DIVIDEND REINVESTMENT PLANS

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Dividend Reinvestment Plans

Introduction

The growing popularity of common stock dividend reinvestment plans has captured the attention of firms and investors alike. Although many plans use reinvested dividends to purchase shares in the secondary market, a growing number of firms now offer plans which purchase newly issued shares and thereby raise new equity capital for the company. Of an estimated eight to nine billion dollars of new equity capital raised during 1978, approximately one billion, over ten percent, was obtained through dividend reinvestment plans.¹

Of the more than eighty companies which sell new shares through dividend reinvestment plans, over half offer shareholders a five percent discount from the market price. This relatively new link in the evolution of dividend reinvestment plans is designed to provide shareholders an incentive to participate and thereby reduce the firm's dependence on other sources of equity capital. In attempting to explain the success of the American Telephone and Telegraph (ATT) plan in raising capital, one source said simply, "Investors are attracted to bargains" [1]. Another indicated that a particular firm could meet all of its future external equity requirements through the plan if stockholders were provided with proper incentives to participate. It was suggested that adding the five percent

¹The total new equity capital estimate is from [2] and the estimate of amount raised through dividend reinvestment plans is from [1].
discount feature would provide that incentive [4].

If adding the discount feature does indeed provide shareholders the inducement to reinvest dividends, it must be that the discount provides them something of value. However, if it does, the irrelevance axioms of financial theory prompt investigation of the benefit and of any associated costs. The presence of both gains and losses is not unrecognized on Wall Street. Joel Stern, writing in the Wall Street Journal, says, "for investors who choose not to participate in automatic reinvestment plans, ARP's represent a form of involuntary wealth transfer to those who do" [7]. And Robert S. Salomon was quoted in Business Week as follows "it is our belief that institutional investors, recognizing their fiduciary responsibility, will increasingly choose to capture the discount" (emphasis added) [1]. Yet it appears that the impact of the dividend reinvestment plan is not widely understood. Several letters to the editor which followed Joel Stern's article revealed considerable misunderstanding in the investment and corporate communities [3]. Apparently the notion, widely accepted in academic circles, that no wealth is created when discounts are used as an incentive to purchase securities has yet to reach many market participants.

The purpose of this paper is to examine the effects on shareholder wealth of discount dividend reinvestment plans. First, the wealth effects for participating and nonparticipating shareholders are developed analytically. Changes in wealth due to reinvestment are derived for each group as a function of per-share
dividend, the level of the discount, the total number of shares outstanding, the percentage of shares participating, and stock price. Comparison of these changes in wealth leads to the conclusion that the benefit from participation is actually a transfer of wealth from the nonparticipating group. In the third section, the analytical results are applied to a sample of firms which offer discount dividend reinvestment to illustrate the nature and magnitude of the transfer of wealth. Finally, certain policy considerations are developed for managers, investors, and the tax authorities.

Wealth Effects

If the addition of a discount to a dividend reinvestment plan encourages shareholder participation and thereby helps the firm to raise additional equity capital, the discount must provide something of value to participants. In other words, plan participants must enjoy an increase in wealth. In order to isolate the wealth effect of the discount plan, this analysis compares wealth for participants and for nonparticipants at the instant in time before and after the decision to reinvest the dividend. Since the interval for comparison is so short, it is assumed that no other event affects value. Moreover, because this work focuses solely on the impact of the discount, it abstracts from transactions cost benefits of the plan, if any, as these are available with or without a purchase price discount. Finally, we ignore taxes on dividends
received since they are independent of the reinvestment decision.\(^2\)

To begin the analysis, wealth is defined for participating and nonparticipating shareholders prior to the reinvestment decision.\(^3\) It is assumed that the dividend has just been received, so wealth is defined in terms of stock price, dividends per share, and the number of shares owned:

\[
\begin{align*}
W_p &= xN(P+D) \\
W_n &= (1-x)N(P+D)
\end{align*}
\]

where

\[
\begin{align*}
W_p &= \text{aggregate wealth of participants before reinvestment} \\
W_n &= \text{aggregate wealth of nonparticipants before reinvestment} \\
N &= \text{total number of shares on which a dividend has just been paid, or, total shares outstanding just prior to reinvestment} \\
x &= \text{fraction of the shares participating in the reinvestment} \\
P &= \text{per share stock price before reinvestment} \\
D &= \text{per share dividend paid, and available for reinvestment}
\end{align*}
\]

For each of the two stockholder groups, before reinvestment wealth is the product of the number of shares held and the sum of the share price and the dividend just received.

\(^2\)Taxes are independent of the dividend reinvestment decision except to the extent that the discount is viewed by the tax authority as an added benefit and is taxed at ordinary rates. This issue is addressed later in the paper.

\(^3\)A stockholder's wealth derives from ownership of many assets. In the following analysis, attention is confined to that part of shareholder wealth derived from owning shares in a firm with a discount dividend reinvestment plan.
Wealth Effect for Participants. After reinvestment of the dividend, the wealth of plan participants is determined as the product of the new number of shares held and the post-reinvestment stock prices:

\[
W^*_p = N^*_p P^*
\]

(3)

where

\[
W^*_p = \text{aggregate wealth of participants after reinvestment}
\]

\[
N^*_p = \text{total number of shares held by participants after exchanging dividends for additional shares}
\]

\[
P^* = \text{per share stock price after reinvestment}
\]

The change in participating shareholder's wealth due to reinvestment of dividends is obviously the difference between equations (3) and (1) above. But if the wealth change can be expressed in terms of known factors prior to reinvestment it can be determined before the reinvestment decision is made. Thus, it is useful to identify the effect of reinvestment on the number of shares held by participants and on the share price.

The number of shares held by participants after reinvestment is equal to the shares held before reinvestment plus the new shares purchased with reinvested dividends:

\[
N^*_p = N_p + \frac{XND}{P(1-d)}
\]

(4)

where

\[
d = \text{fractional discount to participants}
\]
The second term of equation (4) determines the new shares purchased by plan participants by dividing the total dividends reinvested (xND) by the discounted share price \( P(1-d) \).

The stock price after reinvestment \( P^* \) can be expressed as the sum of the aggregate market value before reinvestment (NP) and total dividends reinvested (xND) divided by the number of shares outstanding after reinvestment \( (N + xND/P(1-d)) \). The result is:

\[
P^* = \frac{NP + xND}{N + \frac{xND}{P(1-d)}}
\]  

(5)

Now the effect of dividend reinvestment on participating shareholders can be expressed in terms of pre-reinvestment factors. Substituting equations (4) and (5) into equation (3) for \( N^* \) and \( P^* \), and subtracting wealth before reinvestment, equation (1), yields the change in participant's wealth expressed in terms of pre-reinvestment variables, participation rate \( x \), and the discount fraction \( d \):

\[
W^*_P - W_P = dp\left[\frac{xD}{P(1-d) + xD}\right](1-x)N
\]  

(6)

if \( d > 0 \) and \( 0 < x < 1 \), the wealth change for participants will be positive. In other words, if the opportunity to exchange dividends for new shares at a discount \( (d > 0) \) is taken by some but not all of the shareholders \( (0 < x < 1) \), the wealth of participating shareholders will increase. Since the availability of a discount yields a wealth increase under all relevant conditions, its presence should encourage shareholder dividend reinvestment.
Though less formal analyses of the problem usually reach the same result, they fail to ask an important related question: "What is the source of the benefit enjoyed by participating shareholders?" Equation (6) shows that no wealth increase for plan participants exists when all shareholders participate (x = 1). This suggests that wealth increases for participants at lower participation levels may come at the expense of nonparticipants. To examine this possibility more directly, the wealth effect of the discount plan for nonparticipants is derived. The following development will also yield a clear interpretation for equation (6).

**Wealth Effect for Nonparticipants.** The wealth of nonparticipants, after reinvestment by participants, is the value of the stock held, (1-x)NP*, plus the dividends not reinvested, (1-x)ND:

\[ W_n^* = (1-x)N(P^* + D) \]  

(7)

Subtracting pre-reinvestment, nonparticipant wealth, equation (2), from \( W_n^* \) yields change in wealth for nonparticipants:

\[ W_n^* - W_n = (1-x)N(P^* - P) \]  

(8)

Thus the discount reinvestment plan affects nonparticipants wealth only to the extent of change in the stock price, i.e., only if \( P^* < P \). _A priori_, it is expected that price will fall when new shares are issued at a discount and that the wealth of nonparticipants would therefore decrease. To observe directly the difference between \( P^* \) and \( P \), equation (5) is manipulated to the following result:

\[ P^* - P = -dP \left[ \frac{xD}{P(1-d) + xD} \right] \]  

(9)
Under the previously noted assumptions on \( d \) and \( x \), equation (9) is negative, and a wealth decrease for nonparticipants follows.  
Substituting equation (9) into equation (8) for \( P^* - P \) yields:
\[
\frac{W^*}{n} - \frac{W}{n} = dP \left[ \frac{xD}{P(1-d) + xD} \right] (1-x)N \tag{10}
\]
The decrease in wealth for nonparticipants is a product of the drop in per-share price and the number of shares they hold. 
Comparing the wealth reduction of equation (10) to the wealth increase of equation (6) produces the final result:
\[
\left( \frac{W^*}{P} - \frac{W^*}{P} \right) = - \left( \frac{W^*}{n} - \frac{W}{n} \right) \tag{11}
\]
The wealth gain enjoyed by participants in the discount dividend reinvestment plan comes at the expense of nonparticipants. Wealth is not created by the discount plan; it is merely transferred to participants by shareholders who choose not to participate. This result should help to clear up the confusion that seems to exist concerning the benefits of the discount plans. (Reference [3] reveals the confusion.)

Before these results are used to derive policy implications for investors, managers, and tax authorities, it is useful to consider the details of the mechanism of discount dividend reinvestment plans and to examine the amounts of wealth transfer occurring today in several representative firms.

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4 In order to interpret this formulation of the price decrease occasioned by the discount plan, we first interpret \( xD/(P(1-d) + xD) \). It turns out that this ratio is equal to the fraction of the total shares outstanding after reinvestment that were issued at a discount, \((N^* - N)/N^*\). The price decline occasioned by reinvestment of dividends at a discount can then be thought of as the product of the dollar amount being given away, \(dP\), and the fraction of the shares that received the discount.
Wealth Transfer in Actual Dividend Reinvestment Plans

As of August 1978, forty-five firms offered a discount dividend reinvestment plan to shareholders. Based on our reading of the prospectuses mailed annually to shareholders and on our conversations with various treasurer's department personnel, we offer this brief description of a "typical" plan.

A shareholder authorizes the reinvestment of dividends on some or all of the shares owned. Starting on the next dividend payment date and continuing thereafter, new shares are issued at a price set at the average of the daily high and low stock market prices for the five-day period ending on the dividend payment date. The number of shares issued depends upon the amount of reinvestment and the formula price and may include fractional shares. Shares acquired through the plan are held in an account unless the owner requests issuance (full shares only). Usually the plan is managed for the firm by a bank—a position not unlike that of an investment banker since the bank is paid a fee for assisting in the issuance of new securities!

It is of interest to note that while all firms obtain the approval of shareholders to institute a dividend reinvestment plan, some add the discount feature with only the approval of the board of directors. Given the wealth transfer effects described above, it would seem advisable to obtain direct shareholder approval of the discount.

Summary statistics for fifteen plans which result in an annual wealth transfer in excess of $250,000 are shown in Table 1.
A sample calculation is detailed in the footnote to the table. To estimate the annual wealth transfer (5th column in Table 1), P is measured as the approximate price at the time of the mid-1978 dividend payment, and the quarterly dividend is annualized.

The participation rates shown in 4th column of Table 1 appear at first glance to be low. However, the relative newness of the plans is indicated by the fact that the first discount dividend reinvestment plan (ATT) was initiated in April 1975. It is reasonable to expect increased participation over time—especially in the light of the wealth transfer.

Size differences among firms in the table distort somewhat the significance of the amount of the annual wealth transfer. For example, the $22 million annual transfer enjoyed by ATT plan participants is far greater than the $900,000 received by Bell Canada participants. But, as the sixth column in Table 1 shows, a participating share owner of one hundred shares of each firm would receive approximately the same benefit from participation in each plan.

Note too that, primarily as a result of participation rates, it costs a nonparticipating ATT share owner almost twice as much per share to accommodate the plan (see the seventh column of Table 1). It is particularly interesting to note the nature of the annual wealth transfer when plan participation is very low. For example, the total wealth transfer between Union Carbide shareowners is just $250,000. But participants holding one hundred shares enjoy a gain of more than fourteen dollars while nonparticipants suffer a loss.
of only forty cents. There is at the same time an explanation for the enthusiasm of plan participants for the gain and a rationale for why nonparticipants accept the loss. At current participation levels the situation is similar for all firms. However, when participation increases to more than half the shares, the situation is reversed and nonparticipants will suffer losses which are greater per-share than the gains of participants.

Since the data presented in Table 1 represent annual approximations from quarterly results, further detail on a quarterly basis is presented in Table 2 for ATT and American Electric Power (AEP). The actual quarterly wealth transfer is shown to increase over time with increasing dividends and higher participation rates. Also presented is the maximum wealth transfer which could have occurred quarterly had more shares decided to participate. It is interesting to note that the ATT plan could result in an annual wealth transfer as high as $39,430,000.

Finally, Figures 1 and 2 show the approximate typical shape of the relationship between participation rate and total dollar wealth transfer, respectively. On a per-share basis, benefits are greatest when a small percentage of total shares are participating in the plan.

Policy Considerations

The wealth transfer effects of discount dividend reinvestment plans lead to a single major policy conclusion for shareholders: participate in the plan. Shareowners who do not want to increase
investment in the firm might consider reinvesting dividends and selling the newly acquired shares in the market. The negative effects of transactions costs in such a process must be considered, however. Alternatively, the shareholder who will not or cannot participate should consider selling out and investing in a firm which does not offer a discount dividend reinvestment plan.

For managers and directors considering the implementation of a discount plan, the problems are quite complex. Though the beneficial equity capital-raising aspects of the discount cannot be denied, the detrimental effects should not be ignored. The discount sets up an arbitrary wealth transfer between stockholder groups. One might argue that the losses are so small as to be inconsequential, but it should be remembered that these losses are exactly equal to the benefits--benefits now used by firms to "sell" shareholders on the desirability of the plan. If the majority of current shareholders would not participate in dividend reinvestment, a plan which forces them to reinvest or lose is not in their best interest, and it should not have been approved.

There is, in addition, another detrimental effect on wealth caused by the current tax status of the five percent discount. Participants are taxed at ordinary rates on the market value of the shares their reinvested dividends buy. When dividends are used to buy new shares at a discount, the participants' tax burden is greater than if the dividend had been taken as cash. For example, cash dividends summing to $95 amount to a taxable income of $100 if reinvested, but a taxable income of only $95 if taken in cash. This tax
disadvantage of the plan is somewhat offset by the lowering of future capital gains taxes due to the higher cost basis as compared to the actual purchase price. However, to the extent that the offset is a future one and is at capital gains rates, the tax authority benefits at the expense of the shareholders. Since wealth is not created by the discount plan and is only transferred, such a tax disadvantage means that the firm's entire stockholder set is actually facing a net decrease in wealth because of the plan.

Finally, we must not fail to consider that the discount dividend reinvestment plan should be viewed as an alternative to several other methods of raising new equity capital. It is in the best interest of shareholders for management to choose a method which minimizes the cost of obtaining the required funds. Smith shows that a direct rights offering without standby underwriting is less expensive than the sale of new common stock or a rights offering with standby underwriting [6]. We are as yet unable to obtain complete cost data regarding the operation of a discount dividend reinvestment plan, but view such an addition to the Smith effort as an important area for future research.
Summary and Conclusion

The shareholder wealth transfer effects of discount dividend reinvestment plans have been revealed by this work. As shown in the tabular data, the amounts of such transfer in each year are significant and can be expected to grow as the popularity of the discount plans increases. Though the plans are beneficial to participants and offer promise as a substantial source of new equity capital, nonparticipating shareholders are hurt in an exactly offsetting manner. Finally, because of the way the IRS now taxes the discount, such reinvestment plans have a net negative effect on the wealth of the entire group of stockholders for that company.

Given the wealth transfer, it is difficult to rationalize the relatively low participation levels currently being witnessed. As the wealth effects become more widely understood, participation should increase or stockholders may demand discontinuation of the plan. As each firm considers the possibility of offering such a plan, the benefits and detriments should be considered fully.
Table 1

DIVIDEND REINVESTMENT STATISTICS AND WEALTH TRANSFER AMOUNTS

<table>
<thead>
<tr>
<th>Firm</th>
<th>Number of Common Shares (000)</th>
<th>Price Per Share ($)</th>
<th>Annual Dividend Per Share ($)</th>
<th>Participation in Plan (%)</th>
<th>Amount of Wealth Transfer ($)</th>
<th>Gain to Participants ($/100 shares)</th>
<th>Loss to Nonparticipants ($/100 shares)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allied Chemical</td>
<td>28,180</td>
<td>36.00</td>
<td>2.00</td>
<td>12.8</td>
<td>329,000</td>
<td>0.10</td>
<td>1.30</td>
</tr>
<tr>
<td>American Electric Power</td>
<td>103,327</td>
<td>24.00</td>
<td>2.12</td>
<td>9.6</td>
<td>992,000</td>
<td>10.00</td>
<td>1.10</td>
</tr>
<tr>
<td>AT&amp;T</td>
<td>652,884</td>
<td>50.00</td>
<td>4.60</td>
<td>17.6</td>
<td>22,602,000</td>
<td>19.70</td>
<td>4.20</td>
</tr>
<tr>
<td>Bell Canada</td>
<td>43,760</td>
<td>51.00</td>
<td>4.20</td>
<td>10.5</td>
<td>901,000</td>
<td>19.60</td>
<td>2.30</td>
</tr>
<tr>
<td>Commonwealth Edison</td>
<td>75,360</td>
<td>27.00</td>
<td>2.40</td>
<td>12.2</td>
<td>1,008,000</td>
<td>11.00</td>
<td>1.50</td>
</tr>
<tr>
<td>Detroit Edison</td>
<td>59,529</td>
<td>16.00</td>
<td>1.52</td>
<td>11.9</td>
<td>493,000</td>
<td>7.00</td>
<td>0.90</td>
</tr>
<tr>
<td>General Public Utilities</td>
<td>59,474</td>
<td>18.00</td>
<td>1.76</td>
<td>9.0</td>
<td>447,000</td>
<td>8.40</td>
<td>0.80</td>
</tr>
<tr>
<td>International Paper</td>
<td>47,224</td>
<td>40.00</td>
<td>2.00</td>
<td>13.5</td>
<td>576,000</td>
<td>9.00</td>
<td>1.40</td>
</tr>
<tr>
<td>Ohio Edison</td>
<td>51,387</td>
<td>18.00</td>
<td>1.70</td>
<td>8.2</td>
<td>355,000</td>
<td>8.40</td>
<td>0.80</td>
</tr>
<tr>
<td>Pennsylvania Power &amp; Light</td>
<td>37,923</td>
<td>21.00</td>
<td>1.92</td>
<td>14.8</td>
<td>425,000</td>
<td>7.60</td>
<td>1.30</td>
</tr>
<tr>
<td>Potomac Electric</td>
<td>40,121</td>
<td>15.00</td>
<td>1.34</td>
<td>10.2</td>
<td>257,000</td>
<td>6.30</td>
<td>0.70</td>
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<tr>
<td>Public Service Electric &amp; Gas</td>
<td>63,031</td>
<td>23.00</td>
<td>2.12</td>
<td>14.3</td>
<td>850,000</td>
<td>9.40</td>
<td>1.60</td>
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<tr>
<td>Southern California Edison</td>
<td>54,646</td>
<td>26.00</td>
<td>2.24</td>
<td>10.0</td>
<td>575,000</td>
<td>10.50</td>
<td>1.20</td>
</tr>
<tr>
<td>Southern California Company</td>
<td>137,683</td>
<td>16.00</td>
<td>1.54</td>
<td>13.4</td>
<td>1,278,000</td>
<td>6.90</td>
<td>1.10</td>
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<tr>
<td>Union Carbide</td>
<td>64,533</td>
<td>38.00</td>
<td>2.80</td>
<td>2.8</td>
<td>258,000</td>
<td>14.30</td>
<td>0.40</td>
</tr>
</tbody>
</table>

\[
W^* - W = dP \left[ \frac{xD}{(1-d) + xD} \right] (1-x)N
\]

Thus, for example, the wealth transfer for Allied Chemical is

\[
W^* - W = 0.05(36) \left[ \frac{0.128(2)}{36(0.95) + 0.128(2)} \right] (0.872) 28,180,000 = 328,590
\]

\[5\] Columns 1-4 from [5].
# Table 2

**QUARTERLY WEALTH TRANSFER CALCULATIONS**

**American Telephone & Telegraph Co.**

<table>
<thead>
<tr>
<th>Div. Date</th>
<th>Number of Common Shares</th>
<th>Price Per Share ($)</th>
<th>Div. per Share ($)</th>
<th>Purchase Price as % of Market Price</th>
<th>Fractional Participation</th>
<th>Actual Wealth Transfer ($)</th>
<th>Maximum Wealth Transfer ($)</th>
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</thead>
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<tr>
<td>4/1/75</td>
<td>560,957,608</td>
<td>49.2875</td>
<td>.85</td>
<td>.95</td>
<td>.107</td>
<td>2,393,248</td>
<td>6,217,434</td>
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<td>7/1/75</td>
<td>563,618,204</td>
<td>50.9625</td>
<td>.85</td>
<td>.95</td>
<td>.120</td>
<td>2,666,482</td>
<td>6,270,945</td>
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<tr>
<td>10/1/75</td>
<td>567,221,162</td>
<td>46.0000</td>
<td>.85</td>
<td>.95</td>
<td>.143</td>
<td>3,101,189</td>
<td>6,282,817</td>
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<tr>
<td>1/2/76</td>
<td>582,023,791</td>
<td>50.7875</td>
<td>.85</td>
<td>.95</td>
<td>.145</td>
<td>3,219,824</td>
<td>6,452,637</td>
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<td>4/1/76</td>
<td>584,248,581</td>
<td>56.5750</td>
<td>.95</td>
<td>.148</td>
<td>.158</td>
<td>3,673,959</td>
<td>7,239,129</td>
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<td>7/1/76</td>
<td>599,639,591</td>
<td>56.5500</td>
<td>.95</td>
<td>.158</td>
<td>.164</td>
<td>3,977,569</td>
<td>7,429,802</td>
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<tr>
<td>10/1/76</td>
<td>603,765,428</td>
<td>60.7625</td>
<td>.95</td>
<td>.164</td>
<td>.176</td>
<td>4,127,792</td>
<td>7,485,472</td>
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<tr>
<td>1/3/77</td>
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<td>63.5875</td>
<td>.95</td>
<td>.176</td>
<td>.181</td>
<td>4,392,258</td>
<td>7,533,327</td>
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<tr>
<td>4/1/77</td>
<td>615,527,546</td>
<td>62.6125</td>
<td>1.05</td>
<td>.181</td>
<td>.190</td>
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<td>7/1/77</td>
<td>625,272,712</td>
<td>63.4750</td>
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<td>.198</td>
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<td>8,564,075</td>
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<td>10/1/77</td>
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<td>.198</td>
<td>.202</td>
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<td>.202</td>
<td>.214</td>
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<td>4/3/78</td>
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<td>.214</td>
<td>.220</td>
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<td>9,782,804</td>
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<tr>
<td>7/3/78</td>
<td>658,019,853</td>
<td>60.0500</td>
<td>1.15</td>
<td>.220</td>
<td></td>
<td>6,804,225</td>
<td>9,857,522</td>
</tr>
</tbody>
</table>

**American Electric Power**

<table>
<thead>
<tr>
<th>Div. Date</th>
<th>Number of Common Shares</th>
<th>Price Per Share ($)</th>
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<th>Purchase Price as % of Market Price</th>
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<th>Actual Wealth Transfer ($)</th>
<th>Maximum Wealth Transfer ($)</th>
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<tbody>
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Figure 1. Amount of Wealth Transfer

Figure 2. Per Share Participant Gain
References


