DILUTION, DIVIDEND COMMITMENTS AND LIQUIDITY
Do Dividend Changes Reflect Information Signaling?

P.V. Viswanath
Lubin School of Business
Pace University
1 Pace Plaza
New York, NY 10038
Voice: (212) 346-1817
Fax: (212) 346-1573
Email: pviswanath@pace.edu

Yu Kyung Kim
Seoul Stock Exchange
Seoul, South Korea

and

Jayant Pandit
Lubin School of Business
Pace University
1 Pace Plaza
New York, NY 10038

Review of Quantitative Finance and Accounting, v. 18, no. 4, June 2002

Keywords: Dividends, Signaling

JEL Classification: G14, G35

We thank Thomas Abbott, Ivan Brick, George Papaioannou, Richard PonArul, Avri Ravid and Mike Long for comments.

DILUTION, DIVIDEND COMMITMENTS AND LIQUIDITY
Do Dividend Changes Reflect Information Signaling?

Abstract

We develop new tests of the dividend signaling hypothesis by focusing on the role of liquidity. We allow for two different types of signaling models: one where *current* dividends signal firm value and the objective is to prevent current dilution, and the other where commitments to *future* dividends constitute the signal. We find that the results differ by the sign of the dividend surprise. Signaling models of the commitment type explain the market reaction to negative dividend surprises. Interestingly, this result is significant only for the earlier sub-period in our sample due, perhaps, to the well-documented increase in institutional investors with longer horizons. The market reaction to positive dividend surprises, on the other hand, is shown to be consistent with the over-investment and wealth transfer hypotheses. We show that the failure of the signaling model for these firms could be due to lower costs of dividend increases.

DILUTION, DIVIDEND COMMITMENTS AND LIQUIDITY
Do Dividend Changes Reflect Information Signaling?

I. Introduction

We know from Miller and Modigliani (1961) that dividend policy does not matter in a perfect market setting. However, capital markets are not perfect. One particular imperfection that has been considered in this respect is information asymmetry between insiders (managers) and outsiders (the market). This has led to the theory that dividend payments may be a signal of firm value.[1] This theory has been tested, in the main, by examining the market's reaction to unexpected changes in dividend policy.[2]

Although the earlier evidence was interpreted as supporting the dividend signaling hypothesis, some later studies have called the theory into question. Lang and Litzenberger (1989) argue that the available evidence is more consistent with an "overinvestment" hypothesis than the cash flow signaling hypothesis. In this alternative view, the payment of dividends by overinvesting firms (interpreted as firms with a low

---

[1] Examples of dividend signaling models are Bhattacharya (1979), John and Williams (1985), Miller and Rock (1985) and Ravid and Sarig (1991). By paying dividends, undervalued firms, which are relatively more capable of bearing the costs of such an action can separate themselves from overvalued firms, which would be loath to mimic a dividend policy that is so much costlier for them.

[2] Among the earlier studies, Aharony and Swary (1980) document that stock prices drop during the month of an unexpected dividend decrease, while they rise during the month of an unexpected dividend increase. Other studies that obtain similar results are Pettit (1972), Kwan (1981) and Eades (1982). Watts (1973), however, did not find a significant effect. Many of the more recent studies also use the same basic approach (see e.g the articles published in the Autumn 1998 issue of *Financial Management*).

Tobin's Q ratio) is seen as reduction of "free cash flow" à la Jensen (1986); hence such firms are rewarded for curbing their value-reducing overinvestment tendencies.[3] Bajaj and Vijh (1990) present empirical evidence to support a view that dividend increases are favorably greeted by the market because investors have greater marginal preference for dividend income.[4] Dhillon and Johnson (1994) show that returns to bondholders are negative when dividends are increased, and conclude that "explanations for dividends based on information content may be less important than previously thought." They suggest that the positive abnormal stock returns are at least partly due to wealth transfer away from bondholders.

More recently, Benartzi et al. (1997) find that changes in dividends are correlated with past and current changes in earnings, but not with future earnings growth. They interpret this as evidence against the signaling theory and in favor of a Lintner-type approach that models dividends as a function of earnings. Benartzi et al.'s findings, while important, do not resolve the problem entirely. The main reason for this is that their paper takes an ex-post approach, in that it looks at the actual earnings change

---

3 It must be noted that the term "cash flow" is used with two distinct meanings. In the case of cash flow signaling models, the term cash flow has the connotation of value. In Jensen's free cash flow model, the term is used more in the sense of liquidity. Liquidity can be observable, even when value is not.

4 Bajaj and Vijh (1990) assume that dividend surprises are perfectly correlated with dividend yield surprises. This explains the increase in stock prices. Hence, although dividends are informative, they are not actively used as signals by management to communicate insider information, as in signaling models. Prabhala (1993) shows that the results of Bajaj and Vijh (1990) and Lang and Litzenberger (1989) may be spurious, and due to the fact that the martingale dividend change model that they used was misspecified.

behavior over a given sample period following the dividend announcement. Ex-ante tests (like the ones conducted in this paper) provide a different perspective.[5]

However, other studies have found in favor of the signaling hypothesis. For example, Denis, Denis and Sarin (1994) rebut the overinvestment hypothesis by showing that the perceived inconsistencies disappear, once the amount of the dividend is taken into account. They also look at analyst earnings forecast revisions and changes in firm's capital expenditures. Their findings support the Bajaj-Vijh dividend clientele hypothesis and the signaling hypothesis. Yoon and Starks (1995) also perform similar tests and again find in favor of the signaling hypothesis, and against the overinvestment hypothesis. Bernheim and Wantz (1995) look at time variations in the tax costs of dividends and relate that to the dividend announcement effect per dollar of dividends; their paper also supports the signaling model. Lipson, Maquieira and Megginson (1998) find that newly public firms use dividends to signal superior performance.

Our paper contributes to the ongoing discussion in several ways. First, we develop new tests of dividend signaling models as a class, by focusing on the role of one particular variable in dividend signaling, i.e. liquidity. By testing the specific predictions of the signaling models regarding the role of liquidity, we can provide powerful evidence

---

[5] Their failure to find increased earnings over the two years following a dividend increase may simply mean one of two things: one, that the market's horizon is longer than theirs; or two, that economy-wide factors caused the market's expectations not to be realized during their sample period. Also, Benartzi et al. look at simple dividend changes as signals, while we look at unexpected changes in dividends. Finally, there is another explanation for Benartzi et al.'s results that is consistent with the signaling theory: this is the finding of Dyl and Weigand (1998) that dividend announcements may be signaling, not higher earnings, but rather less risky earnings.

on information signaling as an explanation for dividends. Second, in contrast to many studies of dividend signaling that focus only on the implication that dividends are informative, we look also at two additional implications – one, that dividend impose a cost on firms that is negatively related to their true value; and two, that managers care about the firm's market value.[6] Third, rather than interpret all dividend increases as good news, we use the residual from a dividend expectations model as the basis for the dividend signal.[7] Fourth, we look separately at positive and negative dividend surprises.

In examining the role of liquidity, we distinguish between two types of signaling models that we term **dilution** and **commitment** models; in dilution models, *current* liquidity is the important factor, while in commitment models, current liquidity is important as an indicator of *future* liquidity – commitments to *future* dividends constitute the signal. We empirically distinguish between these two types of signaling models by examining on the one hand, the correlation between dividend policy and liquidity (measured as free cash flow normalized by total assets); and on the other, the market reaction to dividend changes as a function of the liquidity level.

---

[6] Dividends could be informative, and still not be signals in the technical sense, if managers cared about the true value of the firm, but not the market value (cf. Bajaj and Vijh, 1990). Our paper looks at the role of liquidity, which is related to the manager's objective function in dilution models, and is related to the cost of signaling in commitment models (see below). This latter aspect follows up on the suggestion in DeAngelo, DeAngelo and Skinner (1996) that firms' dividend increases (in their sample) were not reliable signals because they entailed only a modest drain on the resources available to managers. Other articles that look at the cost of signaling are Bernheim and Wantz (1995); and Lipson, Maquieira and Megginson (1998).

[7] This is a partial response to the observation made by Brook, Charlton and Hendershott (1998) that dividend policy is driven by goals other than signaling.

Our results suggest that the data are consistent with commitment models of signaling; however, this is true only of negative dividend surprises, and the result is significant only during the first part of our sample period. A partial explanation for these results is shown to be the differential cost of signaling for good firms versus bad firms. We suggest that signaling is less relevant in the later subperiod because of the increasing role of institutional investors, who have longer horizons. As for positive dividend surprises, we show that the empirical findings can be explained by overinvestment and wealth transfer models. However, more work is needed to come to any strong conclusions about these non-signaling models. The next section discusses dilution and commitment models and generates the empirical hypotheses, while section III presents the empirical results. Section IV considers the implications of our empirical results for non-signaling models. Section V provides a conclusion.

II. Alternative Signaling Models

A. Dilution models:

The dilution type of dividend signaling model is typified by John and Williams (1985, JW henceforth). In JW, stockholders have current demand for liquidity. However, there is a cost to satisfying this liquidity demand by paying dividends; dividend payments are taxed, whereas funds distributed by firms through share repurchase are not. If sufficient funds are not available internally to satisfy the firm's needs for investments and to meet existing stockholders' liquidity demands, then stock has to be sold to outsiders.[8] The fact that dividend payments are taxed means that the optimal symmetric information policy is to pay no dividends. Under asymmetric information, if enough funds are available internally for both investment and liquidity needs, then once again, it is optimal to pay no dividends.[9] However, if not enough funds are available, and the firm has to sell stock to outsiders, insiders' stock holdings will be diluted if the current market value of the firm is below the true value. This introduces a signaling role for dividends -- to convince the market that the current value of the stock is indeed high, so that the firm or the insiders can sell to outsiders at the higher price.[10, 11]

---

[8] Either by the firm or by the stockholders directly. If the firm has enough funds, it buys back stock, thus satisfying current stockholders' liquidity needs.

[9] JW assume that stockholder liquidity needs can be satisfied by a pro-rata repurchase of shares, which involves no dilution, and no payment of taxes. On the other hand, if stockholders have negative demands for liquidity, then the firm sells new shares to existing stockholders through a rights issue.

[10] The Miller and Rock (1985) model is also an example of a dilution model. Whereas in JW, all stockholders are presumed to desire to sell a certain proportion of their holdings if greater liquidity is desired, Miller and Rock have two classes of shareholders. The first class of shareholders plan to sell out completely, while the second class plan to hold on to their shares. The implication for the manager’s objective function, however, is similar. To the extent that the manager is influenced by the needs of the first class of shareholders, he signals firm undervaluation by paying higher dividends so that these shareholders need not sell at too low a price.

[11] This can be rephrased in terms of the insider's objective function. The insider's objective can be described as the maximization of a linear combination of the true values and market values of existing stockholders equity; the weight placed on the market value depends on cash flow (liquidity) levels. If the cash flow is positive, the weight given is zero; if not, market value is given positive weight. Such a characterization of the insider's objective function is explicit in other signaling models, such as Ross (1977) and Miller and Rock (1985).

The cost of paying dividends per dollar of dividends does not vary systematically across firms, implying that there are no dividend clienteles. Nevertheless, the benefit of paying dividends is greater for undervalued firms (assuming that investors conjecture that dividends convey information).[12] Hence in the signaling equilibrium, firms that are currently undervalued to a greater extent in the market pay higher dividends, while firms that are less undervalued pay lower dividends, confirming the market's conjecture.

Liquidity in Dilution Models:

Let us now look at the effect of liquidity in this kind of model. The higher the liquidity, the lower the need to resort to dilutory external financing and hence the lower the benefit from stock price revaluation by the market for an undervalued firm. Since the cost per dollar of paying dividends is constant, the level of dividends that the firm is willing to pay in equilibrium to signal firm value is also lower.[13] Hence a lower level of dividends will signal a given firm value in equilibrium, the higher the liquidity. In other words, if ? : {D}? {V} is the function that represents the signaling relationship between dividends, D, and firm value V, then the graph of ? will be steeper, the higher the liquidity.

---

[12] If outsiders conjecture that dividends convey no information and thus pay no premium for stocks with dividends, then insiders distribute no dividends. However, any investor can then make alternative, profitable offers to buy (dividend paying) stocks which unravel this pooling contract (Riley, 1979, Thm 5). See JW, footnote 18.

[13] This can be seen by directly examining the expression in JW for the equilibrium level of dividends (equation 13).

This is shown in Figure 1a. Consider two firms both having a given true value V. If liquidity is high, there will be less of a need to signal, and hence fewer resources will be expended in equilibrium in order to signal firm value. This translates into a lower level of dividends (D_0). If liquidity is low, on the other hand, there is a greater need to signal, and hence a willingness to pay a higher level of (costly) dividends (D_1) to signal. Consequently, the graph relating firm value to dividends is less steep for the low liquidity firm than for the high liquidity firm.

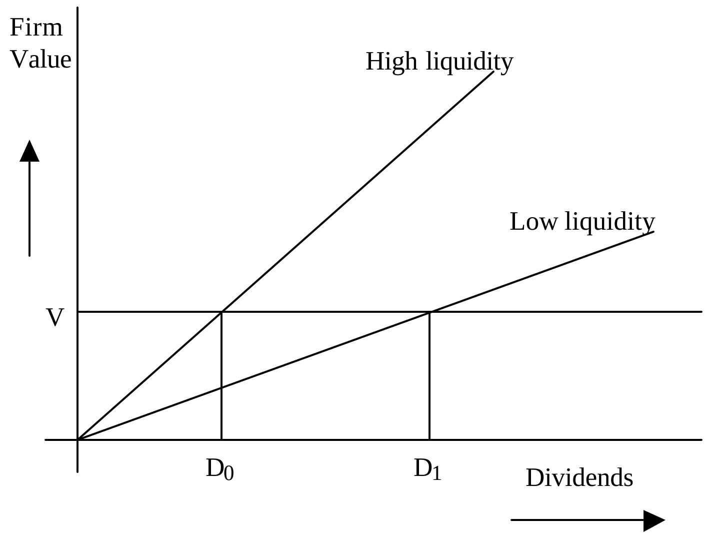


Fig 1a: The Relation between Dividend Signaling and Liquidity in the Dilution Model

B. Commitment models:

In the second type of model (the commitment model) typified by Bhattacharya (1979; henceforth SB),[14] firms are reluctant to cut dividends.[15] The firm can ex ante

---

[14] Ravid and Sarig (1991) model dividends in a manner very similar to Bhattacharya (1979). However, their article actually models the joint use of dividends and debt as signals.

commit itself not to pay dividends--however, once committed to pay a certain level of dividends, it cannot reduce them.[16] Commitment to future dividends can necessitate costly distress financing; consequently, the optimal dividend policy in a symmetric information world is to commit to zero dividends.

While the firm itself is potentially infinitely lived, the stockholders in SB's world have a finite horizon, and hence have an interest in the future market value of their stockholdings.[17] In an asymmetric information world, a role thus arises for dividend commitments to signal firm value. The cost of committed dividends is the expected cost of distress financing. Good firms have a lower probability of having to obtain distress financing and so the cost of committing to pay dividends is lower. Hence in a world where investors conjecture that dividends are informative, undervalued firms would be willing to commit to higher dividends because the benefit to them (in terms of stock price

---

15 Ravid and Sarig (1991) justify this by appealing to the existence of (tax-motivated) dividend clienteles. In such a world, changes in dividend payout require investors to engage in costly portfolio rebalancing. Presumably, the loss of reputation as a firm with a constant dividend payout ratio would then reduce the value of this firm in this world of dividend clienteles.

16 In Ravid and Sarig (1991), promised dividends can be reduced at a cost, but cannot be skipped entirely.

17 The objective functions in SB and in Ravid and Sarig (1991) can also be implicitly characterized as a weighted average of the true and market values of existing stockholders' equity. Although the explicit objective is to maximize the market value of equity, the impact of dividends on the true value of the stock is introduced into the objective function by subtracting from firm value the expected costs of distress financing, conditional on the level of promised dividends. In these models, there are no direct implications for dilution of existing shareholders' equity, since no new securities are to be sold in the current period.

revaluation) is greater, relative to the cost, than for overvalued firms. This confirms investors' conjectures and establishes the signaling equilibrium.

Liquidity in commitment models:

Let us now consider how liquidity affects the signaling equilibrium in commitment models. A firm with a higher level of expected liquidity will find it less expensive to commit to a given level of future dividends, independent of firm value.[18] Consequently, the higher the level of expected liquidity, the higher the level of dividend commitment necessary to signal a certain level of firm value. If we can assume that liquidity levels are positively autocorrelated, i.e. a high level of liquidity this period is, on average, followed by a high liquidity level next period,[19] then we can extend this conclusion to the level of the current liquidity level, as well. That is, the higher the current liquidity level, the higher the level of dividend commitment necessary to signal a

---

18 SB describes the costs of paying the committed level of dividends as "the cost of making up a cash-flow deficit" (p. 262), which is also an important element of the signaling cost in Ravid and Sarig (1991, p. 168). Hence, the cost of paying dividends is lower, the greater the availability of cash flows (liquidity), from which to pay them out.

In Ravid and Sarig (1991), the variable ? (the fraction by which dividends, D, can be cut in case of a liquidity crunch) is an inverse measure of the cost of dividends. By differentiating expression (10) in their Appendix A, we can see that ?D/?? > 0, which implies that as dividends become less costly, more dividends are paid out. The variable ? measures the cost of distress financing and hence is a measure of the cost of dividends, too. Again, ?D/?? < 0 as required. In Bhattacharya (1979), insufficiency of internal funds necessitates distress financing with cost parameter ?. Bhattacharya points out (p. 267) that ?D/?? < 0.

19 This has been amply established in the accounting literature. For example, Bowen, Burgstahler and Daley (1986) show that accounting cash flow can be well modeled as a random walk.

certain level of firm value. In other words, the graph of ? will be less steep, the higher the liquidity level.

This can be clearly seen in Figure 1b. Consider two firms both having a given true value V. The firm with the higher liquidity will need to commit to a higher level of dividends, D_1 to be credible; the lower dividend level of D_0 is not costly enough to avoid mimicry by lower value firms. The firm with the lower liquidity, on the other hand, can prevent mimicry even by adopting a dividend policy at a lower level D_0. The same reasoning applies at all levels of firm value. Consequently, the graph relating firm value to dividends is less steep for the high liquidity firm than for the low liquidity firm.[20]

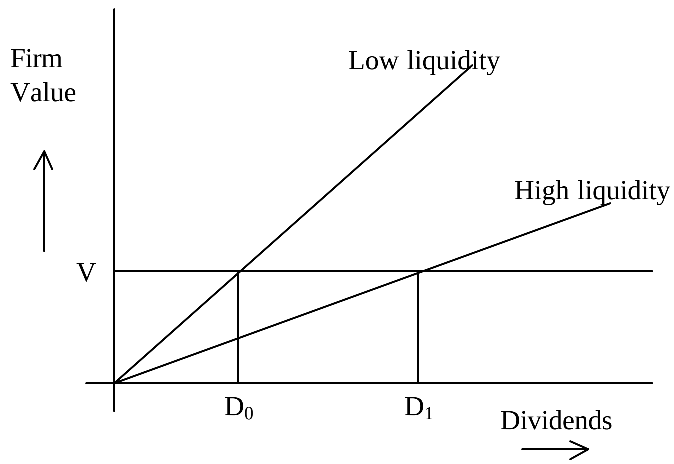


Fig. 1b: The Relation between Dividend Signaling and Liquidity in the Commitment Model

---

20 This implication of the Commitment Model would seem to be inconsistent with the Miller-Rock (1985) story. As discussed in fn 10, the Miller-Rock model does not link firm liquidity to the proportion of shareholders desiring to sell out. However, it is difficult to think of a reason as to why high firm liquidity might induce shareholders to sell. Consequently, even though the Miller-Rock dilution model does not imply all the implications of the other dilution models described here, it would, nevertheless, be rejected if empirical tests support this implication of the commitment models.

C. Other implications of the two models:

Unexpected Temporary Changes in Dividend Policy:

In JW, current liquidity is important for its own sake. This corresponds to the fact the signal in this case is the unexpected increase in *current* dividends. In SB, current liquidity is important as an indicator of future liquidity; this corresponds to the fact that the signal is the unexpected increase in commitments to *future* dividends. Hence, according to JW, an unexpected increase in the current dividend with no implications for future dividends, such as e.g. an unexpected special dividend, would be followed by a stock price revaluation; according to SB, there would be no change in stock price at all.[21]

Dividend Clienteles:

For the SB signaling equilibrium to hold, investors must perceive deviations from stated dividend policies to be undesirable and costly; in other words, clienteles based on dividend policies exist. If this were not so, the equilibrium would unravel by renegotiation in the following period, as pointed out by Thakor (1991). Since liquidity represents a pool of money that can be tapped to make up shortfalls in funds for dividend payments, the existence of dividend clienteles can be tested by examining commitment model predictions regarding the role of liquidity in the market's reaction to dividend increase announcements. Positing such clienteles would also answer Thakor's (1991) theoretical objection to signaling models based on commitment.

---

[21] Chhachhi and Davidson (1997) find that the market reaction to specially designated dividends is about 1.6% over a three-day window (day -1 to day +1). However, they do not test directly for the role of signaling in the market reaction. The Miller-Rock (1985) model would also predict this.

The table below summarizes the differences between the two types of models.

Table 1: Differences between the BS and the JW models

JW	BS
Dividend Dilution Model	Dividend Commitment model
The signal is the payment of current dividends.	The signal is the commitment to pay future dividends; the commitment is demonstrated by paying current dividends.
Cost of dividends is due to their tax status.[22]	Cost of committing to pay dividends is the potential future cost of fulfilling the commitment if liquidity is not available.
No implications for dividend clienteles.	Reneging on a commitment to pay dividends is assumed to be costly, although the commitment is non-contractual. This implies that the firm's clientele desires a certain dividend policy.
The manager's objective is to satisfy the current liquidity needs of the stockholders.	The manager's objective is to maximize the future market value of equity.
Undervalued stock prices imply dilution for existing stockholders when new shares are sold to satisfy liquidity needs.	Undervalued stock prices imply lower wealth for stockholders.
Greater liquidity decreases the concern with undervalued stock prices.	Greater liquidity has no impact on the concern with undervalued stock prices.
Greater liquidity has no impact on the cost of paying dividends.	Greater liquidity decreases the cost of committing to pay dividends.

D. Summary of empirical implications of signaling models:

There are two different testable implications of the SB type (dividend commitment) and JW type (dilution) models regarding the role of liquidity. First,

---

22 This is true in the JW model. However, one could conceive of a dilution-type signaling model where dividends are costly due to some other reason. For example, if internal financing is cheaper because of the cost of a new issue, then the need to pay out dividends for signaling purposes implies the need to raise funds externally at additional cost.

according to the dilution models, liquidity (LIQ) is negatively related to dividend surprises, while according to the dividend commitment models, they are positively related. The second implication, which concerns the market reaction to the dividend surprise (UDIV), is as follows. Consider the regression,

$$CAR = a + b\ UDIV + ? \qquad (1)$$

where CAR is a measure of the market's reaction to the dividend increase announcement, and b is a function of LIQ. Then the SB model predicts that the b coefficient is decreasing in LIQ, whereas JW predict that it is increasing in LIQ. One way to operationalize this regression model is to assume that b is linear in LIQ. Then, we obtain the regression model:

$$CAR = a + b_0 UDIV + b_1 (INTER) + ? \qquad (2)$$

where INTER is defined as LIQ x UDIV.[23] The SB model then predicts that $b_1 < 0$, while the JW model predicts that $b_1 > 0$.

Our hypotheses are summarized in the following table, with ? representing cross-sectional correlation.

---

[23] An alternative way of operationalizing regression (1) that does not impose a linearity constraint on the relationship between the b_i coefficient and LIQ_i, would be as follows. First run regression (1) separately for subsets of firms with different values of the cash flow variable, LIQ_i; then examine the behavior of the slope coefficients of the regressions as a function of LIQ_i. The results are qualitatively similar.

Table 2: Empirical Implications of the Two Signaling Models

Model	?(LIQ, UDIV)	Coeff. of UDIV*LIQ in a regression of CAR on UDIV and UDIV*LIQ
Dividend Commitment models (SB; Ravid and Sarig, 1991)	>0	<0
Dividend Dilution Models (John and Williams, 1985; Miller and Rock, 1985)	<0	>0

If the data show that $b_1 > 0$ and that LIQ is negatively correlated with UDIV, that would support the dilution model. If, on the other hand, we find that $b_1 < 0$, and furthermore that LIQ is positively correlated with UDIV, then we would conclude:

? dividends are more informative when liquidity is lower,

? dividend clienteles exist,

? it is the unexpected commitment to higher future dividend levels that functions as a signal rather than the current dividend increase.

Both commitment and dilution models have one thing in common: the sign of the predicted correlation between UDIV and LIQ is the opposite of the predicted sign of the regression coefficient of b_1 in (2). Hence if the signs of the estimated coefficients in both tests are the same, both types of signaling models are rejected. We now proceed to the empirical testing of the above hypotheses.

III. Empirical Methodology and Results

A. Data

Data from the master files of the Center for Research in Security Prices (CRSP) are used to look at the changes in quarterly dividends (after adjusting for stock splits and stock dividends, and excluding special dividends) of NYSE and AMEX listed firms that declared dividends from July 1986 to June 1995. Other dividend related information, such as dividend amounts were also obtained from the CRSP tapes. The CRSP dividend data was then combined with other firm specific data obtained from the COMPUSTAT quarterly tapes.[24]

In order to test our hypotheses, we need a measure of liquidity and a measure of unexpected dividends. Liquidity is measured by free cash flow for the quarter prior to the one in which the dividend is declared, standardized by total assets for the prior quarter (LIQ).[25] To measure dividend expectations, we regress DELTADIV, the change in quarterly dividends relative to beginning stock price on the following explanatory

---

[24] Since CRSP uses calendar years in reporting, while Compustat data for each company is reported at the end of each quarter of the company's fiscal period, the following procedure was used to match the data. If the company's fiscal year starts in the first half of the calendar year, the fiscal year reported is the same as the calendar year in which the fiscal year started; however, if the fiscal year starts in the second half of the calendar year, the fiscal year reported is the calendar year in which the fiscal year ended. Thus, if company A has a fiscal year ending March, data for the end of fiscal year 1993, quarter 1, would be matched with calendar year 1993, month ending June. On the other hand, if company B has a fiscal year ending June, data pertaining to the end of fiscal year 1993, quarter 1 would be matched with 1992, month ending September. The matched data is, thus, defined quarter by quarter.

[25] Strictly speaking, we need a stock measure of liquidity. However, this runs into the problem of what assets should be considered liquid, and their degree of liquidity. In order to avoid this difficulty, we use a flow measure, which avoids the issue of actual convertibility to cash and the need for minimum levels of working capital to maintain operations (see White, Sondhi and Fried; 1998). We define our liquidity measure as Net Income + Minority Interest + Depreciation & Amortization – Capital Expenditures – Change in Non-Cash Working Capital + Change in Long-Term Debt. Non-Cash Working Capital is defined as: Total Current Assets – Total Current Liabilities – Cash & Short Term Investments. This definition follows Damodaran (1997).

variables: firm leverage, growth opportunities, liquidity (LIQ), working capital (WCAP), size, and the time elapsed since the last dividend payment (GAP).[26, 27]

The firm's growth opportunities are proxied by two variables, dividend yield (DIVYLD) and the growth in dividends over the prior twelve months (LGROW). The rationale behind using DIVYLD is as follows: a firm with growth opportunities would pay out a lower portion of its earnings in dividends, due to its greater need for financing capital expenditures; hence a higher DIVYLD implies more growth opportunities. Dividend yield is measured as DIVYLD = DIV/P, where DIV is the dividend declared this quarter, and P is the price of the stock at the end of the month before the dividend declaration date. SIZE is defined as the natural log of the market value of equity at the end of the month prior to the dividend declaration date. Leverage is the ratio of long term debt as a proportion of total liabilities (LEVG). All variables are defined so that the right hand side quantities are in the market's information set when the dividend in a given quarter is declared. Variable definitions are summarized in Table 3.

---

26 Most researchers, even today, assume that dividends follow a simple martingale; i.e., they use a naive expectations model. For a recent example, see, for example, Best and Best (2000).

27 Our dividend expectations model uses panel data; this suggests that there might be cross-sectional or time-series effects in the data. While there is some evidence that ARCH modeling of dividend changes can improve estimates of the unexpected surprise (Bar-Yosef and Sarig, 1992), there is no reason to believe that our measure of the dividend surprise is biased in such a way as to affect our results.

Table 3: Variable Names and Definitions

Variable Name	Definition
LIQ	(Net Income + Minority Interest + Depreciation & Amortization – Capital Expenditures – Change in Non-Cash Working Capital + Change in Long-Term Debt)/Total Assets. [All variables measured as of the end of the quarter preceding the dividend declaration quarter]
DELTADIV	(Dividend this quarter – dividend last quarter)/(stock price at the month-end preceding this quarter's dividend declaration)
DIVYLD	(Dividend this quarter)/(stock price at the month-end preceding the dividend declaration)
WCAP	Working Capital at the end of the quarter preceding the dividend declaration
GAP	Number of calendar days elapsed since the last dividend payment
LGROW	Growth rate in dividends, summed over the last four quarters prior to the dividend declaration.
SIZE	The natural log of the market value of equity at the end of the month prior to the dividend declaration (Source: CRSP)
LEVG	(Long term debt)/(Total liabilities) [Both variables measured as of the quarter-end preceding the dividend declaration]

Only dividend declarations for which all the above data were available were used in the dividend expectations model regression. This resulted in a shrinkage of the data set from 83856 to 12827 observations. After estimating the dividend expectations model with this dataset, we estimated the market model for each company around each dividend declaration date.[28] The final sample used to test our two hypotheses had 12756 observations; in order for a dividend declaration to be included in the final dataset, both company-specific information as described above, as well as the cumulative abnormal returns (CARs) generated from the market model regressions had to be available. The following table shows the number of observations in our final sample by year.

[28] See below for a more complete description of the procedure followed for the market model estimation.

Table 4: Sample observations by year of dividend declaration

Year	Total number of dividend declarations during year	No. of observations in sample	Ratio of observations in final sample to total number of dividend declarations during the year
1987	4251	171	0.040226
1988	9132	1494	0.163601
1989	9503	1619	0.170367
1990	9340	1600	0.171306
1991	9211	1680	0.182391
1992	10169	1710	0.168158
1993	12281	1747	0.142252
1994	14341	1821	0.126979
1995	5628	914	0.162402
Total	83856	12756	0.152118

The next table shows means and standard deviations of relevant variables for the 12,756 observations included in the sample.

Table 5: Some Summary Statistics for Variables in Expectations Modeul

Variable Name	Mean	Standard Deviation
LIQ	-0.0153	0.0799
DELTADIV	-0.0001	0.0037
DIVYLD	0.0088	0.0186
WCAP	0.2239	0.1907
GAP	93.0318	47.3238
LGROW	0.0192	0.1885
SIZE	13.1232	1.6889
LEVG	0.1926	0.1449
Total Assets	$2,158.53 billion	$5,849.86 billion
Net Income	$29.074 billion	$109.227 billion

B: Results

The dividend expectations model estimated is:

$$\underset{}{\text{DELTADIV}} = \underset{(3.55)}{0.00117} - \underset{(-18.51)}{0.03434}\ \text{DIVYLD} - \underset{(-13.29)}{0.00239}\ \text{LGROW} - \underset{(-1.97)}{0.00049}\ \text{LEVG}$$

$$+ \underset{(-0.39)}{0.00000028}\ \text{GAP} - \underset{(-2.70)}{0.000059}\ \text{SIZE} - \underset{(-0.16)}{0.000066}\ \text{LIQ} + \underset{(-0.22)}{0.000044}\ \text{WCAP}$$

N = 12827; R^2 = 0.0417; t-values for the null hypothesis of a zero coefficient in parentheses.

The coefficients for LIQ, WCAP and GAP are statistically insignificant. The insignificance of the LIQ variable is surprising, since the long-run objective of the firm is to pay out its cashflows as dividends; on the other hand, the dependent variable is not the level of dividends, but the change in dividends. The signs of the other independent variables, which are all significant at the 5% level, can be explained as follows. The greater the firm's growth opportunities, the greater the firm's need for retained earnings, and hence, the lower the likelihood of dividends being increased; the growth opportunities variables, thus, enter the model with a negative coefficient. The negative coefficient for SIZE may be related to the greater degree of information asymmetry for small firms and the consequent need for dividend signaling. The negative coefficient for LEVG is consistent with the view of the dividends as a commitment device. [29] In this case, debt and dividends are substitutes, and a higher leverage ratio implies a lower need for dividends to be increased.[30]

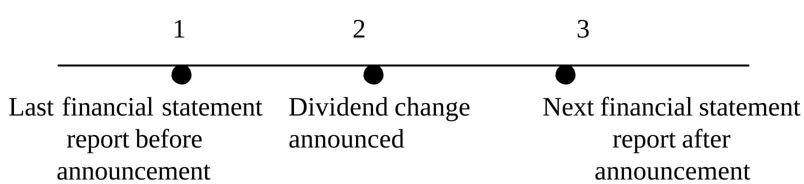
---

[29] The results presented later on partially support the commitment model.

[30] Prabhala (1993) uses a probit model to predict whether firms are likely to increase, decrease or keep dividends constant. He uses these and other variables. Our

The residual from the above model is then used as our measure of the dividend surprise (UDIV). Of the 12756 dividend surprises in our final sample, 6750 are negative (? 0.0) while 6006 changes are positive (> 0.0). The mean positive dividend surprise is 0.072 cents, while the mean negative dividend surprise is also about -0.066 cents.[31] This distribution of positive and negative dividend surprises does not seem to be overly skewed either positively or negatively and suggests that the linear expectations model is well specified.

We now test our first hypothesis by examining the correlation between the dividend surprise and the firm's liquidity. The market can be expected to consider firm liquidity relevant in forming an expectation of the next dividend. Hence, by definition, the correlation between the dividend surprise and the liquidity information already available to the market is zero. The hypothesis can, therefore, only be tested by looking at the correlation between the dividend surprise and information about firm liquidity that is not known to the market. We assume the following time-line regarding when the firm's liquidity information is available to the market:



coefficient estimates are consistent with his results, although he interprets the coefficients differently.

31 Four extreme observations were dropped before running the tests. This changed the means for the negative and positive surprises to –0.059 and + 0.070 cents respectively.

A numerical subscript for a variable indicates the point in time at which the variable is observed. For example, LIQ_1 is used in the dividend expectations model. To test hypothesis 1, we would like to use a measure of the liquidity shock measured simultaneously with the announcement. Assuming that liquidity follows a martingale, this would be measured by $LIQ_2 - LIQ_1$.[32] Unfortunately, we have no direct measure of LIQ_2. On the other hand, we do have LIQ_3, which is an imperfect measure of LIQ_2. Under the martingale assumption, ?(UDIV, $LIQ_2 - LIQ_1$) = ?(UDIV, $LIQ_2 - LIQ_1 + LIQ_3 - LIQ_2$) = ?(UDIV, $LIQ_3 - LIQ_1$). The results reported below measure the change in liquidity (DLIQ = $LIQ_3 - LIQ_1$) from the quarterly financial statement before the announcement to the quarterly financial statement following the dividend announcement.

The correlation between UDIV and the liquidity shock for the entire sample of dividend change announcements is 0.0421, which is statistically significant at the chosen significance level of 5% (p-level = 0.0001; n = 11747).[33] For the subsample of firms with unexpected dividend increases, the correlation is 0.0288, which is also statistically significant (p-level = 0.0318; n = 5575). For the subsample of firms with unexpected dividend decreases, the correlation is equal to 0.0641 and statistically significant (p-level = 0.0001; n = 6172). These results support the dividend commitment model, and are inconsistent with the dividend dilution model.

---

32 See footnote 19.

33 The sample size decreases because we use the lagged UDIV to measure the correlation, as explained above.

To test the second hypothesis, we need to estimate the market reaction to the unexpected dividend change. We use the standard event study methodology (see e.g. Mikkelson and Partch, 1986) to estimate the abnormal returns to the firms on days 0 and 1 relative to the dividend declaration date. The sum of these abnormal returns is used to measure the cumulative abnormal return (CAR) for each firm. The market model coefficients are estimated using 100 daily returns, which begin 105 trading days before and end 6 trading days before the dividend declaration date. As expected, the market reaction to all dividend changes is positive, with a statistically significant average CAR of 0.12% (std. dev. = 3.3%). The average CAR for positive dividend surprises is also positive, statistically significant and equal to 0.18% (std. dev. = 3.4%). The market reaction to negative dividend surprises is equal to 0.06% and is insignificantly different from zero.[34]

We now regress the market reaction (CAR) on UDIV, the dividend surprise (estimated from the model of dividend expectations), and on INTER, the interaction of UDIV with LIQ_1, the firm's liquidity level as of the last financial statement date prior to the dividend announcement.[35]

---

[34] This is interesting in that the market reaction seems to be asymmetric; however, there is no theoretical reason requiring symmetry. Note that we are working with dividend surprises, i.e. dividend changes relative to the dividend expectations model. Hence, there is no inconsistency between our results and the results reported in the literature, which show a strong negative market reaction to dividend decreases. (See e.g. Denis, Denis and Sarin; 1994). On the other hand, if signaling were the only motivation for dividend changes, it would be reasonable to expect a negative market reaction to negative dividend shocks.

[35] Although this two-step procedure implies that the independent variables in the second regression are measured with error, the resultant parameter estimates continue to

$$CAR = 0.0012 + 0.7514\ UDIV + 0.5434\ INTER$$
(3.971) (6.689) (0.958)

R^2 = .0036, N = 12751; (t-values for the null hypothesis of a zero coefficient in parentheses.)

These results do not support either version of the signaling model. However, it has been suggested in the literature that there is an asymmetry between dividend decreases and dividend increases--that managers are unwilling to decrease dividends. In order to accommodate this possibility, the above regression was rerun separately for the subsamples with positive and negative dividend surprises. The estimated regression equation for the positive subsample is:

$$CAR = 0.0013 + 0.7072\ UDIV + 3.934\ INTER$$
(3.142) (4.526) (4.273)

R^2 = 0.0060, N = 6005; t-values for the null hypothesis of a zero coefficient in parentheses.

The estimated regression equation for the negative subsample is:

$$CAR = 0.0011 + 0.8783\ UDIV - 1.401\ INTER$$
(2.531) (5.090) (-1.909)

R^2 = 0.0040, N = 6746; t-values for the null hypothesis of a zero coefficient in parentheses.

Here we notice an asymmetry between unexpected dividend increases and decreases. The coefficients for INTER are significant in both cases at the 5% level (one-tailed test); however, the results of the tests of the two hypotheses taken together are inconsistent with either signaling theory for the positive dividend surprise subsample. On the other

---

be consistent, though biased (Judge et al., 1982). However, given the large size of our sample, the bias is likely to be negligible.

hand, the results for the negative dividend surprise subsample are consistent with the dividend commitment theory of Bhattacharya (1979) and Ravid and Sarig (1991).

To check the robustness of our results, we split the sample into two parts: dividend declarations before Dec. 31, 1991 and after that date.[36] This divides the sample into roughly two equal halves – 6563 observations for the first period and 6188 for the second period.

---

[36] We also checked for robustness of the estimated slope coefficients by including other variables in the regression, such as DIVYLD, LGROW, LEVG and SIZE, which have no implications for the signaling theory, but some of which have been suggested as possible determinants of firm dividends (cf. Table 3 for variable definitions). While the R^2 of the regression did generally increase, the signs of the relevant coefficients did not change, nor did their statistical significance status.

Table 6: Regression results for subsamples

Subsample	Intercept[a]	UDIV[a]	INTER[a]	R^2	Sample Size	? (LIQ, UDIV)[b]
Period 1; all observations	0.0007 (1.701)	0.8619 (5.321)	0.2619 (0.254)	0.0043	6563	0.0735 (0.0001)
UDIV > 0	0.0005 (0.904)	0.9787 (4.131)	2.5544 (1.977)	0.0054	3322	0.0819 (0.0001)
UDIV ? 0	0.0008 (1.374)	1.0049 (4.016)	-4.0693 (-2.214)	0.0055	3241	0.0626 (0.0008)
Period 2; all observations	0.0016 (3.940)	0.6424 (4.092)	0.7417 (1.087)	0.0031	6188	0.0294 (0.0240)
UDIV > 0	0.0023 (3.817)	0.3214 (1.510)	6.5651 (4.798)	0.0104	2683	0.0112 (0.5704)
UDIV ? 0	0.0013 (2.207)	0.8129 (3.378)	-0.8970 (-1.113)	0.0034	3505	0.0651 (0.0002)

[a] t-values for the null hypothesis of a zero coefficient in parentheses.
[b] p-values in parentheses.

As can be seen from Table 6, the results are fairly similar for the two sub-periods. However, the coefficient for the interaction variable for the negative UDIV subsample is no longer significant in the second sub-period, and is much smaller in absolute value than that for the corresponding subsample in the first sub-period. Why should signaling be more prevalent in the pre-1991 period than after? One possible answer relates to the well-documented fact that institutional ownership in the stock market has increased over time (Brancato, 1996); to the extent that institutional investors have longer horizons, firm managers would need to focus less on market value. Although definitive evidence on this is hard to come by, it seems to be conventional wisdom.[37] Other indirect evidence also

[37] For example, see Miles and Mahoney (1997), who believe that a longer holding period is more consistent with the institutional perspective.

suggests such a conclusion.[38] Alternatively, to the extent that managers are able to convince institutional investors without compromising the confidentiality of inside information, signaling would not be as necessary in order to have the true value be reflected in the market price. This might explain why signaling is more prominent in the earlier sub-period.

We still have to address the other interesting aspect of our results – viz. that the signaling model only seems to hold for negative UDIVs, and not for positive UDIVs. Why should this be so? One possibility is that the costs, for good firms, of increasing dividends relative to other good firms are small. Hence the signaling effect, if any, is small enough not to be detectable in our sample. For firms that are not doing well, which presumably are represented in greater numbers in our negative UDIV sample, the costs of keeping dividends artificially high are large, relative to other bad firms. Hence the signaling effect shows up more strongly.

---

[38] Eakins et al. (1997) show that institutional investors are not influenced by analysts' forecasts. Eakins (1995) and Brancato (1996) show that institutional investors play a significant part in corporate management oversight. This would reduce their need to sell off their holdings in case of dissatisfaction with management, which would be the only course available to individual investors. Eakins and Sewell (1997) find that there is a high correlation between January abnormal returns and low levels of institutional ownership; the conclusion is that institutional investors do not need to sell at year end for tax purposes, in contrast to individual investors. Eakins and Sewell (1994) also show that institutions by and large, do not window dress their portfolios at year-end. On the other hand, Maxwell (1998) finds some evidence of institutional window dressing, while Eng (1999) shows that there are significant differences between different classes of institutional investors.

Table 7: Mean Values of Variables for Different Sub-periods

Variable	Mean	Std Dev	Minimum	Maximum
Entire Sample; sample size =12751				
UDIV	0.000019	0.00261	-0.0529	0.0566
CAR	0.00117*	0.03305	-0.44119	0.30402
LIQ	-0.01531	0.07988	-1.45212	1.35761
UDIV > 0; sample size = 6005				
UDIV	0.000701333	0.0026302	5.5904398E-9	0.0565850
CAR	0.00184*	0.03187	-0.25423	0.30402
LIQ	-0.01243	0.07665	-1.05822	1.2283
UDIV ? 0; sample size =6746				
UDIV	-0.000588724	0.0024279	-0.0528939	-6.115132E-8
CAR	0.0005785	0.03407	-0.44119	0.24189
LIQ	-0.01786	0.08257	-1.45212	1.35761

Note: *: significantly different from zero at the 5% level of significance.

In order to test this hypothesis, we looked at the average value of LIQ in the positive and negative UDIV subsamples; assuming a decreasing marginal benefit of liquidity to the firm, which is plausible, the cost of paying dividends would be decreasing in the level of liquidity. Sure enough, the mean value of LIQ for the negative UDIV subsample is -0.01786, which is much lower than the average LIQ for the positive UDIV subsample, which is -0.01243 (see Table 7). Moreover, the difference is significant.

However, we have to explain not only the rejection of the signaling model for the UDIV > 0 subsample; rather we must also find an explanation for the fact that the coefficient for INTER is significant and of the non-posited sign. This suggests that there may be other non-signaling motivations for dividend changes as well. The next section lays out two tentative non-signaling explanations for our results.

IV. The role of liquidity in non-signaling models

What are the predictions of the non-signaling dividend models regarding the role of liquidity? The dividend preference model (Bajaj and Vijh, 1990) does not have any obvious implications for the role of liquidity in market reactions to dividend announcements. Neither do the other models directly imply any role for liquidity in explaining the market reaction. However, it is possible to augment some of these models to give liquidity a role. Below, we sketch two possible augmentations of the overinvestment and wealth transfer models respectively.[39] We show that both frameworks are consistent with the empirical results that we have obtained above.

A: The Overinvestment Model

The Lang and Litzenberger (1989) overinvestment argument is incomplete in that there is no explanation of why some overinvesting firms increase their dividends and some don't; this makes it difficult to properly compare them with equilibrium signaling models. Suppose, nevertheless, that there are unobservable costs preventing the remediation of the over-investment. These costs may be related to the relative control of different corporate governance constituencies, such as management. If there were a decrease in these costs, stockholders would be able to force an increase in dividends and reduce "undesirable" free (excess) cash flow. This would lead to positive abnormal

---

[39] We do not suggest, however, that these models better explain dividend changes. Many studies have investigated these models in great detail and the results are mixed. (See section I for a brief discussion of some of this literature.) Our sole objective in this section is to investigate whether the results presented in the previous section for positive dividend surprises can be potentially explained by these models.

CARs. The firms most "out of line" (high levels of free cash flow) would, obviously, have the greatest benefit from any reduction in free cash flow. Interpreting an unexpected dividend increase as a desire to correct overinvestment, this implies a positive correlation between UDIV and LIQ (as a measure free cash flow) for the subsample of firms with unexpected dividend increases. Furthermore, we would expect the CARs to be more positively related to dividend increases, for high levels of LIQ, because the benefits would be greatest for these relatively inefficient firms.

B: The Wealth Expropriation Model

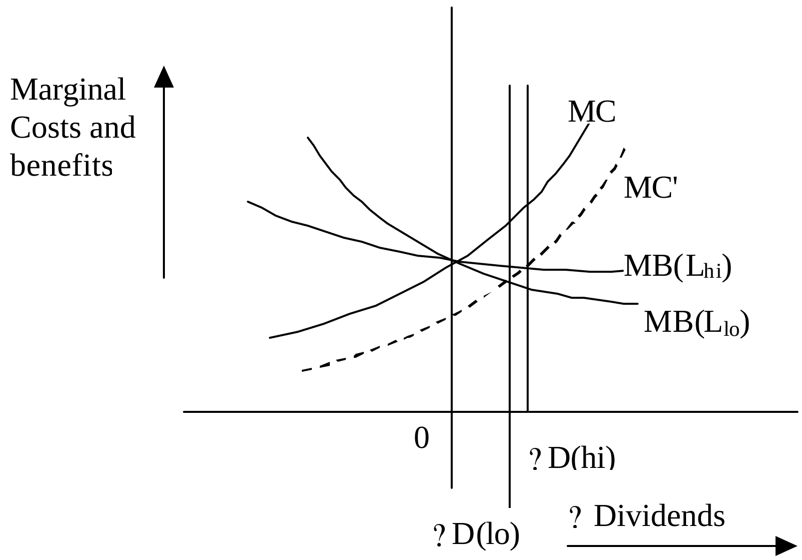
In order to conjecture a possible relationship between liquidity and wealth expropriation, we need to look at how management might come to a decision regarding the optimal amount of bondholder expropriation to undertake through dividend increases. Suppose there are contrary forces, such as reputational costs, that restrain management from expropriatory acts. The balancing of these marginal costs against the marginal benefits of expropriation leads to an equilibrium level of dividends. Suppose, now, that there is a drop in the level of these costs. This leads to a decision by management to increase dividends, which elicits a positive market reaction.

The precise amount of the market reaction implied by a given amount of dividend increase depends on the marginal benefits to stockholders from expropriation. How might the marginal benefits of expropriating bondholders through dividend increases be related to firm liquidity? The answer lies in the fact that increasing dividends does not simply transfer value from bondholders to stockholders. The payment of dividends also decreases internal funds and increases the impact that asymmetric information has on the firm through forgone projects (Myers and Majluf, 1984). For a given stock of positive

NPV projects that the firm has access to, the greater the liquidity level, the less the need for the firm to forego investment in NPV>0 projects. Hence, the greater the net benefits to stockholders from expropriation. Consequently, the slope coefficient of the regression of CAR on the interaction of the UDIV with liquidity would be positive.

It is reasonable that the marginal impact of reduced internal funds is lower, the higher the cash flow level. In other words, the marginal benefit from expropriation (due to the increased dividend payment) is higher, the higher the cash flow level. Hence when the cost of expropriating goes down, the amount of the dividend increase would be greater the higher the cash flow level. That is to say, the correlation between the liquidity and the amount of the unexpected dividend is positive.

The scenarios portrayed above for the wealth expropriation and over-investment models can both be illustrated by the following graph. On the x-axis, we measure the change in dividends and on the y-axis, we measure the marginal costs and benefits to stockholders. The marginal cost curves are hypothesized to increase in the amount of the dividend change. As explained above, in the overinvestment hypothesis, these may be costs of paying off managers, or exercising stockholder control, perhaps through a proxy fight; in the expropriation hypothesis, these may be reputational costs in bond markets. The marginal benefits to increasing dividends are higher when cash flow is higher, in both models. In the wealth expropriation model, the higher internal cash flow availability reduces the NPV loss that information asymmetry would otherwise occasion. In the over-investment hypothesis, the initial higher cash flow level means that a reduction in cash flow reverses or prevents managerial actions that are much greater drains on firm value. In both cases, a higher cash flow level is consistent with higher dividend increases. Furthermore, the positive market reaction per unit of dividends is greater, the greater the initial cash flow level.



This can be seen more clearly by referring to the accompanying figure. The original equilibrium level of dividends at D (? D = 0) is at the intersection of the marginal cost (MC) curve and the marginal benefit (MB) curve. The relevant marginal benefit curve is MB(L_{lo}) if the firm has a low level of liquidity, and MB(L_{hi}) if the firm has a high level of liquidity, and as hypothesized, the marginal benefit to a dividend increase (? D > 0) is higher if the liquidity level is higher. When the marginal cost curve is lower, there is a new equilibrium with dividends being increased; furthermore, the dividend increase is positively correlated with the level of liquidity, as posited.

From the above analysis, we may conclude that the non-signaling models are potentially consistent with the empirical results that we have obtained above for positive dividend surprises, while both types of signaling models are inconsistent with them. However, it is too soon to infer that the data support either of the non-signaling models;

we need to model the marginal cost and benefit curves much more precisely and to construct more discriminating tests before either of these latter models can be accepted.

V. Conclusion

Recent studies of dividend announcements have questioned the information signaling hypothesis. We examine the signaling explanation by testing the predictions regarding the role of liquidity in dividend signaling. Two different types of dividend signaling models are identified: one where current dividends provide the signal of firm value and the objective is to prevent current dilution (dilution models), and the other where dividend clienteles exist and commitments to future dividends constitute the signal (dividend commitment models).

Empirical results suggest that the data are partly consistent with the commitment model of dividend signaling. Interestingly, this support only shows up in the pre-1991 period, and only for negative dividend surprises. We suggest and tentatively support the hypothesis that signaling might be more prevalent for firms that have dividend changes lower than the market expects, because the cost of increasing dividends is much greater for this subset than for the subset of firms with positive dividend surprises. Furthermore, firms might not have felt as much of a need to signal in the later subperiod because of a greater proportion of institutional investors, who may have longer horizons and hence are less worried about market price. Data for positive unexpected dividend changes in both sub-periods are inconsistent with either signaling explanation; however, we show that they are consistent with two other non-signaling models: the over-investment model and the wealth expropriation model. More work is necessary, however, before we can confidently accept either of these non-signaling models.

References

Aharony, Joseph and Itzhak Swary (1980). "Quarterly Dividend and Earnings Announcements and Stockholders' Returns: An Empirical Analysis," *Journal of Finance*, vol. 35, no. 1, pp. 1-12.

Bajaj, M. and Anand Vijh. (1990). "Dividend Clienteles and the Information Content of Dividend Changes," *Journal of Financial Economics*, v. 26, pp. 193-219.

Bar-Yosef, Sasson and Oded H. Sarig, "Dividend Surprises Inferred from Option and Stock Prices," *The Journal of Finance*, Sep 1992, pp. 1623-1640.

Benartzi, Shlomo, Roni Michaely and Richard Thaler (1997). "Do Changes in Dividends Signal the Future or the Past?" *Journal of Finance*, v. 52, no. 3, pp. 1007-1034.

Bernheim, B. Douglas and Adam Wantz (1995). "A Tax-Based Test of the Dividend Signaling Hypothesis," *American Economic Review*, v. 85, no. 3, pages 532-551.

Best, Roger J. and Ronald W. Best, "Earnings expectations and the relative information content of dividend and earnings announcements," *Journal of Economics and Finance*, Fall 2000, pp. 232-245.

Bhattacharya, Sudipto (1979). "Imperfect Information, Dividend Policy, and the 'Bird-in-the-Hand' Fallacy," *Bell Journal of Economics*, vol. 10, pp. 259-70.

Bowen, R., D. Burgstahler and L. Daley (1986). "Evidence on the Relationship Between Earnings and Various Measures of Cash Flow," *The Accounting Review*, October, 713-725.

Brancato, Carolyn Kay (1996). "Institutional investors: Where the growth is," *Across the Board*, v. 33, no. 5, p. 56.

Brook, Yaron, William T. Charlton, Jr., and Robert J. Hendershott (1998). "Do Firms Use Dividends to Signal Large Future Cash Flow Increases," *Financial Management*, v. 27, no. 3, pp. 46-57.

Chhachhi, Indudeep S. and Wallace N. Davidson, III. (1997). "A Comparison of the Market Reaction to Specially Designated Dividends and Tender Offer Stock Repurchases," *Financial Management*, v. 26, no. 3, pp. 89-96.

Compustat, 1998.

CRSP, 1996.

Damodaran, Aswath (1997). *Corporate Finance: Theory and Practice,* John Wiley: New York, N.Y.

DeAngelo, Harry, Linda DeAngelo and Douglas Skinner (1996). "Reversal of Fortune: Dividend Signaling and the Disappearance of Sustained Earnings Growth," *Journal of Financial Economics*, v. 40, no. 3, pp. 341-372.

Denis, David J., Diane K. Denis and Atulya Sarin (1994). "The Information Content of Dividend Changes: Cash Flow Signaling, Overinvestment and Dividend Clienteles," *Journal of Financial and Quantitative Analysis*, v. 29, no. 4, pp. 567-588.

Dhillon, Upinder and Herbert Johnson (1994). "Effect of Dividend Changes on Stock and Bond Prices," *Journal of Finance*, v. 49, no. 1, pp. 281-289.

Dyl, Edward A. and Robert A. Weigand (1998). "The Information Content of Dividend Initiations: Additional Evidence," *Financial Management*, v. 27, no. 3, pp. 27-35.

Eades, Kenneth (1982). "Empirical Evidence on Dividends as a Signal of Firm Value," *Journal of Financial and Quantitative Analysis*, vol. 17, pp. 471-500.

Eakins, Stanley (1995). "An empirical investigation of monitoring by institutional investors," *American Business Review*, v. 13, no. 1, pp. 67-74.

Eakins, Stan, Stanley Stansell, Robert Dillard Teer and Paul Wertheim (1997). "Earnings Forecasts and Institutional Demand for Common Stock," *Journal of Applied Business Research*, v. 14, no. 1, pp. 57-67.

Eakins, Stan and Susan Sewell (1994). "Do institutions window dress? An empirical investigation," *Quarterly Journal of Business and Economics*, v. 33, no. 2, pp.69-78.

Eakins, Stan and Susan Sewell (1997). "Tax-loss selling, Institutional Investors, and the January effect: A Note," *The Journal of Financial Research*, v. 16, no. 4, pp. 377-384.

Eng, Li Li (1999). "Comparing Changes in Sockholdings of Different Institutional Investors," *Journal of Investing*, v. 8, no. 1, pp. 46-50.

Jensen, Michael (1986). "Agency Costs of Free Cash Flow, Corporate Finance, and Takeover," *American Economic Review*, vol. 76, pp. 323-329.

John, Kose and Joseph Williams (1985). "Dividends, Dilution and Taxes: A Signaling Equilibrium," *Journal of Finance* 40, 4: 1053-1070.

Judge, G.G., R.C. Hill, W.E. Griffiths, H. Lutkepohl and T-C Lee (1982). *Introduction to the Theory and Practice of Econometrics*. John Wiley and Sons, New York, NY.

Kwan, Clarence (1981). "Efficient Market Tests of the Informational Content of Dividend Announcements: Critique and Extension," *Journal of Financial and Quantitative Analysis*, vol. 16, pp. 193-206.

Lang, Larry H. P. and Robert H. Litzenberger (1989). "Dividend Announcements: Cash Signaling vs. Free Cash Flow Hypothesis?," *Journal of Financial Economics*, vol. 24 (1), pp. 181-191.

Lipson, Marc L., Carlos P. Maquieira and William Megginson (1998). "Dividend Initiations and Earnings Surprises," *Financial Management*, v. 27, no. 3, pp. 36-45.

Maxwell, William F. (1998). "The January effect in the corporate bond market: a systematic examination," *Financial Management*, v. 27 no. 2, pp. 18-30.

Mikkelson, W.H. and M. M. Partch (1986). "Valuation Effects of Security Offerings and the Issuance Process," *Journal of Financial Economics* 15, 31-60.

Miles, Michael and Joseph Mahoney (1997). "Is Commercial Real Estate an Inflation Hedge?" *Real Estate Finance*, v. 13, no. 4, pp. 31-45.

Miller, Merton and Franco Modigliani (1961). "Dividend Policy, Growth, and the Valuation of Shares," *Journal of Business*, vol. 34, pp. 411-33.

Miller, Merton and Kevin Rock (1985). "Dividend Policy under Asymmetric Information," *Journal of Finance*, vol. 40, pp. 1031-1051.

Myers, Stewart and Nicholas S. Majluf (1984). "Corporate Financing and Investment Decisions When Firms Have Information That Investors Do Not Have," *Journal of Financial Economics*, v. 13, no. 2, pp. 187-221.

Pettit, R. Richardson (1972). "Dividend Announcements, Security Performance, and Capital Market Efficiency," *Journal of Finance*, vol. 27, pp. 993-1007.

Prabhala, N.R. (1993). "On Interpreting Dividend Announcement Effects: Free Cashflow, Clientele or Signaling," Working Paper, New York University.

Ravid, S.A. and O. Sarig (1991). "Financial Signaling by Committing to Cash Outflows," *Journal of Financial and Quantitative Analysis*, v. 26 (2), pp. 165-180.

Riley, J. (1979). "Information Equilibrium," *Econometrica*, v. 47, pp. 331-59.

Ross, Stephen (1977). "The Determination of Financial Structure: The Incentive Signaling Approach," *Bell Journal of Economics*, 8, 23-40.

Thakor, A. (1991). "Game Theory in Finance," *Financial Management*, 20 (1), pp. 71-94.

Watts, Ross (1973). "The Information Content of Dividends," *Journal of Business*, 46, pp. 191-211.

White, Gerald, Ashwinpaul Sondhi and Dov Fried (1998). *The Analysis and Use of Financial Statements*, John Wiley and Sons: New York.

Yoon, Pyung Sig and Laura Starks (1995). "Signaling, Investment Opportunities, and Dividend Announcements," *The Review of Financial Studies*, v. 8, no. 4, pp. 995-1018.