case of earnings, we can test for changes in market expectations by looking at the earnings estimates of Wall Street's analysts. This is how we can test the third implication

of the information/signaling theories, that unanticipated changes in dividends should be followed by revisions in the market's expectations of future earnings in the same direction as the dividend change. Ofer and Siegel (1987) used 781 dividend change events to examine how analysts change their forecast about the *current* year earnings in response to the dividend changes. Consistent with the positive association between dividend changes and actual changes in concurrent year earnings (the year of the dividend change), Ofer and Siegel found that analysts revised their current year earnings forecast by an amount that was positively related to the size of the announced dividend change. They also provided evidence that their revision was positively correlated with the market reaction to the announced dividend.

Most of the empirical research centers on the necessary conditions (price reaction, subsequent earnings and changes in earnings expectations) for dividend signaling. The outcome, as we have shown, is not encouraging. Several papers looked at the sufficient conditions for dividend signaling, most notably at taxes. Recall that tax-based dividend signaling theories are based on the idea that dividends are more costly than repurchases, and that managers intentionally use this costly device to signal information to the market.

Bernheim and Wantz (1995) investigated the market reaction to dividend changes during different tax regimes. In periods when the relative taxes on dividends are higher than taxes on capital gains, the signaling hypothesis implies that the market reaction to dividend increases should be stronger, because it is more costly to pay dividends. Since it is more expensive to signal, the signals are more revealing for those who choose to use them. The free –cash flow hypothesis makes the opposite prediction. Since it is more expensive to pay dividends and the benefit presumably does not change, when the taxes on dividends are relatively higher, the market should react less favorably to dividend increases. Bernheim and Wantz's results are

consistent with the dividend-signaling hypothesis. In periods of higher relative taxes on dividends, the market reaction to dividend payments is more favorable.

However, applying nonparametric techniques that account for the nonlinear properties common to many of the dividend-signaling models in an experiment similar to Bernheim and Wantz (1995), Bernhardt, Robertson, and Farrow (1994) did not find evidence to support the tax-based signaling models. Furthermore, using data from six years before and six years after the Tax Reform Act of 1986, Grullon and Michaely (2001) found that the market responded much more positively to dividend increases when dividend taxation was lower (after the tax change), a finding that is inconsistent with tax-based signaling theories.

Amihud and Murgia (1997) examine dividend policy in Germany, where dividends are not tax disadvantaged and in fact dividend taxation is lower than capital gains taxation for most classes of investors. In this setting, the tax-based models (such as John and Williams, 1995, Bernheim, 1991, and Allen Bernardo and Welch, 2000) predict that dividend changes should not have any informational value. Thus, we should not observe a price reaction around changes in dividends. However, Amihud and Murgia (1997) find that dividend changes in Germany generated a stock price reaction that was very similar to what other researchers have found in the U.S. This finding is not consistent with the theory.

Grullon, Michaely and Swaminathan (2002) examined the relation between changes in dividend policy and changes in the risk and growth characteristics of the firm. Their sample comprised 7,642 dividend changes announced between 1968 and 1993. Using the Fama-French three-factor model or the CAPM, they found that firms that increased dividends experienced a significant decline in their systematic risk, but firms that decreased dividends experienced a significant increase in systematic risk. Firms that increased dividends also experienced a

significant decline in their return on assets, which indicates a decline in systematic risk. Capital expenditures of firms that increased dividends stayed the same and the levels of cash and short-term investments on their balance sheets declined.

Moreover, Grullon, Michaely and Swaminathan found that the greater the subsequent decline in risk, the more positive was the market reaction to the announced dividend. Thus, changes in risk, conditional on changes in profitability, begin to provide an explanation for the price reaction to dividend announcements.

Using the Gordon growth model and the actual changes in risk and dividends, Table 11 illustrates the relations between the risk reduction, the reduction in growth, and the price reaction to the announced dividend. The table shows that the average stock price prior to the announcement is $29.6, and the average market reaction is 1.34%, implying a post-announcement price of $30. Grullon, Michaely and Swaminathan (2002) further reported a decline in the equity cost of capital from an average of 13.2% in the years before the dividend change to 12.2% in the years after the dividend change. Now, using the Gordon growth model, we can calculate the implied change in growth. We find that because of the decline in risk, a growth rate decline of even 20% (from 9.48% to 7.48%) is still consistent with a positive market reaction.

In summary, the empirical evidence provides a strong *prima facie* case against the traditional dividend signaling models. First, the relation between dividend changes and subsequent earnings changes are the opposite of what the theory predicts, so if firms signal, the signal is not about future growth in earnings or cash flows. Second, the market doesn't "get" the signal. There is a significant price drift in subsequent years. (However, there is a change in the dividend-changing firms' risk profile, and that the change is related both to the dividend and to

subsequent performance.) Third, a cross-sectional examination strongly indicates that it is the large and profitable firms and those firms with less information asymmetries that pay the vast majority of dividends.

7.2 Agency models

Since most agency models are not as structured as the signaling models, it is difficult to derive precise empirical implications. According to the free cash flow models what should happen to earnings after a dividend increase? The answer is ambiguous. If the board of directors decides to increase the dividend after management has already invested in some negative NPV projects, then, since the payment of dividends prevents management from continuing to invest in "bad" projects, we should expect earnings and profitability to increase. However, if the board decides on dividends before management has the chance to overinvest, then it is difficult to say how future earnings will be relative to past earnings. If dividends increase around the time the firms face declines in investment opportunities, then even a decline in profitability is consistent with the free cash flow hypothesis.

A clearer implication of the free cash flow hypothesis is that the overinvestment problem is likely to be more pronounced in stable, cash-rich companies in mature industries without many growth opportunities. Lang and Litzenberger (1989) exploited this feature to test the free–cash flow hypothesis, and to contrast it with the information –signaling hypothesis. The basic idea is that, according to the free –cash flow hypothesis, an increase in dividends should have a greater (positive) price impact for firms that overinvest than for firms that do not. Empirically, they identified overinvesting firms as ones with Tobin's Q less than unity. When they examined only dividend changes that were greater than 10% (in absolute value), they found that for dividend-

increase announcements, firms with Q less than one experienced a larger price appreciation than firms with Q greater than one. For dividend-decrease announcements, firms with Q lower than one showed a more dramatic price drop. The greater effect (in absolute value) of dividend changes on firms with lower Q is consistent with the free –cash flow hypothesis. On the other hand, the information-signaling hypothesis would have predicted a symmetric effect regardless of the ratio of market value to replacement value.

Yoon and Starks (1995) repeated the Lang and Litzenberger experiment over a longer time period. They found that the reaction to dividend decreases was the same for high and low Tobin's –Q firms.   The fact that the market reacts negatively to dividend decrease announcements by the value-maximizing (high Q) firms is not consistent with the free-cash flow hypothesis.

Like Lang and Litzenberger (1989), Yoon and Starks found a differential reaction to announcements of divided increases. However, when they controlled for other factors, such as the level of dividend yield, firm size, and the magnitude of the change in the dividend yield (through a regression analysis), Yoon and Starks found a symmetric reaction to dividend changes (both increases and decreases) between high and low Tobin's Q firms. Again, this evidence is not consistent with the free –cash flow hypotheses.

Grullon, Michaely and Swaminathan's findings of declining return on assets, cash levels, and capital expenditures in the years after large dividend increases suggest that firms that anticipate a declining investment opportunity set are the ones that are likely to increase dividends.   This is consistent with the free cash flow hypothesis. Lie (2000) thoroughly investigated the relation between excess funds and firms' payout policies and found that dividend-increasing (or repurchase) firms had cash in excess of peer firms in their industry. He

also showed that the market reaction to the announcement of special dividends (and repurchases) was positively related to the firm's amount of excess cash and negatively related to the firm's investment opportunity set as measured by Tobin's Q. These results are consistent with the idea that limiting potential overinvestment through cash distribution, especially for firms that have limited investment opportunities, enhances shareholder wealth.

Christie and Nanda (1994) examined the reaction of stocks to President Roosevelt's unexpected announcement in 1936 of taxes on undistributed corporate profits. The new tax increased the attractiveness of dividends relative to retained earnings. According to the free cash flow hypothesis, firms would now have had more incentive to reduce retained earnings and thereby reduce potential overinvestment problems, since it had become less expensive (in relative terms) to dispense of those cash flows. This effect would have been particularly pronounced for firms that were more susceptible to agency costs. Christie and Nanda (1994) found that share prices rose in response to the announcement of the tax change, consistent with the notion that paying dividends may alleviate some free cash flow problems. They also found that firms that were more likely to suffer from free cash flow problems experienced a more positive price reaction to the announcement.

The ability to monitor and the rights of outside shareholders differs across countries, and by implication the potential severity of conflicts of interests will also differ. La Porta, Lopez-de-Silanes, Shleifer, and Vishny (2000) examined the relation between investors' protection and dividend policy across 33 countries. They tested two hypotheses. The first was that when investors were better able to monitor and enforce their objectives on management (countries with higher investors' protection), they would also pressure management to disgorge more cash. The second hypothesis was that because of market forces (e.g., management wants to maintain the

ability to raise more cash in the capital markets or wants to maintain a high stock price for other reasons), management would actually pay high dividends in those countries where investors' protection was not high.[12]

La Porta et al. (2000) found that firms in countries with better investor protection made higher dividend payouts than did firms in countries with lower investor protection. Moreover, in countries with more legal protection, high-growth firms had lower payout ratios. This finding supports the idea that investors use their legal power to force dividends when growth prospects are low. That is, an effective legal system provides investors with the opportunity to reduce agency costs by forcing managers to pay out cash. There is no support for the notion that managers have the incentive to "do it on their own."

The results of La Porta et al. (2000) indicate that without enforcement, management does not have a strong incentive to "convey its quality" through payout policy. There is also no evidence that in countries with low investor protection, management will voluntarily commit itself to pay out higher dividends and to be monitored more frequently by the market.

Before concluding this section we discuss the empirical evidence on the relation between the potential shareholder-debtholder conflict of interest and dividend policy.

Handjinicolaou and Kalay (1984) examined the effect of dividend-change announcements on both bond and equities prices. If dividend changes are driven by equityholders' desire to extract wealth from debtholders, then an increase in dividends should have a positive impact on stock prices (which we know it does), and a negative impact on bond prices. The reverse should be true for dividend decreases. The alternative hypothesis, that

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[12] The notion that in countries where investors' protection is low, firms would pay higher dividends is also consistent with many of the signaling models. In countries with low protection, the degree of asymmetric information is likely to be higher, and hence the desire to pay dividends by high-quality firms should be higher as well.

dividends are a consequence of asymmetric information or that they resolve free cash flow problems, implies that bond prices should move in the same direction as equity prices. Handjinicolaou and Kalay found that bond prices dropped significantly at the announcement of dividend decreases, and did not change significantly at dividend-increase announcements. These results do not lend support to the wealth expropriation hypothesis.[13]

Myers (1977) and Jensen and Meckling (1976) suggested that both equityholders and bondholders may a priori agree on restricting dividends. Indeed, most bond covenants contain constraints that limit both investment- and debt-financed dividends.

Kalay (1982b) examined these constraints and found that firms held significantly more cash (or cash equivalents) than the minimum they needed to hold, according to the bond covenants. We can interpret Kalay's finding as a reverse wealth transfer. That is, if debt were priced under the assumption that only the minimum cash would be held by the corporation, then a positive reservoir would increase the market value of debt at the expense of equityholders.

In hindsight, this is not too surprising. We should not expect that large, established firms, which are likely to have to come back to the well and seek more debt financing at some point in the future, are going to relinquish their reputation for a small gain at the expense of bondholders. We can readily see how a one-time wealth transfer from existing bondholders to equityholders may result in a long-term loss because of the increase in the cost of capital. When would the problem arise? In precisely those cases where there is a great probability that the firm's time horizon is short, e.g., the firm is in financial distress, or is about to be taken private. DeAngelo and DeAngelo (1990) found evidence that was consistent with this assertion. They showed that firms in financial distress were reluctant to cut their dividends. In these cases, not cutting

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[13] The asymmetry in the bond price reaction may be explained by several factors. Among them is the fact that dividend decreases are larger in absolute value than dividend increases, and therefore have a more significant

dividends may constitute a significant wealth transfer from debtholders to equityholders. This is still an open question that is worth further consideration.[14]

8. Transaction Costs and Other Explanations

Under certain circumstances, it is possible that investors would prefer dividends despite the tax disadvantage of dividends relative to capital gains.

The first explanation of why firms pay dividends has to do with the "prudent man" laws. These laws and regulation are intended to protect small investors from agents (pension funds, for example) that do not invest in their interest. Private trusts, acting under the Prudent Man Investment Act, are the most constrained fiduciaries. Pension funds are governed by the ERISA, which is less restrictive than the Prudent Man Rule. Lastly, mutual funds are supervised by the SEC according to the Investment Company Act of 1940, which is less restrictive than either the common law (for bank trusts) or ERISA (for pension funds). (See Del Guercio, 1996, for information about the various laws and regulation described here).

Del Guercio (1996) presented evidence indicating that the Prudent Man Rule affects investment decisions. Bank managers significantly tilt the composition of their portfolios that are viewed by the courts as being subject to the Prudent Man Rule. Mutual funds do not. Bank trusts weight their portfolios towards S&P stocks and towards stocks that are ranked A+ (the highest ranking based on earnings and dividend history). Mutual funds load their portfolios the other way, towards lower rank stocks. We find it interesting that there is no difference between the portfolios' composition of bank trusts (mainly trusts of wealthy individuals, which are highly

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impact on both bond and stock prices.

[14] DeAngelo and DeAngelo (1990) allude to another link between conflict of interest and dividend policy. They report that some dividend reductions are intended to enhance the firm's bargaining position regarding labor negotiations.

taxed) and bank pension funds (nontaxable entities). Both types of portfolio are weighted more towards S&P stocks and on stocks that are ranked A+.

Del Guercio went a step further. Using a regression analysis, she examined the role of dividends in the portfolio selection of institutions and found that after controlling for several other factors, such as market capitalization, liquidity, risk, and S&P ranking, dividend yield had no power to explain banks' portfolio choices, and had negative explanatory power in mutual funds portfolio choice.

Overall, the evidence indicates that the Prudent Man Rule has a role in portfolio selection, but that dividends do not play a major role (if any). This evidence is also consistent with the information presented in Table 2, which indicates that dividend taxation is not an issue in portfolio selection, not even for highly taxed investors.

A second motive for paying dividends is based on a transaction costs argument. If investors want a steady flow of income from their capital investment (say, for consumption reasons), then it is possible that dividend payments would be the cheapest way to achieve this goal. This result may hold if the cost of the alternative (i.e., to sell a portion of the holdings and receive capital gains) involves nontrivial costs. These costs might be the actual transaction costs for selling the shares, which can be quite high for retail investors, or they could represent the time and effort spent on these transactions.

However, this argument does not seem to be supported by the time-series evidence on transaction costs, nor by stock ownership. First, through the years, and especially after the switch to negotiated commissions in May 1975, the transaction costs of buying and selling shares have been substantially reduced. This reduction should have resulted in lower demand for dividends, as the alternative became cheaper. The evidence in Table 1, does not support this

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prediction. We do not observe a reduction in dividend payments that is related to the change in transaction costs.

Second, this argument particularly applies to individual small investors who do not hold many shares. Hence, the cost of transacting may be higher. But the role of small investors in the market place has been shrinking. The overall level of dividends in the economy has not been reduced accordingly.

Third, if this effect is in fact substantial, it should lead to an optimal dividend policy at the aggregate level. However, As Black and Scholes (1974) argued, firms will adjust their dividend policy such that the demand for dividends by this clientele is fulfilled. Thus, in equilibrium, any specific firm should be indifferent to dividend policy. So, while this explanation can account for positive payouts despite the adverse tax consequences, it cannot explain why, in equilibrium, firms care about the level of dividends paid.

Shefrin and Statman (1984) suggested a third explanation as to why investors may prefer dividend-paying stocks. Rather than developing an economic model based on maximizing behavior, they eliminated the maximizing assumptions that are the cornerstone of neoclassical economics, and which we have maintained throughout. Instead, Shefrin and Statman developed a theory of dividends based on several recent theories of investors' behavior. The basic idea is that even if the eventual cash received is the same, there is a significant difference in whether it comes in the form of dividends or as share repurchases. In other words, the form of cash flow is important for psychological reasons.

We illustrate Shefrin and Statman's approach with one of the theories they develop, based on Thaler and Shefrin's (1981) theory of self-control. Thaler and Shefrin suggested that people have difficulties behaving rationally when they want to do something but have problems

doing so. Examples that illustrate this suggestion are the prevalence of smoking clinics, credit counselors, diet clubs, and substance abuse groups. Individuals wish to deny themselves a present indulgence, but find that they yield to temptation. Thaler and Shefrin represented this conflict in a principal-agent form. The principal is the individual's internal planner, which expresses consistent long-run preferences. However, the responsibility for carrying out the individual's action lies not with the planner, but with the doer, the agent.

There are two ways the planner can control the agent. The first is will power. The problem is that this causes disutility. The second is to avoid situations in which will power must be used. This avoidance is accomplished by adopting rules of behavior that make it unnecessary for people to question what they are doing most of the time.

Shefrin and Statman suggested that by having money in the form of dividends rather than capital gains, people avoid having to make decisions about how much to consume. Thus, they avoid letting the agent in them behave opportunistically. They postulated that the benefit of doing this was sufficient to offset the taxes on dividends.

As with the transaction costs story, the self-control explanation can account for an aggregate positive payout policy, but not for an individual firm optimal payout policy. That is, in equilibrium, firms will adjust their dividend policy such that the marginal firm is indifferent to the level of dividend paid out. Thus, neither the transaction costs explanation nor the behavioral explanation can account for the positive price reaction to dividend increases and the negative price reaction to dividend decreases. Nevertheless, this explanation is innovative and intriguing.

We also note that this explanation relies heavily on the effect that individual investors have on market prices. The need for a steady stream of cash flows combined with significant transaction costs (the transaction costs story) may adequately describe the actions of small retail

investors, but may not hold when applied to corporate and institutional investors. Likewise, using self-control as an explanation for why firms pay dividends is more persuasive when individual investors are the dominant force in the marketplace. As the evidence in Table 1 indicates, the level of dividend payout did not decrease through time. This evidence does not support the self-control and transaction costs explanations.

However, Long's (1978) study of Citizens Utilities (CU) is illuminating. CU stocks are an almost perfect medium for examining the effect of dividend policy on prices. The reason is that from 1955 until 1989, this company had two types of common stocks that differed only in their dividend policy. Series A stock paid a stock dividend and Series B stock paid a cash dividend.[15] The company's charter required that the stock dividend on Series A stock be of equal value with Series B cash dividends. However, in practice, the board of directors chose stock dividends that averaged 10% higher than the cash dividends. Even without taxes, we would expect the price ratio of Series A stock to Series B stock to be equal to the dividend ratio, i.e., to 1.1. Long found that the price ratio was consistently below 1.1 in the period considered. This price ratio implies a preference for cash dividends over stock dividends despite the tax penalty.

Poterba (1986) revisited the Citizens Utilities case. For the period 1976-84, he found that the price ratio and the dividend ratios were comparable: the average price ratio was 1.134 and the average dividend ratio was 1.122. This evidence implies indifference between dividend and capital gains income. Poterba also examined the ex-dividend day behavior of CU for the period 1965-84, and found that the average ex-day price decline was less than the dividend payment.

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[15] CU received a special IRS ruling so that for tax purposes, the Series A stock dividends would be taxed in the same way as proportionate stock dividends are treated for firms having only one series of common stock outstanding. The special ruling expired in 1990.

This evidence supports the ex-dividend day studies discussed previously. It is hard to reconcile the ex-day evidence of the CU stocks with the relative prices of the two stocks on ordinary days.

Hubbard and Michaely (1997) examined the relative prices of these two stocks after the passage of the 1986 TRA. Because the 1986 TRA substantially reduced the advantage of receiving stock dividends rather than cash dividends, they hypothesized that the price ratio should decrease. Indeed, they found that during 1986, the price ratio was considerably lower than in the previous years. However, in the years 1987 through 1989, the price ratio rose and stayed consistently above the dividend ratio.

It seems that the evidence from the price behavior of Citizens Utilities deepens the dividend mystery, rather than enlightening us. It is difficult to know just how to interpret it.

There is another rationale for paying dividends, but it is not consistent with efficient markets. If managers know more about their firm than the market does and they can time their equity issues decisions to periods when their firm is highly overvalued, then a positive payout is optimal. That is, if investors prefer constant cash flow and managers can sell additional equity when it is overvalued, then investors will be better off receiving a steady stream of dividends and leaving the timing of the sales to the firm. However, in efficient markets, outside investors will realize that when a firm sells its securities, it implies that the firm is overvalued (see Myers and Majluf, 1984, for example), and its price (post announcement) will reflect this fact. In such a case, current equityholders are not better off, even if the managers know more about the firm's value than the market does. The attempt to raise equity will result in a reduction in the existing equity's value. The new shares will be sold at fair value, which renders dividend policy irrelevant.

A growing number of studies are presenting evidence that is not consistent with the market rationality described above. Their evidence is consistent with the notion that managers can time the market (e.g., Baker and Wurgler, 2000); and that the market underreacts to some financial policy decisions, such as seasoned equity issues (Loughran and Ritter, 1995), Initial Public Offerings (Ritter 1991 and Michaely and Shaw, 1994), and repurchases (Ikenberry, Lakonishok and Vermaelen, 1995). We know that announcements of seasoned equity issues are associated with a price decline (e.g., Masulis and Korwar, 1986), and share repurchases announcements are associated with price increases (e.g., Vermaelen, 1981). However, these studies go further by showing that a significant price movement in the same direction continues several years after the event.

Moreover, the post-dividend announcement drift (Charest, 1978; Michaely, Thaler and Womack, 1995; Benartzi, Michaely and Thaler, 1997) may be a result of investor behavior that is less –than –fully rational. This drift can be explained to some extent by the fact that dividend changes indicate changes in the denominator (risk profile) rather than in the numerator (cash flows), and thus are harder to detect. Grullon, Michaely and Swaminathan (2000) find that the long-term drift is negatively related to future changes in risk. The greater the decline in risk, the larger the drift. Thus, in the long run, prices increase with a decline in risk. This price behavior indicates a securities market in which investors only gradually learn the full implications of a dividend change for a firm's future profitability and systematic risk. Hence, we could argue that paying dividends is the optimal policy so that investors do not have to sell their stock when it is below its (true?) market value.

The literature on dividend policy is plentiful. Due to a lack of space, we cannot cover the many contributions in detail. However, one approach that has received considerable attention in

the economics literature, but not in the finance literature, was developed by King (1977), Auerbach (1979), and Bradford (1981). The assumption in this framework is that the prohibition on repurchasing shares is binding, and paying dividends is the only way firms can distribute cash to investors. The market value of corporate assets is therefore equal to the present value of the after-tax dividends firms are expected to pay. Because dividend taxes are capitalized into share values, firms are indifferent on the margin between policies of retaining earnings or paying dividends. Thus, the model supports the idea that firms pay out a significant portion of corporate earnings as dividends. However, this theory fails to explain the market reaction to dividend announcements that was the starting point of many of the other theories. This theory has also not received much attention in the finance literature because of its assumption that dividends are the only way the firm can pay out money to shareholders.[16]

This assumption is appropriate in some countries, such as the U.K., where repurchases have historically been illegal. It is less appropriate for the U.S. Nonetheless, the use of open-market share repurchases in the U.S. was not common until 1983, perhaps because of some legal restrictions. For example, the risk of violating the antimanipulative provisions of the Securities Exchange Act (SEA) of 1934 deterred most corporations from repurchasing shares. After the SEC adopted a safe–harbor rule (Rule 10b-18) in 1982 that guaranteed that, under certain conditions, the SEC would not file manipulation charges against companies that repurchased shares on the open market, repurchase activity experienced an upward structural shift.

9. Repurchases

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[16] Some models have been criticized on the grounds that they implicitly assume that dividends cannot be financed by equity or debt issues. See Hasbrouck and Friend (1984) and Sarig (1984).

Today, repurchases represent a significant portion of total U.S. corporate payouts (Figure 1). In the last several years, the dollar amount of repurchases has been virtually equal to that of cash dividends. Not only has the amount of repurchases increased, but also the number of firms that repurchase has increased dramatically.

The phenomenon of the decline in the number of firms that pay dividends (Fama and French, 2001 and Grullon and Michaely, 2002) might be directly related to the trend we see in repurchases. These trends represent a significant departure from historical patterns in repurchase and dividend policies of corporations.

9.1 The mechanics and some stylized facts

Firms repurchase their shares through three main vehicles: (1) open-market share repurchase, (2) fixed-price tender offer, and (3) Dutch auction. Repurchased shares can either be retired or be counted as part of the firm's treasury stock. In any case, those shares lose their voting rights and rights to cash flows.

In an open-market share repurchase, the firm buys back some of its shares in the open market. Historically, regulatory bodies in many countries frowned on this practice, since it might make it possible for corporations to manipulate the price of their shares. Indeed, there are still many countries where share repurchases are not allowed and many other countries, such as Japan and Germany, that have only recently relaxed the restrictions on repurchases.

In the U.S., share repurchase activity is governed by the antimanipulative provisions of the Securities Exchange Act of 1934. These provisions exposed repurchasing firms (and anyone else involved in the repurchase activity, such as investment banks) to the possibility of triggering an SEC investigation and being charged with illegal market manipulation. This risk seemed to

deter firms from purchasing their shares. Conscious of this problem, the SEC started to design guidelines for corporations on how to carry out share repurchase programs without raising suspicions of manipulative behavior. As part of the deregulation wave of the early 1980s, the SEC approved a legislation to regulate open market share repurchases. In 1982, the SEC adopted Rule 10b-18, which provides a safe-harbor for repurchasing firms against the anti-manipulative provisions of the Securities Exchange Act of 1934.[17] Specifically, Rule 10b-18 was adopted in order to establish guidelines for repurchasing shares on the open market without violating Sections 9 (a) (2) or 10 (b) of the SEA of 1934.[18] In general, Rule 10b-18 requires that firms repurchasing shares on the open market should publicly announce the repurchase program, only use one broker or dealer on any single day, avoid trading on an up tick or during the last half-hour before the closing of the market, and limit the daily volume of purchases to a specified amount.

In a fixed-price tender offer, the corporation, through an investment bank, offers to purchase a portion of its share at a prespecified price. The tender offer includes the number of shares sought and the duration of the offer. However, the firm usually reserves the right to increase the number of shares repurchased if the tender offer is oversubscribed, and/or to buy shares from the tendering shareholders on a pro-rata basis. If the offer is not fully subscribed, the company has the right to either buy the shares tendered or to cancel the offer altogether.

In a Dutch auction, the firm specifies the number of shares to be purchased and the price range for the repurchase. Each interested shareholder submits a proposal containing a price and

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[17] 47 Fed Reg. 53333 (November 26, 1982).

[18] Section 9 (a) (2) establishes that it will be illegal "… to effect, alone or with one or more other persons, a series of transactions in any security registered on a national securities exchange creating actual or apparent active trading in such security, or raising or depressing the price of such security, for the purpose of inducing the purchase or sale of such securities by others." Section 10 (b) establishes that it will be unlawful "… to use or employ, in connection with the purchase or sale of any security registered on a national securities exchange or any security not so registered, any manipulative or deceptive or contrivance in contravention of such rules and regulations as the

the number of shares to be tendered. The firm aggregates all the offers and finds the minimum price at which it can buy the prespecified number of shares. This price is paid to all tendering shareholders, even if they submitted a lower price.

Table 12 shows that open market repurchases are by far the most popular method of repurchase. For example, in 1998 open market repurchases accounted for over 95% of the dollar value of shares repurchased. The relative importance of Dutch auctions and tender offers, was significantly higher in the 1980s. The introduction of Rule 10b-18 and the consequent rise in the popularity of open market share repurchases have made the other methods much less important. Therefore, in this section we concentrate on open market share repurchases.[19]

In practice, fixed-price tender offers and Dutch auctions are likely to be used when a corporation wishes to tender a large amount of its outstanding shares in a short period of time, typically around 15% (see for example Vermaelen, 1981, Comment and Jarrell, 1991 and Bagwell, 1992). The duration of such programs is usually about one month. Open market repurchases are often used to repurchase smaller portions of outstanding shares, with firms repurchasing an average of 6% of the shares (Ikenberry Lakonishok and Vermaelen, 1995, Grullon and Michaely, 2002). The duration of open market repurchases is much longer. Stephens and Weisbach (1998) report that firms complete their open market repurchase program in about three years.

The average announcement price effect of an open market share repurchase program is around 3% and the market reaction is positively related to the portion of shares outstanding sought (Ikenberry, Lakonishok and Vermaelen, 1995, Grullon and Michaely, 2002). Vermaelen

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Commission may prescribe as necessary or appropriate in the public interest or for the protection of investors."
[19] Another type of share repurchase is a targeted stock repurchase, in which the firm offers to buy stocks from a subset of shareholders. For example, a "greenmail agreement" is a type of targeted stock repurchase from (usually) one large shareholder. Greenmail is typically used in conjunction with takeover threats and is used to a much lesser

(1981) and Ikenberry, Lakonishok and Vermaelen, (1995) report a decrease in stock price that is similar in magnitude in the month prior to the announcement. Comment and Jarrell (1991) report an abnormal price reaction of around 12% for fixed-price offers and around 8% for Dutch auction repurchases.

Using more than 1,200 open market repurchases announced between 1980 and 1990, Ikenberry, Lakonishok and Vermaelen (1995) investigated the long-term performance of repurchasing stocks in the four-year repurchase period. They found that repurchasing firms' stock outperformed the market by an average of about 12% over the four-year period. They were particularly interested to find that most of the drift was concentrated in "value" stocks (high book-to-market stocks). Those stocks exhibited an abnormal return of 45% in the four years following the repurchase announcement!

9.2 Theories of repurchases

The positive market reaction to repurchase announcements, and the fact that just like dividends, the firms pay out cash, makes it easier to see why many of the dividend theories apply to repurchases as well. For example, we can seamlessly apply the Miller and Rock (1985) or the Bhattacharya (1979) signaling models to repurchases. At the cost of shaving investments firms pay out cash to signal quality (Miller and Rock) or the need for external costly financing (Bhattacharya). The free cash flow models can also work as easily with repurchases as with dividends. Models that are based on relative taxation (such as John and Williams, 1985 or Allen, Bernardo and Welch, 2000) or those studies that posit that dividends are a better signaling device do not assume (or imply) that repurchases and dividends are perfect substitutes.

extent than those described above.

Before turning our attention to the substitutability of dividends and repurchases, we review some of the work that explains why firms repurchase their shares in isolation.

Vermaelen (1984) used a standard signaling model in which managers were more informed than outside investors about future profitability. He showed that repurchasing shares could be used as a credible signal to convey this information. It is costly for bad firms to mimic because managers hold a portion of the firm and do not tender. Thus, if the firm buys overpriced shares and managers do not participate, the value of their fractional share decreases. Vermaelen's study also explains why the market reaction increases with the portion of shares sought as it increases the credibility of the signal.

Another oft-mentioned reason for buybacks relates to takeover battles. By buying back stocks from investors who value them the least, the firm makes any potential takeover more expensive by increasing the price the acquirer will have to pay to gain control (Bagwell, 1991, Stulz, 1988). The larger the fractional ownership controlled by the management, the higher the likely premium in case of a takeover. This motive might play a role in fixed-price tender offers and Dutch auctions, in which firms repurchase a large fraction of shares over a short period. Although important in their own right, these types of repurchase represent a very small fraction (see Table 12) relative to open market repurchases. They do not appear to be a major factor from an overall payout policy perspective.

Repurchases can also reduce the free cash flow problem and mitigate conflicts of interest between outside shareholders and management. If a firm has too much cash (beyond what it can invest in positive NPV projects), then repurchasing its shares is a fast and tax-effective way to give the cash back to its shareholders. Moreover, buying back shares (and assuming management has some equity, either in stocks or through stock options) increases the relative ownership of

management and decreases potential conflicts of interest by better aligning management interests with outside shareholders' interests (as in Jensen and Meckling, 1976).

9.3 Repurchases compared to dividends

Since dividend distributions are associated with a heavier tax burden, why not signal or resolve agency problems only through repurchases? One answer is institutional constraints. As we noted earlier, in many countries repurchases were prohibited. In the U.S., they were limited because of regulations that subjected the firm to manipulation charges. Nevertheless, open market repurchases were done prior to 1983, before the introduction of Rule 10b-18 (though on a much smaller scale), and dividends continue to be a major vehicle to distribute cash even now, nearly 20 years after the implementation of Rule 10b-18. Some researchers have argued that if firms were to start repurchasing shares on a regular basis, they would be challenged by the IRS. This is another institutional constraint, but to the best of our knowledge this has not happened yet. We are not aware of any case in which the IRS has taxed a repurchase as ordinary income on the grounds that it is a dividend in disguise, despite the fact that a significant number of firms repurchase on a regular basis. Therefore, institutional constraints cannot be the entire story.

Several researchers have attempted to explain this puzzle from a theoretical perspective. Ofer and Thakor (1987) presented a model in which firms could signal their value through two mechanisms, paying dividends or repurchasing their shares. There are two type of costs associated with these signals. First, by paying out cash, firms expose themselves to the possibility of having to resort to outside financing, which is more expensive than generating internal capital. Whether a firm pays dividends or repurchases its shares, it will be subject to this cost because these actions deplete its internal capital. The second cost, which is unique to

repurchases, is that relative to dividends, repurchases reduce managers' risk. If a firm pays dividends, which are prorated, the manager has a portion of his wealth in cash. In the case of repurchases, since she typically does not tender her shares, her portfolio is riskier. Thus, the signaling costs through repurchases are higher. It immediately follows that if future prospects of the firms are much higher than perceived by the market, then the managers will use repurchases. If the discrepancy is not that severe, managers will use dividends. In other words, repurchases are a stronger signal.

Barclay and Smith (1988) and Brennan and Thakor (1990) provided a different explanation as to why so many firms rely so heavily on dividends rather than repurchases. The crux of their arguments is that a portion of the firm's cost of capital is a function of the adverse selection costs (see Amihud and Mendelson, 1986, and Easley, Hvidkjaer and O'Hara 2002). When a firm announces a repurchase program, the cost to the uninformed investors of adverse selection increases. When some shareholders are better informed than others about the prospects of the firm, they will be able to take advantage of this information. They will bid for stock when it is worth more than the tender price, but will not bid when it is worth less. Uninformed buyers will receive only a portion of their order when the stock is undervalued, but will receive the entire amount when it is overvalued. This adverse selection means that they are at a disadvantage in a share repurchase. When money is paid out in the form of dividends, the informed and the uninformed receive a pro rata amount, so there is no adverse selection. As a result, uninformed shareholders prefer dividends to repurchases. Further, this preference will persist even if dividends are taxed more heavily than repurchases, provided the tax disadvantage is not too large. On the other hand, the informed will prefer repurchases because this allows them to profit at the expense of the uninformed.

Brennan and Thakor (1990) argue that the method of disbursement chosen by firms will be determined by a majority vote of the shareholders. If the uninformed have more votes than the informed, firms will use dividends, but if the informed predominate, firms will choose repurchases. When there is a fixed cost of obtaining information, the number of informed depends on the distribution of shareholdings and the amount paid out. For a given payout, investors with large holdings will have an incentive to become informed. When a small amount is paid out, only the investors with the largest holdings will become informed; most shareholders will remain uninformed and will prefer dividends. When a larger amount is paid out, more shareholders become informed, so the firm may choose repurchases.

We note that this model has exactly the opposite prediction to Allen, Bernardo and Welch (2000) on the relation between large (and presumably informed) shareholders and payout policy. In this model, larger shareholders favor repurchases. In Allen et al., large shareholders prefer dividends. It is still an open question as to which one of these predictions holds empirically.

The Brennan and Thakor model is an intriguing explanation of the preference that firms appear to have for dividends. It answers the question of why firms prefer to use dividends even though dividends are taxed more heavily. Unlike the John and Williams' theory, the Brennan and Thankor model supports the idea that dividends are smoothed.

However, their model is not above criticism. First, the range of tax rates for which dividends are preferred to repurchases because of adverse selection is usually small. To explain the predominance of dividends, we must use another argument that relies on shareholders being homogeneous. For tax rates above the level at which adverse selection can explain the preference for dividends, everybody will tender in a repurchase, so it will be pro rata. But this universal tendering clearly does not occur. Second, if superior information is the motive for

repurchases, it is surprising that management almost never tenders its shares. Presumably, they are the ones with the best information. Another criticism is that if adverse selection were a serious problem, firms could gather the relevant information and publicly announce it. Nevertheless, Brennan and Thakor's theory sheds new light on the choice between dividends and repurchases.

Chowdhry and Nanda (1994) and Lucas and McDonald (1998) also considered models in which there is a tax disadvantage to dividends and an adverse selection cost to repurchases. In their models, managers are better informed than are shareholders. Their models show how payout policy depends on whether managers think the firm is over- or undervalued relative to the current market valuation. Both models provide interesting insights into the advantages and disadvantages of dividends and repurchases. However, the stability and smoothing of dividends is difficult to explain in this framework unless firms remain undervalued or overvalued relative to their market value through time.

9.4 Empirical evidence

The market usually reacts positively to an announcement of any type of share repurchase. The extent of the reaction is positively related to the size of the repurchase program and negatively related to the market value of the firm. Despite the positive reaction, many studies have found that the market does not comprehend the full extent of the information contained in the announcement, given the long-term post-announcement drift. The drift is particularly pronounced in high book-to-market stocks (for open market share repurchases, see Ikenberry, Lakonishok and Vermaelen, 1995). Vermaelen (1981), Comment and Jarrell (1991), Ikenberry, Lakonishok and Vermaelen, (1995), and others document a negative abnormal return in the

months leading to the (open market) repurchase announcement, a finding that suggests that firms time the repurchase announcement to when the stock is more undervalued.

A subtler issue concerns the number of shares that have actually been repurchased and the duration of the program. A firm is under no obligation to repurchase all of the shares it seeks. The announcement merely serves to inform investors of its intentions. If there is a significant discrepancy between the announced and the actual number of shares repurchased, this discrepancy can affect the long-term reaction in the years after the announcement. Just as important, when we wish to examine the relation between repurchases and other types of payout such as dividends, or to relate actual repurchases to performance, we must measure the actual repurchases as accurately as possible.

9.4.1 How to measure share repurchase activity?

Using 450 open market repurchase programs announced between 1981 and 1990, Stephens and Weisbach (1998) suggest several measures of repurchases.

(1) The change in number of shares outstanding as reported on the CRSP or Compustat databases.

A potential problem with this measure is that if a firm repurchases shares and simultaneously distributes shares (either to the public or to employees), this measure will understate the actual amount of repurchase.

(2) The net dollar spent on repurchases as reported in the firm's cash flow statement.

If we want to analyze the dollar amount spent on repurchases, this measure is probably the best one to use. If we wish to compute the number of shares repurchased, we must convert the dollar number that is reported in the cash flow statement to number of stocks repurchased.

However, doing so creates a difficulty, since we do not know the purchase price. We can use the average trading price over the period as a proxy for the purchase price. Another possible shortcoming of this measure is that it includes purchases of not only common stocks, but also other type of stocks such as preferred stocks. However, repurchases of securities other than common stocks represent only a very small portion of firms' repurchase activity.

(3) The change in Treasury stock (also reported on Compustat).

However, this measure can be problematic, since firms often retire the shares they repurchase. Thus, while the number of shares outstanding decreases, the number of Treasury shares does not change. In addition, if a firm repurchases shares and at the same time distributes shares, say in lieu of stock options, there is no change in Treasury stock, despite the repurchase activity. This factor may represent a significant problem, given the recent popularity of stock options as a method of compensation.

For example, imagine a firm that repurchases 1,000 shares, say for $10,000, and then a few months later turns around and give these shares to its CEO as part of her compensation. The firm is involved in two distinct actions. The first is a financing action (repurchasing shares), and the second is an investment decision (paying the manager). If we try to analyze the impact of a financing decision, holding all else constant, especially holding investment constant, this measure of repurchase is inadequate.

The problem is even more severe if we try to compare repurchases and dividend decisions. Say, our firm pays a total dividend of $10,000, instead of repurchasing its shares. At the same time, it also issues shares and gives them to the manager. In the first case (when the firm repurchases its shares in the open market and the researcher is using Treasury shares to measure repurchases), we would record no repurchase activity. But in the second case (pay a

dividend and issue shares), we would record a $10,000 dividend. But in reality, assuming away taxes, both routes are exactly identical. Our firm pays $10,000 to shareholders and gives $10,000 worth of stock to the manager.

In summary, measuring repurchases through the change in Treasury stock is likely to yield the most biased measure of repurchases. It can bundle investment and financing decisions (as discussed above), it combines other overlapping distributions, and it does not account for the fact that many firms retire the stocks they repurchase rather than putting them into Treasury stock

Stephens and Weisbach (1998) find that this measure is substantially different from the other measures they use. They show that the first two measures yield similar results in the measurement of share repurchases, while the Treasury stock method yields estimates that are lower than the other two methods by about 60%.

Which method should we use? We recommend using the cash flow spent on repurchases, and trying to account for any changes in the shares outstanding. This measure is likely to yield the least biased estimate of the actual dollar amount spent on repurchases.

Given these measures of actual repurchases, we can address the issue of how long it takes firms to complete their announced stock repurchase program. Stephens and Weisbach (1998) reported that approximately 82% of the programs were completed within three years. More than half of the firms completed their announced repurchase program, but one tenth of the firms repurchased less than 5% of their announced intentions. The authors also showed that the initial market reaction to share repurchases was positively related to the actual share repurchase activity in the two years after the announcement. Firms that repurchased more experienced a larger

positive price effect at the announcement. However, the announcement effect was not related to the announced quantity of share repurchase.

Stephens and Weisbach (1998) also showed that the actual amount of repurchase in a given quarter was related to the firm's cash flow level. Using a Tobit model, they showed that the decision to repurchase was positively related to both the level of expected cash and unexpected cash. They also showed that the actual repurchase activity was negatively related to the equity return in the previous quarter: the more negative the return was in quarter t-1, the more likely the firm was to engage in repurchase activity in quarter t.

9.4.2   Empirical tests of repurchase theories

So repurchases are positively greeted by the market, they are preceded by bad performance, and some (mainly value stocks) are followed by positive abnormal price performance. All of these attributes are consistent with both the asymmetric information/signaling and the free cash flow theories as the main motive behind the decision to repurchase. But, as with dividends, there are two possibilities. The positive price impact of the announcement can be because repurchases are good news (i.e., they lead to better investment decisions because management has less cash to squander), or repurchases can convey good news (i.e., they do not change investment decisions, but they merely convey that the firm's future growth in cash flows are under-valued). The negative price performance in the months before the announcement and the positive price performance in the years after also support both explanations. The stock price might have increased either because the market did not comprehend the full extent of the undervaluation, or because it did not incorporate the extent of the better investment decisions by management after the repurchase.

Thus, to determine the dominant force behind the decision to repurchase, we must look elsewhere. We begin with Vermaelen (1981). Using a number of fixed-price tender offers over the period 1962-1977, Vermaelen documented a significant increase in earnings per share in the years following fixed-price repurchases. Using 122 observations from a similar period, Dann, Masulis and Mayers (1991) confirmed Vermaelen's findings. They also showed that the initial market reaction was positively related to subsequent increases in earnings. Although a decline in cash flows (or earnings) in the years after fixed-price tender offers will lead to a rejection of the information/signaling hypothesis, these studies found that an increase in earnings was consistent with the information/signaling hypothesis.

However, in a detailed investigation of 242 fixed price tender offers, Nohel and Tarhan (1998) showed that the entire improvement in earnings documented in previous studies could be attributed to firms with high book-to-market. That is, to low-growth value firms. Furthermore, they showed that firms involved in tender offers did not increase their capital expenditure, and in fact that the improvement in operating performance of the high book-to-market firms was positively related to asset sales. This finding was inconsistent with the signaling model. They interpreted their evidence as supporting the notion that fixed-price tender offers, and the market reaction to them, is motivated by free cash flow considerations rather then signaling.

The earnings pattern after open-market share repurchases shows an even more consistent lack of improvement than those after fixed-price tender offers. Grullon and Michaely (2000) examined a comprehensive sample of 2735 open market share repurchases in the period 1980-2000. They reported a decline in the level of profitability (measured by ROA) in the three years after the year in which the repurchase was announced.[20] They also reported a decline in capital

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[20] Using a sample of 185 open market share repurchases over the period 1978-1986, Bartov (1991) reported mixed results on the relation between earnings changes and repurchases. In the year after the open market repurchase, those

expenditures and cash reserves for those firms. (Using a different sample, Jaganathan and Stephens, 2001, reach similar conclusions). Overall, it seems that earnings performance subsequent to open-market repurchase programs and earnings performance after large changes in dividends have a very similar pattern.

The risk profile of firms changes in conjunction with open market share repurchases--just as it changes after dividend increases. Grullon and Michaely (2000) found that beta declined in the year after the announcement. The cost of capital in the three years after open market repurchases declined significantly from an average of 16.3% before the repurchase to 13.7% after.[21]

The evidence of declining earnings, a reduction in capital expenditures and cash reserves, and a decline in risk is not consistent with the traditional signaling stories. It is consistent with the notion that when investment opportunities shrink and there is less need for capital expenditures in the future, firms increase their payout to shareholders, either through dividends or through open market share repurchases. Thus, when a firm is in a different stage of its life cycle, its investment –opportunities change, and consequently its risk –profile and need for cash changes as well. This change in turn affects it payout policy, because it increases dividends, repurchases or both. (It is still an open question what determines the form of payout a firm chooses to use.)

Some of the evidence in Ikenberry, Lakonishok and Vermaelen (1995)[22] also supports this notion. They reported that the largest price appreciation in the years after the repurchase

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firms' earnings were significantly worse then the control sample. In the year after that, they were significantly better. These mixed results might be attributable to the small sample size.
[21] Other studies found a similar phenomenon with fixed-price tender offers. See Dann, Masulis and Mayers (1991), Hertzel and Jain (1991) and Nohel and Tarhan (1998). These studies showed that the market reaction to the offer is positively related to the subsequent decline in risk.
[22] Ikenberry, Lakonishok and Vermaelen (2000) reported similar results for Canadian open market repurchases.

occurred for those firms that were most likely to benefit from disposing of cash. Those firms with high book-to-market ratio were the firms that had less need for future capital expenditure and were more likely to encounter free cash flow problems.

This is not to say that perceived undervaluation does not play a role at least in the timing of the repurchase programs. Many of the studies cited above show that there is a clear tendency for firms to repurchase shares after a decline in stock price, which suggests that management repurchases shares when they think the stock is undervalued. An extreme example is the heavy wave of share repurchases immediately after the stock market crash of October 1987.

In addition, Ikenberry, Lakonishok and Vermaelen (2000) provided evidence that in value stocks and small cap stocks, management bought more shares when the price dropped and fewer shares when the price rose. What is clear from their evidence is that this undervaluation is not related to future earnings growth. It may happen because of changes in the risk profile of the firm that are not impounded in market price. It might be that for value stocks that have not performed well in the past, investors are more reluctant to believe that these firms will turn around, cut capital expenditure, reduce the amount of cash reserves, and reap the benefits of reductions in free cash flows. Hence, ex –post, those stocks outperform their peers when information about the realization of these issues starts to appear in the market place.

Miller and McConnell (1995) studied adverse selection as a motive for repurchases by examining one of the direct implications of Barclay and Smith's (1988) conjecture and the Brennan and Thakor (1990) model. These theories argued that corporations relied on dividends rather than repurchases because of adverse selection problems. When a firm announces a share repurchase program, the uninformed market participants, particularly the market makers, should assume that they are more likely to trade with informed traders. Hence, in response to this signal,

the bid-ask spread should widen. Using daily closing quotes around 152 open market share repurchase programs, Miller and McConnell found no evidence of an increase in bid-ask spread that they could associate with repurchases. There was no evidence that firms were deterred from engaging in open market share repurchase programs because of the adverse effect of such programs on market liquidity or on the firm's cost of capital. Moreover, Grullon and Ikenberry (2000) presented evidence that share repurchase programs enhanced liquidity, rather than reducing it.

The empirical evidence indicates that repurchase activity is motivated by several factors. Firms with more cash than they need for operation (excess cash) are more likely to repurchase their shares. Lower-growth firms are more likely to repurchase shares, because their investment –opportunities shrink. Researchers find evidence that both the announcement of repurchases and the actual repurchase activity is more pronounced at times when firms experience downward price pressure. There is no evidence that adverse selection in the market place is a reason for repurchases, nor is there any evidence that the market's underestimation of future cash flows or growth in earnings (or cash flows) are a motive in management's decision to repurchase. In fact, the evidence shows that repurchasing firms experience a reduction in operating performance, have excess cash, and invest less in the years after the repurchase announcement, and that their risk is significantly lower in the post-announcement years.

It is also clear that the market does not incorporate the entire news contained in the repurchase announcement, be it about risk reduction, reduction in agency costs, or some other misvaluation. The market underreaction is particularly pronounced for value stocks.

9.4.3   Some empirical evidence on dividends compared to share repurchases

Equipped with the measures of actual repurchases that we discussed above, researchers were able to examine the issue of how dividend and repurchase policies interact. It was also possible to consider whether firms view these methods as substitutes.

Many of the theories discussed above have implications to whether repurchases and dividends are substitutes, or if they are used for different objectives altogether, which would indicate that there is no relation between dividends and repurchase policies.

Theories that address the issue of total payout policy, such as Miller and Rock (1985) or Bhattacharya (1979), and which make no distinction between dividends and repurchases, imply that these two payout policies are perfect substitutes. Other theories, which rely on differential taxation, such as those by John and Williams (1985) and Allen, Bernardo and Welch (2000), imply that these two payout policies are distinctly different and that there cannot be direct substitution between the two.

The agency theories also imply substitution, but the substitution is not perfect. On the one hand, both repurchases and dividend payments take money out of management's hands and thereby reduce potential abuses. On the other hand, dividends act as a stronger commitment device, because management is more committed to maintaining a stable dividend policy than a stable repurchase policy (see Lintner, 1956). Thus, it is possible that management might distribute temporary excess cash through repurchases and more permanent excess cash through dividends.

There is another reason why managers may have an incentive to pay fewer dividends and distribute more of the cash in the form of repurchases. This is the growing popularity of stock options, and especially of executive stock options. Stock options can affect the form of payment for at least two reasons. First, since these options are typically not protected against dividends,

managers (who own stock options) have an incentive to repurchase shares with the available cash rather than pay it out in the form of dividends. Second, many market analysts center their stock valuation on EPS numbers. Since the exercise of stock options dilutes EPS numbers, both the boards of directors and top management may decide to repurchase more shares to prevent dilution.[23] Thus, stock options can lead to the substitution of dividends for repurchases.

We could argue that by definition, dividends and repurchases are perfect substitutes. A firm can either pay dividends or repurchase its shares. If, and only if, total payout is held constant is this statement correct. But we already know that all else is not constant. Firms can change the amount of cash kept in the firm, they can alter the amount of cash that goes to investments, and they can change the amount of cash that they raise from other sources, such as debt or equity.

Therefore, another way to pose the question is to ask what has happened to total corporate payout since repurchases have become so popular. Have dividends been reduced correspondingly so that total payout remains at a constant level? Or has total payout increased? Whether the increased popularity of repurchases increased corporate payout can be critically important to corporations, investors, and policy makers alike. The answer to this question has significant implications concerning corporate reinvestment rates, resource allocation, and the role of taxes in corporations' decisions. But despite its importance, only recently has the issue begun to receive attention from financial economists.

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[23] We do not to argue that this reason is rational (or irrational). It seems to be the case however, that this is a driving force behind many corporate financial decisions. For example, both authors of this chapter have heard on numerous occasions that one of the important yardsticks of mergers to be consummated is its impact on EPS. Managers are very reluctant to enter into a merger or an acquisition that dilutes EPS. Likewise, the impact of repurchases on EPS is also often mentioned. See also the discussion in Dunbar (2001) of how British institutional investors impose dilution constraints on management.

An analogous question has been recently debated in the public finance literature. The issue is the impact of 401k and IRA programs on U.S. saving rates, where 401k is the equivalent of repurchase programs and the total saving rates is analogous to total payout. Has the introduction of these saving programs increased savings rates, or has it merely caused a shift from one saving vehicle to another? (See Poterba, Venti, and Wise, 1996 for an excellent review of this issue.)

In both cases (saving rates and payout rates), the key impediment to determining the impact of IRAs on saving and repurchases on payouts is agents' heterogeneity. Some corporations pay cash (mostly, the mature firms) and some corporations (those firms with growth opportunities) do not pay out cash to shareholders. Those that do pay tend to pay more in both forms. Thus, one of the main challenges for such an investigation is to control for this heterogeneity in various ways.

In Table 1 and in Figure 1 we presented the pattern of dividends, repurchases, and total payout of U.S. industrial corporations through time relative to total corporate earnings and relative to the corporations' market value. The table shows that relative to total earnings, total payout has increased through time. It also shows that dividend payout did not decrease, despite the surge in repurchases. However, when we scale the cash payout by market value (Figure 1), the opposite picture emerges. Dividend yield has been going down through the years and repurchase yield has been going up. At least through the 1990s, there is no change in the total payout yield.

However, the aggregate data may mask a qualitative difference across firms. For example, there could be some firms that never paid dividends and have recently started to pay

out cash in the form of repurchases. At the same time, firms that have been paying dividends might have continued to do so.

To address the interaction between repurchase and dividend policy, Grullon and Michaely (2002) examined this relation at the individual-firm level as well. Their test relies on Lintner's (1956) analysis of how firms determine their dividend policy. Lintner observed that firms' dividend change decisions were a function of their targeted payout ratio and the speed of adjustment of current dividends to the target ratio. Using this model, Grullon and Michaely calculated the expected dividend payment for a firm based on its past dividend behavior, and determined whether actual dividend payments were above or below the expected dividend payment. That way, they were able to observe whether a firm was deviating from its past dividend policy. If the use of repurchases increased payout and did not affect dividend policy, then there would not be any relation between the dividend forecast error from the Lintner model and repurchase activity. Grullon and Michaely defined the dividend-forecast error as:

$$ERROR_{t,i} = [\Delta DIV_{t,i} - (\beta_{1,i} + \beta_{2,i} EARN_{t,i} + \beta_{3,i} DIV_{t-1,i})]/MV_{t-1,i}$$

where $\Delta DIV_{t,i}$ is the actual change in dividends at time t, $EARN_{t,i}$ is the earnings at time t, $DIV_{t-1,i}$ is the dividend level at t-1, and $MV_{t-1,i}$ is the market value of equity at time t-1. The coefficients $\beta_{2,i}$ and $\beta_{3,i}$ are the parameters of earnings and lagged dividends from Lintner's (1956) model, respectively, that have been estimated over the pre-forecast period, 1972-1991. By scaling by the firm market value of equity, they were able to directly compare the forecast error to the repurchase and dividend yields.

However, if repurchase activity reduces dividend payout, then the test should have result in a negative correlation between the dividend forecast error (actual minus expected) and share repurchase activity. In other words, finding a negative correlation between these two variables

would indicate that share repurchases have been partially financed with potential dividend increases.

Their empirical evidence indicates that the dividend forecast error is negatively correlated with the share repurchase yield. The forecast error becomes more negative (monotonically) as the share repurchase yield increases. That is, as firms repurchase more, the actual dividend is lower than the expected dividend.

They confirmed this result by a cross-sectional regression of the dividend forecast error on the repurchase yield, (controlling for size, the return on assets, the volatility of return on assets, and nonoperating income). The results indicate that the repurchase yield has a negative effect on the dividend forecast error even after controlling for firm characteristics.

In summary, the evidence suggests that dividend-paying firms have been substituting dividends with share repurchases, but the rate of substitution is not one (i.e., they are not perfect substitutes). This finding supports the idea that share-repurchase policy and dividend-policy are interrelated.

But what types of firms use, and under which circumstances would managers decide to use, repurchases and/or dividends? We do not have yet the complete picture, but some recent research gives us some idea.

The first issue is the relation between stock option programs and payout policy. Incentive compensation such as stock options could affect total payout if it aligns management incentive with those of shareholders, and therefore induces management not to invest in value-destroying projects and pay more to shareholders. Thus, incentive compensation may increase total payout. Additionally, as suggested before, managers with stock options, which are not dividend-protected, will be motivated to shift the form of payout from dividends to repurchases.

Using a large sample of 1,100 nonfinancial firms during the period 1993-1997, Fenn and Liang (2000) reported a negative relation between stock option plans and dividends, a finding that supports the notion that the use of managerial incentive plans reduces managers' incentive to pay dividends. Moreover, their cross-sectional regression results indicated that (1) dividend payout was negatively related to the magnitude of stock option plans; (2) repurchase payout was positively related to the magnitude of stock option plans; and (3) total payout was negatively related to the magnitude of stock option plans. The reduction in total payout was larger than the increase in repurchases.

Using a sample of 324 firms that announce a change in payout policy in 1993, Joll (1998) found a positive relation between the repurchase decision and the magnitude of the executive stock option plan.

Weisbenner (2000) extended these studies. He asked if the group holding the stock options (the firm's employees or management) made a difference on payout choice. A priori, we would expect it to do so. If mainly nonexecutive employees hold stock options, then the dividend protection is less of a factor (assuming management does not maximize employees' wealth). The dilution factor is still important, since it affects everyone who holds the stock, not just the employees. Thus, in the case of nonexecutive stock option plans we would expect an increase in repurchase activity but no reduction in dividends. If executives hold stock options, then we should expect both a reduction in dividends and an increase in repurchase activity.

Weisbenner (2000) found empirical support for these hypotheses. The overall size of a firm's stock option program had a significant influence on the firm's repurchase policy (presumably in an attempt to prevent dilution). Stock option programs are also related to the firm's propensity to reduce retained earnings. Second, the larger the executives' holding of stock

options, the more likely the firm was to reduce dividends and to retain more of its earnings (presumably an outcome of managers' incentive not to pay dividends).

The studies discussed above show an important link between compensation, and executive compensation in particular, and the form of payout. As the extent of stock option programs increase, firms tend to use more repurchases and to reduce retained earnings. When more of these stock option programs are directed towards top management, dividends also tend to be reduced.

Jagannathan, Stephens and Weisbach (2000) found another important link between firm's characteristics and payout policy. As with Lintner's model, the authors hypothesized that dividends were more of a permanent commitment than were share repurchases. Hence, dividends were more likely to be paid out of permanent earnings and repurchases were more likely to be used as a way to distribute temporary cash flows. The empirical implication of this hypothesis is that firms that experience higher cash flow variability tend to use repurchases while firms with lower cash flow variability tend to use dividends.

Using a large sample of repurchase and dividend change events, Jagannathan, Stephens and Weisbach (2000) found that firms that repurchased their share had a higher variability of operating income relative to firms that only increased dividends, or to firms that increased their dividend and repurchased their shares. Not surprisingly, they found that firms that did not pay cash had the highest cash flow variability of all. Using a Logit model, they showed that higher cash flow variability and higher nonoperating cash flow (two measures of temporary earnings) increased the likelihood of repurchases relative to dividends. As had earlier studies, they also found that although dividends appeared to be paid out of permanent earnings, there was no evidence of earnings improvements following dividend increases.

Lie's (2001) results also pointed in the same direction. He found that tender offers were more likely to occur when firms had excess cash on their balance sheet (a temporary build-up of cash), and dividends were more likely to increase with excess cash on the income statement (presumably a permanent increase in cash flow).

Overall, the evidence indicates that at least in cross-sectional tests, firms that use stock options more intensely are more likely to use share repurchases. The evidence also associate firms that only repurchase with firms that are riskier (relative to those who pay dividends and those who do both). There is also some evidence that the increase in popularity of repurchases might be related to changes in regulation. The extent to which these variables can explain the dramatic increase in repurchases and the more moderate increase in overall payout is still an open question.

9.5 Summary

Open market repurchases have become a dominant form of payout. Given the economic climate and the deregulation of repurchasing shares around the world, we believe that the phenomenon is here to stay. Repurchases are likely to remain a dominant form of payout from corporations to their shareholders. As researchers, we do not yet have a clear grasp on how firms decide among the various forms of payouts, and in particular, how they decide on whether to pay cash in the form of dividends or share repurchases. Nor do we know how the decision affects their retained earnings and their investment decisions.

The empirical evidence starts to give us some directions. It seems that young, risky firms prefer to use repurchases rather then dividends, though we do not fully understand what determines the choice. We observe that many large, established firms have substituted

repurchases for dividends. That is not to say that those firms have necessarily cut the nominal dividends, but they have increased dividends at a much lower rate than before. Instead, they have been paying more money to shareholders through repurchases. We see that those firms with more volatile earnings tend to substitute more often. But again, we do not have a firm understanding of what determines that choice. Finally, we ask how repurchases and payout policy as a whole interact with capital structure decisions (such as debt and equity issuance). We believe that these are very important questions and a promising field for further research.

10. Concluding Remarks

There are a number of important empirical regularities concerning firms' payout policy. The first is that the mid-1980s represented a watershed. Earlier, dividends constituted the vast majority of corporate payouts. They grew at an average of about 15% per year. Dividend yields over the long run remained fairly constant. There were repurchases, but they represented only a small fraction of payouts.

Since the mid 1980s, repurchases have become increasingly important. Dividends have continued to increase in absolute terms, but at an average rate of 6% rather than 15% a year. Instead of increasing dividends, companies have been much more willing to increase the absolute payout by increasing repurchases. Repurchases have grown steadily and are now about the same level of magnitude as dividends. The result of these changes is that in the last decade or so, dividend yield has fallen significantly from 3% to 1.5%, but the yield resulting from the combination of dividends and repurchases has remained fairly constant at 3%.

At the level of the individual firm there are a number of interesting regularities. Although dividends have decreased in relative importance and firms are much more willing to switch to

repurchases, dividends are still important in absolute terms. Firms seem reluctant to cut dividends. However, firms that have never paid dividends do not seem to regard them as a necessity. Over the years, firms that initiate payments do so increasingly through repurchases. In the last five years, about 75% of initiating firms have used this method of payout.

Another important aspect of the comparison between dividends and repurchases is that both have similar effects in terms of the sign of the impact. Initiation of dividends, dividend increases, or repurchases are all taken as good news by the market. The difference is that repurchases are larger in size relative to dividend increases or initiations, and their impact on prices is more pronounced.

Although these empirical regularities seem clear and provide a guide for how managers should behave, our understanding of why firms behave in this way is, to say the least, limited. This is the case despite the enormous effort that has been invested in the topic of payout policy over the years. It is possible to tell a story, but it is by no means clear that it is anything more than a story.

If we go back over a century or more, there seem to be obvious advantages to paying dividends. Information was sparse and any firm that could consistently pay out dividends was signaling that it had long-term earning potential. Firms that constantly repurchased and intervened in the market for their shares may well have been suspected of manipulating the stock price. Moreover, for individuals to sell shares was an expensive business in terms of direct transaction costs. Extensive insider trading and other similar abuses meant that, in terms of adverse selection, there was also a significant short-term cost from selling. This environment established a convention that paying dividends was good and cutting dividends was bad.

The change in the laws concerning repurchases and stock price manipulation in 1982 meant that repurchases could be used without risk and made them an acceptable alternative. However, since cutting dividends is perceived as a bad signal, at least in the short run, firms are not willing to replace dividends with repurchases even though repurchases have tax advantages. However, as payout is increased, repurchases can be increasingly used.

The other piece of the payout puzzle is that total payout yield in terms of dividends and repurchases has remained fairly constant at least for the last ten years. One possible explanation for this is a signaling story. The market treats increases in dividends and repurchases as good news. In theory, this reaction could be because increases are interpreted as signals of future operating performance. However, there is evidence that increases in payout are not followed by improved operating performance, thus rejecting this explanation. An alternative interpretation is that the market is relieved that managers will no longer acquire cash that can be squandered, and this is why an increase in payout leads to a higher share price.

Of course, all of this argument ignores many important factors, but it is an example of one explanation for the patterns that are observed in the data. Much work remains to be done.

So far, our discussion here has focused on dividends and repurchases. But there is a third component of payout that has been largely ignored in the literature, and that is the cash payments for securities acquired in M&A transactions. The precise amount paid out in this way is difficult to measure exactly. However, the data we have gathered that does allow us to establish a lower bound suggests that over the last decade, such payments have been around $240b per year, or over 50% of aggregate payout if we also include dividends and repurchases. Measuring and understanding this component of payout policy is an important task for future research.

At this stage, we cannot recommend an optimal payout policy. However, we can make several general (and, admittedly, somewhat speculative) suggestions:

1. Following the example of the last decade, repurchases should be used much more frequently than they have been. Investment and repurchase policies should be coordinated to avoid the transaction costs of financing. When there are positive NPV investments, repurchases should be avoided. In years where NPV investment opportunities are low, unneeded cash should be paid out by repurchasing shares.

2. To the greatest extent possible, firms that have a high degree of information asymmetry and large growth opportunities should avoid paying dividends. The significant costs associated with raising equity capital for these firms makes payment of dividends even more costly. Stated differently, in periods when a firm faces many good investment opportunities, a dividend reduction might not be such a bad idea.

3. Given the restrictive dividend-related covenants and the fact that firms interact with bondholders more than once, the use of dividends to extract wealth from debtholders should be avoided. Most times, it does not work. Even when it does, the long-run result can be detrimental to equityholders. (There is no evidence that management follow this strategy in practice)

4. We cannot think of a good reason why most U.S. firms pay dividends on a quarterly basis instead of on an annual basis. Longer intervals between payments would allow investors that are interested in long-term capital gains to sell the stock before the ex-day, avoid paying tax on the dividend, and maintain the long-

term tax status of the stock. Such a schedule would also allow corporations who might be interested in dividend income to minimize transaction costs and deviation from optimal asset allocation while capturing the dividend. Finally, it would save the dividend-paying corporation administrative and mailing costs associated with dividend payments.

5.   Avoid costly "signals." Hopefully, the firm is going to stay alive for a long time. Managers can find cheaper and more persuasive ways to credibly convey the company's true worth to the market.

6.   The difference in taxes between dividends and capital gains makes high-yield stocks less attractive to individual investors in high tax brackets. Such investors should try to hold an otherwise identical portfolio with low-yield stocks.

Other people might disagree with these suggestions. However, until our understanding of the subject is improved, they represent a logical way for managers and investors to proceed. Much more empirical and theoretical research on the subject of payout is required before a consensus can be reached.

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**Table 1: Aggregate Cash Distributions to Equityholders**

Aggregate cash –distributions to equityholders for a sample of U.S. firms, by year. The data sample consists of all firms on Compustat over the period 1972-1998 that have available information on the variables REPO, DIV, EARN, and MV. REPO is the expenditure on the purchase of common and preferred stocks (Compustat item # 115) minus any reduction in the value (redemption value) of the net number of preferred shares outstanding (Compustat item # 56). DIV is the total dollar amount of dividends declared on the common stock (Compustat item #21). EARN is the earnings before extraordinary items (Compustat item #18). MV is the market value of common stock (Compustat item #24 times Compustat item # 25). TP is the average total payout (dividends plus earnings) across firms for a given year. The data sample contains 121,973 firm-year observations and excludes banks, utilities, and insurance companies.

Year	Number	EARN	MV	TP	DIV	REPO	TP/EARN	DIV/EARN	REPO/EARN	TP/MV	DIV/MV	REPO/MV
1972	2802	41437	803582	19122	17633	1488	46.1%	42.6%	3.6%	2.4%	2.2%	0.2%
1973	3107	57503	673974	23517	20470	3047	40.9%	35.6%	5.3%	3.5%	3.0%	0.5%
1974	3411	70139	500180	27508	25961	1547	39.2%	37.0%	2.2%	5.5%	5.2%	0.3%
1975	3573	65856	690795	28196	27389	807	42.8%	41.6%	1.2%	4.1%	4.0%	0.1%
1976	3600	84318	865569	33496	31917	1579	39.7%	37.9%	1.9%	3.9%	3.7%	0.2%
1977	3615	95147	825171	41768	38202	3566	43.9%	40.2%	3.7%	5.1%	4.6%	0.4%
1978	3536	106352	836025	44449	40193	4256	41.8%	37.8%	4.0%	5.3%	4.8%	0.5%
1979	3581	134988	999286	51525	46104	5421	38.2%	34.2%	4.0%	5.2%	4.6%	0.5%
1980	3868	136159	1306814	55978	50289	5689	41.1%	36.9%	4.2%	4.3%	3.8%	0.4%
1981	3972	132796	1143197	58064	51802	6262	43.7%	39.0%	4.7%	5.1%	4.5%	0.5%
1982	4574	103817	1313398	62294	52701	9593	60.0%	50.8%	9.2%	4.7%	4.0%	0.7%
1983	4461	130188	1648433	68282	59384	8899	52.4%	45.6%	6.8%	4.1%	3.6%	0.5%
1984	4686	151671	1554682	89327	61356	27971	58.9%	40.5%	18.4%	5.7%	3.9%	1.8%
1985	4721	141464	2082677	104606	71471	33136	73.9%	50.5%	23.4%	5.0%	3.4%	1.6%
1986	4719	133656	2436697	110569	74862	35707	82.7%	56.0%	26.7%	4.5%	3.1%	1.5%
1987	4908	185146	2581264	137014	84973	52041	74.0%	45.9%	28.1%	5.3%	3.3%	2.0%
1988	4895	220034	2878728	144980	96216	48765	65.9%	43.7%	22.2%	5.0%	3.3%	1.7%
1989	4804	227613	3610378	162795	107846	54949	71.5%	47.4%	24.1%	4.5%	3.0%	1.5%
1990	4781	213056	3331772	160245	113971	46275	75.2%	53.5%	21.7%	4.8%	3.4%	1.4%
1991	4780	168668	4255871	138124	115162	22962	81.9%	68.3%	13.6%	3.2%	2.7%	0.5%
1992	4934	171373	4385812	144268	110978	33289	84.2%	64.8%	19.4%	3.3%	2.5%	0.8%
1993	5120	209238	5155047	153834	117499	36334	73.5%	56.2%	17.4%	3.0%	2.3%	0.7%
1994	5588	303578	5548638	183147	136645	46503	60.3%	45.0%	15.3%	3.3%	2.5%	0.8%
1995	5860	354987	7373933	221218	148889	72330	62.3%	41.9%	20.4%	3.0%	2.0%	1.0%
1996	6289	433290	9077805	276917	175109	101808	63.9%	40.4%	23.5%	3.1%	1.9%	1.1%
1997	6293	448572	11479240	321619	177777	143842	71.7%	39.6%	32.1%	2.8%	1.5%	1.3%
1998	5174	362827	11785621	349555	174067	175488	96.3%	48.0%	48.4%	3.0%	1.5%	1.5%

Source: Based on Table 1 of Grullon and Michaely (2002), "Dividends, share repurchases and the substitution hypothesis."

Figure 1
Cash Distributions to Equityholders as a Percentage of Market Value

This figure depicts the average total payout (dividends plus repurchases) yield, the average dividend yield, and the average repurchase yield (all relative to market value) for a sample of U.S. firms. The data sample consists of all firm-year observations on Compustat (Full-Coverage, Primary, Secondary, Tertiary, Research, and Back Files) over the period 1972-1998 that have positive earnings and have available information on the variables REPO, DIV, and MV. REPO is the expenditure on the purchase of common and preferred stocks (Compustat item # 115) minus any reduction in the value (redemption value) of the net number of preferred shares outstanding (Compustat item # 56). DIV is the total dollar amount of dividends declared on the common stock (Compustat item #21). MV is the market value of common stock (Compustat item #24 times Compustat item # 25). The total payout is the sum of the dividend payout and the repurchase payout. The data sample contains 121,973 firm-year observations and excludes banks, utilities, and insurance companies.
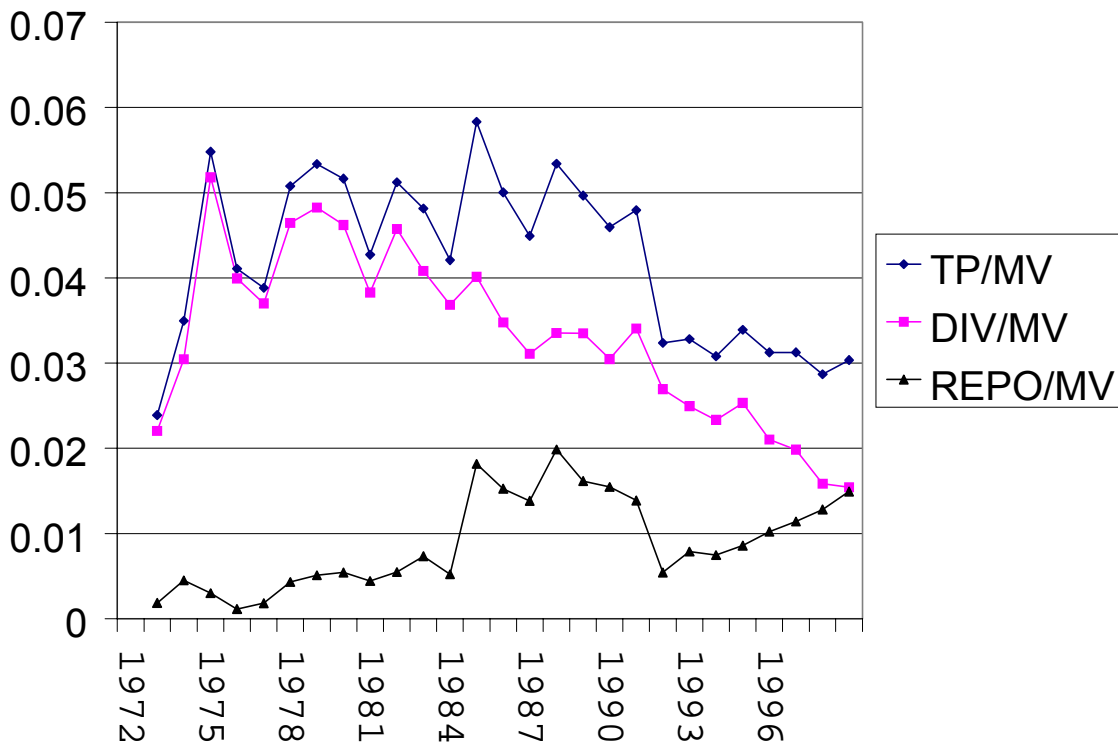
Source: Based on data from Grullon and Michaely (2002), "Dividends, share repurchases and the substitution hypothesis."

Figure 2 - Percent of All CRSP Firms in Different Dividend Groups
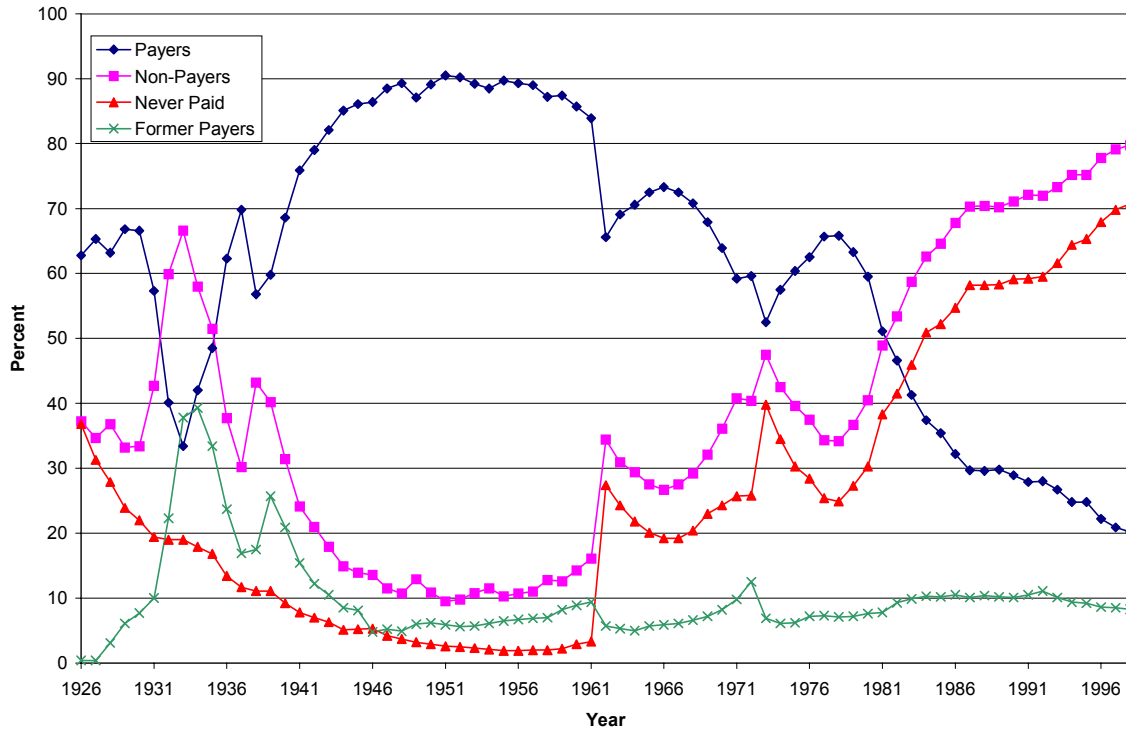
Source: Figure 2 from Fama and French (2001), "Disappearing Dividends: Changing Firm Characteristics or Lower Propensity to Pay?"
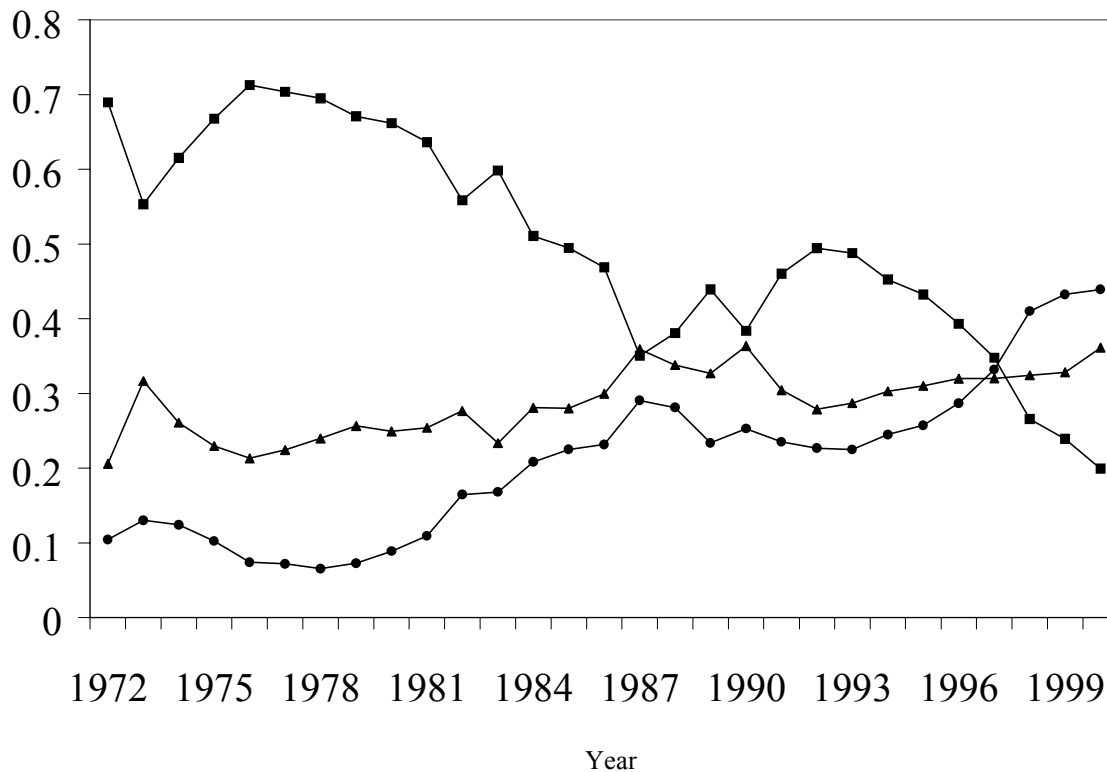
---∎--- Proportion of firms that payout only with dividends
--▲--- Proportion of firms that payout with dividends and repurchases
---•-- Proportion of firms that payout only with repurchases

Figure 3. Distribution of firms by payout method. This figure depicts the distribution of firms by payout method for a sample of U.S. firms. We determine the payout policy of a firm by observing the cash disbursements of the firm over a period of a year. The data sample consists of all firm-year observations on Compustat (Full-Coverage, Primary, Secondary, Tertiary, Research, and Back Files) over the period 1972-2000 that have available information on the following variables: REPO, DIV, EARN, and MV. REPO is the expenditure on the purchase of common and preferred stocks (Compustat item #115) minus any reduction in the value (redemption value) of the net number of preferred shares outstanding (Compustat item # 56). DIV is the total dollar amount of dividends declared on the common stock (Compustat item #21). EARN is the earnings before extraordinary items (Compustat item #18). MV is the market value of common stock (Compustat item #24 times Compustat item #25). The data sample contains 136,646 firm-year observations and excludes banks, utilities, and insurance companies.

Source: Grullon and Michaely (2002), "Dividends, share repurchases and the substitution hypothesis."

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Table 2: Cash Dividends from the Corporate to the private sector

Year	Share of corporate equity owned by individuals	Total dividends paid by US corporations (In Billions of $)[b]	Dividends received by corporations[c]	Dividends received by individuals[d] (% of total div)	Dividends received by individual with an adjusted gross income of over 50,000 relative to dividend received by all individual investors[e]
1973	0.774	29.9	9.4	18.7 (62%)	42%
1974	0.740	33.2	13.8	20.8 (63%)	44%
1975	0.727	33	8.8	21.9 (66%)	45%
1976	0.741	39	11.9	24.5 (63%)	46%
1977	0.718	44.8	13.9	27.8 (62%)	47%
1978	0.696	50.8	13.3	30.2 (59%)	50%
1979	0.708	57.7	16.8	33.5 (58%)	53%
1980	0.710	64.1	18.6	43.6 (68%)	54%
1981	0.690	73.8	17.4	48.1 (65%)	52%
1982	0.653	76.2	18.15	52.1 (68%)	55%
1983	0.624	83.6	19.7	48.6 (58%)	56%
1984	0.600	91.0	21.2	48.6 (53%)	57%
1985	0.572	97.7	16.9	55.0 (56%)	58%
1986	0.592	106.3	15.1	61.6 (58%)	61%
	0.578	112.2	13.8	66.8	57%

Year					
1987				(59%)	
1988	0.617	129.6	15.1	77.3 (60%)	64%
1989	0.612	155	15.4	81.3 (52%)	66%
1990	0.617	165.6	13.4	80.2 (48%)	66%
1991	0.630	178.5	13.1	77.3 (43%)	66%
1992	0.620	185.5	13.1	77.9 (42%)	67%
1993	0.611	203.2	13.6	79.7 (39%)	65%
1994	0.585	234.9	13.2	82.4 (35%)	66%
1995	0.579	254.2	22.8	94.6 (37%)	71%
1996	0.543	297.7	16.3	104.2 (35%)	73%
1997	0.513	333.7	NA	NA	NA
1998	0.485	348.6	NA	NA	NA
1999	0.495	364.7	NA	NA	NA

Authors' calculation with data on market value of domestic corporations and the holding (at market value) of households, personal trust and estates. Source Table L.213 from the Federal Reserve statistical release, Flow of Funds Accounts of the United States, March 2000.

b. From the Federal Reserve, Flow of Funds Accounts of the United States, Table f.7, March 2000.

c. We include only dividends received from domestic corporations. Internal Revenue Service, SOI Bulletin, Corporations return, Table 2, various years

d Internal Revenue Service, SOI Bulletin, Individuals Tax Returns, Table 1.4, various years.

e. Internal Revenue Service, SOI Bulletin, Individuals Tax Returns, Table 1.4, various years

Table 3

Comparative Annual Dividend Changes 1971-1993
(Based on data from approximately 13,200 publicly held issues)

Year	Type of Dividend Change			
	Increase	Decrease	Resume	Omit
1971	794	155	106	215
1972	1,301	96	124	111
1973	2,292	55	154	95
1974	2,529	100	162	225
1975	1,713	215	116	297
1976	2,672	78	133	153
1977	3,090	92	135	168
1978	3,354	65	127	144
1979	3,054	70	85	115
1980	2,483	127	82	122
1981	2,513	136	82	226
1982	1,805	322	97	319
1983	1807	68	57	109
1984	1562	71	32	138
1985	1497	95	46	198
1986	1587	71	54	107
1987	1702	65	40	117
1988	1683	80	42	152
1989	1312	137	39	255
1990	1072	188	48	264
1991	1314	139	55	145
1992	1333	131	53	146
1993	1635	87	75	106
1994	1826	59	52	77
1995	1882	49	51	73
1996	2171	50	37	80
1997	2139	46	24	49
1998	2047	84	17	61
1999	1701	62	38	83
2000	1438	69	32	75
2001	1244	117	17	70

Source: For data until 1982: Moody's Dividend Record. For data between 1983 and 2001: S&P dividend record.

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Table 4
Merger and acquisition and raising capital activities by US corporations

Year	(1) Total M&A Activity (in $mils)	(2) Cash mergers (where US firms are the target)	(3) IPOs proceeds (in $mils)	(4) SEOs proceeds (in $mils)	(5) Net payout from M&A and raising capital (2)-(3)-(4)
1977	191.8	191.8	221	382	-412
1978	8882	8086	225	305	7556
1979	7993	7589	398	247	6944
1980	17570	10417	1387	10901	-1871
1981	86098	59725	3114	10958	45653
1982	53426	27080	1339	14743	10998
1983	82757	30539	12460	26071	-7992
1984	151709	94029	3868	6032	84129
1985	169156	151999	8477	16493	127029
1986	193620	167028	22251	20430	124347
1987	185730	158662	23982	16613	118067
1988	310895	289377	23806	5941	259630
1989	235759	194966	13706	9332	171928
1990	143402	109427	10122	8998	90307
1991	106659	66778	25138	33749	7890
1992	130264	75957	39620	31866	4471
1993	203545	113186	57423	48995	6768
1994	307047	183956	33728	27487	122741
1995	462829	228104	30207	54176	143721
1996	544484	306812	50000	71222	185590
1997	819663	390359	44226	75409	270724
1998	1392997	410619	43721	70886	296012
1999	1021026	543324	71327	100048	371949

Source: Thompson Financial Securities Data.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
							Table 5: Net total payout to individual investors
Year	Portion held by individuals (from Table 2)	Net payout from M&A and raising capital (from Table 4)	Net M&A payout to individual investors (column 2xcolumn 3)	Amount repurchased (Table 1)	Amount repurchased from individual investors(column 2xcolumn 5)	Dividends received by individuals (from table 2)	Net total payout to individual investors (Columns 4+6+7)
1977	0.718	-412	-296	3566	2560	27800	30065
1978	0.696	7556	5259	4256	2962	30200	38421
1979	0.708	6944	4916	5421	3838	33500	42254
1980	0.71	-1871	-1328	5689	4039	43600	46311
1981	0.69	45653	31501	6262	4321	48100	83921
1982	0.653	10998	7182	9593	6264	52100	65546
1983	0.624	-7992	-4987	8899	5553	48600	49166
1984	0.6	84129	50477	27971	16783	48600	115860
1985	0.572	127029	72661	33136	18954	55000	146614
1986	0.592	124347	73613	35707	21139	61600	156352
1987	0.578	118067	68243	52041	30080	66800	165122
1988	0.617	259630	160192	48765	30088	77300	267580
1989	0.612	171928	105220	54949	33629	81300	220149
1990	0.617	90307	55719	46275	28552	80200	164471
1991	0.63	7890	4971	22962	14466	77300	96737
1992	0.62	4471	2772	33289	20639	77900	101311
1993	0.611	6768	4135	36334	22200	79700	106035
1994	0.585	122741	71803	46503	27204	82400	181408
1995	0.579	143721	83214	72330	41879	94600	219694
1996	0.543	185590	100775	101808	55282	104200	260257
1997	0.513	270724	138881	143842	73791	NA	NA
1998	0.485	296012	143566	175488	85112	NA	NA
1999	0.495	371949	184115	202000	99990	NA	NA

Table 6
A Clientele Model Example

	High dividend Payout	Medium dividend payout	Low dividend payout
Before-tax earnings/share	$100	$100	$100
Payout policy:			
Dividends	$100	$ 50	$ 0
Capital gains	$ 0	$ 50	$100
After-tax payoff/share for group:			
(i) Individuals	$ 50	$ 65	$ 80
(ii) Corporations	$ 90	$ 77.5	$ 65
(iii) Institutions	$100	$100	$100
Equilibrium price/share	$1000	$1000	$1000

Table 7
Asset Holdings in the Clientele Model Example

Group	Asset holdings
High tax bracket	Low-dividend-payout assets
Corporations	High-dividend-payout assets
Tax-free institutions	Any assets

Table 8
Ex-Dividend Day Premiums

This table presents the average premiums (price drop relative to dividend paid) for three time periods. The first period, 1966 and 1967, is in Elton and Gruber (1970) and Kalay (1982); the second, third, and forth periods, 1986, 1987, and 1988, are the periods before the implementation of the 1986 TRA, the transition year, and after the implementation of the 1986 TRA, respectively. We adjust premiums to the overall market movements using the OLS market model. Premiums are corrected for heteroskedasticity. Results are taken from Michaely (1991) Tables 2 and 3. The null hypothesis is that the mean premium equals one

Period	Mean Premium	S.D.	Z Value	% above One	Fisher Test
1966-67	0.838	1.44	-7.23	46.1	-4.94
1986	1.054	1.32	2.32	49.9	-0.03
1987	1.028	1.229	1.33	50.7	0.80
1988	0.998	0.821	0.168	NA	NA

Table 9
Firm Characteristics of Dividend-Changing Firms

This table reports the firm characteristics for sample of firms that change their cash dividends over the period 1967-1993. To be included in the sample, the observation must satisfy the following criteria: 1) the firm's financial data is available on CRSP and Compustat; 2) the cash dividend announcement is not accompanied by other non-dividend events; 3) only quarterly cash dividends are considered; 4) cash dividend changes that are less than 10% or greater than 500% are excluded; 5) cash dividend initiations and omissions are excluded; 6) the last cash dividend payment is paid within 90 days prior to the announcement of the cash dividend change. CHGDIV is the percentage change in the cash dividend payment, CAR is the three-day cumulative NYSE/Amex value-weighted abnormal return around the dividend announcement, SIZE is the market value of equity at the time of the announcement of the cash dividend change, RSIZE is the size decile ranking relative to the entire sample of firms on CRSP, PRICE is the average price, and DY is the dividend yield at the time of the announcement of the cash dividend change.

Dividend Increases (6,284 obs.)			
	Mean	Std.	Median
CHGDIV %	30.1	29.3	22.2
CAR %	1.34	4.33	0.95
SIZE	1,185.1	3,796.1	195.9
RSIZE	8.1	2.1	9
PRICE	29.60	24.23	24.50
DY %	3.74	2.09	3.46

Dividend Decreases (1358 obs.)			
	Mean	Std.	Median
CHGDIV %	-44.8	16.4	-45.9
CAR %	-3.71	6.89	-2.05
SIZE	757.4	2,489.4	148.0
RSIZE	7.7	2.4	8
PRICE	26.31	25.31	18.50
DY %	3.29	2.19	2.87

Source: Table 1, Grullon, Michaely and Swaminathan (2002), "Are Dividend Changes a Sign of Firm Maturity?"

Table 10
Regressions of Raw Earnings Changes on Dividend Changes Using
the Fama and French Approach to Predict Expected Earnings

This table reports estimates of regressions relating raw earnings changes to dividend changes. E_τ is the earnings before extraordinary items in year τ (year 0 is the event year). B_{-1} is the book value of equity at the end of year -1. RΔDIV is the annual percentage change in the cash dividend payment. ROE_τ is equal to the earnings before extraordinary items in year τ scaled by the book value of equity at the end of year τ. DFE_0 is equal to $ROE_0 - E[ROE_0]$, where $E[ROE_0]$ is the fitted value from the cross-sectional regression of ROE_0 on the log of total assets in year -1, the market-to-book ratio of equity in year -1, and ROE_{-1}. CE_0 is equal to $(E_0 - E_{-1})/B_{-1}$. $NDFED_0$ is a dummy variable that takes the value of 1 if DFE_0 is negative and 0 otherwise. $PDFED_0$ is a dummy variable that takes the value of 1 if DFE_0 is positive and 0 otherwise. $NCED_0$ is a dummy variable that takes the value of 1 if CE_0 is negative and 0 otherwise. $PCED_0$ is a dummy variable that takes the value of 1 if CE_0 is positive and 0 otherwise. We use the Fama-MacBeth procedure to estimate the regression coefficients. In the first stage, we estimate cross-sectional regression coefficients each year using all the observations in that year. In the second-stage, we compute time-series means and t-statistics of the cross-sectional regression coefficients. The t-statistics are adjusted for autocorrelation in the slope coefficients and reported in parentheses. a, b, and c denote significantly different from zero at the 1%, 5%, and 10% level, respectively.

$$(E_\tau - E_{\tau-1})/B_{-1} = \beta_0 + \beta_1 R\Delta DIV_0 + (\gamma_1 + \gamma_2 NDFED_0 + \gamma_3 NDFED_0 * DFE_0 + \gamma_4 PDFED_0 * DFE_0) * DFE_0$$
$$+ (\lambda_1 + \lambda_2 NCED_0 + \lambda_3 NCED_0 * CE_0 + \lambda_4 PCED_0 * CE_0) * CE_0 + \varepsilon_\tau$$

Year		β_1	Adjusted-R^2
$\tau = 1$	Mean	0.005	22.5%
	T-statistic	0.56	
	% of t(β_i) > 1.65	11.8%	
$\tau = 2$	Mean	0.011	9.7%
	T-statistic	1.13	
	% of t(β_i) > 1.65	12.1%	

Source: Table 2, Benartzi, Grullon, Michaely, and Thaler (2002), "Changes in Dividends (Still) Signal the Past"

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Figure 4
Level of Return of Assets

This figure depicts the level of return on assets (ROA) based on operating income before depreciation (Compustat annual item #13) for a sample of firms that change their dividends over the period 1967-1993. Year 0 is the year in which the dividend change was announced. The data have been winsorized at the first and 99th percentiles.

Dividend Increases

ROA in %

Dividend Decreases

ROA in %
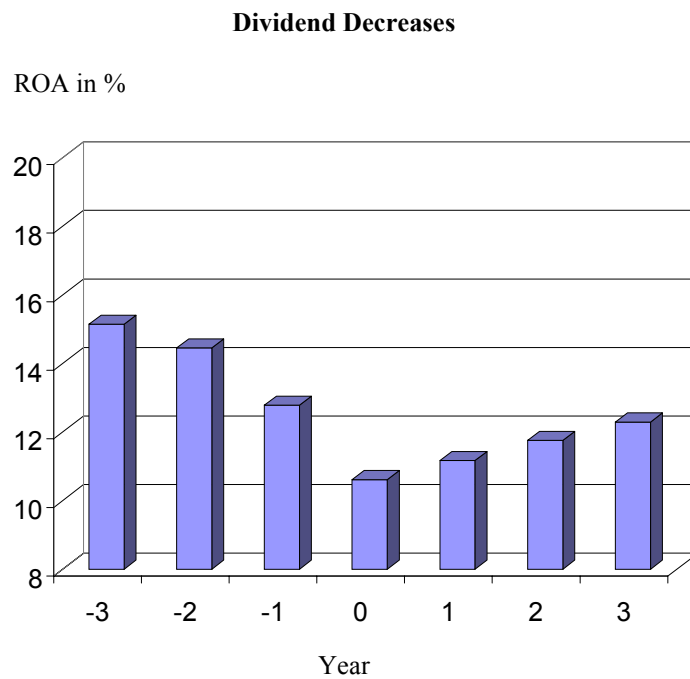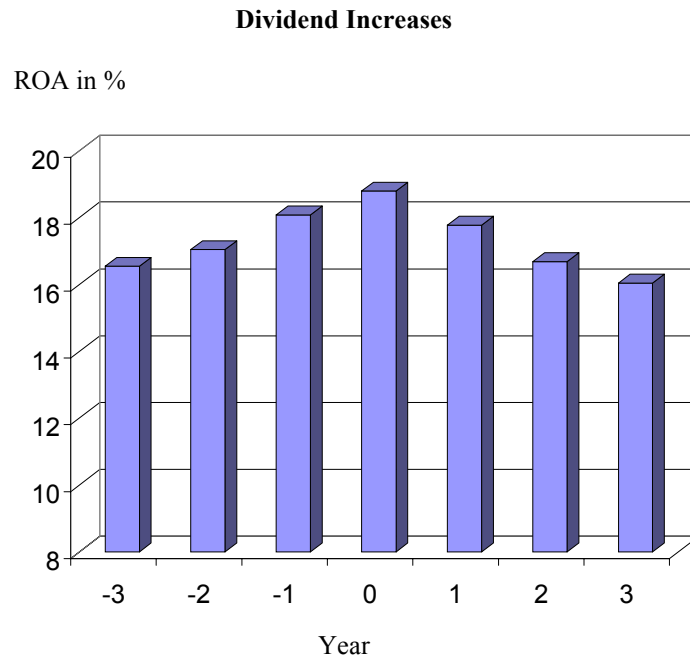
Source: Grullon, Michaely and Swaminathan (2002), "Are Dividend Changes a Sign of Firm Maturity?"

Table 11

This table reports the average stock price before and after the dividend increase announcement, the change in the firm cost of capital (using the Fama-French three factor model), the change in the average dividend payment, and the implied change in growth. The implied change in growth is imputed from the Gordon growth model.

	Before the dividend change	**After the dividend change**	**Comments**
Actual average share prices	$29.6	$30	We calculate the price of $30 based on an average market reaction of 1.43%)
Discount rates	13.2%	12.2%	We calculate the discount rate based on Fama-French 3 factors models and a riskless rate of 5
Average dividend	$1.1 (table 1)	$1.4	The average increase in dividend is 30%, (Table 1)
Implied growth rate	9.48%	7.48%	

Table 12
The Use of Dutch Auctions, Tender Offers and Open Market Share Repurchases
Through time.

	Dutch Auctions			Tender Offers			Open Market	
	Cases	Dollars (millions)		Cases	Dollars (millions)		Cases	Dollars (millions)
1980	-	-	1980	1	5	1980	86	1,429
1981	-	-	1981	44	1,329	1981	95	3,013
1982	-	-	1982	40	1,164	1982	129	3,112
1983	-	-	1983	40	1,352	1983	53	2,278
1984	1	9	1984	67	10,517	1984	236	14,910
1985	6	1,123	1985	36	13,352	1985	159	22,786
1986	11	2,332	1986	20	5,492	1986	219	28,417
1987	9	1,502	1987	42	4,764	1987*	132	34,787
1988	21	7,695	1988	32	3,826	1988	276	33,150
1989	22	5,044	1989	49	1,939	1989	499	62,873
1990	10	1,933	1990	41	3,463	1990	778	39,733
1991	4	739	1991	51	4,715	1991	282	16,139
1992	7	1,638	1992	37	1,488	1992	447	32,635
1993	5	1,291	1993	51	1,094	1993	461	35,000
1994	10	925	1994	52	2,796	1994	824	71,036
1995	8	969	1995	40	542	1995	851	81,591
1996	22	2,774	1996	37	2,562	1996	1,111	157,917
1997	30	5,442	1997	35	2,552	1997	967	163,688
1998	20	2,640	1998	13	4,364	1998	1,537	215,012
1999	19	3,817	1999	21	1,790	1999	1,212	137,015

Source: Grullon and Ikenberry, 2000, "What do we know about stock repurchase?"