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# Do dividend reinvestment plans contribute to industrial firm value and efficiency?

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**Abstract**

This paper examines four hypotheses to test whether industrial firms offering DRIPs are structured to operate efficiently, given that DRIPs are a cheap source of outside financing for a firm. The hypotheses are derived from the corporate finance literature and partially based on a review of the previous DRIP-related finance literature. Evidence is found that larger firms will be more likely to offer DRIPs, which supports a bookkeeping hypothesis. No difference in valuation is found between DRIP firms and the other industry-matched firms using a Tobin's q proxy. Several cash flow measures are found not to be higher for DRIP firms. 

## 1. Introduction

Dividend Reinvestment Plans (DRIPs) allow investors to purchase additional shares of stock with reinvested dividends. The popular media encourages and popularizes individual investor interest in DRIPs. For instance, Vita Nelson's Moneypaper newsletter, TV commercials, and web site prominently tout DRIPs as advantageous to individual investors. The Moneypaper web site (http://www.moneypaper.com) has the following statement, mainly in regard to DRIPs: "By utilizing the information we make available, the small investor finally has a fighting chance. Our commonsense approach helps you save on fees and commissions, invest in quality, and take advantage of strategies to reduce risk." The Motley Fool investor web site (http://www.fool.com/FoolFAQ/FoolFAQ0015.htm) offers the following comments concerning DRIPs, "Basically, DRIPs are an inexpensive and simple way to increase your

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equity position in some really fine companies." The American Association of Individual Investors distributes a yearly DRIP guide to its members.

This study examines whether DRIPs offer additional value to investors. Matched industry samples of DRIP and non-DRIP offering firms are compared based on several variables including a firm valuation measure—Tobin's q. This study also investigates other factors that might affect the value of DRIPs to investors by examining how corporate capital structure and free cash flow relate to the probability of a firm offering a DRIP and how the agency conflicts between management and shareholders are influenced by DRIPs. Thus, various firm operating characteristics are examined to determine whether manager incentives for firms offering DRIPs are aligned with those of investors and whether managers make efficient capital structure decisions.

## 2. DRIP background

### *2.1. Description of DRIPs*

An investor who joins a DRIP will have her dividends automatically reinvested in the purchase of additional shares of the firm offering the DRIP upon payment of dividends. An investor can usually choose to have only part of her dividends reinvested. Discount DRIPs allow the shareholder to purchase the additional shares at a discount to the market price. The selection of the purchase price varies, but is based on the market price of a share. Often the market price on the dividend payment day or a five day average around the payment date is used. Usually, the DRIP corporate sponsor retains the shares purchased through the DRIP on account. DRIPs also usually require ownership in street name. DRIPs are currently taxed as if dividends are received by the shareholder instead of being reinvested and thus no tax effects are proposed in this paper.

Two distinct types and one combined type of DRIP plan exist. Through a new issue (or treasury) plan, a firm sells shares from its treasury stock or issues new shares. The new issue plan acts as a financing source for the firm. New issue DRIPs are a cheap source of cash but the existence of these DRIPs can increase free cash flow abuse by managers, thus lowering a firm's value, and affecting the monitoring of firm management. Also, new issue DRIPs provide a continuous source of cash to firms, thus DRIPs can be viewed as a source of financial slack.

Market DRIPs (also known as repurchase DRIPs), contrarily, provide no cash to a firm. A firm offers a market DRIP as a service to shareholders. Shares are usually purchased by a bank trustee on a stock market or through a negotiated purchase. The sponsoring firm usually maintains an arms-length relationship in relation to these purchases. A possible benefit of these DRIPs may be based on an extension of the dividend signaling literature. The act of paying dividends serves as a costly signal of firm value. Shareholders are not obligated to reinvest the dividends through a DRIP and indeed many choose not to reinvest, thus indirectly disciplining management and maintaining firm value. Indeed, Scholes and Wolfson (1989) indicate many shareholders choose not to reinvest their dividends. However, once

the offer of pay out has been made, reinvestment of dividends in the purchase of new shares should aid in maintaining the price of the stock through buying pressure.

Possible benefits of DRIPs to individual investors include low or no brokerage fees to buy additional shares with the reinvested dividends, the chance to buy additional shares at a discount to a market price, increased stock price due to buying pressure, and increased firm value (stock price) due to DRIPs serving as a cheap source of firm financing. Possible disadvantages of DRIPs for individual investors are related to indirect frictions in the financing of a firm which lower firm value.

### *2.2. Industry distribution of DRIPs*

Utilities and financial firms including real estate reinvestment trusts (REITs) are more likely to have a DRIP and are more likely to offer discount DRIPS, using the DRIPs as a source of financing (Scholes & Wolfson, 1989). The industry distribution of DRIPs is important in reviewing the monitoring structures which protect individual shareholders who lack the analysis capabilities of institutional investors. Since utilities and financial firms are highly regulated, the degree of regulation appears to play a role in firms offering DRIPs. Regulators offer a monitoring function, thus lessening the need for investment and commercial bankers in their monitoring role. The regulated firms are then able to take advantage of the lower cost of DRIP financing yet maintain efficient monitoring of management.

## 3. DRIP literature review

Most of the DRIP literature looks at shareholder wealth (value-enhancing or value-decreasing) effects upon DRIP-related announcements. Peterson et al. (1987) find insignificant average abnormal returns in a day zero, +1 window surrounding SEC filings for new shares to be issued by non-utility firms using DRIPs. Chang and Nichols (1992) and Peterson et al. (1987) find positive announcement effects for announcements regarding the 1981 tax legislation for qualifying utility DRIP firms. Roden and Stripling (1996) find significant wealth effects for announcements of DRIPs by utilities in a 15 day period before the announcements, but not during the announcement period. Dubofsky and Bierman (1988) find significantly positive abnormal returns upon announcements of discount DRIPs for a 46 firm sample from 1975 to 1983 in a three-day window surrounding the announcements.

Perumpral et al. (1991) investigate the stock market reaction upon announcements of DRIP plans with the time of announcement indicated in letters from the firms offering the DRIPs. For their entire sample, they find an average positive significant abnormal return in the month of announcement and significant positive announcement effects for market plan and original issue plan subsamples. No significant effect is found for discount DRIPs for both first and subsequent plan announcements.

Allen (1991) uses the SEC filing date for initial industrial firm DRIPs between 1974 and 1987 and a control sample of initial general cash offerings to measure the wealth effects of initial offerings of DRIPs. Day zero, +1 abnormal returns are significantly negative for both DRIPs and general cash offerings though the negative reaction is significantly larger for the

general cash offerings, supporting an asymmetric information argument since the general cash offering are to new, less-informed investors. Cross-sectional tests for industrial firms using announcement day zero, +1 abnormal returns as the dependent variable indicate no significant relationship to: (1) the discount from share market price at which dividends are reinvested; (2) the number of shares indicated in an offering; (3) if additional shares can be purchased at a discount through the plan; (4) a dummy variable for a period between 1982–1985 when utility DRIPs received preferential tax treatment; and (5) an option which allowed preferred equityholders and bondholders to participate in the DRIPs.

Dhillon et al. (1992) find that announcements of industrial new issue DRIP initiations result in significantly less negative wealth effects than for other new equity issue announcements. The negative wealth effects are also significantly smaller for discount industrial new issue DRIP initiations than for the equivalent no discount initiations. These results provide evidence that DRIPs alleviate the informational asymmetries between managers and investors.

Overall, the DRIP event study findings are ambiguous. These results are surprising given the cost savings that a firm should obtain in using a new issue or combined DRIP instead of investment bankers to raise capital. The findings may be due to agency inefficiencies heightened by DRIPs or by a relatively small proportion of financing being provided by DRIPs.

Another stream of the DRIP literature examines the new issue DRIP directly as a source of outside firm financing. Finnerty (1989) formally models new issue DRIPs as a source of financing for firms. Of interest to individual investors is his finding that when new issue DRIPs issue shares at a discount, participating investors gain at the expense of non-participating investors.

Scholes and Wolfson (1989) view discount DRIPs as providing an investment banking function in raising new capital for a firm. Both the firm and current investors participating in the discount DRIPs can split the underwriting costs which would otherwise accrue to investment bankers. By enrolling in DRIPs for firms which provided discounts on share purchases with reinvested dividends and may have also allowed purchase of shares at below market prices for DRIP participants, Scholes and Wolfson are able to obtain actual net profits of about $421,000 from an initial $200,000 investment after brokerage fees, losses from a hedging program, and other transactions costs.

Tamule et al. (1993) investigate whether firms will offer new issue DRIPs to raise cash. They create samples of new issue DRIPs that are industry matched with market DRIPs. They find the new issue DRIP firms have significantly higher debt-to-asset ratios and insider ownership but are significantly less likely to pay out dividends. The finding for the debt-to-asset ratios supports their hypothesis that firms with a greater need for outside financing will use new issue DRIPs.

## 4. Hypotheses

In this section, four hypotheses are examined to explain how firms offering DRIPs are structured to operate efficiently, given that DRIPs are a cheap source of outside financing for

a firm. The hypotheses are: (1) the free cash flow-debt hypothesis; (2) the monitoring hypothesis; (3) the informational asymmetries hypothesis; and (4) the bookkeeping hypothesis. Each of these hypotheses is based on previous work in the corporate finance literature.

Cash can be raised quickly through an existing DRIP. Finnerty (1989) provides a Salomon Brothers estimate of approximately $4.6 billion raised through new issue DRIPs in 1983. After amending its DRIP in April 1990, to allow a 5% discount from market price for all DRIP-purchased shares, South Jersey Industries raised $8 million dollars by June 1990. Scholes and Wolfson (1989) indicate that the Bank of America raised $350 million in a year-and-half period between 1987 and 1989 by introducing a discount DRIP plan while J.P. Morgan raised $92 million (44% of its common and preferred dividends for the entire year) when it offered a discount DRIP plan for nine months in 1985.

New issue DRIPs and, potentially, combined DRIPs, put cash into the hands of management on a regular schedule which exacerbates the possibility of free cash flow abuse as outlined by Jensen (1986, 1989). He maintains that managers will often waste free cash flow — funds a firm should potentially return to shareholders rather then waste on value decreasing (negative NPV) projects. Several motivations have been forwarded for this behavior including empire building and hubris. The sources of free cash flow can be either internally generated funds or externally raised funds. Jensen also posits that capital structure does affect free cash flow abuse (the financing decisions), most prominently through debt, because the promised interest payments of debt force managers to pay out cash rather then spend it. The free cash flow hypothesis is well tested in the finance literature (for example, Lehn & Poulsen, 1989; Lang & Litzenberger, 1989; Lang et al., 1991).

Management has an increased tendency to abuse cash flow from new issue DRIPs, and possibly, combined DRIPs, since it has this cash inflow on a regular basis rather then going to the market only when positive NPV projects credibly exist. This problem should be especially prominent for discount DRIPs. Free cash flow abuse may lower the market valuation of equity, canceling most gains from receiving shares without paying brokerage fees or receiving the shares at a discount.

Debt bonds the firm to pay out cash and thus lowers the possibility of free cash flow abuse. If firms have high cash flow then a high debt level can overcome the tendency of managers to waste this cash flow. Conversely, a firm with low cash flow will not need a high debt level to alleviate agency costs and will want to keep its debt level relatively low to avoid financial costs of distress. If firms have high levels of cash flow after dividend payments but before interest payments, than these firms should have higher debt levels if managers have a tendency to abuse free cash flow. Thus, the target capital structure of new issue and combined DRIP firms should be maintained so as to increase efficient operation by decreasing the potential of free cash flow abuse through relatively high debt levels while still using DRIPs as a cheap source of financing. This is termed the *free cash flow-debt hypothesis*. Firms with high debt levels, ceteris paribus, are expected to be more likely to have new issue or combined DRIPs. Firms with more growth opportunities are expected to have less free cash flow and thus less free cash flow abuse (and more need for outside funding). These firms should also be more likely to offer new issue and combined DRIPs to obtain outside financing.

Because new issue and combined DRIPs result in firms obtaining equity financing directly

from investors, they forego the outside monitoring of bankers and intense scrutiny of new offerings of equity through securities markets. If firms are to maintain an efficient capital structure, this lack of monitoring would result in a negative probability for firms to have DRIPs. This *monitoring hypothesis* would depend on the percentage of equity and total capital raised through the DRIPs.

On the other hand, equity issuance through DRIPs will tend to prevent a dispersion of ownership that would occur using underwritten offerings of capital, with concentrated ownership assumed to provide a more efficient monitoring function. The anecdotal evidence of higher individual investor proportion of ownership for DRIP firms would tend to mitigate this concentrated ownership effect.

Firms with high R&D expenses and sales expenses should be more difficult to monitor, since these two variables may proxy for growth opportunities which are inherently more difficult to monitor, and thus a negative relation could be found between the probability of firms having new issue DRIPs or combined DRIPs and high R&D or sales expenses. This effect contradicts the free cash flow effect of growth opportunities, thus the overall tendency of DRIP firms to have high growth opportunities is ambiguous.

The management monitoring and the free cash flow-debt hypotheses are conditional on the findings of Eckbo and Masulis (1992) and Smith (1977) that the lower direct flotation costs of rights offerings make rights offerings a substantially cheaper method of equity issuance for firms than underwritten offerings. Both rights offerings and DRIPs provide a means for current investors to invest further cash in a firm. There are tax differences between cash flows to investors through DRIPs and through rights offerings, since DRIP cash flows are taxed as dividends, even though the dividends are reinvested. However, Eckbo and Masulis (1992) provide a strong argument that DRIPs have partially replaced rights offerings as a means of raising cash: “Insofar as DRIPs are similar to rights offer, one would expect rights issuers to adopt DRIPs more often than firm commitment issuers.”

Because DRIPs can be viewed as a partial substitute for rights offerings, firms should realize a distinct cost saving by using DRIPs. Firms will select DRIPs as a significant form of financing as long as other indirect costs can be alleviated to a large enough extent that DRIPs are an efficient form of financing. In other words, only those firms which maintain an efficient or non-wealth-reducing capital structure for the purpose of alleviating the indirect costs of DRIPs are expected to offer (and retain) DRIPs.

If combined, market, and new issue DRIPs lower the costs of informational asymmetries, firms with a tendency toward higher informational asymmetries should be more likely to have DRIPs. This is termed the *informational asymmetries hypothesis*. Scholes and Wolfson (1989) propose a lowering of informational asymmetries through new issue DRIPs. If relatively undervalued firms are willing to sell shares at a price lower than the market price over an extended period of time, adverse selection costs may be lowered since good news about the firms is substantiated over time. Also, new issue and combined DRIPs allow for periodic, steady cash inflows and are thus a source of firm slack, which should be of value to a firm (Myers & Majluf, 1984).

Tied to the informational asymmetries argument is a *small firm effect*. Smaller firms should benefit more from the alleviation of informational asymmetries by the use of DRIPs. Blackwell and Kidwell (1988) find that smaller utility firms tend to issue private placements

since they lower informational asymmetries and Slovin et al. (1992) find significant positive abnormal returns for smaller firms upon announcement of both new loans and loan renewals, since bank loan monitoring also alleviates informational asymmetries.

Bookkeeping costs for DRIPs may be substantial with economies of scale and scope prevalent, thus DRIPs should be proportionately more expensive for smaller firms. For instance, legal departments in large firms may also review a prospectus for a DRIP. Bank trustees hired for other stockholder-related activities can also provide DRIP processing support. The *bookkeeping hypothesis* will cause small firms to be less likely to have DRIPs, thus contradicting the small firm informational asymmetry effect. Thus, the overall tendency for small firms to offer DRIPs is ambiguous.

## 5. Data and method

### *5.1. Sample*

DRIP brochures (firms offering market DRIPs do not have to offer actual prospectuses) and prospectuses, together termed as DRIP descriptions, were collected from DRIP trustees and individual firms between December, 1995 and February, 1996. The collection of actual DRIP descriptions allows for an accurate identification of DRIP types.

The initial sample consists of 238 DRIP descriptions. The descriptions are indexed by date, if indicated, and by statements which indicate the type of plan. A typical market plan description directly states that DRIP shares are purchased on the open market or the plan may state the DRIP involves purchase of shares only on the open market (or through negotiated purchase by the bank trustee) such as the following standard boiler plate statement for the Brown Group, Inc. DRIP brochure, dated March, 1990:

> The purchases ..... may be made on any securities exchange where such shares are traded, in the over-the-counter market, or by negotiated transactions and may be subject to such terms of price as Boatmen's [Bancshares] may agree. Neither Brown Group nor any shareholders shall have any authority or power to direct the time or price at which shares may be purchased, or the selection of the broker or dealer through or from whom purchases are to be made.

Plans which offered a firm the option of either issuing treasury stock, issuing new shares, or directing market purchases of its shares are termed combined plans.

To abstract from industry effects, two matched samples are created for comparison with the DRIP firms. Dhillon et al. (1992) use industry-matched samples of (1) newly-initiated discount, new issue DRIPs; (2) newly-initiated, non-discount, new issue DRIPs; and (3) non-DRIP firms, but they do not differentiate their non-DRIP sample by whether the firms paid out dividends. They measure differences in earnings before taxes, the price-to-book ratio, the debt-to-equity ratio, and current ratios for the year after DRIP initiation. Industrial DRIP firms exhibit significantly lower price-to-book ratios and current ratios, as well as a higher growth rate in total assets.

For this study, the DRIP sample consists of 92 non-utility industrial firms, all which were

in existence prior to 1994. Of these, eight are new issue, 20 are combined, and 64 are market plans. Utility and financial firms are eliminated due to the idiosyncratic nature of their industries' capital structures and regulatory environments. Additional firms are eliminated due to lack of Compustat data. For various tests, the DRIP sample is divided into market, new issue, and combined plan subsamples.

Two other samples were also formed, composed of firms which are matched by industry with the DRIP firms. The DIV sample consists of firms who paid dividends in 1994 but did not offer a DRIP (there are 92 matched sets of firms in the DRIP-DIV comparison sample). The NODIV sample consists of firms who did not pay dividends in 1994 (there are 89 matched sets of firms in the DRIP-NODIV sample). The inclusion of both the DIV and NODIV samples allows for partial differentiation of dividend effects from DRIP effects. If a significant difference is discovered between the DRIP sample and the DIV sample but not the DRIP sample and NODIV sample, this is stronger evidence of a DRIP effect instead of a dividend effect.

Matched t-tests are conducted to allow for statistical tests based on comparisons between DRIP and non-DRIP firms in the same or similar industries. There are some limitations to using a matched sample. Some tests such as differentiation of growth opportunities between DRIP and non-DRIP firms may not be very powerful since growth opportunities tend to be influenced by industry. On the other hand, a matched sample allows for the clearer differentiation of DRIP effects from industry effects, especially as it has been shown that DRIPs tend to cluster in certain industries. To overcome some of the limitations of a matched sample, logistic regressions and valuation tests are estimated, where all DRIP firms are pooled together and compared to the other two samples, which are also pooled.

### *5.2. Test variables and methodology*

Firm valuation (Q) is proxied by the sum of market value of equity, book value of long-term debt, and the book value of preferred stock, all of which is divided by the book value of total assets at the end of 1994. Amit et al. (1989) provide evidence that this measure is highly correlated with Tobin's q. Firm size is proxied by the natural logarithm of book value of total assets (LSIZE) at the end of 1993. Growth opportunities are proxied by R&D-expenses-to-total assets (RDASST) and by sales expense-to-total assets (SALEXP). Two cash flow variables are calculated. The first cash flow measure (CSHFLW1) used is the Lehn and Poulsen (1989) measure of free cash flow, normalized by the total book value of assets.

A summary of specific empirical variables and estimated signs for the logistic regressions follows:

CSHFLW1 — Because interest is deducted from net income, and if debt plays a bonding role, then there should be no significantly greater probability of DRIP firms having a higher value of the Lehn and Poulsen cash flow measure. For example, a firm with high free (undistributed) cash flow before interest payments should have this free (undistrib-

uted) cash flow significantly decreased by interest payments if the high free cash flow, high debt-to-asset level is efficient.

CSHFLW2 — CSHFLW2 is CSHFLW1 without interest deducted. If new issue or combined DRIP firms tend to generate more undistributed cash flow then these DRIP firms should be more likely to have a higher value of CSHFLW2.

DTOA — the ratio of book value of total liabilities to book value of total assets. High levels of debt should be more likely for new issue and combined DRIP firms because of the larger potential for free cash flow abuse.

RDASST, SALEXP — Firms with higher growth opportunities should have less free cash flow abuse and should thus have a higher probability of having new issue and combined DRIPs. Also, firms with high growth opportunities may lower their inherent informational asymmetries through DRIPs. However, firms with growth opportunities will be more difficult to monitor. The realized sign on the RDASST and SALEXP variables is thus indeterminate.

LSIZE — the natural logarithm of book value of total assets. Informational asymmetries are higher for smaller firms since they lack extensive security analyst following and receive less scrutiny from regulators and industry governing bodies. Thus, smaller firms should benefit from the alleviation of informational asymmetries offered by the use of DRIPs. Proportional bookkeeping costs of DRIPs should, however, be larger for smaller firms. The expected sign on LSIZE is thus indeterminate.

ICN — operating income before depreciation income normalized by total assets is included as a measure of profitability/financial distress.

Equation one was estimated to measure the effect of DRIPs on firm valuation. An example of a similar method to measure firm valuation would be Lang and Stulz (1994), who use Tobin's q to measure the contribution of diversification to firm value.

$$Q = a_0 + a_1 DRIP + a_2 DTOA + a_3 CSHFLW1 + a_4 LSIZE \quad (1)$$

Separate regressions were estimated where the DRIP dummy equals 1 for a pooled sample of DRIP, DIV, and NODIV firms. The DIV and NODIV samples were also pooled separately with the following: (1) market DRIP sample; (2) combined DRIP sample; (3) combined and new issue pooled DRIP sample; and (4) new issue DRIP sample. The other independent variables are chosen as control variables, which should affect firm value. Although the valuation test is admittedly noisy, it provides some discriminatory power to differentiate DRIP vs. non-DRIP firm valuation.

Dichotomous logistic regressions were also estimated using maximum likelihood estimation to obtain the probability of a firm having a DRIP. The dependent variable is equal to 0 if a firm has a DRIP in 1994. The regressions were separated into four sections; one set of regressions is estimated with the CSHFLW1 variable and one set with the CSHFLW2 variable; also both sets of regressions were estimated separately with one of the growth opportunity proxies, SALEXP or RDASST.

Table 1
Sample summary statistics

| Variable | N | Mean | Std. Dev. | Minimum | Maximum |
|---|---|---|---|---|---|
| DRIP Sample | | | | | |
| Total Assets | 92 | 7674.91 | 14,638.92 | 98.35799 | 91,896.00 |
| LSIZE | 92 | 8.00925 | 1.4032916 | 4.5886137 | 11.4284128 |
| Tot. Dividends | 92 | 185.698 | 357.96 | 1.0890 | 2623.00 |
| Q | 92 | 1.25756 | 0.69455 | 0.29875 | 4.83937 |
| Q (lagged) | 92 | 1.37651 | 0.73319 | 0.33453 | 4.93527 |
| CSHFLW1 | 92 | 0.0819230 | 0.0372664 | −0.0249086 | 0.1827844 |
| CSHFLW2 | 92 | 0.0997680 | 0.0368283 | −0.0103269 | 0.1966496 |
| INCN | 92 | 0.0561200 | 0.0693949 | 0.000316058 | 0.3650174 |
| DTOA | 92 | 0.6067851 | 0.1487477 | 0.2377968 | 0.9061820 |
| SALEXP | 92 | 0.2453796 | 0.1810896 | nil | 1.0609109 |
| RDASST | 92 | 0.0186885 | 0.0275613 | 0 | 0.1130393 |
| Dividend (DIV) Sample—matched firms that paid dividends but did not have DRIPs in 1994 | | | | | |
| Total Assets | 92 | 1733.06 | 3525.21 | 9.97800 | 21,463.00 |
| LSIZE | 92 | 6.39093 | 1.46960 | 2.30004 | 9.97409 |
| Tot. Dividends | 92 | 31.8512 | 68.7107 | 0.07900 | 340.000 |
| Q | 92 | 1.36663 | 1.11323 | 0.26004 | 8.76430 |
| Q (lagged) | 92 | 1.38931 | 0.90379 | 0.00820 | 4.98289 |
| CSHFLW1 | 92 | 0.0860348 | 0.0533645 | −0.1197285 | 0.2101816 |
| CSHFLW2 | 92 | 0.1012306 | 0.0527817 | −0.1077531 | 0.2149301 |
| INCN | 92 | 0.0791372 | 0.0936032 | 0.001687058 | 0.4721314 |
| DTOA | 92 | 0.5178858 | 0.1824835 | 0.0966009 | 1.0099085* |
| SALEXP | 92 | 0.2538047 | 0.2117171 | nil | 1.0122536 |
| RDASST | 92 | 0.2538047 | 0.0274004 | 0 | 0.1459930 |
| Non-dividend-paying sample (NODIV)—matched firms that did not pay a dividend in 1994 | | | | | |
| Total Assets | 89 | 1094.91 | 2697.18 | 16.3770 | 19,486.00 |
| LSIZE | 89 | 5.91251 | 1.35048 | 2.79588 | 9.87745 |
| Tot. Dividends | 89 | n/a | n/a | n/a | n/a |
| Q | 89 | 1.24907 | 0.93463 | 0.20176 | 4.97667 |
| Q (lagged) | 89 | 1.47672 | 1.26612 | 0.08518 | 6.61897 |
| CSHFLW1 | 89 | 0.0637312 | 0.0862548 | −0.2873609 | 0.3181978 |
| CSHFLW2 | 89 | 0.0924216 | 0.1171183 | −0.2611841 | 0.3395661 |
| INCN | 89 | 0.0561200 | 0.0693949 | 0 | 0.593591 |
| DTOA | 89 | 0.6146045 | 0.2628324 | 0.0764271 | 1.6058428* |
| SALEXP | 89 | 0.2395089 | 0.2231384 | nil | 1.1183610 |
| RDASST | 89 | 0.0274172 | 0.2231384 | 0 | 0.3445305 |

* One firm in the DIV sample and five in the NODIV sample have debt-to-asset ratios greater than one due to accumulated losses resulting in negative equity.

## 6. Results

### *6.1. Sample statistics*

Sample statistics are presented in Table 1 for the industrial DRIP and matched industry firm samples. The average size of the DRIP firms ($7,674 million in total assets) is larger than those of the DIV ($1,733 million in total assets) and NODIV samples ($1,095 million in total assets). General Housewares, the smallest firm in the DRIP sample ($98 million in

total assets), is substantially larger than the smallest firms in the DIV and NODIV samples. The average amount of dividends paid out by DRIP firms ($186.698 million) is higher than that of the DIV sample firms ($31.851 million). The normalized undistributed average cash flow (CSHFLW1) for the NODIV sample is substantially smaller than for the other two samples. DRIP firms (.606) and NODIV firms (.615) have a higher average debt-to-asset ratio (DTOA) than DIV sample firms (.518). Minimum values for the debt-to-asset ratio are also substantially smaller for the DIV and NODIV samples compared to the DRIP sample.

### *6.2. Matched T-test results*

The most notable result is for firm size (LSIZE), as indicated in Table 2. DRIP firms are significantly larger at a .01 level than non-DRIP firms across all plan types, except the new issue DRIP vs. NODIV sample, providing support for the bookkeeping hypothesis. Otherwise, there is no pattern in the significance of variables to support the other hypotheses. Also, there are no significant differences indicated in Table 2 between the samples for Q. Thus, no evidence is provided that DRIP firms have higher market valuations based on the matched t-tests.

The lack of significance for CSHFLW2 indicates that DRIP firms do not generate higher undistributed cash flow. There is also no evidence (CSHFLW1 is not significant) to indicate that new issue and combined DRIPs generate substantially more free cash flow that will be abused by managers. However, an interesting question is, "do new issue and combined DRIP firms distribute a higher portion of dividends (normalized by total assets) than other, same industry firms, knowing that some of the cash from these dividends will return shortly to the firm?" The normalized difference of total common stock dividends paid out is significantly greater for the new issue DRIP sample in 1992 and for the full sample and market DRIP samples in 1994, but otherwise is found to be insignificant.

Additionally, normalized operating income (INCN) is significantly higher for market DRIP firms when compared to matched non-dividend firms (NODIV). The debt-to-asset ratio is significantly higher for market DRIP firms when compared to other same-industry dividend-paying firms (DIV sample).

Because DRIP firms are larger in size, any found effects may be due to firm size. Pearson correlation coefficients for the pooled sample of DRIP, DIV, and NODIV firms (273 observations) are calculated. Firm size (LSIZE) is significantly correlated only with the debt-to-asset ratio variable with a correlation coefficient of 0.2645 and the normalized sales expense ratio with a correlation coefficient of $-0.16600$.

### *6.3. Valuation results*

Table 3 provides the results of the valuation regressions. The DRIP dummy is not significant in any of the regressions. Regressions estimated with only the DRIP dummy and firm size variables did not alter the results. Thus, no evidence is provided that DRIP firms provide incremental increases in firm valuation. Justifying their inclusion in the regressions, both cash flow (CSHFLW1) and the debt-to-asset ratio (DTOA) are usually highly significant

Table 2
Matched-sample T-tests for 1994 data

| DRIP sample vs. DIV sample | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Differences | Full sample (92 obs.) mean | p-value | Pre-1994 sample (57 obs.) mean | p-value | Market Plan sample (64 obs.) mean | p-value | Combined Plan sample (20 obs.) mean | p-value | New issue Plan sample (8 obs.) mean | p-value |
| LSIZE | 1.61832 | 0.0001* | 1.52807 | 0.0001* | 1.70400 | 0.0001* | 1.36005 | 0.0001* | 1.57856 | 0.0333* |
| INCN | −0.02302 | 0.0356 | −0.03023 | 0.0443 | −0.02572 | 0.0594 | −0.02856 | 0.2266 | 0.01248 | 0.6590 |
| Q | −0.09073 | 0.5209 | −0.31275 | 0.0957 | −0.12769 | 0.5180 | 0.06847 | 0.6279 | −0.19307 | 0.3808 |
| CSHFLW1 | −0.00411 | 0.5207 | −0.00207 | 0.8180 | −0.00562 | 0.4973 | 0.00541 | 0.6490 | −0.01587 | 0.3251 |
| CSHFLW2 | −0.00146 | 0.8153 | −0.00182 | 0.8380 | −0.00294 | 0.7092 | 0.00905 | 0.4835 | −0.01589 | 0.3226 |
| DTOA | 0.08890 | 0.0004* | 0.07307 | 0.0414 | 0.08128 | 0.0071* | 0.13777 | 0.0137 | 0.02771 | 0.7699 |
| SALEXP | −0.00843 | 0.6519 | −0.00469 | 0.8247 | 0.01268 | 0.5080 | −0.08448 | 0.1472 | 0.01286 | 0.7718 |
| RDASST | 0.00139 | 0.6237 | −0.00154 | 0.6463 | 0.00097 | 0.7608 | 0.00106 | 0.8961 | 0.00562 | 0.3895 |
| DRIP sample vs. NODIV sample | | | | | | | | | | |
| Differences | Full sample (89 obs.) mean | p-value | Pre-1994 sample (55 obs.) mean | p-value | Market Plan sample (61 obs.) mean | p-value | Combined Plan sample (20 obs.) mean | p-value | New issue Plan sample (8 obs.) mean | p-value |
| LSIZE | 2.02702 | 0.0001* | 1.75031 | 0.0001* | 2.05376 | 0.0001* | 2.1303 | 0.0001* | 1.56485 | 0.0132 |
| INCN | −0.03516 | 0.0088* | −0.03232 | 0.0489 | −0.03910 | 0.0240 | −0.02443 | 0.3124 | −0.03196 | 0.4564 |
| Q | 0.03491 | 0.7682 | −0.12078 | 0.3971 | −0.02633 | 0.8753 | 0.22363 | 0.0568 | 0.03007 | 0.8581 |
| CSHFLW1 | 0.01859 | 0.0782 | 0.01739 | 0.1936 | 0.01085 | 0.3217 | 0.04340 | 0.1330 | 0.01557 | 0.7404 |
| CSHFLW2 | 0.00767 | 0.4533 | 0.00509 | 0.6959 | −0.00279 | 0.7894 | 0.03968 | 0.1588 | 0.07452 | 0.8720 |
| DTOA | −0.01111 | 0.7139 | −0.05435 | 0.1793 | −0.02516 | 0.5384 | 0.03556 | 0.4142 | −0.02069 | 0.8008 |
| SALEXP | 0.00736 | 0.7328 | 0.01437 | 0.5978 | 0.01132 | 0.6841 | 0.02861 | 0.4470 | −0.07595 | 0.2759 |
| RDASST | −0.00828 | 0.1253 | −0.00689 | 0.1793 | −0.01197 | 0.1026 | 0.00009 | 0.9907 | −0.00105 | 0.9292 |

*Notes:* Differences for all variables are obtained by subtracting the value of the non-DRIP sample variable from the value of the DRIP sample variable. The p-values are for two-sided t-tests. The pre-1994 sample eliminates DRIP firms (and their matched firms) for which the DRIP descriptions were dated 1994. * indicates significance at a .01 level or better.

Table 3
Valuation regressions—(dependent variable Q)

| Equations | (1) Par. Est. | p-value | (2) Par. Est. | p-value | (3) Par. Est. | p-value | (4) Par. Est. | p-value | (5) Par. Est. | p-value | (6) Par. Est. | p-value | (7) Par. Est. | p-value |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Intercept | 1.9666 | .0001* | 1.7480 | .0001* | 1.5325 | .0146 | 1.2898 | .0015* | 2.0271 | .0001* | 2.1804 | .0001* | 1.2506 | .0021* |
| DRIP Dummy | 0.0285 | .8199 | −0.0570 | .6801 | −0.2543 | .1069 | 0.1950 | .2098 | 0.2507 | .0967 | 0.1648 | .3742 | −0.2730 | .1645 |
| CSHFLW1 | 3.5993 | .0001* | 0.9789 | .2343 | 1.5010 | .4749 | 3.3591 | .0537 | 0.5031 | .5010 | 7.6469 | .0001* | 4.7786 | .0005* |
| DTOA | −1.4991 | .0001* | −1.6679 | .0022* | −1.8679 | .0017* | −1.3227 | .0125* | −1.7641 | .0018* | −1.9899 | .0003* | −1.0187 | .0039* |
| LSIZE | −0.0131 | .7245 | 0.0238 | .5601 | 0.0866 | .1084 | 0.0276 | .6325 | −0.0146 | .7525 | −0.0515 | .3962 | 0.0747 | .2029 |
| adj-$R^2$ | | .2036 | | .5754 | | .5591 | | .2380 | | .3074 | | .2800 | | .1885 |
| F-value | | .0001 | | .0078 | | 0.0095 | | .0085 | | .0026 | | .0001 | | .0001 |
| Heteroscedasticity test | | .0204 | | .5114 | | .3052 | | .8028 | | .8957 | | .1214 | | .0001 |
| Observations | 273 | | 16 | | 16 | | 40 | | 38 | | 128 | | 125 | |

*Notes:* * Indicates significance at a .01 level or better.
Heteroscedasticity test is White's test using first and second moments.
(1) is estimated for the full sample of 273 firms (all DRIP, DIV and NODIV firms).
(2) is estimated for new issue DRIPs and their matched DIV firms.
(3) is estimated for new issue DRIPs and their matched NODIV firms.
(4) is estimated for combined DRIPs and their matched DIV firms.
(5) is estimated for combined DRIPs and their matched NODIV firms.
(6) is estimated for market DRIPs and their matched DIV firms.
(7) is estimated for market DRIPs and their matched NODIV firms.

Table 4a
Logistic regressions—(dependent variable—DRIP dummy with independent variable CSHFLW1)

| Equations | (1) Par. Est. | p-value | odds | (2) Par. Est. | p-value | odds | (3) Par. Est. | p-value | odds |
|---|---|---|---|---|---|---|---|---|---|
| Intercept | 7.3809 | .0001 | 999.00 | 2.1906 | .6353 | 8.940 | 19.549 | .1435 | 999.00 |
| CSHFLW1 | −0.2961 | .9263 | 0.744 | 2.3418 | .7831 | 10.400 | 11.202 | .6658 | 999.00 |
| DTOA | 0.9058 | .3298 | 2.474 | 5.0039 | .2785 | 148.99 | 6.9614 | .3338 | 999.00 |
| SALEXP | −1.2287 | .0875 | 0.293 | 0.3365 | .9425 | 1.400 | −22.471 | .1102 | 0.000 |
| LSIZE | −0.9749 | .0001 | 0.377 | −0.7684 | .1699 | 0.464 | −3.0747 | .1119 | 0.046 |
| DRIP = 0 | 181 | | | 8 | | | 8 | | |
| DRIP = 1 | 92 | | | 8 | | | 8 | | |

| Equations | (4) Par. Est. | p-value | odds | (5) Par. Est. | p-value | odds |
|---|---|---|---|---|---|---|
| Intercept | 7.0299 | .0323 | 999.00 | 6.7892 | .0537 | 888.19 |
| CSHFLW1 | −9.4897 | .4362 | 0.000 | −8.1343 | .5111 | 0.000 |
| DTOA | −4.8494 | .1868 | 0.008 | 4.7376 | .3236 | 114.15 |
| SALEXP | 0.7663 | .6735 | 2.152 | −1.1770 | .6863 | 0.308 |
| LSIZE | −0.4932 | .1659 | 0.611 | −1.3022 | .0054 | 0.272 |
| DRIP = 0 | 20 | | | 19 | | |
| DRIP = 1 | 20 | | | 19 | | |

| Equations | (6) Par. Est. | p-value | odds | (7) Par. Est. | p-value | odds |
|---|---|---|---|---|---|---|
| Intercept | 6.1603 | .0001 | 473.56 | 8.0831 | .0001 | 999.00 |
| CSHFLW1 | 4.5668 | .3607 | 46.231 | −0.6858 | .8825 | 0.504 |
| DTOA | 0.0582 | .9684 | 1.060 | 2.3616 | .0700 | 10.608 |
| SALEXP | −1.6577 | .1253 | 0.191 | −1.4865 | .1510 | 0.226 |
| LSIZE | −0.8507 | .0001 | 0.427 | −1.3023 | .0001 | 0.272 |
| DRIP = 0 | 64 | | | 61 | | |
| DRIP = 1 | 64 | | | 64 | | |

*Note:* Using the SAS convention, a negative parameter and low odds ratio indicates that large values of the independent variables contribute positively to the probability of a firm having a DRIP.

(1) is estimated for the full sample of 273 firms (all DRIP, DIV and NODIV firms).
(2) is estimated for new issue DRIPs and their matched DIV firms.
(3) is estimated for new issue DRIPs and their matched NODIV firms.
(4) is estimated for combined DRIPs and their matched DIV firms.
(5) is estimated for combined DRIPs and their matched NODIV firms.
(6) is estimated for market DRIPs and their matched DIV firms.
(7) is estimated for market DRIPs and their matched NODIV firms.

in the regressions. The CSHFLW1 parameters are all positively signed, while the DTOA parameters are all negatively signed.

### *6.4. Logistic regressions results*

The results of the logistic regressions are presented in Table 4. The firm size (LSIZE) parameter is negatively significant and has a low odds ratio for the full sample and certain other regressions indicating that DRIP firms are more likely to be large. After firm size and

Table 4b
Logistic regressions—(dependent variable—DRIP dummy with independent variable CSHFLW2)

| Equations | (1) Par. Est. | p-value | odds | (2) Par. Est. | p-value | odds | (3) Par. Est. | p-value | odds |
|---|---|---|---|---|---|---|---|---|---|
| Intercept | 7.2815 | .0001 | 999.00 | 1.7015 | .7195 | 5.482 | 20.421 | .1404 | 999.00 |
| CSHFLW2 | 0.5908 | .8485 | 1.805 | 3.7680 | .6585 | 43.295 | 3.8327 | .8782 | 46.186 |
| DTOA | 0.9563 | .2814 | 2.602 | 5.1509 | .2593 | 172.58 | 5.9254 | .3722 | 374.43 |
| SALEXP | −1.2180 | .0900 | 0.296 | 0.8514 | .8598 | 2.343 | −22.091 | .1214 | 0.000 |
| LSIZE | −0.9774 | .0001 | 0.376 | −0.7533 | .1759 | 0.471 | −3.0240 | .1209 | 0.049 |
| DRIP=1 | 92 | | | 8 | | | 8 | | |
| DRIP=0 | 181 | | | 8 | | | 8 | | |

| Equations | (4) Par. Est. | p-value | odds | (5) Par. Est. | p-value | odds |
|---|---|---|---|---|---|---|
| Intercept | 7.1350 | .0369 | 999.00 | 6.9394 | .0650 | 999.00 |
| CSHFLW2 | −9.3053 | .4491 | 0.000 | −8.0790 | .4977 | 0.000 |
| DTOA | −4.4814 | .1862 | 0.011 | 4.9895 | .2870 | 146.86 |
| SALEXP | 0.6822 | .7096 | 1.978 | −1.2529 | .6667 | 0.286 |
| LSIZE | −0.5132 | .1400 | 0.599 | −1.3226 | .0046 | 0.266 |
| DRIP=1 | 20 | | | 19 | | |
| DRIP=0 | 20 | | | 19 | | |

| Equations | (6) Par. Est. | p-value | odds | (7) Par. Est. | p-value | odds |
|---|---|---|---|---|---|---|
| Intercept | 6.1903 | .0001 | 488.02 | 7.8165 | .0001 | 999.00 |
| CSHFLW2 | 4.5301 | .3621 | 92.768 | 1.7741 | .6875 | 5.895 |
| DTOA | −0.1702 | .9042 | 0.843 | 2.4722 | .0466 | 11.848 |
| SALEXP | −1.6266 | .1342 | 0.197 | −1.4893 | .1479 | 0.226 |
| LSIZE | −0.8487 | .0001 | 0.428 | −1.3074 | .0001 | 0.271 |
| DRIP=1 | 64 | | | 64 | | |
| DRIP=0 | 64 | | | 61 | | |

*Note:* Using the SAS convention, a negative parameter and low odds ratio indicates that large values of the independent variables contribute positively to the probability of a firm having a DRIP.

(1) is estimated for the full sample of 273 firms (all DRIP, DIV and NODIV firms).
(2) is estimated for new issue DRIPs and their matched DIV firms.
(3) is estimated for new issue DRIPs and their matched NODIV firms.
(4) is estimated for combined DRIPs and their matched DIV firms.
(5) is estimated for combined DRIPs and their matched NODIV firms.
(6) is estimated for market DRIPs and their matched DIV firms.
(7) is estimated for market DRIPs and their matched NODIV firms.

other variables are taken into account, the debt-to-asset ratio (DTOA) is only significant in the market DRIP vs. NODIV regressions, where the debt-to-asset ratio tends to be smaller for the market DRIP firms. The normalized sales expense (SALEXP) parameter is negatively-signed with a low odds ratio in all the regressions except the Table 4a regression (2) and (4) and the Table 4b regressions (2) and (4). Only the full, pooled sample parameter is, however, significant. This result provides limited evidence for the alleviation of informational asymmetries by DRIPs, since DRIP firms are more likely to have a higher sales expense ratio and thus more growth opportunities.

## 7. Summary

Evidence is provided that DRIPs do not increase the value of a firm for investors when firms offering DRIPs are compared to firms not offering DRIPs in the same industry. These results hold separately when DRIP firms are separated into new issue, combined, and market plan samples. Evidence is provided that industrial firms which offer DRIPs are larger than other firms in the same industry, including both those who pay dividends and those who do not pay dividends. This supports the bookkeeping rationale that larger firms will tend to have DRIPs because of economies of scale and scope. Market DRIP firms are found to have significantly higher operating income in 1994 than dividend and non-dividend-paying firms in the same industry.

Firm managers appear to offer DRIPs to attract individual investors. DRIPs can serve as a cheap source of outside financing for firms, thus providing possible additional value to investors. However, the motives of managers for offering DRIPs must be identified and investigated to determine if DRIPs, overall, do contribute to increased firm value. No evidence is found to indicate that industrial DRIP firms maintain an efficient debt structure, based on the type of DRIP the firms offers, nor does the evidence in this study indicate that DRIPs are offered to decrease informational asymmetries. However, no evidence is found to indicate that industrial DRIP firms generate more free cash flow than their industry-matched counterparts. Since the results in this study fail to provide evidence that DRIPs increase firm value, the dividend reinvestment puzzle of why firms offer DRIPs remains to be further investigated.

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## References

Allen, G. C. (1991). Dividend reinvestment plans: The effects on shareholder wealth and equilibrium security returns. Unpublished dissertation, University of South Carolina-Columbia.

Amit, R., Livnat, J., & Zarowin, P. (1989). A classification of mergers and acquisitions by motives; analysis of market response. *Contemporary Accounting Research 6*, 143–158.

Blackwell, D. W., & Kidwell, D. S. (1988). An investigation of cost differences between public sales and private placements of debt. *Journal of Financial Economics 22*, 253–276.

Chang, O. H., & Nichols, D. R. (1992). Tax incentives and capital structures: the case of dividend reinvestment plans. *Journal of Accounting Research 30*, 109–125.

Dhillon, U. S., Dennis, J. L., & Ramirez, G. G. (1992). Dividend reinvestment plans: an empirical analysis. *Review of Quantitative Finance and Accounting 2*, 205–213.

Dubofsky, D. A., & Bierman, L. (1988). The effect of dividend reinvestment plan announcements on equity value. *Akron Business and Economic Review 19*, 58–68.

Eckbo, B. E., & Masulis, R. W. (1992). Adverse selection and the rights offer paradox. *Journal of Financial Economics 32*, 293–322.

Finnerty, J. D. (1989). New issue dividend reinvestment plans and the cost of equity capital. *Journal of Business Research 18*, 127–139.

Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *American Economic Review 76*, 323–329.

Jensen, M. C. (1989). Eclipse of the public corporation. *Harvard Business Review 67*, 61–75.

Lang, L. H. P., & Litzenberger, R. H. (1989). Dividend announcements: Cash flow signaling vs. free cash flow hypothesis? *Journal of Financial Economics 24*, 181–192.

Lang, L. H. P., & Stulz, R. M. (1994). Tobin's q, corporate diversification, and firm performance. *Journal of Political Economy 102*, 1248–1280.

Lang, L. H. P., Stulz, R. M., & Walkling, R. (1991). A test of the free cash flow hypothesis: the case of bidder returns. *Journal of Financial Economics 29*, 315–336.

Lehn, K., & Poulsen, A. (1989). Free cash flow and stockholder gains in going private transactions. *Journal of Finance 44*, 771–787.

Myers, S., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics 13*, 187–221.

Perumpral, S., Keown, A. J., & Pinkerton, J. (1991). Market reaction to the formulation of automatic dividend reinvestment plans. *Review of Business and Economic Research 26*, 48–58.

Peterson, P. P., Peterson, D. R., & Moore, N. H. (1987). The adoption of new-issue dividend reinvestment plans and shareholder wealth. *The Financial Review 22*, 221–232.

Roden, F., & Stripling, T. (1996). Dividend reinvestment plans as efficient methods of raising equity financing. *Review of Financial Economics 5*, 91–100.

Scholes, M. S., & Wolfson, M. A. (1989) Decentralized investment banking: the case of discount dividend-reinvestment and stock-purchase plans. *Journal of Financial Economics 23*, 7–35.

Slovin, M. B., Johnson, S. A., & Glascock, J. L. (1992). Firm size and the information content of bank loan announcements. *Journal of Banking and Finance 16*, 1057–1071.

Smith, C. (1977). Alternative methods for raising capital: rights versus underwritten offerings. *Journal of Financial Economics 5*, 173–207.

Tamule, H. B., Bubnys, E. L., & Sugrue, T. F. (1993). Dividend reinvestment plans and pecking order capital structure behavior: an empirical investigation. *Journal of Economics and Finance 17*, 91–102.

The Moneypaper web site. Available online: http://www.money.paper.

The Motley Fool web site Foolish FAQs DRIPS. Available online: http://www.fool.com/FoolFAQ/FoolFAQ0015.htm.