

International comparison of returns from conventional, industrial and 52-week high momentum strategies

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Abstract

The performance of both the industrial and the 52-week high momentum strategies are compared to the conventional strategy, using a large sample of stocks drawn from multiple countries covering a quarter of century to 2007. The sample of 51,879 stocks in 51 countries removes many criticisms, such as data mining, providing more generalisable finding and knowledge concerning the robustness and usefulness of return from momentum strategies. Both the industry and 52-week high strategies generate positive returns but neither was greater than the conventional momentum strategy. A new 52-week high industry momentum strategy is examined and it achieved a similar result.

JEL classification: G11; G15

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1. Introduction

An investigation of the returns from alternative momentum strategies is reported in this paper. The data set consists of 51,879 stocks in 51 countries from 1973 to 2007. Specifically, the traditional momentum strategy, 52-week momentum and industrial momentum strategies are analysed. The breadth of data used provides for a greater generalisability of findings, removing the prospect of data mining or results which are non-repeatable occurrences.

The possibility of making significant returns in stock trading based on past price movement of securities has had an appeal for a long time with chartism and other forms of technical analysis continuing to attract devotees. The efficient market hypothesis (EMH) debunked these approaches demonstrating that returns follow more random walk and that information about future returns is not present in the historical series of returns. This new wisdom gained a broad acceptance, first among academics, and then percolating into the practitioner domains such as portfolio management. A serious assault arose from DeBondt and Thaler (1985) who point to a failure of the EMH when they document the possibility of making abnormal profit in the stock market by transacting on the basis of past stock prices using what is known as the contrarian strategy. Similarly, momentum strategies, documented by Jegadeesh and Titman (1993), are conceived as a “system” of investing in portfolios of shares in a manner that is more profitable than holding a broadly diversified portfolio while at the same time involving no additional risk. Such a possibility is intriguing and raises a range of issues concerning the sustainability of such profits and whether such strategies can be refined so as to optimise the potential returns in both emerging and developed markets. Industrial momentum and 52-week high momentum returns are two extensions to the conventional momentum return. The industrial momentum strategy, first documented by

Moskowitz and Grinblatt (1999), suggest that momentum return is primarily driven by industry factors and therefore the investment strategy should be to buy best and worst performing industries. The 52-week high momentum strategy recommends buying and short-selling stocks based on nearness to their 52-week high/low price. Exponents of the 52-week high momentum return (George and Hwang (2004)) claim that the momentum return under this strategy will yield higher return than those achieved through the normal momentum strategy. Industrial momentum has been tested combining stocks from some European countries (Swinkels (2002)) but not in individual countries per se. 52-week momentum return investment strategy documented by George and Hwang (2004) in the US market has been tested in the Australian market as an out-of-sample empirical study. Recently, Du (2008) tests 52-week momentum strategy on international stock indices and finding a positive and statistically significant 52-week momentum return. However, the dataset covers indices rather than stocks listed within a country. This analysis documents whether the industrial momentum and 52-week high momentum generate superior momentum returns than the normal momentum returns as claimed by Moskowitz and Grinblatt (1999) and George and Hwang (2004) respectively, and whether these returns are consistent under different approaches on a global basis.

2. Prior research

Jegadeesh and Titman (1993) document the possibility of making abnormal profit in the stock market by studying past stock prices. They consider medium-term periods of 3 to 12 months for stock returns, and state that a significant abnormal profit can be made by buying (short selling) best (worst) performing stocks. Their strategy is popularly known as momentum strategy. In accord with the momentum strategy, stocks are ranked on the basis of their past 3 to 12 months of return and then assigned to different portfolios on the basis of

ranking. Each portfolio has a determined cut-off level, e.g., portfolio 1 consists of only those stocks which belong to the top 10% ranking of returns.

2.1. Industrial momentum

According to Moskowitz and Grinblatt (1999), the driving force of the individual momentum returns actually arises from the industry within which the company is positioned. They document no statistically significant individual momentum returns once the market returns are replaced by the industry returns. Similarly, when the loser and winner portfolios are formed within the same industry, an industry-neutral individual momentum strategy fails to generate positive significant abnormal returns. However, when the investment strategy is changed to buying past winning industry stocks and short-selling past losing industry stocks, the strategy results in a significant positive return.

The industry momentum results, however, are not accepted by all. Studies by Lee and Swaminathan (2000) and Lewellen (2002) fail to find any significant role of industry factors in explaining individual momentum return. Further, the industry momentum return has not received the same attention in the literature as the extensive research documented in the context of the individual momentum return. There are only a few studies testing industry momentum in an international context.

Industry momentum studies across a number of countries are undertaken by Swinkels (2002) and Nijman et al. (2004). However, these studies are limited in the sample coverage. Swinkels (2002) uses Datastream created industry indices, whereas Nijman et al. (2004) choose 1,581 stocks from 15 countries and then sort them into different industries based on the MSCI classification.

Other studies do not find industry momentum as a primary explanatory source of individual momentum return. Lee and Swaminathan (2000) document only a small decrease (12.5% to 10.1% per year) in the individual momentum profit once the industry factor is taken into consideration. Similarly, Lewellen (2002) finds significant and strong industry momentum returns with size sorted Book to Market portfolios, but the individual momentum is still present in the sample. Grundy and Martin (2001), Chordia and Shivakumar (2002) claim that the individual and industry momentum are a separate phenomenon and should be investigated separately. Grundy and Martin (2001) further state that the momentum return is not explained by either industry effect or cross-sectional dispersion in mean returns. Hurn and Pavlov (2003) add that no single factor can explain momentum return. Du and Denning (2005) suggest that momentum return arises due to the common factors, rather than industry-specific risk.

In an international context, Swinkels (2002) presents support for industry momentum return in the European markets but no evidence of the same is noted in the Japanese market. Iihara et al. (2004) do not find evidence of industry momentum returns in the Tokyo stock market. Nijman et al. (2004) document profitability of individual and industry momentum return in the European market but individual momentum return dominates industry momentum returns.

The gap of one month between the formation and holding period of the industry momentum return is also seen as an important methodological issue in the recent literature. Grundy and Martin (2001) document insignificant real or random return when a one-month gap is allowed between the formation and holding period. However, a zero-month gap between the formation and holding period results in positive momentum return, suggesting that a significant amount of return is generated in the first month of the holding period. The

contrary view is put forward by Du and Denning (2005) who assert that a one-month gap is not crucial for industry momentum profitability and the return is almost the same irrespective of a one-month or no gap.

2.2. 52-week high momentum returns

George and Hwang (2004) document how 52-week high momentum return generates a superior return when the stock selection is made on the proximity to 52-week high/low price rather than the traditional total return approach utilised in pioneering research by Jegadeesh and Titman (1993). George and Hwang (2004) results show that return associated with the 52-week high strategy are about twice as large as those associated with both the normal momentum return (Jegadeesh and Titman (1993)) and industrial momentum return (Moskowitz and Grinblatt (1999)). The calendar month anomaly does not also apply to a 52-week momentum strategy as the difference is even larger outside of January. George and Hwang (2004) espouse that the 52-week measure has superior predictive power as stocks trading at 52-week high and low price are readily available from many sources. The authors suggest that when a stock's price has been pushed near or to a new 52-week high, investors are likely to sell the stock even when the information implies a trend of increasing price. Eventually, the information is incorporated into the price and the price goes up, resulting in a price continuation. Therefore, a 52-week high price coupled with a stock's current price can explain a large portion of profits from momentum investing.

Marshall and Cahan (2005) contribute further evidence, presenting an out-of-sample test for the 52-week high strategy using Australian Stock Exchange (ASX) data and find high profitability for the strategy. However, they use a different approach, suggesting it focuses on practical strategies, i.e., returns are calculated on the basis of closing price and invested on next day opening price. The study is also constrained in terms of stocks involved in the

sample, using only those stocks which are approved for short-selling by the ASX. Du (2008) tests a 52-week momentum strategy on international stock indices and documents a positive and statistically significant 52-week momentum return even after adjusting for risk and transaction-cost. However, the results also show that the 52-week momentum return follows reversals similar to those of the Jegadeesh and Titman (1993) momentum return.

3. Data

Stock price data are in US dollars for this study and sourced from Datastream. The raw data are carefully checked to remove errors as noted by Ince and Porter (2006). Equity classes such as REITs, ADRs are deleted so that only individual stocks remain in the sample. There are 51,589 stocks in the sample including live, dead, merged and suspended companies to ensure survivorship bias does not impact the study. Country-level data are reported in Table 1.

[Insert Table 1 about here]

Datastream maintains 45 industry classifications and each stock is identified as coming from one of these industries. The industry classification in Datastream is also consistent across all countries, thereby removing problems of conflicting industry classification for each stock under different databases, e.g., Standard Industrial Classification (SIC) and North American Industry Classification System (NAICS).

Of the 45 industry classifications, 38 are chosen as the remaining seven are problematic in terms of their aptness in describing an industry, or their lack of alignment with normal equity stocks category.

There are some notable differences between the industry monthly return (computed directly from stocks positioned within an industry) and Datastream industry indices. One of the most notable differences is the number of companies included in the industry monthly returns. While industry monthly return includes all stocks positioned with the industry, the Datastream industry indices only represents the highest capitalisation stocks within the industry, leading to a large-cap bias. Further, the industry monthly return allows for continuous addition or exclusion of the stocks within the industry in any month, whereas Datastream industry indices are reviewed only annually for possible addition or deletion of stocks from the industry indices¹.

The inclusion of all stocks positioned within the industry also avoids an inflated monthly return, as the return from distressed or other financially weak firms will still be included in the monthly figure. For example, the return of company X (say positioned within Utilities industry) will still be included in the industry monthly return until the last month of delistment. Therefore, computing industry monthly return directly from stocks avoids survivorship bias. Both the industry monthly return and Datastream industry indices are value-weighted. The sample period for each country, nevertheless, remains the same.

4. Analysis

The method of calculating momentum return follows Jegadeesh and Titman (1993), the industry momentum follows Moskowitz and Grinblatt (1999) and 52-week high is based on George and Hwang (2004). The analysis of the industrial momentum strategy proceeds by calculating industrial momentum return, using a specially crafted monthly value-weighted industry return and the Datastream provided industry indices. To test whether ‘normal’

¹ The reviewing was done on a 3-month interval prior to May 1995

momentum return arises due to an industry factor, two analyses are undertaken where the industry-adjusted and industry-neutral momentum return are calculated.

The industry momentum strategy cannot be tested in all 51 countries as the number of companies within an industry is not sufficient in some stock markets. To avoid idiosyncratic risk, it is necessary to have enough companies within an industry to permit proper diversification. Adoption of an arbitrary minimum number of 1000 stocks within any given month results in only seven out of 51 countries satisfying the above condition. The final seven markets are Australia, Canada, China, Japan, India, UK and US. The data used in this study are divided into 38 industries. Therefore, on average there will be around 25 companies within each industry to increase statistical reliability and reduce idiosyncratic risk from monthly industry returns². The sample period for some countries also changes as a result of a restriction on the minimum number of stocks.

Cumulative abnormal return (CAR) is selected as the appropriate method to compute abnormal returns. All the tests in the following section are calculated from the perspective of a US investor. The relevant price and capitalisation figures are converted to US dollars at the daily prevailing exchange rate. The industry momentum return strategy is tested with a 6-month formation and holding period. Grundy and Martin (2001), Lewellen (2002), Swinkels (2002), and Hurn and Pavlov (2003) report that the industry momentum return is generally a medium-term effect (about 6 months). The analyses reported below include a one-month gap between the formation and holding period, unless otherwise stated. The industry monthly return for each industry are value-weighted but the return of the Winner and Loser portfolios

² Some industries, e.g., Oil & Gas producers, may have fewer than 25 companies, potentially creating a degree of idiosyncratic risk in the returns.

are equal-weighted. Du and Denning (2005) find no differences in industry momentum return when either equal- or value-weighted methods are used to calculate the portfolio return.

4.1. Profitability of industry momentum

The industrial momentum returns computed using individual stocks, presented in Panel A of Table 2, indicates that there are statistically significant momentum returns (W-L). The self-financing industry momentum return from the Japanese stock market is very low and not statistically significant. The highest profitability is observed in the Indian stock market with an average monthly return of 0.60% above market. The return in the US market is comparatively lower, vis-à-vis other markets, but still profitable with a market excess return of 0.32% per month. Moskowitz and Grinblatt (1999) report an average monthly return of 0.43% in the US stock market. The loser portfolio returns are negative for all countries except Japan, suggesting a reversal pattern in the Loser portfolio. The results of Iihara et al. (2004) also fail to find evidence of industry momentum profitability in the Japanese stock market.

[Insert Table 2 about here]

Similar results are obtained when indices are used for respective industries. The results from Panel B of Table 2 suggest that the returns change when indices are used. There is an increase in returns for Canada, Japan, UK and US when using indices and a decline in industry momentum returns for Australia, China and India. The results again indicate high industry momentum profitability in the Indian stock market and the major contribution of this profit is from the Winner portfolio. Industry momentum returns are again not statistically significant for the Japanese stock market. Swinkels (2002) also finds statistically non-

significant industry return profitability in the Japanese stock market when Datastream industry indices are used.

The results of this study are consistent with those of Swinkels (2002). He reports a return of 0.44% per month for the US stock market, 0.63% per month for the European market, and 0.28% per month for the Japanese stock market. The returns of the US stock market are statistically significant at a 10% level, whereas the industry momentum returns are not statistically significant for the Japanese stock market. Overall, the results from this study suggest that the industry momentum returns are profitable in six of the seven markets studied when industry indices are used.

4.2. Are industry-returns adjusted significantly positive?

Moskowitz and Grinblatt (1999) suggest that if industry return is deducted from the individual stock return, instead of deducting market return, then the return from the momentum strategy would be almost negligible. They report a marginally significant profit of 13 basis points per month after monthly industry return is deducted instead of market return.

To test their proposition more broadly, the individual momentum return for the seven countries are now adjusted for the same industry-market return instead of the overall market return. The initial hypothesis is that the momentum return will be very low as the industry return is expected to be the driving factor of momentum. The results reported in Panel A of Table 3 do not support this proposition. Although the returns decrease when industry-adjusted abnormal returns are taken into consideration, the individual momentum returns are still high and statistically significant. The exception is the UK where the return increases with

the use of industry-adjusted return. This result suggests that not all the companies within an industry are following momentum trends.

[Insert Table 3 about here]

4.3. Industry-neutral returns

It is suggested that by creating an industry-neutral portfolio that the industry effect can be controlled. Moskowitz and Grinblatt (1999) report a non-statistically significant 0.11% per month when the industry effect is removed from individual momentum returns. The results reported in Panel B of Table 3 indicate that stocks within an industry tend not to rally together. Stocks within an industry can move in opposite directions and a momentum strategy can still be profitable by buying/short-selling Winner and Loser stocks within the same industry. This is contrary to the proposition of Moskowitz and Grinblatt (1999) where the majority of the Winner or Loser portfolio stocks are expected to be positioned within a particular group of industries.

Further, the results exhibit statistically significant positive returns for industry momentum but the individual momentum returns still dominate. The industry-adjusted returns and industry-neutral returns indicate statistically significant positive returns for six out of seven countries, indicating a less important role for industries in explaining individual momentum return. The analysis indicates that the conventional momentum return, though decreasing with industry-neutral return, is still high and statistically significant for all markets except Japan. A significant drop in profit is also noticed in the Indian stock market when industry-neutral momentum return is used. The result from the industry-adjusted return also shows a significant decline in the profitability of the Indian stock market. This means that a major portion of industry momentum profitability is coming from a particular industry and

this profit disappears when an average of all industries is taken together, suggesting that an industry effect may be present in the Indian stock market.

The possibility that industry momentum return dominates individual stock momentum return requires consideration. The results shown in Table 2 and 3 clearly show dominance of individual momentum return over industry momentum return. The return, except for China and India, indicates higher individual momentum return than industry momentum return. The results for China and India offer a mixed result with a higher industry momentum return when industry monthly return is calculated using individual stock return and a lower return when industry indices are used. Momentum return for the Japanese stock market is not statistically significant when assessed using all three strategies.

The strategy was further tested to check whether a one-month or no-month gap between formation and holding period makes a difference. Overall, the unreported results do not suggest a significant difference in return when a one-month gap is allowed between the formation and holding period but there are country differences. This suggests that the first month after the formation period is not the sole contributor to industry momentum profitability.

4.4. 52-week high momentum profitability

The analysis of the 52-week high momentum return is based on value-weighted return unless otherwise stated. The value-weighted approach substantially controls observations for some specific problems that are more pronounced in small capitalisation stocks, e.g., outliers, incorrect data recording, etc. The whole sample is divided into three portfolios where the top 33% belong to Winner stocks and the bottom 33% to Loser stocks.

The initial results from Table 4 indicate that the 52-week high momentum return is profitable on a global basis. The country-neutral average monthly return is 0.38% (t-stat 3.66) using the CAR method, which is statistically significant at 1% level. The highest 52-week high momentum return is seen in the Bangladesh stock market with an average monthly return of 3.34% and the lowest return is observed in the Philippines market with an average monthly holding period return of -0.83%

[Insert Table 4 about here]

The 52-week momentum return also fails to generate a high return compared to a traditional momentum return as documented by Jegadeesh and Titman (1993), using the same formation/ holding period. Unreported results indicate that the average monthly return of traditional momentum strategy using three portfolios and value-weighted CAR approach is 0.58% compared to this study's 52-week high momentum return of 0.38% . The low return of the 52-week high momentum does not support the hypothesis that 52-week high momentum return generates higher momentum return than those of the Jegadeesh and Titman (1993) approach on a country-neutral global basis. The results also show a negative Winner portfolio return for 52-week high momentum against the expected positive return. The major contribution to the 52-week momentum return arises through the short-selling of the Loser portfolio stocks. Again, this observation differs from the result of George and Hwang (2004) and Marshall and Cahan (2005) where the Loser portfolio is not noted as the primary contributor to the 52-week momentum returns.

Different formation/holding period returns may be calculated to check if the 52-week high momentum return is consistent over differing periods or whether the profit is only present for a specific holding period. Momentum returns for various holding periods can be

computed and 6, 12, 24 and 36 months are tested, while formation period are changed to 24 months and 36 months.

[Insert Table 5 about here]

The analysis reported in Table 5 indicates a profitable 52-week high momentum strategy up to the first 12 months of a holding period followed by a gradual decline with non-statistically significant returns thereafter. These findings are similar to the pattern seen in the traditional momentum return of Jegadeesh and Titman (1993) who also report a significant momentum profit only during the first 12 months of a holding period. The average 52-week momentum return decreases when holding period is increased from 6-month to 12-month.

The country-neutral momentum return for various combinations of formation and holding periods indicates that a momentum strategy based on the nearness to 24- or 36-month high is not a profitable investment strategy. All returns are negative and show reversals instead of momentum. The country-neutral Loser portfolios show positive return in the short-term instead of negative return. The Winner portfolios are negative for all combinations of formation-holding periods except marginally positive returns with a formation and holding period of 12 months and 6 months respectively.

Various computational approaches, not reported in this paper, indicate that BHAR and CAR method do not appear to be present statistically significant different results. Similarly, the returns are computed under the equal- or value-weighted portfolio approaches, showing no statistically significant return under an equal-weighted approach but indicating a statistically significant return under when using a value-weighted approach. The lack of statistical significance in returns under the equal-weighted approach most likely arises from the small-cap stocks. When the 52-week high momentum sample is divided into three sub-

samples based on market capitalisation, the results reveal low momentum returns in the small-cap sample with increasing return as the sample size increases. These results suggest that small-cap stocks do not exhibit 52-week high momentum properties.

4.5. 52-week industry momentum returns

The possibility of extending the 52-week high strategy to a 52-week industry momentum strategy is investigated. This expands the above analysis of the industry 52-week high/low strategy to test whether the abnormal return exists at industry level. For example, if a certain number of stocks within the same industry are trading at a 52-week high price, and a certain number of stocks within other industries are trading at 52-week low price, then there are potential opportunities for profit to be made by buying industry/ (short selling) stocks which are trading at a 52-week high price/(52-week low price). This can be done by forming an investment strategy that will calculate 52-week high/low in the industry context and forming the Winner and Loser portfolio from the top and bottom 33% ranking industries.

There are some underlying reasons for testing the 52-week high/low industry return as a substitute for the 52-week high/low stock return. Moskowitz and Grinblatt (1999) explain that much of the individual momentum return is subsumed in the industry return. They also add that the industry momentum return generates a higher return compared to the individual stock momentum return. Therefore, if this is true, then a 52-week high/low individual stock return can be replicated as a 52-week high/low industry momentum return. Further, George and Hwang (2004) add that 52-week high return dominates individual stock momentum return. Therefore, if the two extensions to the traditional momentum strategy are combined, then a 52-week industry momentum strategy may generate significant positive return. The 52-week industry momentum return incorporates investment strategy ideas from all three forms of momentum investing, i.e., individual, industry and 52-week. The initial hypothesis

is that the return generated from the 52-week high/low industry momentum strategy will generate positive significant profits. The method for calculating the 52-week industry momentum strategy is the same as George and Hwang (2004) except the industry monthly return is used instead of the individual stock return.

The results in Panel A of Table 6 show positive returns when the 52-week high/low strategy is applied in the context of industry return. The return, however, is not statistically significant for the Japanese and US markets with an average monthly return of about 0.19%. When the same strategy is applied with Datastream maintained industry indices, the results presented in Panel B of Table 6, show weak support for this strategy for Japan, US and Australia. A sharp drop in return is also noted for the Canadian stock market. The overall results do not suggest a strong profit from 52-week high/low industry momentum compared to other momentum strategies available.

[Insert Table 6 about here]

4.6. Momentum returns comparison

Momentum returns are next computed using a common sample of seven countries tested for all three different strategies reported above. The use of seven rather than 51 countries arises as industry momentum returns cannot be computed for all countries. Unreported results show a higher 52-week individual stock momentum than the 52-week industry momentum return for five out of seven countries, suggesting an inferior performance of the 52-week industry momentum return compared to the 52-week individual stock momentum return. Similarly, industry momentum return dominates the 52-week industry momentum return. All the countries' returns, except Japan, are higher than the 52-week

industry momentum return. Finally, individual stock momentum generates the most impressive return for compared to the other three momentum strategies tested.

The analysis suggests that the individual stock momentum strategy is superior to other momentum strategies available. Nijman et al. (2004) concur in respect to their investigation of the industry momentum strategy in the European market. The significant positive profits arising from other investment strategies also supports rejection of the presence of data-snooping, as returns are significantly profitable in almost all markets except Japan. This study provides an out-of-sample test for the different momentum strategies, as the database used for this research has not been used extensively before to test either 52-week industry or industry momentum strategies for a number of stock markets. Swinkels (2002) uses Datastream industry indices to check industry momentum returns in an international context, emphasising that the industry returns, after aggregating stock returns, may provide a better picture for industry momentum returns.

5. Summary

This research reported in this study investigates the impact on alternative strategies to calculating momentum returns e.g., conventional, industry momentum, 52-week high, and 52-week high industry momentum. A large sample of stocks was drawn upon and the findings presented are not due to data-snooping processes and by-and-large remain statistically significant and positive when calculated using different methods. The country-neutral positive momentum return, involving 51 countries, suggests that this anomaly is not restricted to a particular set of countries but rather appears in all major markets.

The industrial momentum and 52-week high momentum returns also remain statistically significant when applied in different markets and when computed by a number of

methods. However, the claim that industrial momentum and 52-week high momentum returns generate superior returns compared to the conventional momentum strategy is not established.

The results are, however, not very encouraging when normal momentum, industrial momentum, 52-week high momentum and optimisation techniques are applied to small-cap stocks. A significant variation in momentum returns, especially in small developing markets, is noticed when the momentum returns are calculated using a number of methods. The most likely explanations for these variations range from high bid/ask spread, and being subject to high illiquidity.

One of the important contributions of this study is the extension of 52-week high momentum returns to industry 52-week high momentum returns. A 52-week high momentum return is a recently documented anomaly and the inclusion of industry factors will show whether or not the returns outperform individual, industry, or 52-week high momentum returns. The results reveal a statistically significant positive industry 52-week high momentum return for all countries except Japan and US. However, the returns generated from this strategy are not the most profitable when compared to other momentum strategies available.

The presence of an industry momentum return in markets other than the US, in different dataset, time period and with different computational methods, enhances the robustness of this strategy. However, the dominance of industry momentum return over the individual momentum return is not revealed in this study. Individual momentum return continues to generate higher return during the same holding period when compared to industry momentum return.

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Table 1: Sample period and sample size

	Country	Sample period	Size		Country	Sample period	Size
1	Argentina	Feb-93 to Jul-07	135	27	Kenya	Jan-96 to Jul-07	58
2	Australia	Jan-73 to Jul-07	2,627	28	Lithuania	Aug-01 to Jul-07	57
3	Austria	Jul-90 to Jul-07	194	29	Malaysia	Jan-86 to Jul-07	772
4	Bangladesh	Jan-92 to Jul-07	284	30	Mexico	Mar-88 to Jul-07	222
5	Belgium	Jan-86 to Jul-07	280	31	Morocco	Jan-95 to Jul-07	90
6	Brazil	Jan-94 to Jul-07	1,145	32	Netherlands	Jan-73 to Jul-07	272
7	Canada	Jan-73 to Jul-07	2,904	33	New Zealand	Jan-88 to Jul-07	311
8	Chile	Jul-89 to Jul-07	292	34	Norway	Sep-80 to Jul-07	521
9	China	Jan-93 to Jul-07	1,495	35	Pakistan	Aug-92 to Jul-07	373
10	Colombia	Jan-93 to Jul-07	174	36	Philippines	May-90 to Jul-07	239
11	Cyprus	Mar-00 to Jul-07	115	37	Poland	Jan-97 to Jul-07	382
12	Czech Republic	Nov-93 to Jul-07	357	38	Portugal	Jul-92 to Jul-07	99
13	Denmark	Apr-88 to Jul-07	309	39	Romania	Jun-98 to Jul-07	98
14	Egypt	May-97 to Jul-07	147	40	Singapore	Jan-83 to Jul-07	613
15	Finland	May-94 to Jul-07	191	41	South Africa	Jan-75 to Jul-07	902
16	France	Jan-73 to Jul-07	1,454	42	South Korea	Jul-84 to Jul-07	1,054
17	Germany	Jan-73 to Jul-07	1,316	43	Spain	Jun-87 to Jul-07	194
18	Greece	Feb-88 to Jul-07	393	44	Sri Lanka	Jun-87 to Jul-07	298
19	Hong Kong	Jan-73 to Jul-07	1,164	45	Sweden	Jan-82 to Jul-07	688
20	Hungary	Nov-97 to Jul-05	72	46	Switzerland	Jan-73 to Jul-07	316
21	India	Jan-90 to Jul-07	2,102	47	Taiwan	Jul-89 to Jul-07	820
22	Indonesia	Apr-90 to Jul-07	482	48	Thailand	Jan-87 to Jul-07	649
23	Ireland	Mar-90 to Jul-07	105	49	Turkey	Apr-88 to Jul-07	380
24	Israel	Jan-86 to Jul-07	874	50	UK	Jan-73 to Jul-07	6,161
25	Italy	Aug-74 to Jul-07	431	51	US	Jan-73 to Jul-07	13,904
26	Japan	Jan-73 to Jul-07	3,364				
Total			51,879				

Table 2: Industry momentum returns

6 x 6 months, 1-month gap, 3 portfolios, CAR, US dollar

Panel A: Using stock returns

Country	Loser(L)	t-stat	Winner(W)	t-stat	W - L	t-stat
Australia	-0.76%	-2.12	0.42%	3.27	1.18%	3.30
Canada	-0.18%	-1.10	0.43%	3.43	0.61%	4.01
China	-0.62%	-2.42	0.32%	2.13	0.94%	4.88
India	-0.40%	-1.12	1.20%	4.44	1.60%	4.68
Japan	0.20%	1.33	0.24%	1.68	0.04%	0.19
UK	-0.11%	-1.14	0.27%	3.89	0.38%	3.02
US	-0.01%	-0.05	0.31%	4.77	0.32%	3.24

Panel B: Using industry indices

Country	Loser(L)	t-stat	Winner(W)	t-stat	W - L	t-stat
Australia	-0.11%	-0.89	0.57%	8.13	0.68%	4.82
Canada	-0.12%	-0.58	0.71%	3.61	0.83%	5.45
China	-0.44%	-1.90	0.23%	1.05	0.67%	4.10
India	-0.37%	-1.35	1.01%	3.57	1.38%	3.63
Japan	0.12%	0.81	0.35%	2.44	0.23%	1.17
UK	-0.22%	-2.22	0.29%	3.81	0.52%	4.12
US	-0.05%	-0.52	0.32%	4.15	0.37%	3.59

Table 3: Industry adjusted & industry neutral momentum returns

6 x 6 months, 1-month gap, 3 portfolios, US dollar

Panel A: Industry adjusted individual momentum returns

Individual industry-return adjusted momentum returns							Market returns adjusted normal momentum	
Country	Loser(L)	t-stat	Winner(W)	t-stat	W - L	t-stat	W - L	t-stat
Australia	-0.90%	-2.96	0.46%	4.9	1.37%	4.48	1.50%	3.75
Canada	-0.45%	-5.11	0.56%	4.33	1.01%	5.52	1.36%	4.48
China	-0.21%	-1.43	0.32%	4.36	0.54%	2.56	0.80%	2.92
India	-0.56%	-2.78	0.36%	2.99	0.92%	3.67	1.47%	3.60
Japan	-0.06%	-0.52	0.06%	0.82	0.12%	0.70	0.19%	0.75
UK	-0.30%	-5.05	0.23%	4.8	0.52%	5.9	0.50%	3.73
US	-0.19%	-3.73	0.23%	4.84	0.42%	4.87	0.46%	3.38

Panel B: Industry-neutral momentum returns

Industry-neutral momentum returns							Normal momentum	
Country	Loser(L)	t-stat	Winner(W)	t-stat	W - L	t-stat	W - L	t-stat
Australia	-0.84%	-3.98	0.44%	2.26	1.28%	5.09	1.50%	3.75
Canada	-0.61%	-6.27	0.53%	6.61	1.14%	10.29	1.36%	4.48
China	-0.68%	-8.46	-0.14%	-1.11	0.54%	4.41	0.80%	2.92
India	0.39%	0.77	0.76%	2.51	0.37%	1.16	1.47%	3.60
Japan	0.21%	6.35	0.22%	4.32	0.01%	0.33	0.19%	0.75
UK	-0.27%	-4.66	0.27%	7.15	0.53%	8.52	0.50%	3.73
US	-0.05%	-1.53	0.38%	9.66	0.43%	9.53	0.46%	3.38

TABLE 4: 52-week high momentum returns

12x 6 months, Value-weighted returns, 1-month gap, 3 portfolios, US dollar

Country	Loser (L)	t-stat	Winner (W)	t-stat	W - L	t-stat
Argentina	-0.31%	-0.76	0.08%	0.34	0.40%	0.68
Australia	-0.81%	-3.54	0.04%	0.40	0.85%	3.15
Austria	-0.44%	-1.58	-0.45%	-2.45	-0.02%	-0.05
Bangladesh	-0.92%	-2.65	2.42%	1.71	3.34%	2.22
Belgium	-0.24%	-1.34	0.14%	1.69	0.38%	2.01
Brazil	-1.45%	-2.41	-1.64%	-2.46	-0.19%	-0.27
Canada	-0.85%	-3.54	0.22%	3.55	1.07%	3.78
Chile	-0.04%	-0.29	0.03%	0.15	0.07%	0.27
China	-0.38%	-1.94	0.39%	1.70	0.76%	3.35
Colombia	-0.05%	-0.21	0.10%	0.59	0.15%	0.57
Cyprus	-1.55%	-3.12	0.13%	1.37	1.68%	3.18
Czech Republic	-1.08%	-3.53	0.21%	1.10	1.29%	3.54
Denmark	-0.50%	-3.05	0.17%	1.23	0.67%	2.85
Egypt	-1.69%	-2.72	-0.87%	-2.55	0.82%	1.47
Finland	-0.71%	-1.63	0.55%	2.23	1.26%	2.17
France	-0.50%	-3.88	0.20%	2.87	0.70%	3.81
Germany	-0.50%	-3.73	-0.02%	-0.18	0.48%	2.80
Greece	-1.22%	-3.47	-0.09%	-0.38	1.14%	3.08
Hong Kong	-0.37%	-1.63	0.05%	0.71	0.42%	1.91
Hungary	-0.40%	-0.99	-0.06%	-0.38	0.35%	0.73
India	-0.47%	-1.25	0.21%	1.73	0.68%	1.61
Indonesia	0.01%	0.02	-0.13%	-0.68	-0.14%	-0.24
Ireland	0.18%	0.33	0.25%	2.45	0.08%	0.12
Israel	-1.30%	-4.93	-1.48%	-2.90	-0.19%	-0.39
Italy	-0.33%	-2.32	0.34%	3.87	0.68%	3.27
Japan	0.03%	0.20	0.12%	1.34	0.09%	0.54
Kenya	0.37%	0.75	1.56%	6.79	1.19%	1.97
Lithuania	-0.40%	-1.07	-0.12%	-0.55	0.28%	0.60
Malaysia	-0.04%	-0.16	0.09%	1.01	0.13%	0.48
Mexico	-1.27%	-3.15	-0.29%	-1.36	0.98%	2.57
Morocco	-0.73%	-3.82	0.26%	2.62	0.99%	3.92
Netherlands	-0.22%	-1.29	0.11%	1.21	0.33%	1.65
New Zealand	-0.23%	-1.01	0.15%	1.11	0.38%	1.27
Norway	-0.55%	-2.12	-0.17%	-1.45	0.37%	1.30
Pakistan	-0.72%	-2.24	-0.51%	-3.00	0.21%	0.55
Philippines	0.51%	1.49	-0.32%	-1.91	-0.83%	-2.12
Poland	-0.90%	-2.85	0.11%	0.62	1.00%	2.63
Portugal	-0.16%	-0.81	0.12%	0.91	0.28%	1.04
Romania	-1.22%	-1.68	-0.99%	-2.22	0.23%	0.27
Singapore	0.12%	0.53	-0.17%	-1.11	-0.29%	-1.14
South Africa	-0.53%	-2.38	0.04%	0.40	0.57%	2.05
South Korea	-0.25%	-0.87	-0.18%	-1.41	0.07%	0.18
Spain	-0.18%	-0.81	0.14%	1.03	0.32%	1.24
Sri Lanka	0.25%	1.41	-0.24%	-1.71	-0.49%	-2.05
Sweden	0.13%	0.39	0.08%	0.68	-0.05%	-0.12
Switzerland	-0.47%	-3.03	0.25%	2.01	0.72%	4.01
Taiwan	-0.05%	-0.21	-0.22%	-1.90	-0.17%	-0.55
Thailand	-0.11%	-0.37	0.37%	1.86	0.48%	1.07
Turkey	-0.02%	-0.04	-0.01%	-0.04	0.01%	0.02
UK	-0.43%	-2.87	0.07%	1.33	0.50%	2.71
US	-0.19%	-1.68	0.09%	1.81	0.28%	1.99
Country-Neutral 52-week return	-0.45%	-6.45	0.02%	0.27	0.48%	5.32

Table 5: 52-week country-neutral returns with different formation/holding periods
Value-Weighted, 3 portfolios, 1-month gap, US dollar, CAR

Formation period = 12 months						
Holding period	Loser(L)	t-stat	Winner(W)	t-stat	W-L	t-stat
6 months	-0.45%	-6.45	0.02%	0.27	0.48%	5.32
12 months	-0.30%	-4.20	-0.03%	-0.45	0.27%	3.58
24 months	-0.18%	-2.69	-0.12%	-1.86	0.06%	1.05
36 months	-0.12%	-1.82	-0.15%	-2.54	-0.04%	-0.74
Formation period = 24 months						
6 months	0.01%	0.10	-0.22%	-3.51	-0.23%	-3.23
Formation period = 36 months						
6 months	0.04%	0.43	-0.22%	-3.85	-0.26%	-3.25

Table 6: 52-week high/low industry momentum returns (using monthly returns)

12 x 6 months, 1-month gap, 3 portfolios, CAR, US dollar

Panel A: Using stock returns

Country	Loser(L)	t-stat	Winner(W)	t-stat	W - L	t-stat
Australia	-0.45%	-1.48	0.39%	3.54	0.84%	2.95
Canada	-0.16%	-1.10	0.33%	2.18	0.49%	2.82
China	-0.66%	-3.00	0.27%	1.21	0.93%	5.28
India	-0.09%	-0.25	0.78%	3.04	0.87%	2.61
Japan	0.13%	0.91	0.21%	1.52	0.09%	0.47
UK	-0.11%	-0.98	0.19%	3.01	0.30%	2.10
US	0.00%	0.03	0.19%	2.72	0.19%	1.93

Panel B: Using industry indices

Country	Loser(L)	t-stat	Winner(W)	t-stat	W - L	t-stat
Australia	0.04%	0.26	0.26%	3.92	0.22%	1.61
Canada	-0.02%	-0.08	0.46%	2.30	0.48%	3.04
China	-0.54%	-2.25	0.14%	0.63	0.68%	4.98
India	-0.34%	-1.05	0.98%	3.77	1.32%	3.44
Japan	0.07%	0.51	0.29%	2.16	0.22%	1.30
UK	-0.29%	-2.35	0.26%	3.82	0.54%	3.68
US	0.05%	0.45	0.16%	2.26	0.11%	1.14