Trading Volume and Momentum: The International Evidence

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Trading Volume and Momentum: The International Evidence

Abstract

We investigate the role of trading volume in predicting the magnitude and persistence of the price momentum phenomenon in markets around the world. Using comprehensive data for 38,273 stocks from 37 countries, we show that past trading volume relates to both the level and persistence of momentum profits. The volume-based early stage momentum strategy outperforms the traditional momentum strategy in 34 out of 37 countries. In addition, we find evidence of a volume effect and we show that the degree of individualism in a country can explain the size of the volume effect in the markets investigated in this paper.

Keywords: financial markets; international asset pricing; volume effect; momentum; turnover; individualism
JEL classification: G12, G14, G15

1. Introduction

In a landmark paper, Lee and Swaminathan (2000) show that past trading volume provides an important link between momentum and value strategies. Specifically, they show that firms with high (low) past turnover ratios exhibit glamour (value) attributes, generate lower (higher) future returns, and have consistently more negative (positive) earnings surprises over the next eight quarters.[1] The authors conclude that there is strong evidence that high volume stocks tend to be overvalued and low volume stocks tend to be undervalued. In addition to identifying this volume effect, they document that past trading volume predicts both the magnitude and persistence of price momentum. They call the interaction between volume and price momentum the momentum life cycle. Although Lee and Swaminathan (2000) began the process of understanding the role of trading volume in the prediction of cross-sectional stock returns, there is little, if any, research reported on this price and volume relationship outside the United States. This paper is the first study to investigate the volume effect and the role of trading volume in predicting the magnitude and persistence of momentum returns in an international setting.

The principal aim of the paper is to investigate whether a volume-based early stage momentum strategy outperforms the pure momentum strategy and late stage momentum strategy in markets around the world.[2] According to Lee and Swaminathan (2000), the differing performances of their early and late stage strategies reveal key features of the interaction between price momentum and trading volume. This begs the following question: Why is the interaction between price momentum and past trading volume important? Lee and Swaminathan (2000) note that there is little consensus on how past volume information should be interpreted. More importantly, they argue that even less is known about how trading volume interacts with past price movement in the prediction of cross-sectional

[1] This volume effect, based on average daily turnover over the past three to 12 months, should not be confused with the short-term, high-volume effect based on unusually high trading volume over the last day or week, described by Gervais, Kaniel and Mingelgrin (2001) and Kaniel, Ozoguz and Starks (2012).

[2] Pure momentum strategy refers to Jegadeesh and Titman's (1993) strategy of going long on recent winners and short on recent losers. Following Lee and Swaminathan (2000), the early stage momentum strategy is long low-volume recent winners and short high-volume recent losers. In contrast, the late stage momentum strategy is long high-volume recent winners and short low-volume recent losers.

returns. Therefore, examining the role of past trading volume and momentum strategies in markets around the world not only addresses the data snooping bias critique inherent in studies focusing on the U.S. setting but also allows researchers to determine the source and possible explanation for the profitability of momentum strategies.

Lee and Swaminathan's (2000) findings link stock mispricing, stock popularity, and long-term past performances together in a way that strongly suggests that herd-like overreaction by investors may have a role to play in explaining the volume effect that they observe in US stocks. This possibility, together with the conjecture of Chui, Titman and Wei (2010) that less individualistic cultures may lead to herd-like overreaction, leads us to hypothesize that the size of the volume effect may be negatively related to individualism. Since Lee and Swaminathan (2000) document that the volume effect is most evident in extreme winner and loser stocks, we measure the magnitude of the volume effect by the profitability of a strategy that is long low-volume winners and losers and short high-volume winners and losers. Conveniently, we can calculate the profitability of this strategy as the difference between early stage and late stage momentum profits.

We establish three major findings in this study, summarized as follows. First, using a comprehensive sample of 38,273 firms from 37 countries spanning the period 1995–2009, we document that the volume-based early stage momentum strategy is more profitable than the pure momentum and late stage momentum strategies. This result holds true in 34 out of the 37 countries in our sample. In particular, we document that, on average, the early stage momentum strategy earns 1.22% per month and that this strategy outperforms the pure momentum and late stage momentum strategies by 0.38% and 0.74% per month, respectively. Second, we find that trading volume predicts the persistence of momentum profitability. Specifically, the country-average profits of the early stage strategy are profitable for the first five years post-formation whereas the late stage momentum profits reverse strongly after the first post-formation year. Third, we find evidence of a volume effect internationally and we confirm our conjecture that the size of the volume effect is negatively related to individualism.

Our main contribution to the momentum literature is that we are the first to document the pervasiveness of Lee and Swaminathan's (2000) finding in an international setting. Lee and Swaminathan characterize high-volume winners and low-volume losers as late stage momentum stocks, and they characterize low-volume winners and high-volume losers as early stage momentum stocks. We provide compelling evidence that the usefulness of past trading volume highlighted by these authors extends to the majority of the international markets studied in this paper. In particular, we are the first to document that the volume-based early stage momentum strategy outperforms the pure momentum strategy in 34 out of 37 countries and that late stage stocks tend to experience faster reversals than do early stage stocks in most markets.

Our second contribution to the literature is that we are the first to link individualism to the magnitude of the volume effect, as measured by the difference between early stage and late stage momentum profits. Specifically, we are the first to show that the volume effect is stronger in less individualistic cultures than in more individualistic cultures.

The rest of the paper is organised as follows. Section 2 presents the literature and develops our testable hypotheses. Section 3 describes the data and the methodology employed to construct each strategy and Section 4 presents the empirical findings. Section 5 concludes the paper.

2. Related Literature and Hypothesis Development

2.1 Momentum and Trading Volume

Jegadeesh and Titman (1993) report stock return continuation where stocks with strong past performance continue to outperform stocks with poor past performance over medium-term horizons of three to 12 months. They document that trading strategies that include buying stocks that have performed well in the past and selling stocks that have

performed poorly in the past generates an average return of 0.95% per month over the period 1965–1989.[3]

Since stock returns and trading volume are jointly determined by the same market dynamics, trading volume plays a crucial role in some models of asset prices. Blume, Easley, and O'Hara (1994) and Campbell, Grossman, and Wang (1993) present theoretical models in which traders can learn valuable information about a security by observing past trading volume information. However, their models do not specify the nature of the information that might be derived from past volume or make any predictions about longer-term returns.[4]

Lee and Swaminathan (2000) offer an important and comprehensive examination of the interaction between past trading volume and past stock returns in predicting future stock returns. They use the average of the stock's daily turnover over the past three, six, nine, and 12 months as proxies for past trading volume and sort stocks into portfolios based on past short-term returns (winners and losers) and past trading volume (high and low). Their results indicate that low-volume winners and high-volume losers exhibit stronger momentum over a longer horizon than do high-volume winners and low-volume losers. Given the evidence from their study, Lee and Swaminathan (2000) proposed two volume-based momentum strategies that capture key aspects of the interaction between trading volume and price momentum: An *early stage* momentum strategy buys low-volume winners and sells high-volume losers and a *late stage* strategy involves buying high-volume winners and selling low-volume losers. Their results indicate that early (late) stage momentum profits are larger (smaller) than the profits of the pure momentum strategy of Jegadeesh and Titman (1993), which involves buying winners and selling losers. This discussion leads to our first hypothesis.

Hypothesis 1. The early stage momentum strategy outperforms both the pure momentum and the late stage momentum strategies in markets around the world.

[3] Since the predictability of stock returns over time is one of the most controversial issues in stock market efficiency as Fama, (1991) states, several studies have attempted to explain this anomaly. Many examine the return patterns and determine whether the result is driven by an improper response of markets to information due to microstructure bias or accounting for risks (e.g., Lo and MacKinlay, (1990); Chan, Jegadeesh, and Lakonishok, (1996); Fama and French, (1996); Conrad and Kaul, (1998); Bulkley and Nawosah, (2009).

[4] Rouwenhorst (1999), Chan, Hameed, and Tong (2000), Hameed and Kusnadi (2002), Glaser and Weber (2002), Chui, Titman and Wei (2003; 2010), and Wang and Chin (2004) investigate the use of trading volume internationally.

2.2 The Volume Effect

In the volume effect identified by Lee and Swaminathan (2000), firms with high past turnover ratios tend to generate lower future returns while firms with low past turnover ratios tend to earn higher future returns. The authors report that high-volume firms exhibit many glamour attributes, whereas low-volume firms display value attributes. High-volume (low-volume) firms tend to earn higher (lower) stock returns in each of the previous five years; have lower (higher) book-to-market ratios, more (less) analyst coverage, higher (lower) long-term earnings growth *forecasts*, better (worse) current operating performances, worse (better) future operating performances; and receive more negative (positive) earnings surprises over the next eight quarters. Lee and Swaminathan (2000, p. 2065) find that neither differences in liquidity nor the size effect can explain their results and state, "We provide strong evidence that low (high) volume stocks tend to be under- (over-) valued by the market".

A stock's turnover ratio is a measure of the market's current interest in that firm, relative to its size. High-volume stocks are stocks that were popular to trade during the formation period whereas low-volume stocks were neglected by investors during the formation period.[5] According to Lee and Swaminathan (2000), popular high-volume stocks tend to become overpriced after outperforming over the past five years, while neglected low-volume stocks tend to become underpriced after underperforming over the past five years. That these patterns of past performances that lead to mispricing are linked in this way to stock popularity suggests that herd-like overreaction may be responsible for at least a portion of the volume effect's mispricing. Interestingly, Chui et al. (2010) conjecture that herd-like overreaction may be stronger in countries with less individualistic cultures when stating: "Another possibility worth considering is that investors in less individualistic cultures place too much credence on consensus opinions, and may thus exhibit herd-like overreaction to the

[5] According to Lee and Swaminathan's (2000) momentum life cycle hypothesis, a stock's trading volume conveys information on the extent of investor favouritism (or neglect) for that stock.

conventional wisdom" (Chui et al. 2010, p. 389). If their conjecture is correct then the degree of mispricing as measured by the size of the volume effect may be negatively related to individualism.

To test this possibility, we use Hofstede's (2001) individualism index for each country as the measure of its culture's degree of individualism. This same index has been used in a number of previous studies in finance, including Chui et al. (2010) who find that individualism is positively associated with the magnitude of momentum profits.[6] Since Lee and Swaminathan (2000, p. 2055) document that "the volume effect is most pronounced among extreme winners and losers", we measure the magnitude of the volume effect by the profitability of a strategy that is long low-volume (LV) winners and losers and short high-volume (HV) winners and losers. We can calculate the profitability of this volume strategy (VOL) as the difference between the early and late stage momentum profits because

VOL = (LV winners + LV losers) – (HV winners + HV losers)

= (LV winners – HV losers) – (HV winners – LV losers)

= Early Stage – Late Stage.

That is, the size of the volume effect is measured by the difference between the profits of the early stage and the late stage momentum strategies. This discussion leads to our second hypothesis.

Hypothesis 2. The magnitude of the volume effect, as measured by the difference between early and late stage momentum returns, is negatively related to individualism.

[6] Dou, Hunton, Truong, and Veeraraghavan (2010) extend the research of Chui et al. (2010) to show that the level of individualism in a country is positively related to earnings momentum. Similarly, investigating the foreign bias in international asset allocation, Beugelsdijk and Frijns (2010) show that countries with high individualism index scores invest more in foreign markets.

3. Data and Methodology

3.1 Data

Our data consist of monthly stock returns, price, turnover volume, market capitalisation, and book value for 55,977 firms in 51 countries, spanning the period January 1995 to December 2009. The data are from Datastream International, except for the U.S. data, which are from the Center for Research in Security Prices (CRSP), and denominated in U.S. dollars. We apply filters to our sample to eliminate firms with no price, turnover volume, or book value data. We also eliminate stocks with market capitalisation below the fifth percentile of all stocks within a given country in any month. Furthermore, we treat returns larger than 100% and less than -95% as missing. To be included in the sample, stocks must have a return history of at least 12 months and each country must have at least 50 stocks that meet the stock selection criteria. In addition, each country must have a corresponding individualism (IDV) score. After applying the screening process, our final sample consists of 37 countries and 38,273 firms.

We obtain the IDV scores from Hofstede's (2001) cross-country psychological survey conducted in 72 countries. The author constructed an individualism index for each country using factor analysis on the mean scores for 14 questions about employee attitudes towards their private lives and work. The IDV scores range from zero for the most collectivistic country to close to 100 for the most individualistic countries.

Table 1 reports descriptive statistics and the final number of qualifying stocks for each country. It shows that Peru displays the lowest IDV score, 16, in our sample and five Asian countries (China, Singapore, South Korea, Taiwan, and Thailand) have scores of 20 or less. Conversely, Australia, Canada, the Netherlands, the United Kingdom, and the United States, have IDV scores of 80 or more. Table 1 also lists average monthly return, market capitalization, average turnover, and the average ratio of price to the book value of equity (P/B).

(Insert Table 1 about here)

3.2 Methodology

Our investigation employs two distinct types of momentum strategies: a pure momentum strategy and volume-based momentum strategies. This section describes how these strategies are constructed.

3.2.1 Pure momentum

To construct the pure momentum strategy, we follow Jegadeesh and Titman's (1993) methodology. For each month, we rank the stocks in each country and group them into terciles based on their past six-month returns. We assign the third of stocks with the lowest returns to the loser portfolio (denoted R1) and the third of stocks with the largest past returns to the winner portfolio (denoted R3). The remaining stocks form the middle portfolio (denoted R2). The dollar-neutral pure momentum strategy is constructed by buying extreme winners and selling extreme losers (R3–R1). We base our analysis on the monthly returns of each portfolio over a six-month holding period. To be consistent with prior research, we skip a month between the end of the formation period and the start of the holding period. This procedure applies to all strategies. Skipping a month also eliminates any concerns about the feasibility of trading strategies that may arise because national exchanges do not open and close simultaneously. We employ the overlapping portfolios procedure of Jegadeesh and Titman (1993, 2001) to increase the power of our tests. Thus, the monthly return for the six-month holding period is an equal-weighted average of portfolio returns for the strategies from the current month and the previous five months. With this procedure, tests are based on simple *t*-statistics.

3.2.2 Volume-based momentum

We base the volume-based momentum strategies on a two-way independent sort between momentum and past trading volume. For each month, we sort firms into terciles (R1

to R3) based on their previous six-month returns, as for the pure momentum strategy. Following Lee and Swaminathan (2000), we focus on trading volume, defined as the average percentage daily turnover over the six-month formation period. Daily turnover is the ratio of the number of shares traded each day to the number of shares outstanding at the end of the day. Next, we sort the same firms into two portfolios, V1 and V2, based on their trading volume: V1 is the portfolio that contains those 50% of stocks with the lowest trading volume, while V2 is the portfolio with the 50% of stocks with the highest trading volume. We then form the volume-based momentum portfolios from the intersection of these sorts. The portfolios of interest are low-volume winners (R3V1), high-volume winners (R3V2), low-volume losers (R1V1), and high-volume losers (R1V2), held for six-month holding periods using the same overlapping portfolio approach as for the pure momentum strategy.

Lee and Swaminathan (2000) suggest two volume-based momentum strategies: the early stage momentum strategy, which involves buying low-volume winners and selling high-volume losers (R3V1–R1V2) to capture those stocks that exhibit momentum over a longer period, and the late stage strategy, which involves buying high-volume winners and selling low-volume losers (R3V2–R1V1) to capture firms that experience faster reversals of momentum. As a result of sorting stocks by volume into just two groups V1 and V2, our late stage long (short) portfolio contains those stocks from the pure momentum long (short) portfolio that are not currently included in the early stage long (short) portfolio. As with the pure momentum strategy, we skip a month between the end of the formation period and the beginning of the holding period and employ overlapping portfolios.

4. Empirical Findings

This section presents the results of our analysis. First, we document that the momentum effect is pervasive globally. Next, we report the results for the early and late stage momentum strategies, followed by results from the Fama–French three-factor regressions and an analysis of the post-holding period evidence. We then present the cross-country regression results linking the volume effect and individualism.

4.1 Pure Momentum

Table 2 presents the momentum holding period average monthly returns in all countries investigated for the extreme loser (R1), winner (R3), and zero-cost (R3–R1) portfolios. We observe that momentum profits are positive and statistically significant in 24 out of 37 countries and all but three countries have positive profits. These results are broadly consistent with those of Chui et al. (2010), who observe significant momentum profits in 25 out of 41 countries. In general, the developed markets display the highest profits. In particular, the strategy returns 2.06% per month (*t*-value 4.56) in Germany, 1.77% per month (*t*-value 6.84) in the United Kingdom, and 1.54% per month (*t*-value 3.67) in Sweden. South Africa provides an emerging market exception, with a large momentum return of 1.79% per month (*t*-value 7.25). Interestingly, inspection of the magnitudes of the winner and loser returns of these countries indicates that their momentum profits are largely coming from shorting the loser portfolio. In the case of Germany, for example, the winner portfolio earns 0.38% per month (*t*-value 0.87) while the loser portfolio returns -1.68% per month (*t*-value -2.55).

(Insert Table 2 about here)

Table 2 reports insignificant momentum profits in many Asian markets (China, Hong Kong, Japan, Malaysia, Philippines, Singapore, South Korea, and Taiwan). These results are broadly consistent with those of Hameed and Kusnadi (2002), who find no significant momentum profits in Malaysia, Singapore, South Korea, or Taiwan.[8] In some countries, for example, China, the loser portfolio yields positive returns; in other countries (Japan, Malaysia, Philippines, South Korea, and Taiwan), both the winner and the loser portfolio returns are negative. In sum, Table 2 confirms prior findings on the pervasiveness of the momentum effect, with strong evidence of momentum in most developed markets and mixed

[8] Chui et al. (2010) also report negative momentum profits for Japan, Korea, and Taiwan.

results for developing and emerging markets. The final row in Table 2 reports country-average momentum results produced by employing the pure momentum strategy globally. We construct country-average portfolios by equally weighting each country's corresponding portfolio. The average return for the country-average pure momentum strategy is 0.75% per month (*t*-value 15.70).

4.2 Volume-Based Momentum

Table 3 reports the average monthly holding period returns for the volume-based momentum portfolios. There are significant early stage (R3V1 – R1V2) profits in 29 out of 37 countries, and all early stage profits are positive. When we compare the results in Tables 2 and 3 we see that early stage momentum profits are larger than the corresponding pure momentum profits in 34 out of the 37 countries. Interestingly, the early stage strategy is highly successful in some Asian countries where pure momentum is weak and insignificant. For example, South Korea's significant early stage profit of 1.49% per month is clearly superior to its pure momentum profit of -0.01% per month. Similarly, the insignificant pure momentum profits of Hong Kong, Malaysia, Singapore and Taiwan contrast starkly with their significant early stage profits. Overall, the evidence shows that volume is a useful variable for enhancing momentum profits in most countries and supports our view, that the volume-based early stage momentum strategy outperforms the pure momentum strategy. Comparing the country-average early stage profits of 1.22% per month (*t*-value 16.47) in the final row of Table 3 with the corresponding pure momentum result of 0.85% per month (*t*-value 15.70) in Table 2, we can report that the early stage strategy significantly outperforms pure momentum, by 0.38% per month (*t*-value 8.72), on average, across the countries in our sample.

(Insert Table 3 about here)

The late stage strategy profits reported in Table 3 are also weaker than the corresponding early stage profits. Only 18 of the 37 countries have positive and significant late stage profits. With the exception of three countries (China, South Africa, and the United Kingdom), the early stage strategy outperforms the late stage strategy. The difference in profitability between these strategies is significant for 10 countries. The country-average results in the final rows of Table 3 show that the early stage strategy significantly outperforms the late stage strategy by 0.74% per month (*t*-value 8.87). In addition, comparing the country-average pure momentum profits of 0.85% per month (*t*-value 15.70) in Table 2 with the corresponding late stage result of 0.48% per month (*t*-value 8.09) in Table 3, we can report that the pure momentum strategy significantly outperforms the late stage strategy by 0.37% per month (*t*-value 4.61). In summary, the evidence in Tables 2 and 3 shows that the early (late) stage momentum strategy outperforms (underperforms) the pure momentum strategy in markets around the world. The ability of trading volume to predict the magnitude of momentum profits is pervasive across many countries.

Table 3 also provides information related to the liquidity hypothesis. The second and third columns present the returns of the high- and low-volume losers, while the fourth and fifth columns present the returns of the high- and low-volume winners. These columns show that low-volume losers outperform high-volume losers in 34 markets and that low-volume winners outperform high-volume winners in 27 markets. These results are consistent with the liquidity hypothesis of Amihud and Mendelson (1986), which implies that trading volume is inversely related to expected returns. The sixth and seventh columns show that momentum returns are higher for high-volume stocks (R3V2–R1V2) than for low-volume stocks (R3V1–R1V1) in 29 markets. Although, these results are in line with those of Lee and Swaminathan (2000), they are difficult to reconcile with the liquidity hypothesis.

Table A1 in the Appendix reports country-specific descriptive statistics on all volume-based momentum portfolios. We observe that, in general, the loser portfolio (R1) has the smallest average firm size for both the low- and high-volume stocks in 27 out of 37 markets. Another feature is that, for the high-volume stocks, it is the middle (R2) portfolio that has the

largest average firm size. In addition, high-volume winner and loser stocks tend to be those of larger firms than for the corresponding low-volume winner and loser stocks. Table A1 also shows that, with one exception, the loser portfolio has a lower average P/B than the corresponding winner portfolio. Looking over Table A1 we see the average P/B of the low-volume winner and loser portfolios are lower than the average P/B of the corresponding high-volume winner and loser portfolios for 32 out of 37 countries. These results are consistent with those of Lee and Swaminathan (2000), who argue that low-volume stocks tend to exhibit value characteristics whereas high-volume stocks display glamour characteristics.

4.3 Risk Adjustments

To determine whether the profits of the strategies investigated are related to other well-known factors, we employ the Fama–French three-factor model in time-series regressions for each country, using monthly portfolio returns:

$$R_{pt} - R_{ft} = \alpha_p + b_p(R_{mt} - R_{ft}) + s_p SMB_t + h_p HML_t + \varepsilon_{pt}, \qquad (1)$$

where R_{pt} is the monthly return for portfolio *p* at time *t,* R_{ft} is the country's monthly risk-free rate at time *t*, downloaded from Datastream (or the CRSP in the case of U.S. data), R_{mt} is the country's value-weighted market index return, and SMB_t and HML_t are the monthly Fama–French size and book-to-market factors, respectively, at time *t* constructed from that country's stocks. We can interpret each estimate of the intercept in these regressions (α_p or alpha) as the risk-adjusted return of the portfolio.

Table 4 provides evidence of abnormal returns for the various momentum strategies. Both the pure momentum and early stage momentum strategies have significant alphas for 32 out of the 37 countries. Even the late stage strategy has positive and significant alphas for 27 of the 37 countries. Another interesting feature of the table is that at least one of the early or late stage alphas is positive and significant for every country. Looking at the country-

average results in the final row, we see that the pure, early and late stage momentum alphas are all significant and larger than 1% per month. These results demonstrate that the three-factor model cannot explain the momentum effect. Recall that the difference between early and late stage returns (early-late) is a measure of the size of the volume effect since early-late is long low-volume winners and losers and short high-volume winners and losers. We expect from Lee and Swaminathan's (2000) findings that this is equivalent to being long value characteristics and short glamour characteristics. Consequently, it is not surprising that only seven out of the 37 early-late alphas in Table 4 are significant. Nevertheless, the country-average early-late alpha of 0.54% per month is significant (*t*-value 6.12).

(Insert Table 4 about here)

4.4 Post-Holding Period Evidence

Lee and Swaminathan (2000) report that the early stage strategy shows continued momentum over a long horizon whereas the late stage strategy reverses more quickly. Given that our sample size is relatively short, reporting long-horizon results on a country-by-country basis would not be particularly meaningful. Accordingly, in Table 5 we report country-average results for the various momentum strategies for post-holding period average monthly returns for one, two, three, four, and five years after portfolio formation. The results for pure momentum show that, on average, across all countries there is no consistent evidence of reversal of the first year's significant profits of 0.67% per month (*t*-value 12.52) in the following four years. Average returns over months 13 to 60 amount to an insignificant -0.04% per month (*t*-value -1.58). In striking agreement with Lee and Swaminathan (2000), we find the early stage produces significant continuation throughout the first five years post-formation. In particular, months 13 to 60 show continuation averaging 0.23% per month (*t*-value 4.17). In contrast, the late stage momentum strategy's first 12 months' profit of 0.27% per month (*t*-value 4.42) precedes a significant reversal over the next 48 months since months 13 to 60 have an average return of -0.32% per month (*t*-value -6.67).

In summary, the country-average results show that trading volume predicts both the magnitude and persistence of momentum. Thus, our results are consistent with Lee and Swaminathan's (2000) findings. The final rows of Table 5 report the country-average early-late average monthly returns for the first five years following formation. The results show that the early stage strategy has significantly higher average returns than the late stage strategy in each of these five years. Figure 1 depicts the differing post-formation behaviors of the momentum strategies. It presents the cumulative momentum profits of the pure, early and late stage momentum strategies over the 60 months following portfolio formation. Figure 1 suggests that the early and late stage strategies are well named: The early stage portfolios contain stocks in the early stages of a price continuation, while the late stage portfolios contain stocks whose momentum soon reverses.

(Insert Table 5 and Figure 1 about here)

Specifically, early stage stocks display price continuation for at least five years, suggesting that investors underreact to fundamental news or to past overreactions. In contrast, late stage stocks exhibit large price reversals in the second through fifth post-formation years, suggesting investor overreaction is present in these international markets. Importantly, this country-average pattern of both investor underreaction and overreaction is consistent with that observed by Lee and Swaminathan (2000). Our results confirm the usefulness of trading volume for identifying short-term underreaction and long-term overreaction in international markets.

4.5 Possible Determinants of the Cross-Country Volume Effect

In this section we test the hypothesis that the magnitude of the volume effect (as measured by early minus late profits) is negatively related to individualism. We examine the determinants of cross-country variation in the size of the volume effect by regressing the early minus late profits on IDV and other variables:

$$\text{Early} - \text{Late})_{it} = \alpha_0 + \beta_1 \text{IDV}_i + F_i \gamma_1 + A_{it} \gamma_2 + \varepsilon_{it}, \quad (2)$$

where (Early-Late)$_{it}$ is the difference in the average monthly returns of the early and late stage momentum strategies in country *i* in year *t*, IDV$_i$ is the individualism index of country *i*, and F_i and A_{it} are vectors of explanatory variables, where F_i is a constant and A_{it} is updated annually. Each explanatory variable is defined in Table A2 in the Appendix. We employ the Fama–MacBeth (1973) method to estimate regression equation (2). We calculate the Fama–MacBeth regression coefficients as the averages of the time-series estimates from the year-by-year cross-sectional regressions. For the *t*-statistics on these average coefficients, we use Newey–West (1994) standard error estimates to control for heteroskedasticity and autocorrelation.

Table 6 presents the early-late regression results. Panel A shows the results from the early-late regression on individualism without any control variables. We observe a negative and statistically significant coefficient of -0.0120 (*t*-value -2.75), indicating IDV is negatively related to the magnitude of this difference in profits across countries. While these regression results support the possibility that individualism is negatively related to the difference between early and late stage profits, we need to consider control variables.

(Insert Table 6 about here)

We follow Chui et al. (2010) and include the same cross-country control variables that they employed in their study of the determinants of cross-country pure momentum profits. We group these variables into behavioral, financial market development, institutional quality, and macroeconomic variables.[9] Chui et al. (2010) examine several variables that proxy for the effect of speed of information flow and information uncertainty at the country level.

[9] Other studies, such as that of Falkenstein (1996), Gompers and Metrick (2001), and Dongmin, Ng, and Wang (2010), show that firm characteristics such as size, turnover, and volatility play an important role in the stock investment decisions of institutional investors.

Research by Zhang (2006) shows that these items can help explain variation in momentum profitability. Following Chui et al. (2010) and Zhang (2006), we examine these variables' explanatory power with respect to early-late momentum profits. The variables include stock turnover (LnV), the average dispersion of analyst forecasts in a country (LnDisp), the average number of analysts following a stock in a country (LnCov), the median firm size in a market (LnSize), stock market price volatility *(*Volp*)*, and cash flow growth rate volatility *(*VolFCF*)*. We also include the ratio of price to the book value of equity (P/B).

Panel B of Table 6 displays the results of the regression model with these explanatory variables, showing that, even after controlling for firm characteristics, the relationship between IDV and early-late momentum profits remains negative and significant at the 10% level (*t*-value -1.87). Panel B also shows that none of the other explanatory variables have significant coefficients. Chui et al. (2010) suggest that the development of financial market and institutional quality might be correlated with informational efficiency because markets with greater integrity facilitate the flow of information and reduce transaction costs. Similarly, we adopt the variables used by Chui et al. (2010) to see whether IDV and early-late profits are still related after we control for financial market development and institutional quality.

The financial market development variables include the ratio of private credit to gross domestic product (CreditGDP) as a measure of financial market development, as suggested by Stulz and Williamson (2003); capital flow restriction (Contr), which measures the extent to which foreign institutions can invest in the market; the average common language dummy variable (Lang) suggested by Chan, Covrig, and Ng (2005); and the ratio of the market capitalization of the stocks comprising the Standard & Poor's IFC investable index to that of the stocks comprising the Standard & Poor's IFC global index in each country as a measure of stock market openness (Open), used by Bekaert, Harvey, Lundblad, and Siegel (2007). Panel C of Table 6 indicates that when we consider financial market development variables, IDV and early-late profits remain negatively related. The relationship between IDV and early-

late profits is significantly negative at the 10% level (*t*-statistic -1.95). Similar to Panel B's results, none of the other explanatory variables have significant coefficients.

The institutional quality variables include the insider trading index (Insider), which measures a country's prevalence of insider trading activity. To measure transaction costs, we also include the estimate of cost of trading (Lntran), as suggested by Chan et al. (2005). Panel D of Table 6 shows that the IDV coefficient is negative and significant at the 5% level (*t*-statistic -2.06). One explanatory variable (Insider) is also significant at the 10% level in Panel D of Table 6, but this did not undermine the significance of the IDV coefficient in this case.

Next, we examine the effect of macroeconomic variables on cross-country early-late profits. Griffin, Ji, and Martin (2003) use macroeconomic variables such as gross domestic product growth rate and inflation rate to explain the variation of momentum profits. Following these authors, we use gross domestic product growth rate (GDP) and inflation growth rate (Inflation) to examine the extent to which macroeconomic variables can explain cross-country differences in the profits of the early and late stage momentum strategies. Panel E of Table 6 indicates that IDV's explanatory power on cross-country early-late profits remains negative and statistically significant at the 5% level when the model includes these macroeconomic variables (*t*-statistic -2.43). Neither of the macroeconomic variables have significant coefficients in either table.

In sum, the IDV coefficient is negative and significant at either the 5% or 10% level for every model in Table 6. This evidence is consistent with the hypothesis that the magnitude of the volume effect, as measured by the difference between early and late stage momentum returns, is negatively related to individualism.

5. Conclusions

In this paper we investigate the robustness of trading volume in predicting the returns of momentum strategies for stocks listed in 37 countries. We show that one can successfully employ trading volume to enhance momentum profitability. Specifically, we show that the

volume-based early stage momentum strategy outperforms the pure momentum strategy in 34 out of 37 countries. While the pure momentum strategy averages a return of 0.85% per month across the countries in our sample, the early stage strategy earns 1.22% per month on average. In addition, consistent with Lee and Swaminathan's US finding, we find that trading volume predicts the persistence of momentum profitability. Specifically, the early stage momentum strategy has significant country-average profitability for the first five years post-formation whereas the late stage strategy's country-average profitability reverses strongly after the first post-formation year.

Lee and Swaminathan (2000) describe a volume effect in US stocks that can be measured by the difference between early stage and late stage momentum profitability (early-late). We find strong evidence of this effect internationally. The early stage strategy outperforms the late stage strategy by a significant 0.74% per month on average across the countries in our sample. We also proposed individualism as a possible explanation of the strength of the volume effect. Lee and Swaminathan (2000) argue that the volume effect is the result of mispricing. Since their evidence suggests that the volume effect can partly be attributed to the herd-like overreaction of investors, and since Chui et al. (2010) conjecture that herd-like overreaction may be stronger in less individualistic cultures, we hypothesized a negative relationship between the size of the volume effect and the degree of individualism. We are the first to show that the volume effect is stronger in less individualistic cultures than in more individualistic cultures.

Our evidence of the robustness and profitability of the volume-based early stage momentum strategy suggests that further research into the interaction between trading volume and momentum is an important future direction for research. Our finding that individualism plays an important role in explaining cross-country variations in the strength of the volume effect is an important first step in this direction and should help researchers and practitioners better understand why momentum profitability varies significantly across countries.

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APPENDIX

Table A1

Characteristics of Portfolios Based on Price Momentum and Trading Volume

This table presents the portfolio characteristics in a matrix format for the six portfolios (R1V1, R1V2, R2V1, R2V2, R3V1, R3V2) formed from the intersection of the three price momentum categories (R1, R2, R3) and the two trading volume categories (V1, V2) for each country. Here R1 represents the loser stocks and R3 represents the winner stocks and V1 represents the low-volume stocks and V2 represents the high-volume stocks. Size (in millions of U.S. dollars) represents the time-series average of the market capitalisation of the portfolio on the portfolio formation date, P/B represents the time-series average of the ratio of price to the book value of equity of the portfolio on the portfolio formation date, returns refer to the geometric average monthly returns in percentages during the last six months, turnover represents the average percentage monthly turnover during the last six months, and *N* represents the average number of firms in each portfolio.

		V1 (Low)					V2 (High)				
Country	**Momentum**	**Size**	**P/B**	**Turnover**	**Returns**	***N***	**Size**	**P/B**	**Turnover**	**Returns**	***N***
Argentina	R1	585	1.12	0.30%	-4.03%	9	266	1.02	3.42%	-4.40%	9
	R2	870	1.08	0.32%	0.56%	10	419	1.03	3.08%	0.63%	9
	R3	991	1.31	0.31%	5.96%	9	469	1.28	3.46%	6.65%	10
Australia	R1	60	2.21	1.00%	-5.32%	175	387	2.22	6.41%	-5.70%	151
	R2	164	2.06	0.94%	0.52%	178	1,462	2.36	6.20%	0.58%	149
	R3	162	2.64	1.01%	6.47%	137	884	3.04	8.48%	8.85%	189
Austria	R1	199	1.37	0.40%	-2.89%	12	994	2.22	5.22%	-3.74%	12
	R2	432	1.25	0.36%	0.56%	14	1,546	1.80	4.17%	0.56%	11
	R3	517	1.44	0.41%	4.30%	11	1,623	2.24	5.37%	5.23%	14
Belgium	R1	262	1.71	0.36%	-2.54%	21	1,997	2.05	3.24%	-2.99%	19
	R2	503	1.37	0.39%	0.76%	22	3,248	2.18	2.68%	0.77%	18
	R3	614	1.51	0.40%	4.40%	17	2,423	2.64	3.22%	5.08%	23
Brazil	R1	600	0.77	0.37%	-3.85%	22	908	0.93	10.44%	-3.73%	22
	R2	1,182	0.89	0.38%	1.55%	23	1,906	1.12	9.62%	1.52%	23
	R3	868	1.06	0.39%	8.32%	22	1,650	1.25	10.77%	8.33%	23
Canada	R1	86	2.03	1.05%	-6.50%	232	366	2.11	7.83%	-7.03%	188
	R2	386	2.03	1.04%	0.14%	225	1,343	2.10	7.07%	0.26%	196
	R3	312	2.61	1.11%	7.60%	173	1,020	2.90	9.36%	9.75%	247
Chile	R1	390	1.41	0.10%	-2.64%	18	863	1.41	1.90%	-2.78%	18
	R2	571	1.55	0.11%	0.86%	19	1,278	1.63	1.76%	0.90%	17
	R3	549	1.88	0.11%	5.19%	17	1,141	1.83	2.32%	5.54%	20
China	R1	527	2.51	6.84%	-2.71%	204	294	3.07	23.78%	-2.55%	156
	R2	622	2.80	7.90%	1.20%	187	309	3.33	24.40%	1.35%	171
	R3	851	3.64	7.91%	6.25%	144	461	3.73	28.37%	6.85%	209

Denmark	R1	169	1.50	0.61%	-2.59%	27	672	2.11	5.63%	-3.43%	28
	R2	170	1.29	0.62%	0.78%	32	1,268	1.98	4.87%	0.80%	24
	R3	268	1.65	0.66%	4.34%	24	1,107	2.52	6.04%	5.47%	31
Finland	R1	214	1.76	0.90%	-2.70%	17	2,161	1.94	6.73%	-3.34%	17
	R2	253	1.70	0.86%	0.97%	19	2,479	1.96	6.18%	1.03%	16
	R3	312	2.02	0.91%	4.81%	15	3,266	2.64	7.15%	5.94%	19
France	R1	215	1.86	0.40%	-3.46%	101	2,225	2.33	5.11%	-4.14%	107
	R2	404	1.75	0.40%	0.64%	116	4,792	2.33	4.58%	0.67%	93
	R3	458	2.20	0.43%	5.00%	95	3,598	3.06	5.10%	6.08%	113
Germany	R1	1,330	2.26	0.48%	-4.30%	66	896	1.99	5.69%	-5.68%	101
	R2	2,638	2.18	0.47%	0.05%	101	1,037	2.21	5.56%	0.06%	66
	R3	2,995	2.76	0.37%	5.13%	87	1,196	3.06	6.93%	6.83%	84
Greece	R1	291	2.14	1.60%	-3.54%	40	303	2.20	10.19%	-3.97%	39
	R2	336	2.39	1.67%	1.04%	44	497	2.48	9.49%	1.18%	35
	R3	433	2.99	1.79%	7.29%	34	582	3.40	12.15%	8.35%	44
Hong Kong	R1	343	1.24	0.82%	-4.88%	104	770	1.42	8.53%	-5.39%	88
	R2	587	1.09	0.84%	0.30%	108	1,781	1.48	7.76%	0.41%	85
	R3	647	1.49	0.94%	6.22%	76	1,598	2.00	11.25%	8.60%	115
India	R1	271	1.52	0.42%	-4.43%	143	215	1.62	4.67%	-4.78%	121
	R2	412	1.89	0.43%	0.75%	146	354	1.99	4.35%	0.87%	119
	R3	557	2.50	0.47%	7.28%	107	469	2.82	5.94%	9.25%	156
Israel	R1	64	1.25	0.40%	-4.16%	74	181	2.01	5.33%	-4.81%	72
	R2	69	1.40	0.40%	0.70%	78	324	1.76	4.15%	0.73%	68
	R3	83	1.66	0.41%	6.01%	67	348	2.62	5.80%	7.67%	79
Italy	R1	508	1.57	1.42%	-2.80%	37	2,837	2.04	8.91%	-3.38%	37
	R2	673	1.55	1.39%	0.42%	42	5,250	2.13	7.80%	0.46%	33
	R3	878	1.90	1.56%	3.94%	32	4,390	2.42	9.67%	5.29%	42
Japan	R1	325	1.27	0.82%	-3.70%	524	1,310	1.79	6.97%	-4.53%	556
	R2	424	1.14	0.79%	-0.26%	633	1,967	1.63	5.81%	-0.24%	449
	R3	503	1.35	0.82%	3.32%	461	2,086	2.13	8.46%	5.27%	614
Malaysia	R1	172	1.31	0.59%	-3.66%	125	164	1.53	6.77%	-4.39%	115
	R2	230	1.33	0.61%	-0.09%	139	314	1.61	6.29%	0.01%	102
	R3	303	1.63	0.70%	4.06%	96	373	2.09	9.17%	5.77%	143
Netherlands	R1	616	2.42	1.80%	-3.60%	28	3,970	3.06	13.45%	-3.94%	26
	R2	1,514	2.16	1.93%	0.65%	29	7,707	3.17	11.46%	0.71%	26
	R3	1,485	2.90	2.01%	5.03%	24	4,837	4.06	13.22%	5.78%	30

New Zealand	R1	64	2.03	0.44%	-3.42%	18	288	2.37	3.25%	-3.79%	16
	R2	122	1.79	0.45%	0.68%	17	499	2.17	2.90%	0.71%	18
	R3	143	2.18	0.46%	4.58%	16	405	2.62	3.28%	5.52%	19
Norway	R1	200	1.82	1.10%	-3.42%	24	614	2.32	11.85%	-4.46%	24
	R2	298	1.65	1.08%	0.85%	29	1,783	2.12	10.04%	0.95%	21
	R3	303	2.10	1.22%	5.22%	20	1,296	3.02	13.39%	7.18%	29
Peru	R1	241	0.98	0.34%	-3.53%	8	95	0.43	4.95%	-3.64%	7
	R2	457	1.44	0.34%	1.42%	8	164	0.58	4.47%	1.37%	7
	R3	461	1.67	0.34%	7.12%	7	136	0.74	6.18%	8.78%	8
Philippines	R1	104	1.05	0.19%	-5.03%	23	247	1.20	3.32%	-5.18%	19
	R2	193	1.09	0.19%	-0.05%	23	532	1.42	3.06%	0.08%	20
	R3	203	1.33	0.19%	6.25%	18	374	1.71	5.53%	7.72%	25
Poland	R1	189	1.58	1.36%	-4.35%	27	149	1.29	9.62%	-4.97%	30
	R2	323	1.74	1.31%	0.45%	32	234	1.44	8.87%	0.49%	26
	R3	335	2.30	1.26%	6.72%	27	306	1.79	10.24%	8.06%	31
Portugal	R1	231	1.25	0.47%	-3.00%	10	1,320	1.96	5.35%	-3.13%	9
	R2	489	1.34	0.52%	0.49%	10	2,622	2.38	4.77%	0.55%	9
	R3	483	1.42	0.50%	5.00%	9	2,094	2.73	6.35%	4.92%	10
Singapore	R1	240	1.24	0.61%	-3.62%	65	413	1.75	7.22%	-4.28%	55
	R2	313	1.20	0.62%	0.41%	69	842	1.73	6.61%	0.53%	52
	R3	376	1.49	0.73%	4.88%	47	807	2.24	9.92%	6.81%	73
South Africa	R1	111	1.88	0.47%	-5.00%	57	827	2.08	4.36%	-4.52%	54
	R2	288	2.01	0.52%	0.76%	55	1,327	2.31	3.93%	0.79%	56
	R3	237	2.15	0.52%	6.55%	54	1,137	2.63	4.49%	6.83%	57
South Korea	R1	284	0.99	7.07%	-5.00%	152	132	1.27	37.03%	-5.76%	178
	R2	422	0.85	6.75%	0.11%	194	232	1.14	35.35%	0.15%	149
	R3	608	1.17	7.01%	6.48%	147	316	1.51	39.08%	8.16%	168
Spain	R1	1,298	2.07	1.31%	-1.90%	19	4,205	2.63	9.80%	-2.48%	21
	R2	1,798	2.40	1.31%	1.02%	22	7,434	2.47	8.89%	1.02%	19
	R3	1,932	2.97	1.45%	4.47%	19	6,007	3.05	10.30%	5.27%	22
Sweden	R1	148	2.29	1.46%	-4.15%	49	755	2.50	9.09%	-5.06%	51
	R2	337	2.08	1.39%	0.70%	55	2,050	2.56	8.50%	0.73%	46
	R3	399	2.55	1.50%	5.70%	47	1,616	3.32	9.96%	7.24%	54
Switzerland	R1	342	1.63	0.74%	-2.59%	35	5,692	2.32	7.09%	-3.19%	34
	R2	547	1.45	0.72%	0.73%	39	8,217	2.23	6.17%	0.78%	31
	R3	755	1.70	0.82%	4.43%	30	5,944	2.72	7.15%	5.30%	40

Taiwan	R1	424	1.35	5.35%	-4.28%	158	326	1.63	25.74%	-4.42%	116
	R2	609	1.45	5.42%	-0.17%	152	433	1.72	27.39%	-0.02%	122
	R3	848	1.94	5.97%	4.68%	96	592	2.17	34.08%	6.32%	170
Thailand	R1	97	1.10	0.46%	-4.48%	46	211	1.25	9.88%	-5.13%	58
	R2	133	1.21	0.43%	0.26%	61	446	1.52	9.24%	0.25%	45
	R3	153	1.49	0.49%	5.69%	49	463	1.84	12.37%	7.56%	54
Turkey	R1	397	1.89	5.41%	-3.50%	35	127	1.52	34.99%	-3.91%	41
	R2	600	1.92	5.25%	1.11%	41	199	1.55	34.17%	1.13%	37
	R3	1,106	2.50	5.16%	7.35%	38	246	2.04	36.64%	8.56%	37
U.K.	R1	191	2.41	1.29%	-5.06%	238	1,840	2.63	9.82%	-5.23%	198
	R2	512	2.11	1.40%	0.41%	228	4,102	2.79	8.74%	0.45%	208
	R3	603	2.88	1.48%	5.37%	188	3,035	3.56	9.84%	6.55%	248
United States	R1	2,394	1.99	3.50%	-2.34%	468	3,806	2.16	17.49%	-3.06%	499
	R2	3,214	2.16	3.54%	0.95%	580	5,239	2.51	14.63%	1.00%	385
	R3	3,791	2.54	3.69%	5.16%	402	4,692	3.10	17.61%	6.50%	567

Table A2
Definitions and sources of all variables included in Table 6

Variable	Source	Definition
Stock Returns Data		
U.S.	CRSP	Logarithmic returns of stock prices (incl. dividends).
Non-U.S.	Datastream International	Logarithmic returns of stock prices (incl. dividends).
Stock Volume Data		
U.S.	CRSP	Total dollar trading volume divided by stock market capitalisation.
Non-U.S.	Datastream International	Total dollar trading volume divided by stock market capitalisation.
Explanatory variables		
Hofstede's individualism index (IDV)	Hofstede (2001)	A higher score indicates a higher degree of individualism.
Behavioural Variables		
Market trading volume (LnV)	Datastream International	Market trading turnover of Datastream's global index of a given country.
Average dispersion in analyst forecasts in a country (LnDisp)	I/B/E/S	Arithmetic mean of the standard deviations of analyst forecasts for each earnings announcement in each country.
Average volatility of the individual stocks in a market (Volp)	Datastream International	Arithmetic mean of the annualised standard deviation of log price changes for each country, each year, from 1995 to 2008, calculated from Datastream's monthly standard deviations of the log of stock price changes $\times \sqrt{12}$.
Volatility of the growth of cash flows (VolFCF)	Datastream International	Arithmetic mean of annualised standard deviations of the log of free cash flow changes for each country, each year, from 1995 to 2008, calculated from Datastream's monthly standard deviations of the log of free cash flow growth $\times \sqrt{12}$.
Median market capitalisation in a country (LnSize)	Datastream International	Median of each country's market capitalisation component of Datastream's global index for each year, from 1995 to 2008.
Analyst coverage (LnCov)	I/B/E/S	Average number of analysts providing one-year-ahead earnings forecasts for each firm in each country.
Price-to-book ratio in a country (P/B)	Datastream International	Arithmetic mean of each country' market-to-book ratio component of Datastream's global index for each year, from 1995 to 2008.
Financial Market Development Variables		
Ratio of total private credit to gross domestic product (CreditGDP)	World Development Statistics database, World Bank	A country's total private credit divided by its gross domestic product in a given year.
Index of capital flow restrictions (Contr)	Economic Freedom of the World Annual report	A lower value indicates more restrictions. The arithmetic mean of the Foreign Ownership/Investment Restrictions index, the Capital Controls Index and International Capital Market Controls index for each country in each year from 2000 to 2007.
Average common language dummy variable (Lang)	Chan et al. (2005)	An average score of a common language dummy that equals 1 if countries *i* and *j* share a major language and 0 otherwise.

Market Integrity Variables		
Prevalence of insider trading (Insider)	La Porta, Lopez-de-Silanes, and Shleifer (2006)	Composite score of the disclosure requirements of each country, the arithmetic mean of six categories: (1) prospectus, (2) director compensation, (3) shareholders, (4) inside ownership, (5) irregular contracts, and (6) transactions.
Transaction costs index (LnTran)	Chan et al. (2005)	Transaction costs associated with trading foreign securities, originally computed by Elkins-Sherry based on commissions, fees, and market impact costs for the period September 1996 to December 1998.
Macroeconomic Variables		
Inflation growth (Inflation)	International Monetary Fund	Average annual consumer price index percent changes for each country, each year, from 1995 to 2008.
Gross domestic product growth (GDP)	International Monetary Fund	Average nominal GDP growth for each country, each year, from 1995 to 2008.

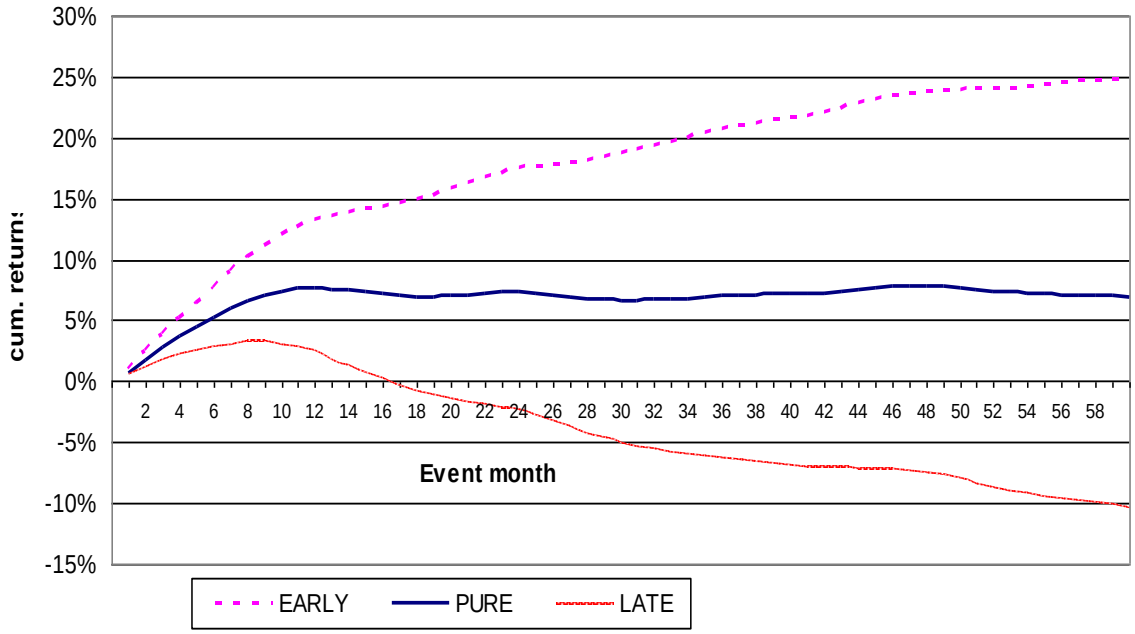

Fig. 1. Cumulative Returns of Momentum Strategies
This figure displays the cumulative monthly momentum returns for the pure momentum, early and late stage momentum strategies.

Table 1
Descriptive Statistics

This table reports the descriptive statistics for our sample countries. We screen out stocks with market capitalisation below the fifth percentile of all stocks within a given country in any month. We treat the returns that are larger (less) than 100% (-95%) as missing. To calculate the past six-month cumulative returns on individual stocks as well as measure the returns on the momentum portfolios, we also require each stock in our sample to have a return history of at least 12 months. Since we need a reasonable number of stocks to form momentum portfolios, we require each country to have at least 50 stocks that meet our stock selection criteria in any month during our sample period. In addition, we require each momentum portfolio in each country to have a return history of at least five years. We also require each country to have a corresponding Hofstede (2001) IDV score. This table reports average returns, market capitalisation in millions, percentage turnover (number of shares traded in a month divided by the total number of shares on issue), P/B (the average ratio of price to the book value of equity), and the number of qualifying stocks for each country.

Country	IDV	Average Return	Market Cap	Turnover	P/B	No. of Stocks
Argentina	46	-0.33%	435	1.91%	1.31	100
Australia	90	-0.29%	328	4.33%	2.46	2,205
Austria	55	-0.34%	935	2.95%	2.36	130
Belgium	75	0.02%	1,135	1.80%	2.40	217
Brazil	38	1.68%	1,394	4.11%	1.65	431
Canada	80	-0.62%	441	4.78%	2.45	2,380
Chile	23	0.53%	643	1.06%	1.67	180
China	20	0.70%	806	18.57%	3.31	2,075
Denmark	74	-0.13%	453	3.12%	1.94	283
Finland	63	0.40%	1,145	4.03%	2.16	184
France	71	-0.08%	1,437	2.56%	2.61	1,153
Germany	67	-1.00%	1,185	1.58%	2.80	1,154
Greece	35	-0.28%	385	6.84%	2.83	380
Hong Kong	25	-0.30%	774	5.21%	1.92	979
India	48	-0.05%	432	3.25%	2.24	1,275
Israel	54	-0.26%	147	2.92%	2.31	795
Italy	76	-0.28%	1,841	5.38%	2.18	418
Japan	46	-0.72%	914	4.97%	1.79	4,665
Malaysia	26	-0.58%	192	4.79%	1.51	1,166
Netherlands	80	-0.36%	2,744	7.03%	3.37	280
New Zealand	79	-0.21%	181	1.64%	2.48	206
Norway	69	-0.50%	540	6.25%	2.28	375
Peru	16	0.56%	191	2.37%	1.16	117
Philippines	32	-0.68%	230	2.07%	1.47	228
Poland	60	-0.76%	252	5.14%	2.07	430
Portugal	27	0.70%	826	2.50%	1.91	112
Singapore	20	0.07%	349	5.15%	1.76	690
South Africa	65	-1.38%	381	2.29%	2.45	764
South Korea	18	-1.18%	260	25.17%	1.46	2,063
Spain	51	0.26%	2,976	4.98%	2.79	208
Sweden	71	-1.16%	485	5.02%	2.94	688
Switzerland	68	0.08%	2,638	3.77%	2.30	313
Taiwan	17	-0.34%	380	16.93%	1.67	1,469
Thailand	20	-0.46%	226	6.94%	1.45	547
Turkey	37	0.26%	433	23.76%	1.91	340
United Kingdom	89	-1.24%	880	4.69%	2.94	3,240
United States	91	0.86%	2,483	9.85%	2.57	6,033

Table 2
Returns to Price Momentum Portfolios

This table presents the average monthly returns for price momentum portfolios for the sample countries. At the beginning of each month, we sort the stocks in each country based on their previous six-month returns and divide them into three equal-weighted portfolios: R1 represents the third of stocks with the lowest past returns (losers), R3 represents the third of stocks with the highest past returns (winners), and R2 represents the middle stocks not included in either R1 or R3. After skipping one month, we hold the winners and losers for six months. If a stock is delisted, we rebalance the portfolio at the end of the delisting month. We compute monthly holding period returns using Jegadeesh and Titman's (1993, 2001) overlapping portfolio approach. A country's pure momentum strategy (R3–R1) is long the winner portfolio and shorts the loser portfolio. We construct country-average portfolios by equally weighting each country's corresponding portfolio. This table presents the *t*-statistics in parentheses.

Country	R1 Losers		R3 Winners		R3–R1	
Argentina	-0.67%	(-0.84)	0.04%	(0.06)	0.71%	(1.95)
Australia	-0.88%	(-1.26)	0.38%	(0.62)	1.27%	(4.48)
Austria	-0.67%	(-1.32)	0.57%	(1.46)	1.23%	(4.17)
Belgium	-0.38%	(-0.75)	1.05%	(2.97)	1.43%	(4.81)
Brazil	0.45%	(0.52)	1.13%	(1.52)	0.69%	(2.23)
Canada	-1.29%	(-1.83)	0.00%	(0.00)	1.29%	(4.16)
Chile	0.04%	(0.09)	0.67%	(1.52)	0.62%	(2.79)
China	0.82%	(1.10)	0.90%	(1.23)	0.08%	(0.27)
Denmark	-0.41%	(-0.88)	0.83%	(2.23)	1.25%	(5.00)
Finland	-0.05%	(-0.09)	0.97%	(2.10)	1.02%	(3.04)
France	-0.61%	(-1.15)	0.70%	(1.77)	1.31%	(4.35)
Germany	-1.68%	(-2.55)	0.38%	(0.87)	2.06%	(4.56)
Greece	-0.39%	(-0.42)	0.32%	(0.39)	0.71%	(1.76)
Hong Kong	-0.59%	(-0.76)	0.02%	(0.03)	0.61%	(1.91)
India	-0.08%	(-0.08)	0.74%	(0.87)	0.82%	(2.18)
Israel	-0.21%	(-0.34)	0.38%	(0.69)	0.59%	(2.11)
Italy	-0.40%	(-0.68)	0.72%	(1.59)	1.12%	(3.88)
Japan	-0.58%	(-0.99)	-0.57%	(-1.25)	0.01%	(0.05)
Malaysia	-0.98%	(-0.97)	-0.61%	(-0.78)	0.37%	(1.01)
Netherlands	-0.79%	(-1.30)	0.67%	(1.55)	1.46%	(4.27)
New Zealand	-0.68%	(-1.27)	0.76%	(1.59)	1.44%	(5.97)
Norway	-0.65%	(-0.97)	0.86%	(1.61)	1.50%	(4.74)
Peru	0.69%	(0.99)	0.97%	(1.80)	0.28%	(0.61)
Philippines	-0.57%	(-0.63)	-0.89%	(-1.30)	-0.32%	(-0.74)
Poland	-0.75%	(-0.98)	0.49%	(0.70)	1.25%	(3.79)
Portugal	-0.10%	(-0.18)	0.67%	(1.64)	0.76%	(2.32)
Singapore	-0.42%	(-0.47)	0.04%	(0.06)	0.45%	(1.29)
South Africa	-1.15%	(-1.89)	0.65%	(1.04)	1.79%	(7.25)
South Korea	-0.83%	(-0.84)	-0.85%	(-0.95)	-0.01%	(-0.04)
Spain	0.38%	(0.77)	1.04%	(2.49)	0.66%	(2.56)
Sweden	-0.92%	(-1.30)	0.62%	(1.21)	1.54%	(3.67)
Switzerland	-0.31%	(-0.60)	0.98%	(2.62)	1.29%	(4.38)
Taiwan	-0.42%	(-0.52)	-0.38%	(-0.53)	0.04%	(0.12)
Thailand	-0.90%	(-1.01)	-0.03%	(-0.05)	0.87%	(2.09)
Turkey	0.23%	(0.19)	-0.44%	(-0.39)	-0.66%	(-2.43)
United Kingdom	-1.48%	(-2.83)	0.29%	(0.70)	1.77%	(6.84)
United States	0.69%	(1.46)	1.10%	(3.17)	0.41%	(1.57)
Country-average	-0.40%	(-3.52)	0.45%	(4.69)	0.85%	(15.70)

Table 3
Monthly Returns for Portfolios Based on Price Momentum and Trading Volume

This table presents the average monthly returns for portfolio strategies from an independent two-way sort based on past returns and past average turnover. At the beginning of each month, we sort all available stocks based on their past six-month returns and divide them into three portfolios: R1 represents the third of stocks with the lowest returns (losers) and R3 represents the third of stocks with the highest returns (winners). We then independently sort stocks based on their past trading volume, where a stock's trading volume is defined as its average daily turnover ratio over the past six months (a stock's turnover ratio on a particular day is the ratio of the number of its shares traded that day to the number of its shares outstanding at the end of the day). Here V1 represents the portfolio with the 50% of stocks with the lowest trading volume and V2 represents the portfolio with the 50% of stocks with the highest trading volume. We group the stocks at the intersection of the two sorts together to form portfolios based on past returns and past trading volume. The early stage momentum strategy buys low-volume winners and sells high-volume losers (R3V1–R1V2) and the late stage momentum strategy buys high-volume winners and sells low-volume losers (R3V2–R1V1). The column labelled *early–late* shows the average early stage momentum return minus the average late stage momentum return. The average monthly returns are for a six-month holding period, based on the portfolio rebalancing method described in Table 2. We construct country-average portfolios by equally weighting each country's corresponding portfolio. This table presents the *t*-statistics in parentheses.

Country	Losers		Winners		Winners–Losers		High–Low		Early	Late	
	R1V1 Low	R1V2 High	R3V1 Low	R3V2 High	R3V1–R1V1	R3V2–R1V2	R1V2–R1V1	R3V2–R3V1	R3V1–R1V2	R3V2–R1V1	Early–Late
Argentina	-0.46%	-0.83%	0.22%	-0.04%	0.68%	0.79%	-0.37%	-0.26%	1.05%	0.42%	0.63%
	(-0.66)	(-0.92)	(0.36)	(-0.05)	(1.61)	(1.90)	(-0.80)	(-0.65)	(1.85)	(0.97)	(0.86)
Australia	-0.69%	-1.08%	0.79%	0.13%	1.48%	1.21%	-0.39%	-0.66%	1.87%	0.82%	1.05%
	(-1.06)	(-1.40)	(1.55)	(0.19)	(5.81)	(3.82)	(-1.79)	(-2.69)	(5.22)	(2.52)	(2.50)
Austria	-0.59%	-0.98%	0.73%	0.51%	1.32%	1.50%	-0.40%	-0.22%	1.72%	1.10%	0.62%
	(-1.30)	(-1.65)	(2.20)	(1.06)	(4.16)	(4.38)	(-1.08)	(-0.73)	(3.84)	(3.28)	(1.09)
Belgium	-0.18%	-0.54%	1.07%	1.02%	1.25%	1.56%	-0.36%	-0.05%	1.61%	1.20%	0.40%
	(-0.41)	(-0.94)	(3.22)	(2.60)	(4.85)	(4.39)	(-1.39)	(-0.23)	(4.11)	(4.40)	(1.08)
Brazil	0.69%	0.19%	1.18%	1.07%	0.48%	0.88%	-0.50%	-0.10%	0.98%	0.38%	0.61%
	(0.86)	(0.21)	(1.64)	(1.32)	(1.20)	(2.31)	(-1.32)	(-0.30)	(2.01)	(1.05)	(1.06)
Canada	-0.83%	-1.83%	0.30%	-0.14%	1.13%	1.69%	-1.00%	-0.44%	2.13%	0.69%	1.44%
	(-1.26)	(-2.38)	(0.57)	(-0.23)	(3.99)	(4.64)	(-4.45)	(-2.04)	(5.23)	(2.20)	(3.74)
Chile	0.11%	-0.10%	0.57%	0.76%	0.47%	0.86%	-0.20%	0.19%	0.67%	0.65%	0.01%
	(0.22)	(-0.16)	(1.42)	(1.54)	(1.95)	(3.15)	(-0.81)	(0.83)	(2.13)	(2.29)	(0.04)
China	0.77%	0.91%	0.92%	0.98%	0.15%	0.06%	0.14%	0.06%	0.01%	0.21%	-0.20%
	(1.10)	(1.07)	(1.41)	(1.26)	(0.50)	(0.22)	(0.42)	(0.21)	(0.02)	(0.55)	(-0.35)
Denmark	-0.27%	-0.58%	0.78%	0.89%	1.05%	1.47%	-0.31%	0.11%	1.36%	1.15%	0.21%
	(-0.61)	(-1.10)	(2.19)	(2.18)	(4.52)	(4.99)	(-1.16)	(0.55)	(3.61)	(4.81)	(0.51)

Finland	0.03%	-0.11%	1.07%	0.90%	1.03%	1.01%	-0.14%	-0.17%	1.18%	0.87%	0.31%
	(0.07)	(-0.18)	(2.67)	(1.67)	(3.21)	(2.55)	(-0.45)	(-0.57)	(2.65)	(2.59)	(0.64)
France	-0.32%	-0.89%	0.73%	0.72%	1.05%	1.61%	-0.58%	-0.01%	1.63%	1.04%	0.59%
	(-0.77)	(-1.39)	(2.27)	(1.51)	(5.07)	(4.53)	(-1.58)	(-0.06)	(3.52)	(3.65)	(1.04)
Germany	-1.19%	-1.98%	0.67%	0.12%	1.83%	2.11%	-0.80%	-0.44%	2.56%	1.31%	1.17%
	(-2.21)	(-2.56)	(1.59)	(0.23)	(4.74)	(4.39)	(-1.67)	(-1.12)	(3.80)	(3.30)	(1.49)
Greece	0.21%	-0.99%	0.58%	0.08%	0.37%	1.08%	-1.21%	-0.50%	1.57%	-0.13%	1.71%
	(0.25)	(-0.97)	(0.78)	(0.09)	(0.89)	(2.62)	(-3.93)	(-1.79)	(3.06)	(-0.34)	(3.41)
Hong Kong	0.01%	-1.34%	0.50%	-0.16%	0.49%	1.18%	-1.35%	-0.66%	1.84%	-0.17%	2.01%
	(0.02)	(-1.53)	(0.93)	(-0.22)	(1.60)	(3.57)	(-4.78)	(-2.25)	(3.91)	(-0.51)	(3.71)
India	0.37%	-0.64%	0.75%	0.77%	0.38%	1.41%	-1.02%	0.02%	1.39%	0.39%	1.00%
	(0.40)	(-0.59)	(0.95)	(0.84)	(1.19)	(3.19)	(-3.11)	(0.07)	(2.82)	(1.00)	(1.86)
Israel	0.11%	-0.53%	0.30%	0.53%	0.19%	1.06%	-0.64%	0.23%	0.83%	0.42%	0.41%
	(0.19)	(-0.75)	(0.63)	(0.85)	(0.85)	(3.22)	(-1.91)	(0.90)	(2.00)	(1.29)	(0.75)
Italy	-0.19%	-0.62%	0.77%	0.69%	0.97%	1.31%	-0.42%	-0.08%	1.39%	0.89%	0.51%
	(-0.36)	(-0.97)	(1.87)	(1.40)	(3.92)	(4.08)	(-1.89)	(-0.47)	(3.65)	(3.57)	(1.44)
Japan	-0.29%	-0.89%	-0.41%	-0.61%	-0.12%	0.27%	-0.59%	-0.20%	0.47%	-0.32%	0.79%
	(-0.58)	(-1.32)	(-1.05)	(-1.19)	(-0.49)	(0.85)	(-2.43)	(-0.96)	(1.16)	(-1.22)	(1.88)
Malaysia	-0.67%	-1.42%	-0.09%	-0.87%	0.59%	0.54%	-0.74%	-0.79%	1.33%	-0.20%	1.53%
	(-0.72)	(-1.30)	(-0.12)	(-1.03)	(1.73)	(1.44)	(-3.00)	(-3.84)	(2.65)	(-0.68)	(3.58)
Netherlands	-0.82%	-0.85%	0.81%	0.61%	1.64%	1.46%	-0.02%	-0.21%	1.66%	1.43%	0.23%
	(-1.55)	(-1.20)	(2.13)	(1.23)	(5.47)	(3.42)	(-0.08)	(-1.00)	(3.52)	(4.70)	(0.54)
New	-0.39%	-0.97%	0.67%	0.76%	1.06%	1.73%	-0.57%	0.09%	1.64%	1.16%	0.48%
Zealand	(-0.80)	(-1.57)	(1.48)	(1.46)	(4.25)	(5.54)	(-1.96)	(0.41)	(4.54)	(4.14)	(1.12)
Norway	-0.54%	-0.81%	1.00%	0.77%	1.55%	1.59%	-0.27%	-0.23%	1.82%	1.32%	0.50%
	(-0.90)	(-1.07)	(2.19)	(1.25)	(4.47)	(4.36)	(-0.72)	(-0.74)	(3.67)	(3.64)	(0.83)
Peru	0.68%	0.75%	1.21%	0.79%	0.53%	0.04%	0.07%	-0.42%	0.46%	0.11%	0.35%
	(1.19)	(0.87)	(2.67)	(1.19)	(1.23)	(0.07)	(0.14)	(-0.95)	(0.67)	(0.22)	(0.43)
Philippines	-0.28%	-0.98%	-0.62%	-1.06%	-0.33%	-0.08%	-0.69%	-0.44%	0.36%	-0.78%	1.14%
	(-0.34)	(-0.97)	(-1.02)	(-1.35)	(-0.72)	(-0.19)	(-2.07)	(-1.19)	(0.59)	(-1.82)	(1.83)
Poland	-0.62%	-0.91%	0.51%	0.50%	1.17%	1.41%	-0.29%	0.01%	1.30%	1.12%	0.12%
	(-0.86)	(-1.06)	(0.73)	(0.68)	(3.26)	(3.48)	(-0.69)	(0.03)	(2.67)	(2.87)	(0.19)
Portugal	0.13%	-0.23%	0.55%	0.78%	0.42%	1.01%	-0.36%	0.23%	0.78%	0.65%	0.12%
	(0.27)	(-0.38)	(1.32)	(1.61)	(1.19)	(2.84)	(-0.97)	(0.64)	(1.51)	(1.94)	(0.20)
Singapore	0.01%	-1.00%	0.25%	-0.03%	0.23%	0.97%	-1.01%	-0.28%	1.25%	-0.04%	1.29%

	(0.02)	(-1.03)	(0.39)	(-0.04)	(0.71)	(2.44)	(-3.46)	(-1.02)	(2.62)	(-0.12)	(2.58)
South Africa	-1.05%	-1.26%	0.55%	0.77%	1.60%	2.02%	-0.21%	0.22%	1.81%	1.82%	-0.01%
	(-1.82)	(-1.91)	(0.96)	(1.12)	(6.66)	(6.71)	(-0.82)	(1.04)	(5.74)	(5.82)	(-0.03)
South Korea	0.20%	-1.32%	0.17%	-1.07%	-0.04%	0.25%	-1.52%	-1.23%	1.49%	-1.27%	2.76%
	(0.23)	(-1.22)	(0.21)	(-1.09)	(-0.11)	(0.80)	(-4.40)	(-3.63)	(2.89)	(-3.50)	(4.25)
Spain	0.62%	0.16%	1.06%	1.03%	0.44%	0.87%	-0.46%	-0.03%	0.90%	0.41%	0.49%
	(1.45)	(0.28)	(2.82)	(2.17)	(1.88)	(2.82)	(-1.66)	(-0.15)	(2.38)	(1.46)	(1.11)
Sweden	-0.46%	-1.32%	0.75%	0.52%	1.22%	1.84%	-0.86%	-0.23%	2.07%	0.98%	1.09%
	(-0.75)	(-1.65)	(1.69)	(0.92)	(3.28)	(3.88)	(-2.88)	(-1.08)	(3.93)	(2.55)	(2.44)
Switzerland	-0.23%	-0.45%	1.00%	0.97%	1.23%	1.42%	-0.22%	-0.03%	1.45%	1.20%	0.25%
	(-0.52)	(-0.76)	(3.13)	(2.24)	(4.63)	(4.42)	(-0.73)	(-0.16)	(3.50)	(4.28)	(0.55)
Taiwan	0.03%	-1.09%	0.03%	-0.49%	0.01%	0.59%	-1.11%	-0.53%	1.12%	-0.52%	1.64%
	(0.04)	(-1.21)	(0.06)	(-0.63)	(0.02)	(1.64)	(-3.93)	(-1.75)	(2.44)	(-1.35)	(2.99)
Thailand	-0.31%	-1.35%	0.25%	-0.11%	0.56%	1.24%	-1.05%	-0.37%	1.61%	0.19%	1.41%
	(-0.43)	(-1.30)	(0.49)	(-0.15)	(1.65)	(2.89)	(-2.36)	(-0.94)	(2.33)	(0.58)	(1.77)
Turkey	0.76%	-0.12%	0.20%	-0.73%	-0.56%	-0.60%	-0.88%	-0.93%	0.32%	-1.49%	1.81%
	(0.67)	(-0.10)	(0.19)	(-0.62)	(-1.89)	(-1.98)	(-3.76)	(-3.50)	(0.84)	(-4.94)	(4.28)
U.K.	-1.58%	-1.37%	0.28%	0.32%	1.86%	1.69%	0.21%	0.04%	1.65%	1.90%	-0.25%
	(-3.28)	(-2.35)	(0.73)	(0.70)	(9.11)	(5.06)	(0.94)	(0.30)	(4.90)	(7.34)	(-0.81)
United States	0.98%	0.61%	0.86%	1.11%	-0.12%	0.50%	-0.37%	0.25%	0.25%	0.13%	0.13%
	(2.15)	(1.04)	(2.46)	(2.26)	(-0.36)	(1.13)	(-0.96)	(0.75)	(0.60)	(0.33)	(0.23)
Country-average	-0.15%	-0.63%	0.57%	0.35%	0.72%	0.99%	-0.50%	-0.24%	1.22%	0.48%	0.74%
	(-1.44)	(-5.01)	(6.58)	(3.21)	(13.31)	(15.73)	(-9.79)	(-5.32)	(16.47)	(8.09)	(8.87)

Table 4

Fama and French Alphas for Pure Momentum and Early and Late Stage Momentum Portfolios

This table presents the regression intercepts (alphas) from the Fama–French three-factor regressions for the monthly returns of the pure, early stage, late stage, and early-late strategies reported in Tables 2 and 3. The three-factor model for a country at time *t* can be written

$$R_{pt} - R_{ft} = \alpha_p + b_p(R_{mt} - R_{ft}) + s_p \mathrm{SMB}_t + h_p \mathrm{HML}_t + \varepsilon_{pt},$$

where R_{pt} is the monthly return for portfolio *p*, R_{ft} is the monthly risk-free rate for the country, R_{mt} is the value-weighted market index return of the country, and SMB_t and HML_t are the monthly Fama–French size and book-to-market factors, respectively, constructed from that country's stocks. This table reports the *t*-statistics in parentheses. We construct country-average portfolios by equally weighting each country's corresponding portfolio.

	Fama–French Alphas							
Country	**Pure**	***t*-Stat**	**Early**	***t*-Stat**	**Late**	***t*-Stat**	**Early-Late**	***t*-Stat**
Argentina	1.04%	(2.88)	1.57%	(2.76)	0.53%	(1.31)	1.03%	(1.53)
Australia	2.19%	(8.76)	2.32%	(7.94)	2.09%	(6.37)	0.23%	(0.62)
Austria	1.43%	(4.65)	1.71%	(3.97)	1.15%	(3.82)	0.57%	(1.36)
Belgium	2.00%	(6.68)	2.15%	(5.24)	1.82%	(7.04)	0.33%	(0.97)
Brazil	1.23%	(3.88)	1.44%	(2.94)	0.70%	(1.83)	0.74%	(1.43)
Canada	1.86%	(5.71)	1.79%	(4.04)	1.93%	(6.27)	-0.14%	(-0.34)
Chile	0.89%	(4.08)	1.02%	(3.77)	0.76%	(2.76)	0.26%	(0.78)
China	0.48%	(1.76)	0.16%	(0.51)	0.89%	(2.36)	-0.73%	(-1.63)
Denmark	1.49%	(5.23)	1.42%	(3.45)	1.56%	(6.25)	-0.13%	(-0.36)
Finland	0.94%	(2.72)	0.73%	(1.52)	1.16%	(3.80)	-0.43%	(-1.03)
France	1.57%	(4.83)	1.43%	(2.78)	1.70%	(7.01)	-0.27%	(-0.56)
Germany	1.98%	(4.27)	2.60%	(3.74)	1.32%	(2.87)	1.28%	(1.82)
Greece	1.63%	(4.61)	2.46%	(5.54)	0.81%	(2.20)	1.64%	(4.08)
Hong Kong	1.89%	(5.30)	3.15%	(6.22)	0.68%	(1.57)	2.47%	(3.95)
India	1.23%	(4.04)	1.75%	(3.92)	0.68%	(1.91)	1.07%	(2.01)
Israel	0.98%	(3.45)	0.68%	(1.60)	1.27%	(4.80)	-0.59%	(-1.37)
Italy	1.43%	(4.78)	1.72%	(4.05)	1.14%	(4.43)	0.58%	(1.56)
Japan	0.78%	(2.64)	0.59%	(1.26)	0.98%	(4.30)	-0.39%	(-0.86)
Malaysia	1.68%	(7.03)	2.82%	(8.45)	0.61%	(2.15)	2.21%	(5.65)
Netherlands	1.71%	(4.93)	1.95%	(4.03)	1.47%	(4.94)	0.48%	(1.17)
New Zealand	1.36%	(5.37)	1.63%	(4.18)	1.06%	(3.82)	0.57%	(1.26)
Norway	1.37%	(4.10)	0.96%	(2.03)	1.79%	(5.23)	-0.83%	(-1.72)
Peru	0.82%	(1.92)	1.44%	(2.52)	0.23%	(0.44)	1.21%	(1.75)
Philippines	0.93%	(2.43)	1.87%	(3.74)	0.01%	(0.01)	1.87%	(3.28)
Poland	1.81%	(5.73)	1.95%	(4.42)	1.66%	(3.80)	0.29%	(0.48)
Portugal	0.88%	(2.67)	0.89%	(1.92)	0.88%	(2.79)	0.01%	(0.01)
Singapore	1.58%	(4.59)	1.56%	(3.07)	1.62%	(4.95)	-0.06%	(-0.11)
South Africa	2.26%	(8.20)	1.92%	(5.41)	2.60%	(7.94)	-0.68%	(-1.69)
South Korea	0.65%	(1.74)	1.22%	(2.06)	-0.02%	(-0.04)	1.24%	(1.77)
Spain	1.12%	(4.69)	1.39%	(3.56)	0.84%	(3.44)	0.55%	(1.24)
Sweden	1.18%	(2.70)	1.22%	(2.16)	1.14%	(2.92)	0.08%	(0.18)
Switzerland	1.50%	(4.38)	1.52%	(3.35)	1.47%	(4.88)	0.05%	(0.15)
Taiwan	0.83%	(2.84)	1.17%	(2.60)	0.50%	(1.71)	0.67%	(1.38)
Thailand	1.92%	(5.07)	3.10%	(4.86)	0.82%	(2.14)	2.28%	(3.15)
Turkey	0.25%	(0.90)	1.86%	(4.91)	-1.14%	(-3.31)	3.00%	(6.57)
United Kingdom	2.23%	(7.51)	2.10%	(5.68)	2.35%	(8.92)	-0.25%	(-0.99)
United States	0.27%	(0.68)	0.85%	(2.24)	0.55%	(1.45)	0.30%	(0.56)
Country-Av.	1.27%	(22.91)	1.55%	(19.24)	1.01%	(17.47)	0.54%	(6.12)

Table 5
Country-Average Post-Holding Period Returns on Momentum Portfolios

This table reports the country-average returns for the pure momentum (R3–R1), early stage (R3V1–R1V2), late stage (R3V2–R1V1), and early-late strategies for one, two, three, four, and five years after portfolio formation. We construct country-average portfolios by equally weighting each of the 37 corresponding country-specific portfolios. This table reports Newey–West *t*-statistics with the appropriate number of lags (determined by the amount of overlap) in parentheses.

	Months 1–12	**Months 13–24**	**Months 25–36**	**Months 37–48**	**Months 49–60**	**Months 13–60**
Pure Momentum	0.67% (12.52)	-0.07% (-2.00)	-0.05% (-1.36)	0.07% (2.01)	-0.06% (-1.84)	-0.04% (-1.58)
Early stage	1.10% (13.42)	0.32% (4.73)	0.25% (4.32)	0.27% (4.28)	0.13% (2.31)	0.23% (4.17)
Late stage	0.27% (4.42)	-0.45% (-7.68)	-0.33% (-5.11)	-0.09% (-1.60)	-0.21% (-3.30)	-0.32% (-6.67)
Early-Late	0.83% (9.45)	0.78% (8.77)	0.56% (6.04)	0.33% (3.57)	0.35% (3.99)	0.52% (6.79)

Table 6

Possible Determinants of Early Minus Late Stage Momentum across Countries

This table shows the results of regressing the early minus late stage momentum average profits across countries on Individualism (IDV) and other explanatory variables. Panel A reports the regression results on IDV with no control variables. Panel B reports results related to a set of variables suggested by behavioural models, including the natural logarithm of stock turnover (LnV), the natural logarithm of the dispersion of analyst forecasts (LnDisp), the natural logarithm of analyst coverage (LnCov), the logarithm of median firm size (LnSize), the average price-to-book ratio (P/B), stock market price volatility (Volp), and cash flow growth rate volatility (VolFCF). Panel C shows results related to a set of proxies for financial market development: the ratio of total private credit to gross domestic product (CreditGDP), an average common language dummy variable (Lang), and an index of capital flow restrictions (Contr). Panel D reports results for a set of variables related to institutional quality. These include the insider index (Insider), which has the property that a higher score indicates that insider trading is less prevalent, and the natural logarithm of the transaction cost index (LnTran). Panel E reports results related to a set of macroeconomic variables: nominal gross domestic product growth rate (GDP), and inflation growth rate (Inflation). This table reports the Fama–MacBeth regression coefficients (i.e., time-series averages of the year-by-year cross-sectional regression coefficients). It shows *t*-statistics in parentheses and uses Newey–West (1994) standard error estimates to correct for heteroskedasticity and autocorrelation. The table also shows *F*-test *p*-values in parentheses.

Volume-Based	**Panel A: No Control**	**Panel B: Behavioural Models**	**Panel C: Market Development**	**Panel D: Institutional Quality**	**Panel E: Macro-economic models**
Intercept	1.3872 (5.59)	-1.3649 (-0.76)	1.0857 (2.71)	0.3537 (0.31)	1.6584 (3.73)
IDV	-0.0120 (-2.75)	-0.0102 (-1.87)	-0.0090 (-1.95)	-0.0097 (-2.06)	-0.0115 (-2.43)
LnV		0.0529 (0.75)			
LnDisp		0.0043 (0.07)			
LnCov		0.2042 (0.30)			
LnSize		0.0795 (0.74)			
Volp		1.2050 (1.20)			
VolFCF		0.2404 (1.06)			
P/B		-0.0872 (-0.30)			
CreditGDP			-0.0010 (-0.46)		
Lang			0.9135 (0.86)		
Contr			0.0177 (0.28)		
Insider				0.7518 (1.76)	
LnTran				0.1219 (0.48)	
GDP Growth					-0.0619 (-0.87)
Inflation					-0.0511 (-0.93)
F-Value	7.56 (0.00)	1.87 (0.11)	1.43 (0.25)	3.82 (0.02)	2.29 (0.10)
No. of countries	37	34	36	32	35
Adjusted R^2	15.42%	17.49%	4.73%	21.46%	10.21%