

RESEARCH BRIEF

Mean Reversion in the Dimensions of Expected Stock Returns

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RESEARCH

This study looks for evidence of mean reversion in the equity, profitability, size, and value premiums. Regressions test for statistical evidence of mean reversion, and trading simulations examine whether mean reversion in historical premiums was strong enough to permit profitable trading strategies. Evidence of mean reversion is weak, and 780 simulated trading strategies show very limited evidence of reliably positive abnormal returns.

INTRODUCTION

While the evidence indicates that the equity, size, value, and profitability premiums have been reliably positive, their annual realizations have varied substantially. This variation leads some to wonder if the expected values of these premiums are constant over time. In particular, some have speculated that there may be mean reversion, so that high premiums tend to be followed by low premiums and vice versa.

There are at least two consequences of mean reversion in a return series. First, returns measured over long horizons are not as variable as they would be in the absence of mean reversion. Second, future values of the return

are at least partially predictable. If high returns tend to be followed by low returns (and vice versa), investors can learn something about likely future returns by looking at past returns. However, it is not clear what the time horizon should be, nor is it clear what mean a premium should revert to, nor is it clear how strong the predictability in returns should be.

This study focuses on predictability in the US and 14 other markets.¹ Time series regressions look for statistical evidence of predictability, and trading simulations examine whether predictability was strong enough to generate reliable excess returns.

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1. For a complete discussion of the methodology and results see the full white paper, "Mean Reversion in the Dimensions of Expected Stock Returns", available at my.dimensional.com.

KEY FINDINGS

- Evidence of mean reversion found in the study is quite weak. While the presence of mean reversion in the historical sample cannot be ruled out, there is minimal evidence that it has been strong enough to permit profitable trading strategies. The proportion of simulations generating reliably positive excess returns was similar to what one would expect by random chance.
- The regressions in non-US markets indicate some ability to predict when the equity premium will be above or below average, but that is not enough for a successful trading rule. Such a rule requires an ability to predict when the premium is likely to be negative. The evidence suggests this is more difficult to do.
- If there is no mean reversion at all in the dimensions of return, about 5% of the 780 trading simulations in the study would likely show reliably positive excess returns just by random chance. The actual proportion is 5.8%. Overall, the evidence of predictability from these simulations is quite weak.

CONCLUSIONS

The procedure followed in this study—trying hundreds of different trading rules in search of some that work in the historical sample—is commonly called data mining. Dimensional has always cautioned investors not to rely on strategies that were found by data mining because the success of the strategies in historical data could be spurious. If one dredges through the data long enough,

one will eventually find some strategies that perform well in the historical sample. That is not an interesting result. It becomes more interesting if the same rule generates reliable excess returns in multiple samples while underperforming in few samples. The most interesting result of this study is that, in spite of vigorous historical data mining, no trading rule was found that consistently generated reliable excess returns across markets and premiums.

To reliably capture the premiums, an investment strategy must maintain a systematic focus on the expected return dimensions—equity, size, relative price, profitability—being pursued by the strategy. Dimensional's investment approach provides a consistent focus on the dimensions and adds value through advanced portfolio design, management, and implementation.

IMPORTANT DISCLOSURES

Strategies presented herein are for illustrative purposes only and do not represent actual investments or strategies available during the periods represented. The data does not reflect advisory fees, trading costs, or other expenses associated with the management of an actual portfolio. The securities held in the simulated model may differ significantly from those held in an actual account. Actual management of these types of simulated strategies may result in lower returns than the back tested results achieved with the benefit of hindsight. Investing involves risks such as fluctuating value and possible loss of principal investment. Past performance of a simulated strategy is no guarantee of future results.

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