

Dividend Reinvestment, Price Appreciation and Capital Accumulation

Capital accumulation prospects depend entirely on price appreciation.

Alfred Rappaport

Investors strive for returns that enable them to accumulate sufficient capital to meet their lifetime needs. But what long-term rate of return should they expect to earn on their equity investments? While no prudent investor assumes future returns will mirror past returns, historical performance is a sensible starting point.

Studies of historical stock market performance by Ibbotson Associates and other leading financial data publishers invariably report total shareholder return (TSR). Despite the name, a TSR calculation does not represent the return earned by equity investors—it is instead the *capital accumulation rate* investors achieve if they purchase shares at the start date, reinvest all dividends to buy additional shares, and hold all shares to the terminal date.

Investors who use historical TSR rates as a point of departure for establishing their assumed capital accumulation rates can be misled in two ways. First, TSR is the relevant capital accumulation rate *only* for those rare individuals who can count on employment earnings and other sources of income that permit them to reinvest all dividends and sell no shares. For the overwhelming majority of investors who use proceeds from dividends or sell stock to fund consumption, the capital accumulation rate will always be lower than the TSR rate.

Second, the remarkable historical growth in accumulated capital from reinvested dividends can mistakenly persuade some investors that dividends, rather than price appreciation, govern investment performance. Both the uncritical use of TSR and a misplaced emphasis on dividends can cause investors to make damaging financial choices.

DIVIDEND REINVESTMENT

We of course know that when investors consume rather than save, whether funding consumption by

ALFRED RAPPAPORT
is the Leonard Spacek
professor emeritus in the
Kellogg Graduate School
of Management at
Northwestern University.
He lives in La Jolla, CA.
alrapp@san.rr.com

dividends or sale of shares, end-of-horizon wealth is diminished. I first examine just how materially departures from the TSR assumption of 100% dividend reinvestment affect capital accumulation.

Most shareholders take advantage of the automatic dividend reinvestment feature that mutual funds offer. The Investment Company Institute reports that investors reinvested an average of about 90% of their dividends and capital gains over the past few years. Investors who automatically reinvest often also sell shares, so the overall reinvestment rate is likely to be well below 90%. While we know of no comprehensive publicly available statistics, discussions with companies, their transfer agents, and retail stock brokers indicate that investors who invest directly in individual stocks reinvest on average less than 10% of their dividends. This appears to be the case even though most dividend-paying public companies offer a dividend reinvestment plan at no fee.

How important is the level of dividend reinvestment to capital accumulation? To assess the impact, we begin with the simple formula for TSR, where g is the annual price appreciation rate and d is the dividend yield:

$$TSR = (g) + (1 + g) d \quad (1)$$

Investors who do not reinvest dividends increase their capital at the price appreciation rate (g), while those who reinvest 100% of their dividends increase capital at the TSR rate. The capital that investors accumulate due to reinvested dividends grows at rate $(1 + g) d$, and as the number of shares purchased with dividends compounds over time, the proportion of capital accumulated due to reinvestment increases.

Assume an investor buys 100 shares of stock at \$100 per share for an initial investment of \$10,000. The share price appreciates 6% annually, and the dividend yield is a constant 2%.

Exhibit 1 presents the capital the investor will accumulate over investment periods ranging from 5 to 50 years for no-reinvestment and 100% dividend reinvestment cases.

For the no reinvestment scenarios, the initial capital of \$10,000 grows at the 6% annual price appreciation rate. For the 100% reinvestment scenarios, capital grows at the TSR rate of 8.12%; that is, $(6\%) + (1.06\%) (2\%)$. The significantly higher ending capital balances for 100% reinvestment scenarios are the result of the larger dollar amounts invested due to lower consumption and the magic of compounding positive returns.

EXHIBIT 1

Capital Accumulation With and Without Dividend Reinvestment

Years	No Reinvestment			100% Reinvestment		
	# shares	Price	Total	# shares	Total	Due to reinvestment
5	100	\$133.82	\$13,382	110.41	\$14,775	9.4%
10	100	179.08	17,908	121.90	21,830	18.0
20	100	320.71	32,071	148.59	47,655	32.7
50	100	1842.02	184,202	269.16	495,797	62.8

EXHIBIT 2

Accumulated Capital (%) Relative to 100% Reinvestment

Years	Dividend Reinvestment Rate			
	0%	25%	50%	90%
5	91%	93%	95%	99%
10	82	86	91	98
20	67	74	82	96
50	37	48	61	91

The longer the investment period, the greater the impact of the reinvestment decision. The capital accumulated due to 100% reinvestment increases from 9.4% of total capital for 5 years to 62.8% for a 50-year investment period. For companies that pay no dividends, the share price would have to rise at the 8.12% annual TSR rate to generate the same ending capital.

Exhibit 2 compares the percentage of capital accumulated by investors who do not fully reinvest dividends and those who choose 100% reinvestment. A suitable reinvestment policy naturally depends on an individual's consumption needs. The TSR rate at which capital grows for investors who reinvest only a fraction, r , of their dividends is calculated as:

$$TSR = g + (1 + g) (d) (r) \quad (2)$$

At a 50% reinvestment rate, a 2% dividend yield, and 6% price appreciation, capital grows 7.06% annually. Compare that to the 6% capital accumulation rate assuming no dividend reinvestment and 8.12% with 100% reinvestment. Investors who do not fully reinvest dividends should use Equation (2) rather than Equation (1) for assessing their capital accumulation prospects.

Exhibit 2 illustrates several points. First, the lower the reinvestment rate investors choose, the less accumulated capital they will end up with compared to the 100% reinvestment case. Second, the longer the investment period for any given reinvestment rate, the less accumulated capital relative to 100% reinvestment. Third, fund investors with a 90% reinvestment rate capture a significant portion of full reinvestment, even over longer investment periods. For example, over a 20-year period investors earn 96% of full reinvestment. Finally, investors who reinvest at a 50% rate or less experience substantial shortfalls relative to the 100% reinvestment option.

While the numbers in Exhibits 1 and 2 are specific to this example, the general conclusions hold for any reasonable combination of price appreciation and dividend yield assumptions.

DIVIDENDS OR PRICE APPRECIATION?

Researchers use long-run historical dividend and price appreciation data to estimate the equity risk premium (see Arnott and Bernstein [2002]) and to establish a basis for selecting stocks (see Siegel [2005]). Noting the dramatic cumulative wealth generated by reinvesting dividends over 1802–2000, Arnott and Bernstein [2002, p. 68] state:

These data put the lie to the conventional view that equities derive most of their returns from capital appreciation, that income is far less important, if not irrelevant.

Siegel [2005, p. 13] sounds a similar note:

Reinvesting dividends is *the* critical factor giving the edge to most winning stocks in the long run (emphasis in the original).

Do dividends rather than price appreciation really dominate equity returns? To the contrary, I will show that price appreciation is the *sole* source of *investment returns* that increase accumulated capital. Let's begin with the critical distinction between capital accumulation due to investor behavior and stock market behavior.

Three essential factors shape capital accumulation:

- How much you invest.
- How long you invest.
- Price appreciation.

Investors determine the first two factors, the size and term of their investments, while the stock market determines the third.

Here's the crucial observation: Once investors make the dividend reinvestment decision (how much to invest), capital accumulation over the expected holding period (how long to invest) *depends entirely on price changes* for both the initially purchased shares and shares subsequently purchased with dividends.

The investor who forgoes consumption and uses dividends to purchase additional shares makes a new investment. While dividend reinvestment increases accumulated capital, the increase comes from investment rather than return. The payoffs from this act of deferred gratification, on the other hand, come exclusively from future share price appreciation. Without price appreciation, the increase in accumulated capital equals the amount the shareholder actually invests or, in percentage terms, the dividend yield.

It is important not only to differentiate investor-generated versus market-generated contributions to capital accumulation, but also to distinguish clearly between the equity rate of return and the capital accumulation growth rate. For dividend-paying stocks, TSR does not represent the rate of return on initial investment, but rather the capital accumulation growth rate assuming reinvestment of all dividends and no liquidation of shares. The equity rate of return, comprising the dividend yield plus price appreciation, is unaffected by the dividend reinvestment decision. It is what it is. All shareholders earn the same return for any given period. Some simply consume less and reinvest more than others.

In the example earlier, the expected equity rate of return is 8%—6% price appreciation plus 2% dividend yield—but the capital accumulation rate depends on the investor's dividend reinvestment decision. At 100% reinvestment, the annual capital accumulation rate is 8.12%. If no dividends are reinvested, the rate falls to the 6% price appreciation level.

While it is clear that investors who reinvest no dividends depend entirely on price appreciation to achieve their capital accumulation targets, the same is true of investors who reinvest dividends to buy additional shares. Shares are fungible. It doesn't matter whether investors purchase shares initially or subsequently with dividends. The same price change governs portfolio value.

Slightly recasting the TSR equation makes the role of price appreciation even more obvious. Equation (1) divides TSR into two components: price appreciation (g), and capital growth arising from reinvested dividends $(1 + g)d$. Growth from reinvested dividends, in turn, can be split into dividend yield (d) and the growth that price appreciation on dividend-financed shares generates, $(g)(d)$.

Equation (3) recasts Equation (1) to reflect the split:

$$\text{TSR} = (g) + (d) + (g)(d) \quad (3)$$

The second component, dividend yield, represents the rate of new investment. The third component takes the new investment and multiplies it by the price appreciation rate. Without price appreciation the increase in accumulated capital is limited to the dollars of new investment. If share prices fall, so does accumulated capital.

Equation (3) also makes it clear that you can swap price appreciation and dividend yield estimates with no change to TSR. In the example earlier we assumed 6% annual price appreciation and a dividend yield of 2%. If we instead assume 2% price appreciation and a 6% yield, the TSR remains unchanged at 8.12%. A sizable dividend yield relative to price appreciation means that new investment contributes a greater percentage of capital accumulation. At the other extreme, stocks like Berkshire Hathaway that pay no dividends place the entire burden of capital accumulation on price appreciation.

DO DIVIDENDS MATTER?

Corporate dividend policy matters. It matters when management does not return excess cash to shareholders in the absence of value-creating investment opportunities, and it matters when management forgoes value-creating opportunities to finance the market's dividend expectations.

Dividends, however, do not matter for the reasons people typically advance. The significant contribution of dividend reinvestment to long-term capital accumulation is evident. But, as I have demonstrated, it is the investor's decision to reinvest dividends and price appreciation on those reinvested dividends that fuels capital accumulation, rather than dividends *per se*.

Relatively few investors save at a level that enables them to consistently reinvest all dividends. Yet market observers frequently employ historical TSR performance, with its 100% reinvestment assumption, as a basis for recommending stocks. Siegel [2005, pp. 24, 26] summarizes his study of the S&P index from its beginning in 1957 through 2003 as follows:

The return on the original firms in the S&P 500 beat the returns on the standard, continually updated S&P 500 Index and did so with lower risk The shares of the original S&P 500 firms have, on average, outperformed the nearly 1,000

new firms that have been added to the index over the subsequent half century.

Siegel explains that the prices investors paid for newer companies were too high to provide good returns. These higher prices, in turn, meant lower dividend yields and fewer shares accumulated through reinvested dividends. If shares of long-established, dividend-paying companies are more attractively priced than shares of newer growth companies, buying the former is certainly the sensible choice.

Yet it is wrong to justify the choice on the grounds that you can accumulate more dividend-financed shares in older companies than in newer companies. First, this reasoning presumes that investors fully reinvest dividends. Second, it fails to acknowledge that superior returns for investing in additional shares depend entirely on price appreciation. Third, investors who own non-dividend-paying or low-yielding stocks but periodically need to withdraw funds can create their own "homemade dividends" by selling shares to generate the funds needed for consumption. Finally, except in tax-deferred accounts such as 401(k)s and IRAs, dividend income is taxable.

Consider Standard Oil of New Jersey, one of the top performers of the original S&P companies. According to Siegel, a \$10,000 investment in 1950 would have been worth about \$12.6 million by the end of 2003, a capital accumulation rate of 14.42%. Average annual price appreciation was 8.77%, and the average dividend yield was 5.19%. Employing Equation (1) produces the capital accumulation rate of 14.42%. Suppose the investor reinvests only 50% of dividends. Employing Equation (2), the rate falls from 14.42% to 11.59%.

Now assume a second company that pays no dividends and over the same 53-year-period had an average annual price appreciation of 14.42% or the same capital accumulation rate as Standard Oil. Investors can tap 283 basis points of the annual 14.42% price appreciation by selling shares to produce the same pre-tax cash flow and the same continuing capital accumulation rate of 11.59%. While price appreciation is more volatile than dividends, investors can generate their own quasi-dividends when companies do not.

TAXES

Income taxes payable on dividend income can significantly reduce the capital accumulated by investors.

To illustrate, consider Siegel's reported 1950-2003 performance for IBM and Standard Oil of New Jersey shares:

	IBM	Standard Oil
Price appreciation	11.41%	8.77%
Dividend yield	2.18	5.19
TSR (100% reinvestment)	13.83	14.42

Top marginal income tax rates averaged over 50% between 1950 and 2003. They were as high as 90% and did not fall below 50% until 1987. Assuming a conservative 50% rate over the entire period, IBM's after-tax 12.62% return now beats Standard Oil's 11.59% return.

Differences in capital accumulation calculated pre-tax compared to after-tax can be eye-popping. Here are the ending capital amounts for a \$10,000 investment made in 1950:

	IBM	Standard Oil	Advantage to:
Pre-tax	\$9,600,000	\$12,600,000	Standard Oil by 24%
After-tax	5,500,000	3,350,000	IBM by 39%

While the maximum federal income tax rate on dividends is currently down to 15%, investment choices can still be sensitive to tax considerations, and investors would do well to assess capital accumulation prospects on an after-tax basis.

CONCLUSION

In the final analysis, what matters is not dividends, but achieving a *total* after-tax capital accumulation rate that meets lifetime consumption needs, without regard to its source. Understanding the capital accumulation process, particularly the contributions of dividend reinvestment and price appreciation, equips investors to make more informed asset allocation and stock selection decisions, and to better judge the level of reinvestment they need to achieve their financial goals.

Investors should recognize that once they determine their reinvestment rate and investment horizon, capital accumulation prospects depend entirely on price appreciation. This recognition will encourage investors to focus on the market expectations embedded in current stock prices in their search for portfolio-enhancing returns.

REFERENCES

- Arnott, Robert D., and Peter L. Bernstein. "What Risk Premium is Normal?" *Financial Analysts Journal*, vol. 58, no. 2 (March/April 2002), pp. 64-85.
- Siegel, Jeremy J. *The Future for Investors*. New York: Crown Publishing Group, 2005.

To order reprints of this article, please contact Dewey Palmieri at dpalmieri@ijournals.com or 212-224-3675.

©Euromoney Institutional Investor PLC. This material must be used for the customer's internal business use only and a maximum of ten (10) hard copy print-outs may be made. No further copying or transmission of this material is allowed without the express permission of Euromoney Institutional Investor PLC. Copyright of *Journal of Portfolio Management* is the property of Euromoney Publications PLC and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.

The most recent two editions of this title are only ever available at <http://www.euromoneyplc.com>