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# 7 Share Repurchases and Acquisitions: An Analysis of Which Firms Participate

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## 7.1 Introduction

Contrary to the conventional wisdom that dividends are the primary means of transferring cash from the firm to its shareholders, nondividend cash payments surpassed dividends in the two most recent years for which data are available, 1984 and 1985 (Shoven 1986). This development challenges the "trapped-equity" cost of capital models[1] which equate the opportunity cost of retained earnings to the after-tax yield of the alternative considered, namely, dividends. If dividends are the only alternative to retaining earnings, the high taxation of dividends lowers the shadow cost of retained earnings and hence lowers the cost of capital. On the other hand, if cash can be and is paid out in nondividend form, with lower taxes, the economics profession needs to change the way it computes the cost of equity capital.

In this paper we review the theoretical rationale for nondividend cash payments. These payments can take the form of either share repurchase programs or cash mergers. The primary new material of this paper is an econometric investigation into what types of firms engage in these two forms of share acquisition programs: repurchasing own shares or acquiring the shares of other firms. We examine whether the same characteristics of the firm determine both mergers (or acquisitions) and share repurchases. Because these activities are so much more prominent now than in the past, we also examine whether the

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type of firm involved in these activities has changed since a decade ago.

## 7.2  Alternative Hypotheses about Nondividend Cash Payments

The literature has spawned numerous hypotheses about why firms make nondividend cash payments. We discuss several in turn.

### 7.2.1  Taxation and the Preference for Share Repurchases

In the absence of informational asymmetries between stockholders and management, and in the absence of taxes and transactions costs, dividends and repurchasing shares are equivalent. Whether it disburses a given amount of cash in one form or the other, the firm's total value will be the same. It will have the same debt-equity ratio, the same ownership claims, the same real assets, the same opportunities, and therefore the same value. In other words, it is possible to produce exactly the same consequences by either distributional form. After a share repurchase, each shareholder can sell sufficient shares to match the cash flow he would have received from a dividend. After a dividend payment, the shareholder can use the dividend proceeds to buy additional shares in the company and therefore reproduce the percentage interest he would have had if he had declined to sell in a share repurchase program.

Taxes cause a major break in this equivalence, to the disadvantage of dividends and, therefore, to the relative advantage of share repurchase for taxable households or individuals.[2] It is still true, however, that the total equity value of the firm should be the same after the payment of an equivalent amount of cash in either dividend or share repurchase form. This equivalence rests on the idea that the firm has the same assets, capital structure, and future opportunities in either case. If the cash is paid out as a dividend, it is fully taxable. But if it is paid out as a repurchase, the payment results in a capital gain to shareholders of the amount of the purchase.[3] Most of this capital gain, however, is accrued and not realized.

To fully understand the share repurchase strategy, consider the simple example outlined in table 7.1.[4] A hypothetical company is originally financed by the issue of 100 shares at $10 each. The company uses the $1,000 proceeds to purchase productive capital, and after a year it has realized a $100 profit. The competitive market value of the firm is now $1,100 ($11 per share), as the company now consists of a fully restored $1,000 machine and $100 cash.

Consider two strategies of returning the $100 earnings to the shareholders. If the money is paid out as a dividend (strategy A), the personal tax bill will be $28 if the marginal tax rate of the equity holders is 28

**Table 7.1**      An Example of a Dividend Payment and a Share Repurchase for a Hypothetical Firm

| | | |
|---|---|---|
| Initial financing | 100 shares at $10/share | $1,000 |
| Profit | 100 shares at $ 1/share | $ 100 |
| Value at end of year | 100 shares at $11/share | $1,100 |

| | Strategy A<br>$1 dividend payment/share | Strategy B<br>Repurchase $100 worth of shares |
|---|---|---|
| Cash received<br>by shareholders | $100 | $100 |
| Value of firm<br>after transaction | $1,000 | $1,000 |
| Number of shares | 100 | 90.91 |
| Price per share | $10 | $11 |
| Taxes owed[a] | $28 | $2.55 |
| Accrued capital gain[b] | $0.00 | $90.91 |

[a]Assumes a personal tax rate of 28 percent.

[b]Accrued capital gains will generate a future tax obligation if realized. A recent estimate of the effective tax rate on accrued capital gains is about 5 percent.

percent. The net-of-tax receipts from the dividend are $72. The value of the company would return to $1,000, or $10 per share, after the dividend payment. On the other hand, if the firm uses its $100 to buy 9.09 of its shares at a price of $11 (strategy B), the total realized gain by those who sell their shares to the firm is $9.09, assuming that the sellers are among those who originally financed the firm at a price of $10 per share. The tax on that $9.09 would be $2.55.

Note that the company's shares will remain at $11 after the repurchase and therefore each of the remaining 90.91 shares has an accrued gain of one dollar. These accrued gains will generate some taxes for the government, although the present value of the taxes depends on average holding periods, as well as any escape from capital gains taxes on assets that pass through estates.

This example demonstrates that share repurchases result in much lower personal taxes than do dividends, under the taxation assumptions stated here. Even so, this case may exaggerate what would actually be paid in a share repurchase. In the real world, investors buy their shares at different times and at different prices, and those most likely to tender their shares back to the company will be those with the lowest reservation price on holding the shares.[5] These will include shareholders who have actually lost money on their investments. The government may therefore receive no immediate revenue from those who receive the corporate cash. The example also illustrates that the advantage of

share repurchase over dividends exists even when realized capital gains are taxed at the same rate as dividends (as is the case both in the example and under the new tax law).

The tax advantage of share repurchase relative to dividends may be a powerful explanation of why share repurchases have become more prevalent. But because the explanation hinges on the fact that capital gains are taxed on a realization basis and escape taxation when passed through estates (rather than depending on characteristics of the firm), it is not an argument that can be readily addressed with cross-sectional econometrics. Nonetheless, it does suggest that dividend yield on the common stock and, perhaps, increases in the dividend rate may be predictors of participation in share repurchase activities. The tax advantage implies that share repurchase may be a substitute means of transmitting cash to shareholders, and thus firms with high dividend yields or which have increased dividends may be less likely to repurchase shares.

### 7.2.2 Repurchase as a Transitional Mechanism for Adjusting the Debt-Equity Ratio

In the absence of transactions costs and taxes at both the personal and corporate level, and with fully informed investors, shareholders will be indifferent about the price offered in a share repurchase plan. In a fundamental way they are buying the shares from themselves, and so their indifference comes from their being both the buyer and the seller. The heterogeneity of shareholders, however, creates a potential transfer between those who sell and those who do not. This possibility is diminished if all shareholders have an equal right to participate, and if shares are offered on a pro rata basis in the event the offer is oversubscribed (as is required by Securities and Exchange Commission rule 13e-4).

With no taxes, as Modigliani and Miller (1958) demonstrated, the value of the firm is also invariant to its financial structure. But in the presence of both personal and corporate taxes, there appears to be a substantial tax advantage of debt, because interest is tax deductible from the corporation income tax, whereas dividends and other equity earnings are not. Miller (1977) argued, however, that although the aggregate amount of debt in the economy is determinate, the capital structure for any individual firm is irrelevant, since the return on debt and equity incorporate taxes (the weak form of the Modigliani-Miller theorem). This proposition received empirical support from Trzcinka (1982). In contrast, Ross (1985), allowing for uncertainty, showed how firms may have an interior optimal debt-equity ratio. The standard model of a firm's optimal debt-equity ratio involves first order condi-

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tions trading off the tax advantages of debt against the agency costs of debt, as well as the inflexibility of debt in times of crisis. That is, higher debt ratios increase the likelihood of incurring the real costs associated with bankruptcy.

An adequate model of optimal debt-equity ratios would, of necessity, be very complex and would depend on variables that are unobservable in publicly available information about the firm, variables such as uncertainty and restrictions on the creation of state-contingent claims. Nevertheless, it is possible to predict some changes in the environment facing the firm that might cause its managers to want to adjust its leverage ratio. For instance, a change in the underlying riskiness of the firm (perhaps arising from the maturing of a market or the resolution of some technological uncertainties) may allow the firm to operate with a higher leverage ratio and enjoy more of the tax advantages of debt. This change in risk, or many other factors, may cause higher equity values. When stock market valuations increase dramatically (as they certainly have in the past four years), the leverage ratios of firms are automatically lowered. In many cases it will be optimal for the firm to at least partially offset this change in financial ratios by issuing debt and absorbing equity. When the tax rate applicable to bonds decreases, the optimal aggregate debt level increases, even in a Miller analysis. Both dividends and share repurchases absorb equity. But share repurchases may be a better mechanism for the transitional purpose of changing the debt-equity ratio than an increased dividend (as suggested by the work of Feldstein and Green 1983) because of the penalty that the market imposes on firms that later cut their dividend.

Taxes and transactions costs alter investors' neutrality regarding the price offered in share repurchase programs. Higher prices mean that more of the cash paid out will be taxed as a realized capital gain and less as a return of capital. This effect is probably outweighed, however, by the leverage adjustment effect of higher equity prices just mentioned. The underlying theory suggests, therefore, that higher share prices will encourage share repurchases, rather than discourage them as is the common wisdom. As well, there will be an economywide increase in the debt to equity expected given a decline in the taxation levels applicable to bonds.

One problem with this explanation of share repurchase as a transitional instrument in adjusting debt-equity ratios is that it depends on the difference between actual leverage and optimal leverage, a variable that can be neither observed nor predicted. In the empirical analysis to follow, we include the actual debt-equity ratio as an explanatory variable. The theory does not, however, predict even the sign of its influence on share acquisition activities.

### 7.2.3 Repurchase as an Anti-Takeover Strategy

Another reason firms may buy back their own shares instead of paying dividends is to fend off a takeover attempt (Bagwell 1986). In paying dividends, a company gives cash to all shareholders in proportion to their shareholdings. However, if the cash is used to make a share repurchase tender offer, only those who tender their shares (or a pro rata proportion of those tendered) will receive cash from the firm. Due to heterogeneous inframarginal rents to holding across shareholders, there exists an upward sloping supply curve representing the prices at which shareholders are willing to sell. The cash dividend does not change the distribution of reservation values, whereas the share repurchase buys out those with the lowest reservation prices, leaving behind those who would sell only when offered a premium above the tender offer price. Moreover, the position of the supply curve endogenizes the distributional choice and its effect on the possibility of takeover. As is shown in Bagwell (1986), the cost to the bidding firm of acquiring control of the target will be larger if the target distributes a fixed amount of cash through share repurchase than if it does so through a cash dividend. This explanation is consistent with the recent spate of repurchases motivated solely as takeover deterrence. We therefore would predict an increase in restructurings, especially repurchases, in response to the threat of takeover.

### 7.2.4 Free Cash Flow and the Preference for Share Repurchases

Jensen (1986) has analyzed the principal-agent problem that exists when an organization generates a substantial free cash flow. Managers have an incentive to increase the resources under their control, and need to be motivated not to grow beyond wealth maximization. Given this incentive, managers with substantial free cash flow may choose repurchase or dividends instead of investments. This choice gives them control over future cash flow that would be lost if the resources were invested.

Issuing debt to buy back stock creates an incentive for managers to overcome their inefficiencies. The fixed payment pattern of the debt allows them to commit to transferring resources to their financial claimants. Jensen focused on the example of the oil industry in the late 1970s: a case of simultaneous free cash flow and necessary industry shrinkage. He documented that oil firms were purchasing other companies, as well as restructuring themselves, consistent with the agency costs of free cash flow. The theory suggests a positive effect of cash flow on the probability of repurchase and acquisition.

The free cash flow hypothesis also implies that firms with low levels of investment, or poor internal investment opportunities, are more

likely to engage in share repurchases. A potentially useful but imperfect measure of internal investment opportunities is the ratio of price to book value. This ratio approximates Tobin's $q$ in our attempt to capture the $q$ theory of investment first developed in Tobin (1969).

An expectation of future cash flow is theorized to be signaled through cash disbursed to shareholders in a tender office. Vermaelen (1981) found the per share earnings of tendering firms were above the predictions of a preannouncement time-series model, a finding he interpreted as evidence that the tender offer serves as an announcement of favorable earnings prospects. Dann (1981) concluded as well that the information signaled by repurchase may be improvements in cash flows. Ofer and Thakor (1986) differentiated the repurchase signal from the signal implied by dividend payments. This hypothesis of a signaling of cash flow reconfirms the free cash flow expectation of a repurchase motivated by high cash flow.

### 7.2.5   The Equivalence of Share Repurchases and Mergers and Acquisitions

In the absence of informational problems, taxes, and transactions costs, buying shares in another company is nearly equivalent to buying back one's own. Rather than returning cash to the shareholders, the firm instead buys a financial investment. If the market value of the acquired asset is equal to what the firm pays for it,[6] then in the absence of transactions costs the acquisition is as good as cash to the stockholders of the acquiring firm. If there are transactions costs, they would have to be taken into account since some investors might now prefer cash, and some investors may want to rebalance their portfolio after the acquisition.

Although it is certainly true that if we relax the above assumptions share repurchases and acquisitions may serve different purposes, both actions convey similar tax advantages over dividends by transfering value to shareholders in a manner that results in capital gains (both realized and accrued) rather than ordinary income. The actions are dissimilar, however, in that a merger or acquisition does not absorb equity, whereas a repurchase does not a priori increase debt. The two activities, therefore, are not perfect substitutes in attaining optimal debt-equity ratios. This implies that previous appreciation in the firm's stock price may positively predict acquisitions (if the acquisition is done to increase leverage) and similarly may encourage share repurchases (if done to absorb equity).

The equivalence of the two share acquisition policies requires strong sets of assumptions. It is an interesting empirical issue, however. In the analysis below we separate the regressions for the two phenomena,

unwilling to accept ex ante the hypothesis that the two are perfect substitutes. We desire to investigate whether the hypothesis appears credible.

### 7.2.6 Clientele and Management Effects

For many economists, the payment of dividends, appearing to be tax disadvantaged, remains a puzzle despite the multitude of theories offered to explain them.[7] Share acquisition seems to offer too great a tax saving not to be preferred to dividends. But the tax argument is true only for some classes of investors. Nontaxable institutions are indifferent to tax-based arguments, and they are very large market participants. With transactions costs, it can be argued that such organizations as pension funds and private university endowments might find dividends the preferred form of return.

The implication of this argument is that firms may specialize to a clientele. Those firms that pay returns as dividends may be held disproportionately by tax-exempt organizations, whereas those that retain earnings, repurchase shares, or engage in mergers may be predominantly held by taxable owners. Although the necessary taxation information to assess this is not included in our data source, we do know a firm's previous participation history. If the clientele theory is valid, certain firms can be expected to have a propensity to perform these activities year after year.

There are other poorly understood aspects of corporate accounting and financial behavior. One is the choice of inventory accounting techniques, particularly in times of inflation. Firms can choose between first in, first out (FIFO) and last in, first out (LIFO) methods. With inflation FIFO generally leads to larger reported and taxable profits than LIFO. FIFO seems to be a nonoptimizing choice, as if investors cannot "see through" the accounts to ascertain real earnings. We can examine whether some managements are more likely to take advantage of tax-saving opportunities, if they exist, by seeing whether the firms that use the tax-efficient LIFO policy are those that also use nondividend means of transferring value to their shareholders.

### 7.3  Measurement Model and the Specific Hypotheses

We are interested in modeling the binary choice of whether to do an action of repurchase or acquisition, to study how various explanatory variables affect the probability of participation in such action.

This model is motivated by the definition of an unobserved random variable, the value of the contemplated action, as a linear function of some observed characteristics of the firm and an unknown disturbance:

$$(1) \qquad \text{value (action)} = XB + \epsilon,$$

such that the firm chooses the action if its value exceeds some critical constant (which can be zero). As just noted, this value is not directly observable. Given this limitation, we employ a binary probit to analyze the explanatory variables for the choice between the discrete alternatives of whether or not to undertake the action, representing the choice with a dummy variable. If the disturbance $\epsilon$ is normally distributed, the probability that the action will be undertaken is given by the cumulative normal function of $XB$, and a maximum likelihood estimator of the coefficients $B$ is available that yields consistent and asymptotically normal estimates (see, for example, Amemiya 1985, chap. 9).

### 7.3.1   Data

The data for this analysis were collected from the 1984 Compustat Industrial, Over the Counter (hereafter OTC), and Industrial Research files, which yielded 2,399, 853, and 1,289 original observations, respectively. We immediately removed 29 observations from the sample because they lacked all data and firm identification information.

Although we are interested in predicting participation in share repurchases, we want to exclude those small repurchases intended to eliminate odd lot holders. We therefore classify a firm as a repurchaser only if it acquires at least one-half of one percent of its outstanding share equity value.

Our use of the computerized data sources gave us a large sample, but it also limited our data selection. We would like to test the hypotheses on the tax advantages of repurchase, but the data source lacked information on the distribution of basis values and on the percentage of holders who escape taxation through death. We thus attempted instead to calculate a marginal tax rate of the firm, although this too proved impossible because of missing data in our source file.

We have posited various relationships between the leverage ratio and cash acquisition. We therefore created the variable $DBEQXY$, the previous year's debt-equity ratio (of book values). (For example, $XY = 75$ for the 1976 regressions, and $XY = 83$ for the 1984 regressions.) We created $DIVINC$, the percentage increase in dividends, to test the substitutability of dividends and acquisitions.

We would also like to test whether repurchase is a response to the threat of takeover, but financial statements do not contain data on whether a threat of takeover, either overt or covert, exists. For the large sample, therefore, we sacrificed such manually gathered information.

To represent the free-cash-flow and signaling-of-cash-flow hypotheses, we created a cash flow ratio, $CASHRAT$, which is operating income before depreciation as scaled by total assets.[8] The cash flow

hypothesis also implies the relevance of levels of investment and the potential importance of a measure of internal investment opportunity. We therefore created *INVRAT*, a ratio of the increase in investment to the value of total assets. We created *PRICEBK*, the ratio of the closing price to book value, as an indicator of internal investment opportunities.

If firms are using acquisitions and repurchases to achieve an optimal debt-equity ratio, price appreciation should encourage repurchase. We therefore created *PRICE*, an average of the ratios of one year's to the previous year's high, low, and closing stock prices.

The clientele hypothesis suggests repurchase is done by firms with low dividend yield. We include the previous year's ratio of dividends to share equity value, *DIVRATXY*, to examine this hypothesis. To test the hypothesis further, we are also interested in previous participation history. We therefore included dummy variables for the previous year's participation in repurchase (*REPXYO1*) and acquisition (*ACQXYO1*) as statistics for such habit formation.[9]

The hypothesis that managers who are smart about taxes should use nondividend payments is tested by the inclusion of a dummy variable *IVADUM*, which indicates whether the firm used LIFO or not.

The remaining data sample of 4,512 firms was purged of missing data relevant for respective 1976 or 1984 regressions. This resulted in corresponding samples of 2,366 and 1,820 firms. The appendix analyzes the data and the resultant samples in more detail.

## 7.3.2   Hypotheses

If the hypotheses of the previous sections are correct, we have certain expectations about the directions and significance of the coefficients.

An increase in general equity levels caused by the stock market growth is hypothesized to encourage firms to increase their relative leverage by absorbing equity. That absorption can be accomplished through repurchase. In addition, the optimal economywide level of debt can increase with a decline in the marginal tax rate applicable to bonds. Acquisition of a firm with higher leverage can assume increased debt in a controlled way. This may suggest a negative relationship between the debt-equity ratio and these actions in 1984, with insignificance in 1976.

The free cash flow hypothesis implies a positive relationship between the cash flow ratio and the probability of both repurchase and acquisition. That repurchase is believed to signal future cash flow may strengthen the implied relationship in the repurchase probit.

The free cash flow hypothesis also suggests that these actions are the result of low levels of investment or poor internal investment opportunities. This would be consistent with negative effects of the investment ratio and our $q$ approximation for both regressions.

If firms use acquisition and repurchase to obtain an optimal debt-equity ratio, we would expect price appreciation consistent with the action, implying a positive effect on the probability of the action of price.

A test of the clientele and habit formation hypotheses would predict significant positive coefficients on previous-action participation dummies. One indication of relative substitutability between actions is whether previous repurchase is correlated with acquisition and vice versa. The clientele effect also predicts a negative relationship between the dividend ratio and repurchase.

We expect a negative relationship between the percentage dividend change and both actions if they are substitutes to dividends. We also expect firms with low dividend yield to repurchase as an alternative to dividend payment. We therefore expect a negative relationship between the dividend ratio and repurchase.

Our test for smart tax managers implies a positive relationship between the use of LIFO and repurchase. Similarly, the tax advantage of acquisitions relative to dividends implies a positive relationship between LIFO and acquisitions.

We are also interested in the "importance" of the explanatory variables, specifically, in what magnitude they alter the probability of the event (the dummy variable equals 1). As well, certain relationships across equations are suggested above. We test between regressions to determine whether a specific action is stable over time. A finding of functional change across periods would reject the null hypothesis that the model has no structural change across time.

## 7.4   Empirical Results

### 7.4.1   Estimation of the Model

*1976 Probits*

Table 7.2 reports the results of estimating the parameters in the 1976 repurchase model, including the estimated intercept and coefficients, (Newton-Raphson) standard errors, and the associated $t$-statistics. The coefficients on the cash flow ratio and the 1975 repurchase dummy are positive and significant (at the .01 level). The coefficient on the 1975 dividend ratio is significant and negative (at the .025 level). The coefficient on the dividend increase is significant (at the .05 level). The $q$ and the investment ratio coefficients are negative and significant (at the .10 level).

Table 7.3 shows the results of estimating the parameters in the 1976 acquisition model. The 1975 acquisition dummy and the 1975 repurchase dummy are significant (at the .01 level). The price variable is

**Table 7.2**    **Probit Results for the 1976 Repurchase Model**

| Parameter | Estimate | Standard Error | $t$-statistic |
|---|---|---|---|
| Constant | −1.4944 | 0.1329 | −11.2430 |
| DBEQ75 | −0.0208 | 0.0190 | −1.0958 |
| IVADUM | 0.0453 | 0.0842 | 0.5384 |
| PRICE | 0.0939 | 0.0779 | 1.2052 |
| DIVRAT75 | −2.8016 | 1.3843 | −2.0238 |
| DIVINC | 0.0157 | 0.0093 | 1.6805 |
| PRICEBK | −0.1692 | 0.1248 | −1.3555 |
| CASHRAT | 1.2997 | 0.4111 | 3.1612 |
| INVRAT | −2.1806 | 1.3688 | −1.5931 |
| ACQ7501 | 0.0950 | 0.0955 | 0.9948 |
| REP7501 | 1.2879 | 0.0768 | 16.7790 |

**Table 7.3**    **Probit Results for the 1976 Acquisition Model**

| Parameter | Estimate | Standard Error | $t$-statistic |
|---|---|---|---|
| Constant | −1.6359 | 0.1339 | −12.2210 |
| DBEQ75 | −0.0087 | 0.0153 | −0.5692 |
| IVADUM | −0.0427 | 0.0889 | −0.4797 |
| PRICE | 0.1775 | 0.0801 | 2.2166 |
| DIVRAT75 | 0.6850 | 1.2701 | 0.5393 |
| DIVINC | −0.0113 | 0.0240 | −0.4704 |
| PRICEBK | −0.3394 | 0.1361 | −2.4941 |
| CASHRAT | 0.4775 | 0.4149 | 1.1510 |
| INVRAT | −1.4709 | 1.0590 | −1.3889 |
| ACQ7501 | 1.4180 | 0.0823 | 17.2200 |
| REP7501 | 0.2502 | 0.0894 | 2.7992 |

significant (at the 0.25 level). The coefficient on our $q$ approximation is significant and negative (at the .01 level), as is the coefficient on the investment ratio (at the .10 level).

## 1984 Probits

Table 7.4 reports the results of estimating the parameters in the 1984 repurchase model. The cash flow ratio and the repurchase dummy are significant (at the .01 level). Our estimate of $q$ is significant and negative (at the .01 level). The previous debt-equity ratio and dividend ratios are negative and significant (at the .05 level).

Table 7.5 shows the results of estimating the parameters in the 1984 acquisition model. The 1983 acquisition dummy is significant (at the .01 level), as are the 1983 repurchase dummy (at the .025 level) and price (at the .05 level). Our estimate of $q$ is significant and negative (at the .01 level), as is the 1983 debt-equity ratio (at the .05 level).

**Table 7.4**                 **Probit Results for the 1984 Repurchase Model**

| Parameter | Estimate | Standard Error | $t$-statistic |
|---|---|---|---|
| Constant | −0.8676 | 0.1166 | −7.4408 |
| DBEQ83 | −0.0411 | 0.0188 | −2.1823 |
| IVADUM | 0.0040 | 0.0756 | 0.0522 |
| PRICE | −0.0668 | 0.1120 | −0.5965 |
| DIVRAT83 | −0.2675 | 0.1458 | −1.8351 |
| DIVINC | 0.0258 | 0.0201 | 1.2815 |
| PRICEBK | −0.4025 | 0.1035 | −3.8881 |
| CASHRAT | 1.2656 | 0.3452 | 3.6660 |
| INVRAT | 0.3278 | 0.3955 | 0.8288 |
| ACQ8301 | 0.0138 | 0.0880 | 0.1569 |
| REP8301 | 1.2116 | 0.0806 | 15.0410 |

**Table 7.5**                 **Probit Results for the 1984 Acquisition Model**

| Parameter | Estimate | Standard Error | $t$-statistic |
|---|---|---|---|
| Constant | −1.0912 | 0.1073 | −10.1710 |
| DBEQ83 | −0.0340 | 0.0180 | −1.8902 |
| IVADUM | −0.0746 | 0.0798 | −0.9348 |
| PRICE | 0.1582 | 0.0926 | 1.7094 |
| DIVRAT83 | −0.0386 | 0.1656 | −0.2329 |
| DIVINC | 0.0238 | 0.0206 | 1.1553 |
| PRICEBK | −0.5067 | 0.1328 | −3.8159 |
| CASHRAT | 0.3519 | 0.3260 | 1.0793 |
| INVRAT | 0.0216 | 0.4076 | 0.0530 |
| ACQ8301 | 1.1762 | 0.0828 | 14.2110 |
| REP8301 | 0.1981 | 0.0876 | 2.2615 |

## 7.4.2   The Importance of the Variables

We are interested in a notion, beyond significance, of the importance of variables. Estimations of coefficients are not sufficiently informative about the increase in the probability of an event's occuring given a unit increase in the independent variable. Specifically, we look at how the probability of an action changes, given a one-standard-deviation movement in each independent variable, to normalize its impact on the change in probability. Table 7.6 gives the mean probability derivatives from each probit equation and the corresponding standard deviation of each explanatory variable. We create a local approximation of the change in the probability of the event given a one-standard-deviation change in the explanatory variable. We look specifically at those variables found significant in the probit analysis.

**Table 7.6**    **The Importance of the Explanatory Variables**

| Parameter | dp/dx (1) | Standard Deviation (2) | Change in Probability (1) × (2) | dp/dx (1) | Standard Deviation (2) | Change in Probability (1) × (2) |
|---|---|---|---|---|---|---|
| | 1976 Repurchase Model | | | 1976 Acquisition Model | | |
| DBEQ75 | -0.00428 | 3.25688 | -.0139394 | -0.00163 | 3.25688 | -.0053087 |
| IVADUM | 0.00933 | 0.39778 | .0037112 | -0.00798 | 0.39778 | -.0031742 |
| PRICE | 0.01933 | 0.43843 | .0084748 | 0.03320 | 0.43843 | .0145558 |
| DIVRAT75 | -0.57718 | 0.03149 | -.0181753 | 0.12811 | 0.03149 | .0040341 |
| DIVINC | 0.00323 | 4.05034 | .0130825 | -0.00211 | 4.05034 | -.0085462 |
| PRICEBK | -0.03485 | 0.41987 | -.0146324 | -0.06347 | 0.41987 | -.0266491 |
| CASHRAT | 0.26775 | 0.10373 | .0277737 | 0.08931 | 0.10373 | .0092641 |
| INVRAT | -0.44924 | 0.06235 | -.0280101 | -0.27509 | 0.06235 | -.0171518 |
| ACQ7501 | 0.01958 | 0.33796 | .0066172 | 0.26519 | 0.33796 | .0896236 |
| REP7501 | 0.26532 | 0.36128 | .0958548 | 0.04679 | 0.36128 | .0169042 |
| | 1984 Repurchase Model | | | 1984 Acquisition Model | | |
| DBEQ83 | -0.01150 | 3.41099 | -.0392263 | -0.00856 | 3.41099 | -.0291980 |
| IVADUM | 0.00111 | 0.45003 | .0004995 | -0.01880 | 0.45003 | -.0084605 |
| PRICE | -0.01869 | 0.36276 | -.0067799 | 0.03989 | 0.36276 | .0144704 |
| DIVRAT83 | -0.07483 | 0.45437 | -.0340005 | -0.00972 | 0.45437 | -.0044164 |
| DIVINC | 0.00720 | 1.45608 | .0104837 | 0.00599 | 1.45608 | .0087219 |
| PRICEBK | -0.11259 | 0.57582 | -.0648315 | -0.12774 | 0.57582 | -.0735552 |
| CASHRAT | 0.35403 | 0.17869 | .0632616 | 0.08871 | 0.17869 | .0158515 |
| INVRAT | 0.09168 | 0.08341 | .0076470 | 0.00544 | 0.08341 | .0004537 |
| ACQ8301 | 0.00386 | 0.37984 | .0014661 | 0.29655 | 0.37984 | .1126415 |
| REP8301 | 0.33893 | 0.38720 | .1312336 | 0.04994 | 0.38720 | .0193367 |

The dummy variable predicting habit formation most drastically affects the probability of all of the outcomes. For instance, in the 1984 repurchase equation a one-standard-deviation move in the dummy variable for 1983 repurchase changes the probability of repurchase by .131. This is an enormous change, particularly relative to the overall sample mean probability of a 1984 repurchase of .2632. The derivative figure indicates that having repurchased in the previous year (the dummy variable equals unity) versus not having done so changes the 1984 repurchase probability by .339, holding other factors constant.

Our estimate of $q$ is also important in all equations. A one-standard-deviation increase in the price-to-book ratio in 1984 decreases the probability of a firm's participating in repurchase by 6.5 percentage points. This finding suggests that firms with low internal investment opportunities seek to spend their money elsewhere.

This analysis of the importance of the explanatory variables indicates that certain factors are more important for particular actions or at particular times. The variables for cash flow and the previous dividend

ratio are important in both repurchase equations, consistent with the free-cash-flow hypotheses. The debt-to-equity and dividend ratios are also important in both repurchase equations. Conversely, price appreciation is influential in changing the probability of acquisitions in both 1976 and 1984. Both the price-to-book ratio and the habit variables are consistently important, though more so in 1984.

### 7.4.3 Model Specification Predictions

The percentage correct of the model prediction is the sum of correctly predicted outcomes scaled by the total number of observations. The percentage-correct values of the 1976 repurchase, 1976 acquisition, 1984 repurchase, and 1984 acquisition models are .849, .866, .783, and .813, respectively. These findings imply that the models have predictive capability. We desire further interpretation of the predictability, however, and so we explicitly compare our models to a "naive" model. For that model we have chosen knowledge of the aggregate ratios of actual one dummies to nonoccurrences and then predicted accordingly. Complete aggregate information is itself a demanding standard of comparison.

Table 7.7 reports matrices of the number of realizations for each model of each of the 4 possible outcomes:

1. Correctly predicting an outcome occurrence (that is, $\hat{Y} = 1/Y = 1$, where $\hat{Y}$ is the predicted value of the dummy variable for the action, and $Y$ is the actual value).
2. Misidentifying a nonoccurrence as an action ($\hat{Y} = 1/Y = 0$). The probability of this outcome gives the size of the type-two error.

**Table 7.7**            **Prediction Realizations**

| 1976 Repurchase Model | $\hat{Y}$ | | | 1976 Acquisition Model | $\hat{Y}$ | | |
|---|---|---|---|---|---|---|---|
| | < .5 | ≥ .5 | | | < .5 | ≥ .5 | |
| Y  0 | 1,892 | 90 | 1,982 | Y  0 | 1,928 | 96 | 2,024 |
| 1 | 267 | 117 | 384 | 1 | 220 | 122 | 342 |
| | | | N = 2,366 | | | | N = 2,366 |

| 1984 Repurchase Model | $\hat{Y}$ | | | 1984 Acquisition Model | $\hat{Y}$ | | |
|---|---|---|---|---|---|---|---|
| | < .5 | ≥ .5 | | | < .5 | ≥ .5 | |
| Y  0 | 1,227 | 114 | 1,341 | Y  0 | 1,305 | 116 | 1,421 |
| 1 | 198 | 281 | 479 | 1 | 224 | 175 | 399 |
| | | | N = 1,820 | | | | N = 1,820 |

| Table 7.8 | "Naive" Predictions | |
|---|---|---|
| | $\hat{Y}$ | |
| | $< .5$ | $\geq .5$ |
| $Y$    0 | $F_0 F_0 N$ | $F_1 F_0 N$ |
|      1 | $F_1 F_0 N$ | $F_1 F_1 N$ |

$F_1$ = fraction of ones $= \dfrac{\text{number of ones}}{\text{total number}}$

$F_0$ = fraction of zeros $= \dfrac{\text{number of zeros}}{\text{total number}}$

$N$ = total number

3. Misidentifying an action as a nonoccurrence ($\hat{Y} = 0/Y = 1$). The probability of this outcome is the size of the type-one error.
4. Correctly predicting a nonoccurrence of the event ($\hat{Y} = 0/Y = 0$).

Table 7.8 calculates the realization matrix for our naive model. We assume knowledge of the aggregate ratio of realizations, that is, we know the total number of observations and their true division ratio between zeros and ones. If we predict a one, we are correct by a percentage equal to the fraction of ones. Thus, the number of realizations such that $\hat{Y} = 1/Y = 1$ is equal to the fraction of ones predicted correctly times the number of ones, or $F_1 \cdot F_1 \cdot N$. We similarly calculate the number of realizations in each cell of the matrix for the total number of observations, $N$. We can therefore calculate the conditional probabilities of the naive model.

The conditional probabilities of the regression models and the naive model are given in table 7.9. Our model excels in improving the size of type-one error, as well as in increasing the power of our predictions.

### 7.4.4 Structural Change

*Across Time*

Initial observation of the results may suggest structural change across time.[10] In the repurchase model the investment ratio is significant and negative in 1976 and insignificant and positive in 1984. Whereas the previous year's dividend increase is significant in 1976, it lacks such significance in 1984.

Similarly, the 1975 repurchase dummy is significant in the 1976 acquisition model but not as significant in the 1984 model. The investment ratio is significant and negative in 1976 but insignificant in 1984. Conversely, the previous year's debt-equity ratio is significant and negative in 1984 but insignificant in 1976.

**Table 7.9**        **Conditional Probabilities of the Regression Models and the Naive Model**

|  | Regression Models | Naive Model |
|---|---|---|
| **1976 Repurchase** | | |
| prob ($\hat{Y} = 1 / Y = 1$) | .305 | .162 |
| prob ($\hat{Y} = 1 / Y = 0$) | .045 | .162 |
| prob ($\hat{Y} = 0 / Y = 1$) | .695 | .838 |
| prob ($\hat{Y} = 0 / Y = 0$) | .955 | .838 |
| **1976 Acquisition** | | |
| prob ($\hat{Y} = 1 / Y = 1$) | .357 | .145 |
| prob ($\hat{Y} = 1 / Y = 0$) | .047 | .145 |
| prob ($\hat{Y} = 0 / Y = 1$) | .643 | .855 |
| prob ($\hat{Y} = 0 / Y = 0$) | .953 | .855 |
| **1984 Repurchase** | | |
| prob ($\hat{Y} = 1 / Y = 1$) | .587 | .263 |
| prob ($\hat{Y} = 1 / Y = 0$) | .085 | .263 |
| prob ($\hat{Y} = 0 / Y = 1$) | .413 | .737 |
| prob ($\hat{Y} = 0 / Y = 0$) | .915 | .737 |
| **1984 Acquisition** | | |
| prob ($\hat{Y} = 1 / Y = 1$) | .439 | .220 |
| prob ($\hat{Y} = 1 / Y = 0$) | .082 | .220 |
| prob ($\hat{Y} = 0 / Y = 1$) | .561 | .780 |
| prob ($\hat{Y} = 0 / Y = 0$) | .918 | .780 |

We can also expect some structural change across time given how the relative importance of the parameters change over time. The investment ratio alters the probability of repurchase far more in 1976 than in 1984. Our approximation of $q$ alters the probability of acquisition far more in 1984 than 1976. In both habit formation is more important in 1984. In addition to the possibility of changes in the probit coefficients, the increased occurrence of both repurchases and acquisitions suggests that an intercept shift may also have occurred over time.

We test for structural change within an action across time with the likelihood ratio test. The test is computed as $LR = 2(L_2 - L_1)$, where $L_2$ is the value of the likelihood function for the maximum of the unconstrained model, and $L_1$ is the value with imposed constraints. This statistic is asymptotically distributed as a chi-squared variable with degrees of freedom equaling the difference in the number of constraints.

We are interested in testing whether the probit coefficients are constant between our sample periods, allowing for the possibility of an intercept shift. We have created two pooled samples: one for share repurchase, and one for acquisition. Each includes a time-specific dummy variable, allowing the intercept to differ for the two subperiods.

Table 7.10          Likelihood Ratio Tests of Structural Change across Time

| Unconstrained | Repurchase | Constrained |
|---|---|---|
| log $L$ (rep76) | | log $L$ (all repurchase) |
| $-886.125$ | | $-1799.90$ |
| log $L$ (rep84) | | |
| $-906.792$ | | |

$2(-886.125 - 906.792 + 1799.90) \sim \chi^2_{10}$ (at $p = .05$, critical level $= 18.3$)

$$LR = 13.96$$

| Unconstrained | Acquisition | Constrained |
|---|---|---|
| log $L$ (acq76) | | log $L$ (all acquisition) |
| $-809.508$ | | $-1636.90$ |
| log $L$ (acq84) | | |
| $-822.448$ | | |

$2(-809.508 - 822.448 + 1636.90) \sim \chi^2_{10}$ (at $p = .05$, critical level $= 18.3$)

$$LR = 9.89$$

Table 7.10 displays our results for the likelihood ratio statistic ($LR$) for tests of structural change across time. In comparing the figures with the 5 percent critical level for a chi-squared variable with ten degrees of freedom (18.3), we find that the evidence fails to reject the null hypothesis of no structural change in the coefficients for both repurchase and acquisition (as neither 13.96 nor 9.89 exceeds 18.3). Nonetheless, the time-specific dummy variable is large and significant in each pooled probit. In both cases the intercept shift indicates that these actions become more likely for reasons not captured by our explanatory variables. This is consistent with the previous evidence that these activities expanded enormously between the 1970s and mid-1980s.

## 7.5 Conclusions

The explanatory variables suggested by the hypotheses about nondividend cash payments collectively have substantial power in predicting participation in share repurchases and acquisitions. For instance, relative to a naive model based on correct aggregate ratios, our probit estimators reduce the occurrence of type-two errors (misidentifying a nonoccurrence of the event) by roughly a factor of three.

Among the hypotheses surveyed, perhaps the free cash flow theory is most consistent with our findings, particularly the share repurchase ones. The cash flow variable and the price-to-book ratio (our $q$ approximation) had the correct sign, were statistically significant, and were quantitatively important in both 1976 and 1984. The coefficient on the price-to-book ratio was consistently negative, significant, and

important in both the repurchase and the acquisition probits. This finding suggests, consistent with Tobin's $q$ theory and Jensen's free cash flow hypothesis, that firms that sell at a discount relative to book value are more likely to engage in share repurchases or acquisitions, presumably as an alternative to unprofitable further investments in their primary activity. The investment ratio was marginally significant and consistent with the free cash flow theory for repurchases in 1976, but its coefficient was insignificant in 1984.

Consistently, the variable with the largest $t$-statistic and the one that most greatly affected the probability of an action was participation the preceeding year. Thus, share repurchases and acquisitions appear to be "habit forming." This trait is consistent with the clientele hypothesis, which asserts that firms specialize in how they transmit cash to their owners.

The tests for structural change across time failed to reject the hypothesis that the determinants of repurchases and acquisitions are unchanged over time. This may be somewhat surprising, given that the aggregate levels of these activities have increased so dramatically in recent years. We do demonstrate that the intercept has time dependence. In subsequent research we hope that by addressing other considerations, including the existence of a takeover threat and tax information, we can explain the effects now captured by the dummy variable. Nonetheless, the failure of this study to find structural change in the determinants of participation does suggest that the theories tested here were consistently operative in both years examined.

In further work we plan to examine how these phenomena are affected by provisions in the 1986 Tax Reform Act. This major realignment of the tax environment may dramatically affect these aspects of corporate financial behavior.

## Appendix

### The Data

We began with 2,399 Industrial, 853 OTC, and 1,289 Research observations. Of these, 29 lacked all information including CUSIP numbers. Thus, we manipulated the data from 4,512 original observations to achieve the resultant 2,366 points for 1976 and 1,820 points for 1984.

Table 7.11 lists the Compustat definitions of our dependent variables. It should be noted that we included both cash and stock-swap acquisitions. Analysis of data in *Mergers and Acquisitions* indicated the vast

**Table 7.11    Compustat Definitions of the Dependent Variables**

*Acquisition:* "The funds for, or the costs relating to, the acquisition of a company in a current or prior year as reported on the statement of changes."

Includes:

1. Cost of the net assets of the business acquired
2. Acquisition of additional ownership (a decrease in minority interest)
3. Additional interest in the company (if the company is consolidated)
4. Retail assets in the business acquired
5. Property, plants, and equipment of the acquired company
6. Long-term debt assumed in acquisition

*Repurchase:* "Use of funds which decreases common and/or preferred stock."

Includes:

1. Purchase of treasury stock
2. Retirement or redemption of preferred stock
3. Retirement or redemption of redeemable preferred stock
4. Retirement of common stock
5. Conversion of preferred stock into common stock
6. Conversion of Class A, Class B, special stock, etc., into common stock

majority of 1984 acquisitions were cash deals, suggesting that the inclusion of stock-swaps would not strongly affect our analysis for that year.

The 1984 research file consists of companies deleted from other Compustat files because of acquisition or merger, bankruptcy, liquidation, delisting, or inconsistent reporting. Thus, many of those companies may have had observations for 1976 (if they existed before the delisting) but not for 1984. This is one explanation of the disparity between the number of observations for 1976 and 1984.

We then created dummy variables for repurchasing and acquisitions, giving missing values a zero. We did this because Compustat counts insignificant figures as not available. Thus, as missing data are potentially in actuality insignificant, we set them equal to zero to maximize the information obtainable from the dependent variables. (Note, however, that since a firm often has many, or all, points missing, many of these firms were subsequently "relost" by missing another variable.) The repurchase dummy variable was assigned a one only if the firm bought more than one-half of one percent of its outstanding share equity value. We also created the inventory dummy to be one if either the firm chose solely LIFO, or else LIFO was the primary choice of two inventory valuation methods; otherwise it was zero.

TSP probit executes only for complete observations, and we eliminated from the analysis firms missing any of the necessary variables. We then eliminated any debt-equity ratios that were either negative or exceeded 100, as we found ratios outside these parameters implausible,

and suggestive of erred data. This procedure therefore resulted in the samples of 2,366 for 1976 and 1,820 for 1984.

## Notes

1. See, for example, Auerbach (1983).
2. Gordon and Bradford (1980) argued that the implication of tax rules for the preference for capital gains is not so unambiguously in favor of capital gains. The importance of the differentials between ordinary income and capital gains taxation in dividend policy is still an unsettled issue. See, in addition, Miller and Scholes (1982).
3. The repurchase is treated as a capital gain if, according to Section 302 of the U.S. Internal Revenue Service code, the redemption is "substantially disproportionate." Vermaelen's (1981) sample had only 3 out of 105 tender offers subject to ordinary income taxes.
4. This example is found in Shoven (1986).
5. Recent studies have demonstrated how differing basis values given capital gains taxation result in these choices. The Balcer and Judd (1985) life-cycle model showed the optimal decision rule to be the selling of those shares with the highest basis values first. Bagwell (1986) also demonstrated how the heterogeneous basis values of shareholders result in selling by those with the lowest basis last.
6. There is no evidence that the rate of return on the common stock of the acquiring firm is abnormal, whereas there is an excess return enjoyed by the holders of the securities of the acquired firm (Dennis and McConnell 1986).
7. See, for example, Black (1976).
8. At the suggestion of Jerry Green, we examined an alternative measure of cash flow. It approximated the free cash flow available after replacement investment scaled by total assets. In general, the qualitative results were unchanged.
9. A problem with the one-year lagged participation variables is that some repurchase and share acquisition programs span more than one calendar year. To consider whether this overlap biased the lagged participation coefficient, we ran the probits with a two-year lagged repurchase dummy. Its significance and importance remained.
10. We chose 1976, instead of ten years before 1984, or 1974, because of Nathan and O'Keefe's (1986) finding of a structural change event in 1974. We therefore wanted to separate out this finding from other structural changes and chose two periods on the same side of their shift.

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## Comment    David F. Bradford

Bagwell and Shoven's paper investigates a phenomenon that is important in part because of the serious challenge it poses to economic analysis. The problem is this: In an active market populated by agents with very sharp pencils, the participants do not appear to optimize. Year in and year out, which we might interpret as an "equilibrium" state, firms choose to pay out dividends in spite of the availability of other modes of distribution that are significantly better for most shareholders and worse for none. The most obvious alternative is repurchase of the firm's own shares in the market. With apparently minor qualifications, share repurchases are definitely superior to dividend payments. Yet dividends continue to be paid.

Bagwell and Shoven start by reminding us of the superiority argument. They begin with a situation in which the firm has a sum of money it wishes to distribute. The state of the firm after the money has left its hands would seem to be independent of the route by which the money departed. All the state variables describing the firm are

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independent of the method by which the funds are distributed. Of the two methods, share repurchase generates lower taxes than dividends. This is true in part because of the rate difference between long-term capital gains and dividends and in part because of the deferral of some income in the hands of shareholders, since they can deduct the basis in shares sold in calculating their income subject to tax. The share repurchase method also offers shareholders an opportunity to choose the cash flow they wish to realize from their ownership in the firm. This sums up the case for share repurchase over dividends.

An only slightly more complicated method—using the firm's cash to purchase the shares of another firm rather than its own shares—may also be superior to dividend payment as a means of routing cash out of the firm and into the hands of the public. All that is required to accept this is to view the pair of firms involved in a consolidated way.

The authors present a statistical analysis of the characteristics of firms that engaged in (more than a negligible amount of) share repurchases or acquisitions of other firms (or both) in 1976 and 1984. (It is not clear from the paper whether the acquisition transactions are for cash from individual shareholders, which they would need to be to accomplish the equivalent of a share repurchase.) There are essentially two parts to the puzzle: which firms distribute cash to shareholders; and, among those, how much do they distribute via each of the possible paths—dividends, share repurchase, and acquisition.

Although the reasoning behind Bagwell and Shoven's empirical work is based partly on the determinants of cash distributions, rather than on the form those distributions take, the authors are especially interested in the latter. Having noted that dividends are inferior to the other forms of distribution from the point of view of their after-tax consequences for shareholders, but noting also that dividends continue to be used, they focus on the factors that make dividends *relatively* more or less costly. Let us then briefly review the weak points in the argument for the superiority of the nondividend forms of transfer. Several might be mentioned.

First, there is the tiny qualification in the argument given above: that the individual tax rate is constant. Because the tax rate may not be constant, the deferral of income associated with share repurchase as a method of distribution may conceivably be disadvantageous; the deferred income may later be subject to a higher tax rate. But if the shareholder anticipates the higher tax rate, the optimal behavior on his part would be to realize the income now in any case, so that this is a very minor problem indeed.

Second, to qualify for capital gains rather than dividend treatment, the net effect of the share repurchase must not look like that of a dividend. That is, the distribution of ownership among shareholders

must be changed by the share repurchase, at least in the short run. If not, the tax authorities have the power to require the selling shareholders to report the proceeds as a dividend for tax purposes. Although there is some theoretical reason to expect this sanction, it is in fact very rare and should be easy to avoid.

Third, the share repurchase method may subject the board of directors to some risk. If the firm's shares increase in value, a shareholder who earlier tendered may have a basis for suit against the directors. Again, my impression is that this risk is very small.

Fourth, for some shareholders dividends may in fact be preferable to capital gains. An important class of shareholders for which this is true is corporations. Until recently, a corporation could deduct up to 85 percent of any dividend from its corporate tax base. By contrast, a realized capital gain has been taxed at a flat rate, which, though lower than the tax on ordinary income, is still much higher than 15 percent of the regular rate. Perhaps because of this tax fact, most intercorporate dividends to be found in the statistical series (putting to one side dividends paid to tax-exempt entities) are flows from wholly owned subsidiaries to parents.

Tax-exempt institutions represent another class of shareholders that may prefer dividends to capital gains. One might think that these institutions would be indifferent to the two forms of cash flow, since neither of them has any tax consequences. But for some of these institutions the regulatory restrictions would treat the forms of cash flow differently. Universities, for example, may be allowed to spend cash flowing from dividends, but not cash flowing from share repurchases.

A fifth counterargument to Bagwell and Shoven's analysis is that the two forms of distribution convey different signals to the market. The usual way of putting this is to say that the fact that a firm is able to put cash dividends in the hands of shareholders must indicate that there really are some earnings there. Two comments might be made about this. First, the ability to distribute cash bears no necessary connection to current earnings. Second, it would seem a very simple matter to provide methods for auditing the repurchase of shares by corporations in such a way as to make it entirely equivalent to a dividend as far as any cash distribution can serve as a signal of a firm's underlying conditions. There is no obvious reason one could not make a commitment to future distributions in much the same way that firms appear to have commitments to regular dividend distributions. It should, however, be conceded that one could imagine problems with the tax authorities if the policy looked too much like dividends.

A sixth set of arguments is based on transactions costs. I must say, I find these arguments the most compelling. One can identify significant transactions cost differences at both the firm and the shareholder level.

At the firm level it seems very likely that arranging for share repurchase, which I believe is typically by tender offer at a specified price, is more costly than the routine payment of dividends. At the shareholder level the arguments run in both directions. For the shareholder who wants the cash flow associated with a dividend, the share repurchase route may be more costly, since it is necessary to go to the expense of selling a portion of the portfolio. Furthermore, for small shareholders it will often be impossible to match exactly the tax flow associated with the dividend.

In a world of no transactions costs, the dividend route might be presumed to generate no incentives to change portfolios. The day before the distribution, the shareholder owns a claim to the package of assets represented by the firm, including the firm's bank balance. The day after the distribution, the firm's bank balance is down, but the shareholder's bank balance is up by the same amount. And the shareholder's portfolio is the same in real terms. With transactions costs, however, all bets are off. Shareholders are always in the position of wishing they had different portfolios, but not wishing it enough to incur the cost of rebalancing. A nondividend distribution by the firm, with no offsetting portfolio adjustment, might leave any given shareholder better off or worse off. It is not at all clear that one method of distribution is superior to the other in this respect, that is, in terms either of the shareholder's transactions costs of rebalancing or of his loss of utility resulting from the deviation that might prevail from the portfolio he would have chosen in the absence of transactions costs.

The Bagwell and Shoven discussion of the choice among distribution modes as an element of an anti-takeover strategy depends on this sort of transactions-cost effect. The argument, as I understand it, is that shareholders who would tender their shares in a repurchase transaction are the ones closest to overcoming the transactions-cost impediment to rebalancing their portfolios. By picking those shareholders off, incumbent management can impose higher transactions costs as the price to a would-be takeover bidder.

A final counterargument in favor of dividends is that shareholders are essentially irrational on the subject. That is, they care about the form of the cash flow as well as its substance. They simply like dividends. I regret to say, I'm afraid this explanation may be the leading candidate.

There is a scrap of evidence relating to the nature of this possible irrationality, contained in a paper I wrote with Roger Gordon (1980). The question is whether it is the managers of firms or the shareholders whose behavior is inconsistent with the relevant maximization, which here is presumably maximization of shareholders' after-tax returns. The econometric results in our paper can be interpreted as saying that

the market places equal value on returns in the form of dividends and capital gains (appropriately adjusting for risk). If this is true, there would be no reason to fault managers for their choice of policies. Instead, the puzzle is in the behavior of the shareholders.

The problem confronting Bagwell and Shoven is that none of these possible counterweights, except the last, suggests differences that should show up in a cross-section of firms. For the last one implies (a) that firms can do whatever they habitually do and perhaps that (b) shareholders may slowly learn what they are spending on their affection for dividends and gradually come to demand that managements use the more favorable forms of distribution. My reading of the Bagwell and Shoven evidence is that this is the main thing they have found: When firms have a lot of cash, they tend to distribute it. In doing so, they use the mode of distribution they have grown accustomed to. There is some tendency, however, for the nondividend forms to take on the preferred status rather strongly predicted by theory.

### Reference

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## Comment    Jerry R. Green

The theory of finance has supplied us with no determinate model of the optimal capital structure of the firm. Equally lacking has been a theory of optimal cash flow management. Despite this lack of a theoretical underpinning, Bagwell and Shoven attempt to use evidence on the merger and share repurchase behavior of firms to provide a measure of firms' attempts to adjust toward financial targets and to minimize their owners' tax liabilities. In this respect their paper is openly and unashamedly empirical. By developing data and exploring these issues, the authors have done a great service to future work on this topic. The results of their study, however, with a few exceptions that I will mention below, cannot be regarded as a definitive test of economic hypotheses.

Any model of adjustment toward an optimally determined economic magnitude has two ingredients: a theory of where the target should be; and a theory of the costs of adjustment toward the target level, using

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one or more instruments. Economic theory is much better at supplying the former ingredient than the latter. Adjustment costs are hard to theorize about—they are just measured.

Their measurement requires knowing where the desired level is. Based on this knowledge one can estimate the speed of adjustment toward it. If we assume the marginal cost being "out of equilibrium," away from the target, increases with the distance from the target, the speed of adjustment is a proper measure of these unknown costs.

In the present context the desired level is itself unknown. It is not something that is parameterized within the model, and the evidence in this paper does not bear upon it. The intensity with which firms use share repurchases and mergers to make financial adjustments cannot be used to identify simultaneously the costs of being away from the target, the costs of adjusting toward the target, and the location of the target itself.

This paper does not claim to be an adjustment cost explanation of firms' financial behavior, although the authors do seem to want to proceed along these lines in their future work. What they do accomplish is twofold. They give a very interesting exploratory data analysis of the incidence of share repurchasing and merger behavior, and they amply document the fact that this behavior, however generated, has not remained the same over the past decade.

As one of the authors has shown in other work, the idea of share repurchases, though not a new one, is being seriously rethought by firms' financial managers. Bagwell and Shoven demonstrate that the two time periods studied are very different indeed. Hence, researchers must be very cautious about pooling time-series evidence on the rate of share repurchases.

Not too many years ago we thought that share repurchases were quasi-legal, or at least somewhat tainted. Up to now, however, we have not become aware of the substantial legal or tax problems that have arisen for firms that have engaged in this activity. Does that mean that the corporate sector is on a learning curve, finding out how much dividend tax avoidance via share repurchases will be tolerated? If it does, the analysis of this paper, though qualitatively interesting, cannot quantify the issue of adjustment costs. How are we to know whether we are just on the beginning of a learning curve, and soon to see share repurchases supplant dividends entirely, or whether the two time periods investigated in the paper represent the beginning and the end of a learning process? One would need more than two points to identify the parameters of any learning curve. One suggestion I have, therefore, is to redo this analysis for other years so that the true rate of acceleration of this behavior can be estimated.

Although the theory of finance has not given us a fully consistent picture of capital structure, it has provided many partial models that would lead us to believe the primary determinants of capital structure are unobservable. Not only are these variables hard to measure, and surely not available in the Compustat data base, but they are fundamentally unobservable. Indeed, the message of these theories of finance is that the very financial practices under investigation in the Bagwell and Shoven paper—dividends, mergers and cash management practices—are used to signal the true unobservables to the financial and product markets. The true determinants of the optimal capital structure may include the costs of bonding between management and shareholders, the ease of monitoring manager's actions, and other informational data. It is not surprising, therefore, that the authors find no evidence at all that the use of share repurchases and mergers is an attempt to alter the capital structure. There is probably just too much heterogeneity in these unobservable dimensions across firms for the few observables to be accurate predictors of cash flow management practices.

Share repurchases are often generated as part and parcel of other financial or other real activities of the firm. In some cases they arise from the sale of a division or a significant contraction in scale. But in other cases they arise in combination with a refinancing unrelated to immediate real operations. They may accompany the issuance of debt or preferred shares.

Bagwell and Shoven look at the cash management side of share repurchases in isolation. It would be interesting to tie the issuance of other securities to the share repurchase question, and the data on this are available in the same sources as those the authors use. One hypothesis that could be tested in this way concerns whether firms are ascertaining the legality of their share repurchases as a dividend tax avoidance action. It seems more likely that share repurchases are defensible when a serious contraction is taking place, rather than as part of a refinancing of a firm operating at constant scale.

This paper also looks at certain aspects of clientele effects: Are firms that repurchase their shares more apt to be held by individuals for whom the tax advantage of such an action is relatively more important? Such a question embodies two hypotheses. First is that the firm, with knowledge of who its owners are, chooses a course of action in their interest. But the second, equally plausible in my opinion, is that the firm chooses what it believes to be a preferable financial strategy, hoping to attract ownership by taxable investors who may benefit from this strategy. I doubt that these two hypotheses can be disentangled by using only data on firms' behavior. Nonetheless, the paper offers an interesting first step in this direction.

Finally, Bagwell and Shoven offer a very interesting discussion of the use of share repurchases as a takeover defense. The evidence accumulated in this paper should be combined with the growing data bases on mergers and takeovers and on the attempt to execute such transactions by tender offers. I have no doubt that the approach taken in this paper will be very useful in such future research efforts.