

# **Towards a Reconciliation of Portfolio Theory and Empirical Outcomes in Stock Price Behaviour: Australian Evidence**

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## **Background and aims of project:**

The CAPM (capital asset pricing model) which explains investor expectations in terms of a simple variable – exposure to market risk – has traditionally underpinned financial understanding of investment risk-return relationships. Notwithstanding, over the last 30 years or so, a major body of academic research - based on construction of historical portfolios – has demonstrated that equity stocks characterised as (a) of small size firms, (b) of high book-to-market ratio firms, and (c) of high idiosyncratic risk (non-market aligned volatility) firms have each enjoyed significantly higher returns over those of their counterparts (large size firms, low book-to-market firms, and low idiosyncratic risk firms). Indeed, a three-factor model comprising not only market volatility, but also “firm size” and “book-to-market ratio” as explanatory variables, is now viewed as academically “main-stream”. Such a model is now customarily applied in place of the standard CAPM in academic analyses of abnormal returns for portfolio managers, IPO’s, and individual firm performances.

Notwithstanding, a convincing theory has yet to be advanced by way of explanation as to why portfolios based on such variables as those highlighted above should be “rewarded” with superior returns by the markets. This has led to the criticism that in Finance, theory has failed to keep pace with empirical results. Alternatively, by way of defence for traditional theory, respected authors as far back as Black (1993) have rejected the empirical outcomes as “data snooping”.

Furthermore, and notwithstanding the fact that the empirical results derive from actual historical market performances, the implied portfolio strategies have recently been rejected as *un*-able to provide a basis for achieving superior investment performance in practice (Malkiel, 2004). A “credibility gap” may thus be said to have arisen between academic outcomes and practitioner applicability. This is clearly disturbing. The present project will address both of the above causes for concern: the “need for explanatory theory” and the “credibility gap” between attested academic empirical outcomes and practitioner applicability.

## **Significance and innovation:**

A serious criticism of finance research over the last 30 years has been the failure of theory to keep pace with empirical findings. Added to which, such empirical findings appear to be rejected as relevant by practising managers in their quest for superior investment performances. We have a “credibility gap” between theory and practice. The present project is aimed at rectifying both concerns. Dempsey’s (2002, one of the member’s of the present project) hypotheses offer a credible basis for such achievement. Traditional understanding is that investors determine a risk-return relationship by “setting prices”. Dempsey’s contribution here is a *mathematical* relationship between idiosyncratic risk and return based on statistical principles that predicts a positive relationship between idiosyncratic risk and return (as has been observed empirically for US data).

To date, very little work has been dedicated to an analysis of portfolio performance in terms of the constituent performances of the individual stocks making up the portfolio. It is simply not known, for

example, whether the superior performance of academically attested portfolios is the outcome of the *majority* of stocks performing above average, or (following the Dempsey hypothesis) the outcome of a relatively *small number* of “big winners” carrying the winning portfolio over the line, so to speak.

### **Description of Approach:**

Given the fact that stocks in small-size firms are generally more volatile, any explanation for the higher returns of high idiosyncratic risk firms may be interpreted as an explanation for the higher returns of small-size firms (as observed by Malkiel and Xu, 1997). Dempsey’s 2002 argument is that returns are *a*-symmetric (the downward return is bounded by minus 100%, whereas the up-side is theoretically unbounded) so that idiosyncratic risk *of itself* is capable of generating – *mathematically* – higher returns. The argument can be applied not only to small size firms – with higher volatility – but also to high book-to-market stocks which have, in effect, reached close to their downside potential – so that their downside is restricted while their upside potential remains unbounded. Dempsey’s arguments also hold potential to explain the “credibility gap” between the superior performances of academically constructed portfolios based on size, book-to-market ratio, and idiosyncratic risk, and practitioner responses that the application of such portfolios are unable to provide them with a basis of achieving superior investment performance.

The explanation is simple. Following, Dempsey’s theoretical basis, there is no reason to expect that a *majority* of stocks in the superior portfolios as recommended by academics (low size, high book-to-market ratio, high idiosyncratic risk, etc) should over-perform. Rather, the explanation for the superior performance of such portfolios is that the performance of the “big winners” more than compensate for the “big losers” in the portfolio. In fact, following Dempsey’s hypothesis, the “winning portfolios” is expected to comprise 50% over-performers and 50% under-performers against the average market performance – exactly the same as for the inferior performing portfolios. For the above reason, it is likely the case that a portfolio requires investment in a *large number* of stocks from the academically attested winning portfolio before such portfolio attains a reasonable probability of superior performance. In other words, when a *small* number stocks from the academically attested winning portfolio is selected, there is only a small implied probability of investment success – exactly as attested by practitioners. Consistently, the project’s approach will be that of observing whether the performances of portfolios based on “size, “book-to-market” and “idiosyncratic risk” are the outcome of the *average* performance of the assets in the portfolio, or – as the proposed theory suggests – the outcome of the *asymmetry* of performances.

### **Nature of expected outcomes:**

Practising portfolio performance is charged with the long-term provision of insurance payouts, pension commitments, and investor provisions for long-term wealth creation. As described, the present project is aimed at achieving a relevance of financial theory for practising portfolio management aimed at optimising the effectiveness of portfolio selection. It is anticipated that the project will deliver articles for publication in top-ranking journals.

### **National Benefit:**

It is important that investors and fund managers have guidance on the behavior of stock prices. Otherwise, there is no basis on which to recognize and reward superior investment performance. Although the three-factor model of Fama and French is gaining wider acceptance, we still do not understand what drives the model. Malkiel and Xu (1997) suggest that small firms generate superior returns as they have high idiosyncratic volatility. Our study seeks to provide ground-breaking but nevertheless sound explanations of stock price performance. Our model could be used to evaluate, rank and reward fund management performance.

**References:**

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