DIVIDEND REINVESTMENT PLANS

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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, approxi-

mately 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 attempt-

ing 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 particu-

lar 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

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[1]The 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 share-
holders 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 cor-
porate 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 share-
holders 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 con-

clusion 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 some-

thing 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 bene-

fits 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:

$$W_p = xN(P+D) \tag{1}$$

$$W_n = (1-x)N(P+D) \tag{2}$$

where

W_p = aggregate wealth of participants before reinvestment

W_n = aggregate wealth of nonparticipants before reinvestment

N = total number of shares on which a dividend has just been paid, or, total shares outstanding just prior to reinvestment

x = fraction of the shares participating in the reinvestment

P = per share stock price before reinvestment

D = per share dividend paid, and available for reinvestment

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.

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[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.

<u>Wealth Effect for Participants.</u> 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:

$$W_p^* = N_p^* P^* \qquad (3)$$

where

W_p^* = aggregate wealth of participants after reinvestment

N_p^* = total number of shares held by participants after exchanging dividends for additional shares

P^* = 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:

$$N_p^* = N_p + \frac{xND}{P(1-d)} \qquad (4)$$

where

d = 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:

$$P^* = \frac{NP + xND}{N + \dfrac{xND}{P(1-d)}} \qquad (5)$$

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_p^* 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):

$$W_p^* - W_p = dP\left[\frac{xD}{P(1-d) + xD}\right](1-x)N \qquad (6)$$

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 non-

participants, after reinvestment by participants, is the value of

the stock held, $(1-x)NP^*$, plus the dividends not reinvested,

$(1-x)ND$:

$$W_n^* = (1-x)N(P^* + D) \tag{7}$$

Subtracting pre-reinvestment, nonparticipant wealth, equation (2),

from W_n^* yields change in wealth for nonparticipants:

$$W_n^* - W_n = (1-x)N(P^* - P) \tag{8}$$

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 nonpartici-

pants would therefore decrease. To observe directly the difference

between P^* and P, equation (5) is manipulated to the following result:

$$P^* - P = -dP \left[\frac{xD}{P(1-d) + xD} \right] \tag{9}$$

Under the previously noted assumptions on d and x, equation (9) is negative, and a wealth decrease for nonparticipants follows.[4]

Substituting equation (9) into equation (8) for $P^* - P$ yields:

$$W_n^* - W_n = dP \left[\frac{xD}{P(1-d) + xD} \right] (1-x)N \qquad (10)$$

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:

$$(W_p^* - W_p) = - (W_n^* - W_n) \qquad (11)$$

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 partici- pants is far greater than the $900,000 received by Bell Canada participants. But, as the sixth column in Table 1 shows, a partici- pating 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 $258,000. 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 partici-

pation increases to more than half the shares, the situation is re-

versed and nonparticipants will suffer losses which are greater

per-share than the gains of participants.

Since the data presented in Table 1 represent annual approxi-

mations 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[5]

Firm	Number of Common Shares (000)	Price Per Share ($)	Annual Dividend Per Share ($)	Participation in Plan (%)	Amount of Wealth Transfer ($) [a]	Gain to Participants ($/100 shares)	Loss to Nonparticipants ($/100 shares)
Allied Chemical	28,180	36.00	2.00	12.8	329,000	9.10	1.30
American Electric Power	103,327	24.00	2.12	9.6	992,000	10.00	1.10
ATT	652,884	60.00	4.60	17.6	22,602,000	19.70	4.20
Bell Canada	43,760	51.00	4.20	10.5	901,000	19.60	2.30
Commonwealth Edison	75,360	27.00	2.40	12.2	1,008,000	11.00	1.50
Detroit Edison	59,529	16.00	1.52	11.9	493,000	7.00	0.90
General Public Utilities	59,474	18.00	1.76	9.0	447,000	8.40	0.80
International Paper	47,224	40.00	2.00	13.5	576,000	9.00	1.40
Ohio Edison	51,387	18.00	1.76	8.2	355,000	8.40	0.60
Pennsylvania Power & Light	37,923	21.00	1.92	14.8	425,000	7.60	1.30
Potomac Electric	40,121	15.00	1.34	10.2	257,000	6.30	0.70
Public Service Electric & Gas	63,031	23.00	2.12	14.3	850,000	9.40	1.60
Southern California Edison	54,646	26.00	2.24	10.0	575,000	10.50	1.20
Southern Company	137,683	16.00	1.54	13.4	1,278,000	6.90	1.10
Union Carbide	64,533	38.00	2.80	2.8	258,000	14.30	0.40

a. $W^* - W = dP\left[\dfrac{xD}{P(1-d)+xD}\right](1-x)N$

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

$W^* - W = .05(36)\left[\dfrac{.128(2)}{36(.95)+.128(2)}\right](.872)28,180,000 = \$328,590$

[5] Columns 1-4 from [5].

Table 2

QUARTERLY WEALTH TRANSFER CALCULATIONS

American Telephone & Telegraph Co.

Div. Date	Number of Common Shares	Price Per Share ($)	Div. per Share ($)	Purchase Price as % of Market Price	Fractional Participation	Actual Wealth Transfer ($)	Maximum Wealth Transfer ($)
4/1/75	560,957,608	49.2875	0.85	.95	.107	2,393,248	6,217,434
7/1/75	565,618,204	50.9625	0.85		.120	2,666,482	6,270,945
10/1/75	567,221,162	46.0000	0.85		.143	3,101,189	6,282,817
1/2/76	582,023,791	50.7875	0.85		.145	3,219,824	6,452,637
4/1/76	584,248,581	56.5750	0.95		.148	3,673,959	7,239,129
7/1/76	599,639,591	56,5500	0.95		.158	3,977,569	7,429,802
10/1/76	603,765,428	60.7625	0.95		.164	4,127,792	7,485,472
1/3/77	607,405,025	63.5875	0.95		.176	4,392,258	7,533,327
4/1/77	615,527,546	62.6125	1.05		.181	5,026,437	8,429,570
7/1/77	625,272,712	63.4750	1.05		.190	5,300,409	8,564,075
10/1/77	631,459,073	62.7625	1.05		.198	5,522,157	8,647,659
1/3/78	647,632,225	60.4250	1.05		.202	5,747,999	8,866,460
4/3/78	652,883,733	61.4500	1.15		.214	6,618,955	9,782,804
7/3/78	658,019,853	60.0500	1.15	→	.220	6,804,225	9,857,522

American Electric Power

| Div. Date	Number of Common Shares	Price Per Share ($)	Div. per Share ($)	Purchase Price as % of Market Price	Fractional Participation	Actual Wealth Transfer ($)	Maximum Wealth Transfer ($)
3/10/77	87,909,182	23.875	.515	.95	.0538	121,000	589,000
6/10/77	89,146,912	23.50	.515		.0638	144,000	597,000
9/9/77	101,657,764	24.625	.515		.0653	168,000	681,000
12/9/77	102,823,735	24.375	.53		.0731	194,000	709,000
3/10/77	103,075,090	22.875	.53		.0886	232,000	710,000
6/9/78	103,397,459	22.75	.53		.0918	240,000	712,000
9/8/78	103,673,860	23.50	.53	→	.0946	247,000	714,000
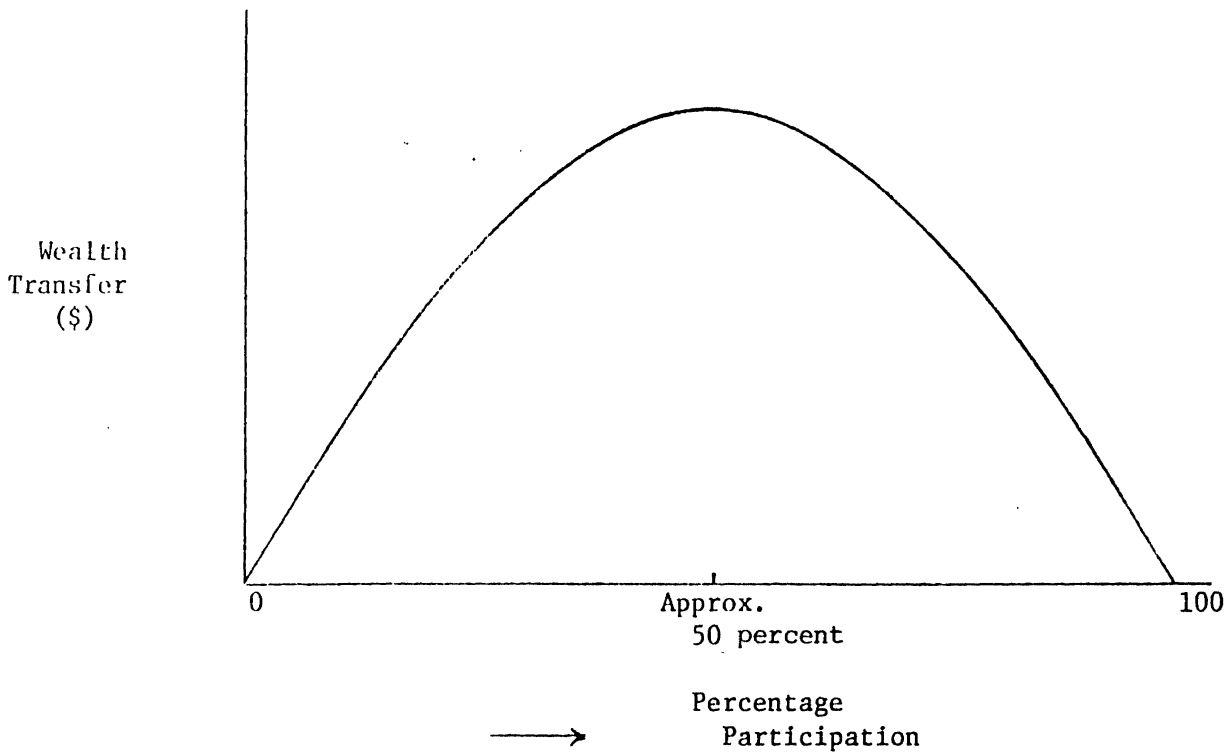
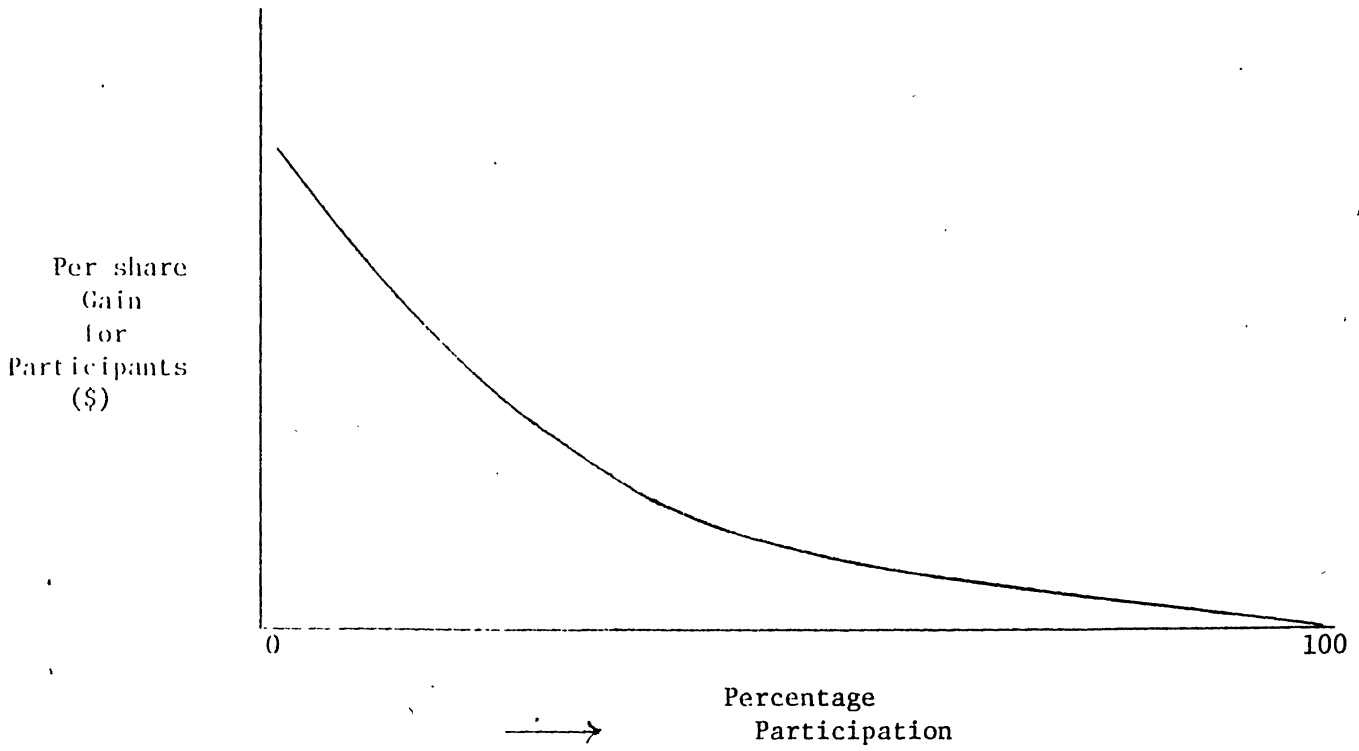Figure 1. Amount of Wealth Transfer

Figure 2. Per Share Participant Gain

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