What causes the equity premium?

Historical comparisons of the superior return from equities with other investments have generally sought to explain this long-term superiority in terms of risk. As **RICHARD FITZHERBERT** explains, there might be an alternative explanation based on return on shareholders' equity.

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If the "risk premium" explanation for estimating equity returns is correct, then we should be able to base reliable future long-term forecasts of equity returns on an estimate of the risk premium, plus an estimated "risk free" return. On the other hand, a number of people (e.g. Ritter, 2002) advocate the use of alternative methods such as the Gordon dividend growth model for future estimates.

Such approaches have completely different underlying assumptions to the "risk premium" approach to estimating future equity returns. The idea of risk-averse behaviour as the driving force behind equity returns was challenged 20 years ago by Mehra and Prescott (1985). Those advocating alternative methods indicate a lack of faith that the "risk" explanation of the past is relevant to the future.

The explanation outlined in this paper is that long-term equity returns depend more on the decisions of corporate directors and management than the behaviour of portfolio investors. In terms of numbers, it is mainly return on equity compared to interest rates, rather than stock market volatility, that have determined the superior historical investment record of shares compared to (say) bonds.

DOES CORRECT IDENTIFICATION OF CAUSE MATTER?

As long as the historical record shows an equity premium does it matter whether this is a *risk* premium, an *inflation* premium, an *economic growth* premium, or something else? This question corresponds with an important debate in the philosophy of science between regularities and laws of nature.

In his well-established text, Chalmers (1999 Chapter 14) argues that laws of nature and causes are "intimately linked". Laws of nature can be relied upon to repeat themselves outside controlled conditions (in this context in out-of-sample periods), whereas regularities may not.

If, for example, inflation could be confirmed as *the cause* of growth in dividends, then we should be confident of forecasts, which employ this assumption. However if there is some reason other than inflation that causes dividend growth, then any historical similarity between the rate of growth of dividends and inflation could be a non-causal regularity that cannot be relied upon.

If the type of risk measured by volatility is not the cause of the equity premium, then reliable estimates of the future equity premium may need to adopt different methods, such as those suggested by Ritter (2002):

"Many textbooks encourage students to use the historical arithmetic average equity risk premium of 9% [per annum] for computing the cost of equity capital…The numbers I am about to compute using forward-looking estimates suggest that 1% is a more defensible number."

However, it seems inconsistent to adopt models of the future equity premium that are fundamentally different from the widely accepted causal explanation of the historical record.

The alternative suggested in this paper is that the level of the historical equity premium has been mainly *caused by* the return on shareholders' equity that has been achieved by company management, not risk aversion by portfolio investors. So we should use estimates of future return on equity as the starting point for a reliable projection of long-term returns from equity portfolios.

THE PLOUGHBACK FACTOR

In these days of paperless trading, a proliferation of derivatives and structured investment products, it is easy to forget that if companies fail to make a return on their equity capital there will be no company earnings and no dividend income, and equity investment will make little sense.

However, there are differences in the long-term effect of earnings paid in dividends and those retained. This analysis begins with an assessment of the effect of retained earnings on long-term returns by investors (the *ploughback factor*).

It follows from the "accounting equation" that the growth in shareholders' equity over a financial year is equal to earnings less dividends. It is relatively easy to show that when return on equity (ROE) and the payout ratio (POR) are constant then shareholders' equity, earnings and dividends will all grow from one year to the next at the same constant compound rate of growth (G), which is given by:

$$G = ROE \times \{ 1 - POR/100 \}$$

The derivation of this formula appears in many standard texts. (See, for example Hemsted, 1962.) So if return on equity is 9% per annum and the payout ratio is 55%, the constant compound growth factor will be:

$$G = 9\% \times \{ 1 - 55/100 \} = 9\% \times 0.45 = 4.05\% \text{ per annum}$$

This simple formula has a number of underlying assumptions. Perhaps the most important is that it ignores inflation and real growth in GDP. Writing in *The Intelligent Investor*, Benjamin Graham (1973, p21) observed that inflation had little to do with the growth in earnings of the constituents of the Dow Jones Industrial Averages. He argued that *all* of the growth in earnings over the period 1950–1970 could be attributed to the ploughback of retained earnings.

However, if we consider the history of listed property trusts in Australia since 1979, which distribute almost all their earnings and which have seen significant growth in distributions and capital appreciation, it is clear that ploughback of retained profits is not the whole story.

Also, as we shall see, the ploughback factor does not fully account for the long-term capital appreciation of ordinary shares over the period 1937–2004 when the average annual rate of inflation was 5.3%.

A second assumption is that return on equity and payout ratios are constant. While these fluctuate considerably for individual companies, aggregate return on equity seems to have been reasonably stable in the second half of the 20th century.

ESTIMATING PLOUGHBACK

From Reserve Bank figures over the period 1957–1985, aggregate return on equity averaged 8.9% per annum for the industrial sector with a standard deviation of 1.3% per annum. Corresponding figures for the resources sector over the much shorter period 1975–1985 were a mean of 7.8% per annum with a standard deviation of 4% per annum. This level of profitability seems to have continued into the late 1990s. (See Fitzherbert, 1998.)

Although payout ratios are sometimes considered as a variable, company directors seem reluctant to reduce dividends when return on equity falls. When considering the ploughback effect, it may therefore be preferable to look directly at *retained* return on equity rather than deal separately with return on equity and the payout ratio.

On the basis of the Reserve Bank data, this ploughback factor (i.e. retained earnings each year as a percentage of shareholders' funds) seems to have been 4% per annum for the industrial sector and 3.5% for the mining sector over the periods cited.

A third assumption is that companies do not issue or repurchase shares. As with the discussion below, we need to recognise that investors are in a very different position, as far as growth in equity capital is concerned, to creditors or the tax office.

If there are no retained profits, then shareholders' equity can grow from new issues, but equity investors have to pay for these new shares, and must adjust their calculations—as happens, for example, in the construction of stock exchange indices.

Any capital raised will be equal to the additional growth in shareholders' funds, and issues of additional shares tend to be priced close to the market price of existing shares. Consequently, as far as investors in old shares are concerned, the growth in equity capital arising from new issues is, in effect, automatically allowed for by ignoring both the increase in capital and the increase in the number of shares on issue.

THE INFLATION FACTOR

The reason why long-term growth of earnings and dividends (after adjustment for new issues) is mainly due to retained profits rather than inflation is not immediately obvious. However, there is both historical evidence and accounting logic to support this view. We can also identify special situations where inflation is more important.

If we consider the history of Australian stock prices, there are records since 1875 which may approximate today's standards. Nevertheless, we can split the period 1875–2004 into two roughly equal time periods, which were quite different as far as inflation is concerned.

A major question is where to draw the point of division. If we choose 1936–37, this will give us two long periods, one terminating when the worst of the Depression had passed but comfortably before commencement of World War II.

Using the Australian All Ordinaries Price Index and its generally recognised predecessors, we can now compare the compound growth rates in share prices (the "SPI") and inflation over these very long periods.

Era	Inflation (% pa)	SPI (% pa)
1875–1936	0.7	3.9
1937–2004	5.3	6.1

In the era of negligible inflation, the ploughback factor (estimated above at 4% per annum) neatly explains the growth in share prices of 14 times (3.9% per annum compound) over the period 1875–1936. However, this does assume that the return on equity data collected over 1957–1985 applied to the period 1875–1936, for which data does not appear to be available.

While this seems a speculative assumption, it is clear that inflation of 0.7% per annum does not explain capital appreciation of 3.9% per annum. In the second period (1937–2004) we can have more confidence in the accuracy of the ploughback factor because the available data covers half the period. However, ploughback clearly does not explain all of the growth in share prices, nor does it explain how the listed property trust index (where there has been very little ploughback of retained earnings) has grown at 5% per annum compound since 1979.

It is tempting to suggest that inflation should be a favourable factor on two grounds. First, earnings (and consequently dividends) should, in aggregate, broadly follow gross domestic product and, over long periods, show much the same rate of growth in both real and nominal terms. Second, companies invest their shareholders' funds in real assets such as plant, equipment, stock and work in progress.

With regard to the argument that earnings should grow with GDP, we need once again to recognise that equity investors are in a different situation to creditors or the tax office because, if the earnings underlying a stock market index are to grow with GDP, then the underlying equity capital base also needs to grow at this rate over time.

If equity capital does not grow quickly enough from retained profits to at least match the growth in business activity then, sooner or later, debt service and gearing ratios will be overstretched. Shareholders will then need to subscribe additional equity capital to maintain their share of the business.

The second argument, that corporate capital is invested in real assets, is also based on a valid premise and explains the special case of listed property trusts. (See below.) Yet if inflation were a favourable factor for the equity market as a whole, the ploughback factor would still apply and the rate of capital growth over the period since 1936 should have been almost 9.5% per annum rather than just 6.1%.

So, how can companies invest in real assets, retain almost half their profits and not see their shareholders' funds grow with inflation and retained earnings?

The answer to this puzzle lies in the way in which companies and businesses prepare financial statements, both externally in reporting to shareholders and internally as a basis for decision-making.

THE IMPACT OF HISTORICAL COST ACCOUNTING

Financial statements, both internal and external, are normally based on the historical cost accounting convention. With some exceptions, assets are recorded (and thought about) in terms of their original dollar cost. When an item of plant reaches the end of its working life, the amount provided for in the accounts will be the original cost, not the cost of an equivalent new plant.

It might be argued that such understated plant will continue to generate earnings, even after it has been written off. If management decisions were based on achieving an adequate return on the economic value of undervalued plant, then the benefits would emerge as higher reported return on equity.

For our purposes, the effect of historical cost accounting, which understates the economic value of plant, is therefore captured in reported return on equity. Similarly, manufacturing profits are based on the costs of inputs for the goods sold, not the cost of acquiring inputs for the next sale.

Any benefit of stock inflation will emerge in return on equity. As far as balance sheets are concerned, shareholders' funds may be invested in real assets, but most real assets are treated as monetary assets under historical cost accounting.

Exceptions to this rule are permanent fixed assets such as the property holdings of listed property trusts where inflation-induced increases in accounting values are not normally regarded as part of the normal operating profit. In these cases the historical cost convention is modified to account for these assets in real terms.

The extent to which this accounting modification occurs will vary considerably from one business to the next, but overall, it seems to apply to one-quarter to one-third of shareholders' equity. Once we allow for a partial impact of inflation of this order (in addition to the ploughback factor and the varied impact of inflation on specialised sectors), ploughback plus this partial inflation factor seems to explain the long-term capital growth in the share price index in times of high and low inflation.

In the case of the listed property trust index since 1979, which has risen at 5.0% per annum compound, the dividend yield has fallen from 8.2% to 7%, which accounts for capital appreciation of 0.7% per annum. The balance corresponds closely with inflation of 4.5% per annum.

THE DIVIDEND FACTOR

After considering the impact of retained earnings and inflation, we need to consider the long-term effect of earnings distributed in dividends. Under the so-called Gordon growth model, the total return from purchasing and indefinitely holding a portfolio corresponding to the stock exchange index is equal to:

the current dividend yield
plus the rate of growth of dividends

There is, however, a subtle underlying assumption which makes this model unsuitable for considering the historical record in that it assumes dividends are consumed as received, whereas investigations of the historical record tend to assume dividends are reinvested as they become payable, which is the assumption implicit in the calculation of accumulation indices. As dividends are assumed to be reinvested at a variety of stock market levels, the dividend factor in historical total return investigations should therefore be, as a first approximation, an average dividend

yield rather than the dividend yield at the beginning of the investigation.

Using the Reserve Bank data, the average dividend/shareholders' funds ratio was 5% per annum. If we now allow for an average price/shareholders' funds ratio of 1.5 (see Fitzherbert, JASSA March 1979), this suggests a dividend factor of the order of 3.5% per annum when return on equity averaged 9% per annum. So the *historical* (geometric mean) stock market return in Australia should be:

ploughback factor plus ***partial*** *inflation adjustment plus average dividend yield*

Over the 20th century, this should have been approximately 8.7 or 9% per annum in round terms as follows:

4% (ploughback) + 30% of 4% pa (partial inflation) + 3.5% (dividends) = 8.7%

The *prospective* total return from a *buy and indefinite hold* strategy using the Gordon growth model is the same except that we use the current dividend yield rather than the historical average.

This estimate of the total (geometric mean) return generated by Australian equities over the 20th century is some 3% per annum lower than the estimate of Officer (1989) over the 106 years ended 1987.

There are, however, two adjustments that may need to be made to Officer's study. As well as quoting a geometric mean for 106 years, details are also provided for 10 10-yearly intervals and one six-yearly period. Compound interest calculations using the stated geometric mean rates of return for these intervals leads to a 106-year geometric mean return of 9.95% per annum rather than 11.78% as quoted.

Prior to 1980, the most widely known series of average dividend yields was an unweighted average. Over the period 1964–1973, the Melbourne Stock Exchange published two series of dividend yields, one weighted by market capitalisation, another unweighted.

These series demonstrated a difference ranging from 1.4% to 3.5% between weighted and unweighted yields. It is not clear exactly what dividend data Officer used in the earlier part of his study. However, his 10-yearly results over the period 1882–1957 seem to be broadly similar to those quoted by Owen (1964) who used unweighted dividend yields.

For some of the period covered by Officer, the underlying data therefore appears to involve unweighted averages of dividend yields, perhaps leading to an overstatement of 1–2% per annum in total return over the whole 106-year period. Applying these adjustments we arrive at a total geometric mean return of 8–9% per annum over the period 1882–1987, which reconciles Officer's long-term geometric mean to the estimate based on the return on equity approach.

MARKET VOLATILITY RISK?

It has been argued here that the main mathematical quantity that determines long-term equity returns is the underlying return on shareholders' equity, with inflation playing a secondary role. This accounts for all of the return evident in the historical record in Australia since the late 19th century. Of the three factors contained in this explanation of historical equity returns—ploughback, inflation and dividends—it is only the dividend factor that is affected by market levels and, in consequence, risk-averse behaviour by portfolio investors.

If the stock market index had been, say, 30% lower at all times, then this would have increased the dividend factor (i.e. the average dividend yield) from 3.5% to 5% per annum.

Return on equity and (partial) inflation accounts for all of the observed total return. As the level of consistent mispricing required having a material difference on long-term returns is very large, it is difficult to see how risk averse behaviour by *portfolio investors* has been an important *causal* factor in long-term equity returns.

Conclusion

Starting from the "accounting equation" and the historical cost convention, it has been shown how the long-term return achieved by equity investors will depend mainly on the level of return on equity achieved by company management, not the "risk" averse behaviour of portfolio investors.

With some exceptions, the role played by inflation is relatively minor. To the limited extent that data is available, it is possible to reconcile the return-on-equity argument with the historical record in Australia.

As part of a causal explanation for long-term stock returns, the return-on-equity approach offers a reliable framework for long-term projections. This reliability is not shared by the risk premium approach which is based on a non-causal relationship.

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