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Momentum in Australia—A Note

by

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Abstract:

Our note examines the momentum effect in Australia using the J-month/K-month methodology of Jegadeesh and Titman (1993, 2001). Our sample consists of stocks listed on the Australian stock exchange from January 1980 to December 2001. We do not find evidence for a momentum effect in Australia during this period. Rather, we find evidence of significantly positive returns for ‘loser’ portfolios in July—the first month of the Australian financial year.

Keywords:

MOMENTUM; AUSTRALIA.

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1. Introduction

The presence of momentum has challenged notions both of market efficiency and models of the cross-section of asset returns. That a portfolio formed of *past* winners should outperform a portfolio based on *past* losers is a *prima facie* challenge to weak-form market efficiency. Such effects seem to be persistent, present in a number of countries¹ and inexplicable using generally accepted asset-pricing models such as the Fama-French three-factor model (Fama & French 1993). These findings have led to arguments that a spanning portfolio of ‘winners minus losers’ should augment models of the determinants of the cross-section of asset price returns.²

2. Prior Research

Research has suggested that momentum may be present due to inefficiencies or frictions in incorporating information in prices. Chan, Jegadeesh and Lakonishok (1996) have argued that momentum stems from investors’ slow response to new information. Hong, Lim and Stein (2000) have found that there is market underreaction to firm-specific information, particularly to bad news. Lee and Swaminathan (2000) have documented that momentum is linked to the trading volume: stocks with low (high) volume in the past generate higher (lower) future returns. Chan (2003) provides support that news is incorporated slowly in prices but argues that the effect is driven by the slow reaction of prices to bad news.

Previous analyses provide mixed evidence of the presence of a momentum effect in Australia. Using monthly data to examine autocorrelation of individual stocks, Gaunt and Gray (2003) find evidence of negative autocorrelation of small to medium stocks and positive autocorrelation of large stocks; they are sceptical as to whether abnormal profits might be generated by the momentum trading strategies they examine. Hurn and Pavlov (2003) examine momentum in the largest Australian stocks. Unlike our study, however, they do not consider any effect of seasonality. Due to the difficulty of constructing the HML factor for the period they study, they do not consider whether the returns they find are abnormal using a generally accepted model of returns.³ Chan and Faff (2003) include a momentum factor in their examination of the role of liquidity in asset pricing.⁴

Examining daily returns of the constituents of the All-Ordinaries index, Demir, Muthuswamy and Walter (2004) find *prima facie* evidence of momentum in daily returns. Like Hurn and Pavlov (2003), Demir, Muthuswamy and Walter do not consider seasonality in their data. Demir, Muthuswamy and Walter do not

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1. Further support for the existence of momentum is found outside of the U.S. markets (in studies such as Rouwenhorst 1998; Chan, Hameed & Tong 2000; Bacmann, Dubois & Isakov 2001) although there is some evidence that it may not be pervasive in emerging markets (Rouwenhorst 1999; Hameed & Kusnadi 2002; Chui, Titman & Wei 2000).
 2. ‘Assuming that the anomaly endures, then, quite appropriately, it will enter the lexicon of finance as a ‘factor’ whose economics are as well understood as the SMB and HML factors: If it remains a fact, it becomes a factor’ (Grundy & Martin 2001, p. 72).
 3. Halliwell, Heaney and Sawicki (1999), Faff (2001), Gaunt (2004) and Durack, Durand and Maller (2004) provide evidence of the applicability of the Fama-French model in Australia.
 4. Chan and Faff’s (2003) justification for the inclusion of a momentum factor is based on overseas, not Australian, evidence.

consider whether their returns are abnormal using a generally accepted model of returns.⁵ Demir, Muthuswamy and Walter, however, provide the best evidence of momentum and, pre-empting our findings, present results that seem inconsistent with ours. We replicate their results and discuss the relationship to ours in the appendix to this note.

The seminal papers in the study of momentum are Jegadeesh and Titman (1993, 2001). Jegadeesh and Titman (1993) examine the profitability of momentum strategies on the New York Stock Exchange (NYSE) and the American stock exchange (AMEX) stocks over the period 1965–1989, and find a significant momentum effect in 31 of the 32 momentum portfolios that were formed. Jegadeesh and Titman (2001) re-examine the profitability of momentum strategies over the period of 1990–1998. Once again, momentum portfolio returns were found to be both positive and significant. In addition, both studies find a significant January effect, which is the first month of the U.S. fiscal year.

3. Analysis

Our analysis follows the methodology utilised in Jegadeesh and Titman (1993, 2001) and examines all stocks listed on the Australian Stock Exchange from January 1980 to December 2001.⁶ To be included in our sample, the stock had to survive for the duration of the J -month formation period. To illustrate the number of stocks available for our analysis, table 1 presents the number of stocks available for inclusion in the $J = 12/K = 12$ strategy over the sample period. We rank stocks on the basis of their returns over the previous J -months and form ten portfolios. The first portfolio, $P1$, consists of the winners, the 10% of best performing stocks in the J -month evaluation period. The second portfolio, $P2$, consists of the next decile of stocks, which outperformed 80% of the stocks in the market but did not fall within the top 10%, etc. $P10$ consists of the decile of worst performing stocks. We then examine the returns of these portfolios over the K -months after the portfolios are formed. Of the sixteen strategies we test over the full-sample period, four analyses suggest that a contrarian effect may be present; winners appear to under-perform losers. Once we account for the possibility of seasonal effects, we cannot reject the null hypothesis that the ‘winner’ returns are no different from those of the ‘losers’ in any of the sixteen strategies.

If momentum is present in Australia in the form found by Jegadeesh and Titman (1993, 2001), the K -month returns of $P1$ should be significantly different from those of $P10$. As the Kolmogorov-Smirnov one-sample test confirms that all of our portfolios are normally distributed (table 1), the appropriate test of the above hypothesis is a paired t -test. Using a paired t -test allow us to focus on the difference between the returns of the two portfolios and also recognise the contemporaneity of the portfolios. In order to ensure the validity of the inferences we make on the basis of our test statistics, we ensure that the K -month observations we examine are independent (that is, we do not use overlapping data). Thus, we examine the differences in the monthly returns over K -months and, when this period is ended, say at time t , form another set of portfolios based on the preceding J -months and

5. While Demir, Muthuswamy and Walter (2004) do not go as far as using the three-factor model, they do consider the effects of size and also liquidity on momentum.

6. In each strategy, the first J -months returns of the entire sample are lost in the portfolio formation process.

then examine the returns from this second K -month period, etc. Examining the distribution of the data and using an appropriate test, ensuring that samples are independent when statistical tests are premised on this assumption, and recognising the data are paired and focussing on the difference in returns, are steps that are, unfortunately, often neglected in the literature.

Table 1
Sample Size at each Portfolio Formation ($J = 12$; $K = 12$)

This table reports the number of stocks available for inclusion in the momentum portfolios when returns are calculated over the previous 12 months, ranked in descending order, and held for 12 months.

Portfolio Formation Year (1 January)	Stocks Available for Portfolio Formation
1981	470
1982	471
1983	480
1984	564
1985	630
1986	678
1987	815
1988	745
1989	770
1990	543
1991	461
1992	505
1993	575
1994	673
1995	754
1996	836
1997	843
1998	842
1999	836
2000	823
2001	876

Table 2 presents summary statistics for the first four moments of the holding period returns for PI (the portfolio of winners during the J -month formation period) and $PI0$ (the portfolio of losers during the J -month formation period) for each of the strategies in the full-sample period. In all but one case post-formation returns of $PI0$ are higher than those of PI , contrary to what would be expected if momentum was present in Australian returns.

Table 2
Descriptive Statistics of Momentum Portfolios (Full-Sample Period)

Stock returns are calculated over J -months and ranked in descending order. Decile portfolios are then formed and the decile portfolio returns are calculated over the K -months following the formation period. Descriptive statistics are presented below for the highest ($P1$) and the lowest ($P10$) ranked portfolios. The Kolmogorov-Smirnov One-Sample Test is used to test the null hypothesis that a sample conforms to a normal distribution. In all instances, the p -value of the Kolmogorov-Smirnov tests we report are greater than 0.05. The sample period is January 1980 to December 2001.

J	K	3		6		9		12	
		P1	P10	P1	P10	P1	P10	P1	P10
3	Mean	1.0107	1.0586	1.0615	1.0587	1.0654	1.1595	1.0611	1.2831
	Standard Error	0.0210	0.0242	0.0560	0.0587	0.0733	0.1043	0.1169	0.1787
	Standard Deviation	0.1963	0.2261	0.3673	0.3850	0.3947	0.5617	0.5358	0.8191
	Kurtosis	2.3475	-0.0237	2.1889	0.3101	1.0879	0.9362	1.1489	2.4171
	Skewness	0.3140	0.4441	1.1317	0.6999	0.9178	1.1623	0.9964	1.4676
	Kolmogorov-Smirnov	0.3990	0.9350	0.2370	0.7460	0.4540	0.3670	0.8810	0.6290
6	Mean	1.0184	1.0404	1.0310	1.0788	1.0563	1.1166	0.9983	1.2605
	Standard Error	0.0204	0.0256	0.0417	0.0620	0.0648	0.1003	0.0696	0.1558
	Standard Deviation	0.1895	0.2376	0.2735	0.4064	0.3431	0.5309	0.3189	0.7142
	Kurtosis	2.2368	0.1953	1.6952	1.0368	-0.4857	1.2324	-0.2875	0.9406
	Skewness	0.2756	0.4638	0.8702	1.1193	0.4653	0.9588	0.2864	0.9653
	Kolmogorov-Smirnov	0.4290	0.7810	0.4580	0.3630	0.7060	0.7320	0.9190	0.9090
9	Mean	1.0090	1.0420	1.0303	1.0621	1.0325	1.1556	1.0250	1.1046
	Standard Error	0.0195	0.0257	0.0471	0.0564	0.0772	0.1143	0.0894	0.1144
	Standard Deviation	0.1798	0.2373	0.3049	0.3652	0.4086	0.6048	0.4098	0.5242
	Kurtosis	1.9424	0.6799	1.6691	-0.5172	0.1695	3.6066	0.2282	-1.0277
	Skewness	0.0261	0.6569	0.6973	0.3930	0.6016	1.5215	0.3312	0.2167
	Kolmogorov-Smirnov	0.7380	0.7830	0.5950	0.9080	0.9060	0.8510	0.9080	0.8880
12	Mean	1.0031	1.0431	0.9986	1.0796	1.0115	1.1474	1.0128	1.1346
	Standard Error	0.0191	0.0253	0.0388	0.0590	0.0676	0.1007	0.1030	0.1279
	Standard Deviation	0.1747	0.2322	0.2518	0.3825	0.3575	0.5328	0.4718	0.5861
	Kurtosis	1.5516	0.0868	0.8083	0.6458	0.1030	-0.4915	0.9913	0.8978
	Skewness	-0.2440	0.5227	0.6166	0.9428	0.2609	0.7708	0.9871	1.1907
	Kolmogorov-Smirnov	0.8060	0.6490	0.8310	0.7570	0.9480	0.5710	0.7280	0.1030

The results of the tests of the null hypotheses that the returns of $P1$ equal the returns of $P10$ are reported in table 3. The tests reported in Panel A indicate that in four strategies over the full-sample period, we can reject the null hypothesis with confidence. Further analysis of these strategies (Panels B, C and D) in all periods,

demonstrates that the difference in returns is concentrated in July.⁷ Our contention that it is seasonality (rather than momentum) that is driving our findings is strengthened by the significant return differences between *P1* and *P10* in July in 14 of the 16 portfolios over the full-sample period. The test statistics are negative, indicating that it is the returns of the *P10* portfolios that exceed those of *P1* portfolios. Seasonality is itself an anomaly and while it may account for the momentum effect, it does not provide an explanation for it.

Table 3
Momentum Return Difference Tests (Full-Sample Period)

Stock returns are calculated over *J*-months and ranked in descending order. Decile portfolios are then formed and the decile portfolio returns are calculated over the *K*-months following the formation period. A paired-sample t test is used to test the null hypothesis that the means of *P1* and *P10* are equal. Panel A reports the results from the entire sample. Panel B excludes returns in January and July, Panel C reports the January result and panel D the result in July. The sample period is January 1980 to December 2001. * represents significance at the 5% level and ** at the 1% level.

J-Month	K-Month			
	3	6	9	12
<i>Panel A: All Months</i>				
3	-2.612*	0.081	-1.399	-2.468*
6	-1.115	-1.114	-1.025	-2.235*
9	-1.634	-1.004	-1.895	-1.182
12	-2.113*	-1.989	-1.899	-2.007*
<i>Panel B: Other Months (Excluding January and July)</i>				
3	-0.462	0.064	0.521	-1.984
6	0.791	0.736	0.241	-0.984
9	0.099	0.120	-0.549	-0.795
12	-0.545	-0.398	-0.924	-0.610
<i>Panel C: January</i>				
3	-2.402*	1.162	-1.096	-1.291
6	-0.510	-0.510	-1.174	-1.206
9	-0.909	-1.213	-0.776	-1.213
12	-2.004*	-2.004*	-1.188	-2.004*
<i>Panel D: July</i>				
3	-5.947**	-1.557	-3.073**	-1.655
6	-5.092**	-5.092**	-3.569**	-5.036**
9	-4.438**	-2.009*	-3.033**	-2.962**
12	-3.164**	-3.164**	-3.450**	-3.471**

7. We chose July following visual inspection of the data. We note with interest that the effect, in the first month of the Australian financial year, parallels the U.S. January effect. We included January due to the strong influence U.S. stocks have on Australian stocks (Durand, Koh & Watson 2001).

4. Conclusion

We conclude, therefore, that the momentum effect is not present in monthly Australian stock returns in the period we study. Noting the findings of Demir, Muthuswamy and Walter, however, we believe that the question as to the presence of momentum in daily data is still open (as is the question as to why the results do not ‘scale up’ to the monthly returns we analyse in appendix A).⁸ Rather than a momentum effect, we find a strong seasonal regularity associated with July, the first month of the Australian financial year. The bottom line of our analysis, however, is that momentum does not appear to be a candidate for inclusion as a priced factor in models for the cross section of Australian returns.

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Appendix

Demir, Muthuswamy and Walter (2004) Reconsidered

Our note analyses monthly returns of stocks listed on the Australian Stock Exchange from January 1980 to December 2001. Our findings indicate that momentum is not present in Australia. Any differences between *P1* and *P10* are driven by seasonality.

As we discuss in the note, these findings are at odds with those of Demir, Muthuswamy and Walter (2003). Several differences exist in the methodology used in these studies. We use monthly data while Demir, Muthuswamy and Walter use daily data. We use all stocks in the market while Demir, Muthuswamy and Walter use two samples: the stocks that make up the All-Ordinaries index and securities approved for short-selling. Demir, Muthuswamy and Walter study a shorter time-period than we do: September 1990 to July 2001 for approved securities, and July 1996 to July 2001 for index securities, while our sample spans 21 years. One other major difference is that we consider the effects of annual seasonalities in returns.

The goal of our analysis was to replicate Jegadeesh and Titman (1993, 2001) and, accordingly, a re-examination of momentum using daily data is beyond the scope of the present analysis. Nonetheless, it is useful to consider why the findings in this note may be at odds with those reported in Demir, Muthuswamy and Walter. We do so by considering daily, rather than monthly, returns for the stocks we analysed in the note. We find results comparable to Demir, Muthuswamy and Walter.

As we have mentioned, one of the major differences between our note's analysis and Demir, Muthuswamy and Walter is the sample of stocks included in the dataset. Demir, Muthuswamy and Walter use a restricted set while we have included all fully paid ordinary securities. As Gaunt and Gray (2003) and Hurn and Pavlov (2003) relate the presence of momentum to the market capitalisation of stocks we begin our analysis by replicating table 1 in Demir, Muthuswamy and Walter with one difference: we use, as in our note, the entire set of fully paid ordinary shares. Like Demir, Muthuswamy and Walter, we exclude stocks that have a price less than 50 cents in the formation period, calculate returns using the daily value weighted average price with overlapping returns and use the same sample period of September 1990 to July 2001. Table A1 presents results that are in keeping with Demir, Muthuswamy and Walter. We find pronounced and statistically significant momentum for all the strategies considered with similar levels of momentum to Demir, Muthuswamy and Walter. The differences in the securities included in the datasets appear an unlikely source of the difference between our note and Demir, Muthuswamy and Walter.

Table A1

Replication of Demir, Muthuswamy and Walter's (2004) Table 1

Stock returns are calculated over *J*-days and ranked in descending order. Only included are Australian fully paid ordinary stocks which are priced at 50 cents or above during the formation period. Decile portfolios are then formed and the decile portfolio returns are calculated over the *K*-days following the formation period. A *t* test is used to test the null hypothesis that the mean of *P1* and *P10* are equal. The holding period return is reported first; the number in brackets next to each is the average 30 day return from the strategy (30d). The sample period is 1 September 1990 to 1 July 2001.

* represents significance at the 5% level and ** at the 1% level.

Returns to the Zero-Cost Momentum Portfolio: All Fully Paid Ordinaries												
K=30			K=60			K=90			K=180			
Return	30d	t-statistic	Return	30d	t-statistic	Return	30d	t-statistic	Return	30d	t-statistic	
Buy and Hold Returns												
J=30	3.46	(2.47)	2.50*	8.35	(2.98)	3.70**	10.96	(2.61)	3.54**	16.91	(3.02)	3.78**
J=60	4.23	(3.02)	3.16**	9.56	(3.41)	4.45**	13.01	(3.10)	4.63**	15.56	(2.78)	3.30**
J=90	4.81	(3.44)	3.48**	10.76	(3.84)	4.94**	13.64	(3.25)	4.61**	14.64	(2.61)	2.86**
J=180	3.22	(2.30)	2.30*	5.67	(2.02)	2.11*	6.72	(1.60)	1.95	4.53	(0.81)	0.85

Table A2 runs the same analysis again on the set of all fully paid ordinary stocks for the longer period of time seen in our study. As the value weighted average price is not available in the 1980's we use closing price data to calculate returns. We mostly see reversals. Thus once again, as in our study's monthly return results, we find no evidence of momentum over the entire sample period using daily returns. The difference between Demir, Muthuswamy and Walter and our study appears to be unrelated to the choice of monthly versus daily data. It may, however, be the case that momentum exists only for certain periods of time (in which case, following a momentum strategy may not be an advisable course of action). Clearly, further analysis of momentum using daily data may be a fruitful course for future research.

Table A2
Application of Daily Returns to our Study Period

Stock returns are calculated over J-days and ranked in descending order. All Australian fully paid ordinary stocks are included. Decile portfolios are then formed and the decile portfolio returns are calculated over the K-days following the formation period. A *t* test is used to test the null hypothesis that the mean of P1 and P10 are equal. The holding period return is reported first; the number in brackets next to each is the average 30 day return from the strategy (30d). The sample period is 1 January 1980 to 31 December 2001. * represents significance at the 5% level and ** at the 1% level.

Returns to the Zero-Cost Momentum Portfolio: All Fully Paid Ordinaries												
K=90			K=180			K=270			K=360			
Return	30d	t-statistic	Return	30d	t-statistic	Return	30d	t-statistic	Return	30d	t-statistic	
Buy and Hold Returns												
J=90	-2.05	(-0.68)	-0.66	-5.67	(-0.95)	-0.56	-6.88	(-0.76)	-0.45	-22.96	(-1.91)	-0.93
J=180	-1.67	(-0.56)	-0.56	1.40	(0.23)	0.15	7.67	(0.85)	0.48	-21.29	(-1.77)	-0.71
J=270	-3.16	(-1.05)	-1.11	-11.52	(-1.92)	-1.16	2.23	(0.25)	0.11	-26.09	(-2.17)	-1.27
J=360	-3.77	(-1.26)	-1.19	4.23	(0.71)	0.33	-3.57	(-0.40)	-0.15	3.69	(0.31)	0.14