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# MOMENTUM RETURNS TO S&P/ASX 100 *constituents*

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*With mixed evidence to date on the performance of momentum strategies in Australia, this paper examines returns to momentum strategies for constituent companies within the S&P/ASX 100, focusing on practical, realisable investment strategies. We find that momentum is both present and obtainable, and has been a persistent feature of the S&P/ASX 100 since its inception, including throughout the global financial crisis.*

Momentum has been a puzzling phenomenon of financial markets since its discovery by Jegadeesh and Titman in 1993. Momentum refers to the anomaly of abnormal returns due to buying stocks that have been past 'winners' and selling stocks that have been past 'losers'.

Momentum has been comprehensively studied in many markets around the world, and is often cited as 'the premier anomaly', a termed coined by Eugene Fama, the father of the efficient markets hypothesis (Fama and French 2007). There is overwhelming international evidence that momentum is a persistent, pervasive feature of stock prices and that it is not explained by traditional risk models.

In Australia, the evidence about the performance of momentum strategies is quite confusing. Table 1 documents 10 previous academic studies on momentum in the Australian market, and indicates the general findings of each of these studies.

**TABLE 1: Previous Australian momentum studies**

| Paper | General findings |
|---|---|
| **'Short-term autocorrelation in Australian equities', Gaunt and Gray (2003)** | Although not specifically testing for momentum, this paper tested autocorrelations among Australian stocks, which is a necessary precondition for momentum to occur. This paper supports the existence of momentum for stocks outside the top 200, but does not support momentum for the top 200 stocks. |
| **'Momentum in Australian stock returns', Hurn and Pavlov (2003)** | This paper tests for momentum within the top 200 stocks, as well as the top 50 stocks, and the remaining 150 stocks. It documents a strong momentum effect and notes that the effect appears strongest in the largest stocks. |
| **'Global momentum strategies: a portfolio perspective', Griffin, Ji and Martin (2004)** | This paper tests for momentum in the Australian market as part of a larger global study on momentum. It concludes that the momentum effect is not significant in Australia. |
| **'Momentum returns in Australian equities: the influences of size, risk liquidity and return computation', Demir, Muthuswamy and Walter (2004)** | Momentum is found to be a prevalent feature of the Australian market and this paper concludes that the returns to momentum in Australia are of a greater magnitude than previously found in overseas markets. |
| **'Do momentum strategies work? — Australian evidence', Drew, Veeraghavan and Ye (2004)** | This paper supports the finding that the momentum effect is stronger in Australia than in the United States. |
| **'Momentum in Australia — a note', Durand, Limkriangkrai and Smith (2006)** | Using Australian data from a much longer period than previous research, this paper finds no support for the momentum effect in Australia. |
| **'Disentangling size from momentum in Australian stock returns', Brailsford and O'Brien (2008)** | This paper attempts to explain the varying results of previous Australian studies by reference to differences in design empirics, sample periods and cross-sectional stock selection. |
| **'Momentum profits in the Australian equity market: a matched firm approach', Bettman, Maher and Sault (2009)** | Using a matched firm approach, this paper demonstrates that momentum returns are robust to short selling restrictions and transaction costs, and the paper confirms the existence of the momentum effect in Australia. |
| **'What should we know about momentum investing? The case of the Australian Security Exchange', Galariotis (2010)** | This paper confirms that the momentum effect in Australia is greater than in the majority of developed markets. It also documents that the most of the returns come from the 'long' side of the portfolios. |
| **'Interaction of size, book-to-market and momentum effects in Australia', O'Brien, Brailsford and Gaunt (2010)** | This paper suggests that previous studies which report loser portfolios outperforming winner portfolios may be picking up on the small-size effect rather than the momentum effect. It confirms the existence of momentum for large portfolios. |

## Methodology

In conducting our analysis, we chose to focus on the extent to which momentum returns were obtained by constituents of the S&P/ASX 100. There are a number of benefits to focusing on the constituents of an S&P index, such as their level of liquidity and market capitalisation. Further, the mandates for many fund managers cause them to invest almost exclusively among the constituents of S&P indices to ensure liquidity and to provide a ready investment benchmark. In addition to this, the stocks within the higher level ASX S&P indices have contracts for difference (CFD) equivalents, meaning there are no short selling constraints.

To conduct our analysis, we sourced data from the Securities Industry Research Centre of Asia Pacific (SIRCA). We obtained historical membership data for the S&P/ASX 100, daily prices for all constituents including de-listed stocks, daily dilution adjustment factors and relevant symbology changes. The price data adjustment factors allow for adjustments related to bonus issues, consolidations, splits, capital returns and dividends. This allowed us to reconstruct the daily prices of all members of the S&P/ASX 100 since its inception in early 2000, until the end of 2011.

To test momentum strategies, researchers usually use the J/S/K methodology. In the J/S/K approach, stocks are ranked on the basis of their previous *J* months' price change, and their performance is measured for the next *K* months. The *S* parameter is usually 0 or 1, and indicates whether a month is skipped between the end of the *J*-month ranking period and the beginning of the *K*-month holding period. For example, a 6/1/6 strategy means that in any month, all stocks are ranked on the basis of their last six months' price change. The top group of stocks are bought into a portfolio after waiting for one month. This portfolio is then held for the next six months, and the average portfolio return is calculated. It is traditional to create decile portfolios, that is, to divide stocks up into 10 portfolios dependent on the strength of the *J*-monthly prior returns. It is also traditional to create monthly rolling, overlapping portfolios, and the results in this paper reflect those traditions. This allows for a direct comparison of our results with other prior research on momentum.

To understand how momentum develops, we have created traditional J/S/K momentum portfolios for the cases where J/S/K range over {*J*=3,6,9,12,18,24}/{*S*=0,1 /{*K*=3,6,9,12,18,24}. This results in 72 different momentum strategies. Within each strategy, we divide the stocks into deciles on a rolling monthly basis.

To implement a momentum strategy, the investor goes long (short) the highest (lowest) ranked decile each month.

We calculate the total returns (known in momentum terminology as the 'WML portfolio' — winner minus loser portfolio), and then compare the result with the returns to holding the S&P/ASX 100. In doing so, we can assess the potential for the winners to outperform the losers, and for the entire WML implementation to outperform the index.

## Discussion of results

Table 2 shows the returns to the 6/1/6 strategy. It is traditional to present calculations for the 6/1/6 strategy and present summary figures for other strategy implementations, and we have followed that convention here. Table 2 presents the monthly mean returns to the winner and loser deciles, the WML returns and the index returns. The WML returns are tested for difference to zero, and significant values are marked with an asterisk to indicate significance at the 5 per cent level. The relevant *p*-value for the *t*-statistic is shown in parentheses.

**TABLE 2: Monthly mean returns to the 6/1/6 strategy**

| | Momentum (6/1/6) | |
|---|---|---|
| **Decile** | **Mean** | ***t*-stat (*p*)** |
| **Loser** | 0.0023 | |
| **Winner** | 0.0123 | |
| **WML** | 0.0100 | 2.3835 (0.0186) * |
| **Index (XTOA)** | 0.0078 | |

Table 2 documents the 6/1/6 mean monthly returns for the S&P/ASX 100 constituents since inception. The S&P/ASX 100 is designed to represent the large and mid-cap universe for Australia, and covers approximately 74 per cent of Australian equity market capitalisation (Standard and Poor's 2011). Companies in this index are specifically chosen for their size and liquidity, with the aim being to minimising turnover and thereby ensure tradability. The comparison index used is XTOA, which is the accumulation index for the S&P/ASX 100.

The WML portfolio for the 6/1/6 strategy is statistically significant at the 5 per cent level.

The 'loser' portfolio is the portfolio that an investor would need to short to implement a zero-cost momentum strategy. The 'winner' portfolio is the portfolio that an investor would need to take long positions in to implement a momentum strategy. Interestingly, it is the long portfolio which contributes the largest overall return. One of the past criticisms of momentum has been that it can be difficult to implement a momentum strategy due to the restrictions of short selling.

**TABLE 3: Monthly mean returns to the J/1/K strategies**

| J \ K | 3 | 6 | 9 | 12 | 18 | 24 |
|---|---|---|---|---|---|---|
| 3 | 0.013 (*t*= 3.076; *p*= 0.003) | 0.008 (*t*= 2.241; *p*= 0.027) | 0.009 (*t*= 2.975; *p*= 0.004) | 0.006 (*t*= 2.305; *p*= 0.023) | 0.001 (*t*= 0.644; *p*= 0.521) | 0.000 (*t*= 0.113; *p*= 0.910) |
| 6 | 0.015 (*t*= 2.868; *p*= 0.005) | 0.010 (*t*= 2.383; *p*= 0.019) | 0.008 (*t*= 2.397; *p*= 0.018) | 0.004 (*t*= 1.552; *p*= 0.123) | -0.001 (*t*=-0.493; *p*= 0.623) | -0.001 (*t*=-0.595; *p*= 0.553) |
| 9 | 0.014 (*t*= 2.835; *p*= 0.005) | 0.007 (*t*= 1.808; *p*= 0.073) | 0.005 (*t*= 1.516; *p*= 0.132) | 0.001 (*t*= 0.593; *p*= 0.555) | -0.003 (*t*=-1.023; *p*= 0.309) | -0.002 (*t*=-1.338; *p*= 0.184) |
| 12 | 0.011 (*t*= 2.222; *p*= 0.028) | 0.003 (*t*= 0.903; *p*= 0.368) | 0.001 (*t*= 0.195; *p*= 0.846) | -0.003 (*t*=-1.468; *p*= 0.145) | -0.005 (*t*=-2.084; *p*= 0.039) | -0.005 (*t*=-3.258; *p*= 0.001) |
| 18 | 0.003 (*t*= 0.750; *p*= 0.455) | -0.003 (*t*=-0.878; *p*= 0.381) | -0.004 (*t*=-1.726; *p*= 0.087) | -0.006 (*t*=-3.342; *p*= 0.001) | -0.010 (*t*=-4.222; *p*= 0.000) | -0.009 (*t*=-5.888; *p*= 0.000) |
| 24 | 0.001 (*t*= 0.261; *p*= 0.794) | -0.004 (*t*=-1.184; *p*= 0.239) | -0.005 (*t*=-2.360; *p*= 0.020) | -0.007 (*t*=-4.300; *p*= 0.000) | -0.009 (*t*=-4.090; *p*= 0.000) | -0.009 (*t*=-5.644; *p*= 0.000) |

Table 3 demonstrates a number of well-understood, stylised facts concerning stock market data. The data in the upper left-hand side of the table show significant momentum returns. Further, the data clearly show a trend of returns to momentum falling for each *J* as the holding period *K* increases, confirming that momentum is a medium-term effect. It is a stylised fact that momentum returns tend to dissipate with increases in holding periods.

The bottom right-hand side of the table shows the well-documented mean-reversion effect, that is, the tendency for outperforming stocks to revert to their means over extended periods of time. Indeed, for lengthy *J* and *K* periods, following an 'opposite' approach to momentum would have led to statistically significant returns. This is the well-known 'mean reversion effect'.

## Conclusion

This research has focused on documenting the returns to momentum strategies in the S&P/ASX 100. Momentum was found to be present in the shorter timeframe *J* and *K* combinations tested. The long side of portfolios performed at a statistically significant level in every combination tested.

This is in contrast with some prior US work (Lesmond, Schill and Zhou 2004), which finds that momentum effect is primarily driven by the smaller, illiquid stocks in a portfolio. It is also in contrast with some prior Australian work (Brailsford and O'Brien 2008), which finds that the momentum effect is largely due to short selling smaller stocks.

However, these results closely align with the prior findings of Galariotis (2010), who finds that the momentum effect in large stocks in Australia is predominantly driven by the long side of the portfolio.

Overall, we find support for the use of momentum-based investment strategies within the S&P/ASX 100.

## Future work

This research has documented the returns to momentum portfolios over a wide range of J/S/K combinations. To fully understand the benefits and potential of momentum investment strategies, our future work will aim to benchmark momentum returns among the constituents of the S&P/ASX 50 and S&P/AS 200 indices.

Along with the S&P/ASX 100, these indices represent the larger Australian S&P indices, and their constituents are specifically chosen for their size, liquidity and tradability. For these reasons, momentum investment among the constituents of the ASX/S&P indices represents potential opportunities for all investors. ■

*Overall, we find support for the use of momentum-based investment strategies within the S&P/ASX 100.*

## Note

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