Momentum, Legal Systems and Ownership Structure: An Analysis of Asian Stock Markets*

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Abstract

This paper examines momentum profits in eight Asian markets with a focus on ownership structure, legal systems and valuation uncertainty. The results indicate that momentum strategies, which buy past winners and sell past losers, are highly profitable when implemented on Asian stock markets outside Japan. Interestingly, the common law/civil law distinction provides a perfect indicator of whether or not a market exhibited a momentum effect prior to the financial crisis. Consistent with the previous findings in the U.S., we document that the momentum effect is relatively stronger for firms with smaller market capitalizations, lower book-to-market ratios, and higher turnover ratios. In addition, we document that the momentum effect is stronger for independent firms than for group-affiliated firms and present weak evidence that suggests that foreign ownership can influence the momentum effect in Japanese firms. We also find return reversals around nine or ten months after the portfolio formation date, which supports the prediction of some behavioral models.

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There is now substantial evidence that momentum strategies, which buy past winners and sell past losers, make substantial profits in most developed stock markets. Using data from the U.S. market, Jegadeesh and Titman (JT) (1993, 2000) document that investment strategies, which buy stocks ranked in the top decile and sell stocks ranked in the bottom decile based on the previous six-month returns, earn profits of about one percent per month over a six-month holding period. The evidence suggests that it is quite unlikely that a risk-based theory will emerge to explain these returns. Indeed, most of the focus in the recent literature is on behavioral explanations.[1]

In this paper we examine the profitability of momentum strategies in eight different Asian countries: Hong Kong, Indonesia, Japan, Korea, Malaysia, Singapore, Taiwan and Thailand. Our motivation is that if we want to explore non-risk based explanations for the momentum effect, it makes sense to compare the effect in countries with significant cultural and institutional differences. For example, a study by Hofstede (1991) found that people in Western countries tend to score higher in tests of "individualism" than do people in Asia. While it is not obvious how a tendency to think and act more or less independently relates to the momentum effect, it is quite plausible that individualism is related to "conservatism" and "overconfidence" which have been suggested by Barberis, Shleifer, and Vishny (BSV) (1998) and Daniel, Hirshleifer, and Subrahmanyam (DHS) (1998) as determinants of momentum.[2]

A second potentially important difference between the Asian economies and the Western economies is the importance of corporate groups in Asia. Large portions of the public companies in Asian countries are affiliated with corporate groups (e.g., *keiretsu* in Japan and

[1] One exception is a recent paper by Berk, Green and Naik (1999).
[2] DHS (1998) also discuss this possibility and cite a paper by Kitayama, Takagi, and Matsumoto (1995) that suggests that the Japanese show no evidence for what they call "self-enhancing attribution." They suggest that this explains why we observe no momentum in Japan and conjecture that other Asian countries with similar cultural attributes will also have "weak momentum effects."

chaebol in Korea) that are associated with either a bank or a powerful family (Claessens, Djankov, and Lang (2000)). Firms in business groups in Asia either are associated through cross-ownership and pyramid structures or are owned by a single family or coalition of families. Group affiliation can potentially affect momentum profits if stronger members of the group tend to take actions that support the stock prices of their weaker members. On the other hand, group firms may be less transparent, and hence more difficult to evaluate than independent firms (see Claessens *et al.* (2000) and Fan and Wong (2000)), which can potentially make them more subject to investor overconfidence and momentum. [3] In contrast to the relevance of cultural/behavioral differences between Asians and Westerners, which is likely to be difficult to directly test, we have data on which firms are associated with groups and which are not, so we can test whether there are differences in momentum in these two sub-samples.

Transparency may also be related to the legal systems in the different countries. In this respect, there is not a clear distinction between the legal systems in Asian and Western countries but there are important differences within Asia (and also within Europe). Indeed, our sample is equally divided into Civil Law countries (Indonesia, Japan, Korea and Taiwan) and Common Law countries (Hong Kong, Malaysia, Singapore and Thailand) as reported by La Porta *et al.* (2000). On a second measure of legal protection La Porta *et al.* rank Japan, Hong Kong, Malaysia, and Singapore as high and Indonesia, Korea, Taiwan, and Thailand as low.

Our study is similar in motivation to two studies by Rouwenhorst (1998, 1999) who examines momentum effects in twelve European markets and twenty emerging stock markets. His results in the former study indicated that the momentum effect in each of the European markets is quite similar to the previous findings for the U.S. market. The latter study does not

[3] There is evidence in the psychology literature that suggests that individuals are more overconfident about evaluating less precise information. See Daniel and Titman (1999) for a discussion of how this affects momentum.

find the momentum effect as universal in the emerging markets; however, he finds that the momentum strategies in emerging markets are profitable on average.[4]

Although there is some overlap between the countries we examine and those that Rouwenhorst (1999) examines, there are important differences between his and our samples and tests. For example, Rouwenhorst (1999) obtains his data from the Emerging Markets Database of the IFC that typically includes mainly the stocks with the largest market capitalizations. Given the evidence in the U.S. that indicates that the momentum effect is weaker for large firms (Hong, Lim, and Stein (2000) and Jegadeesh and Titman (2000)), his sample selection may reduce the momentum effect. In contrast to Rouwenhorst (1999), this study includes all the listed companies in the eight Asian markets and examines a longer time period, which includes the period of the Asian financial crisis as well as periods both before and after many of these markets first opened to foreign investors. In addition, to obtain further insights into the behavioral explanations we examine momentum profits over longer horizons and examine how momentum is related to various characteristics of both the stocks and the markets.

We also examine the effect of foreign ownership on momentum profits. Recent research has documented that mutual fund managers tend to pursue momentum strategies (Grinblatt, Titman, and Wermers (1995)) and that foreign investors tend to be momentum investors (Choe, Kho, and Stulz (1999), Froot, O'Connell, and Seasholes (2000), and Grinblatt and Keloharju (2000)). If the investor's trading behavior is a major determinant of momentum profits, as suggested by some of the behavioral models, we might expect that higher foreign ownership may be associated with higher momentum.

[4] Rouwenhorst (1999) finds that momentum strategies are profitable if they are implemented simultaneously over all twenty emerging markets. Using stocks from the top and bottom 30 percent to form the momentum portfolio, he reports an average profit of about 0.4 percent per month in the emerging markets when stocks are equally weighted in the portfolio. When countries are equally weighted in the portfolio, the average profit is about 0.6 percent per month.

Our evidence indicates that the momentum effect is present in all of the Asian countries except for Korea and Indonesia, but it is generally weak and is statistically significant only for Hong Kong for the entire sample period and for Hong Kong, Malaysia, Singapore, and Thailand for the pre-crisis period. Interestingly, the Common Law/Civil Law distinction provides a perfect indicator of whether or not a market exhibited a momentum effect prior to the financial crisis.

When stocks from all of the different countries are included in one aggregate sample, the momentum effect is still weak. However, this aggregate sample is dominated by Japanese stocks, which exhibit a very weak momentum effect. For the sample that includes all countries except for Japan, the momentum effect is quite strong and is statistically significant. In addition, a momentum strategy that ranks stocks relative to returns in their own markets, and buys those stocks that do well relative to their markets, also earns significant profits. However, the profits from this "country-neutral" strategy are considerably less than the profits from the aggregate strategy that does not include Japanese stocks. The difference in the momentum profits from the country-neutral strategy and the momentum profits on the entire sample (where returns are ranked unconditionally) reflects the fact that the individual country indexes also exhibit momentum.[5]

Our analysis of the long-run performance of momentum stocks show that in the aggregate sample excluding Japan, as well as in the country-neutral portfolio, positive momentum profits last for about nine or ten months after the ranking date (in the U.S. the positive momentum profits last 12 months). After that, the profits of the momentum portfolio become negative from Month 10 through the fifth year. These results, which are roughly consistent with the U.S. evidence, provide support for the behavioral explanations of momentum, which predict that momentum returns are subsequently reversed.

Consistent with the previous evidence in the U.S. markets, we find that the momentum effect is relatively stronger for firms with smaller market capitalizations, lower book-to-market ratios, and higher turnover ratios. In addition, we document that the momentum effect is statistically stronger for independent firms than for group-affiliated firms, which seems to support the price stability argument rather than the transparency argument.

We also find relatively weak evidence that momentum profits in Japan are relatively higher for firms with higher foreign ownership, which suggests that the trading behavior of foreign participants, especially institutional investors, can potentially influence return patterns. However, our results from the four markets (Korea, Malaysia, Taiwan, and Thailand) that have experienced market liberalization in the late 1980s are mixed and do not provide a clear conclusion that market liberalization and the participation of foreign investors actually increase momentum profits.

The remainder of the paper is organized as follows. Section I describes the data and presents the profits on international momentum portfolios, the country momentum strategy, and the profitability of momentum strategies in each individual country. We also discuss the relation between momentum effects and legal systems. In Section II, we relate momentum profits to firm size, book-to-market ratios, and turnover ratios. We discuss the effect of corporate ownership structure on momentum profitability in Section III and the effect of foreign ownership and market opening on momentum profitability in Section IV. Finally Section V concludes the paper.

[5] Chan, Hameed, and Tong (2000) also provide evidence of momentum profits on international stock market indexes.

I. Data Description and Returns on Momentum Portfolios

A. Data

Our data include all common stocks listed on eight Asian stock markets in various time periods. The data on the Japanese market are obtained from the NEEDS database, the PACAP database, and Datastream for the months before January 1975, between January 1975 and December 1997, and from January 1998 to February 2000, respectively. The data on the Korean market are obtained from the PACAP data before January 1995 and from Datastream for the period from January 1996 to February 2000. For other countries, the data are obtained from PACAP before January 1998 and from Datastream afterward.

To be included in our sample the stocks must have available data on market capitalization or size (SZ) at the end of each portfolio formation month, as well as return history of at least eight months. The market capitalization is the price times the number of shares outstanding. The first criterion is required because we use market capitalization to form value-weighted portfolios. The second criterion is needed in order to calculate the past six-month cumulative returns including dividends on individual stocks.[6] Our sample period starts in late 1970s for most markets and ends in February 2000 for all markets.

Table I reports the total market capitalization in million US dollars, the average firm size, and the number of firms listed at three different times: the first month of the sampling period, December 1990, and February 2000. The result indicates that each of the eight stock markets has experienced tremendous growth in total market capitalization, average firm size, and the number of firms listed.[7] As of February 2000, Japan had the largest market capitalization among the eight with a value of US$3,183 billion. Next in order are Hong Kong, Taiwan, Singapore,

[6] Our sample periods for Indonesia and Thailand are shorter than the time series available from the data sources. Because only a few firms have observations on returns in these two countries before the start of our sample periods, we do not include those early in our sample.

[7] The sample periods shown in Table I start 12 months after the actual sample periods. We need to use twelve observations on returns to compute the returns for momentum portfolios.

Malaysia, Korea, Indonesia, and Thailand. Thailand had a market capitalization of only US$38 billion. It should be noted that the market capitalization of the Japanese market is almost seven times larger than that of Hong Kong, the second largest in our sample. Japan also has the highest average firm size with a value of US$1,928 million, which was about twice the average firm size in Taiwan and Hong Kong. Furthermore, close to half of the firms in our sample are from the Japanese stock market. The dominance of Japan in our sample is especially true at the beginning of our sample period. However, the other markets grew much faster than Japan during this sample period.

[Insert Table I here]

Table I also reports the legal origin, the shareholder rights, and accounting standards adopted by each country. The information about legal origin and shareholder rights is taken from La Porta *et al.* (1998, 2000). Hong Kong, Malaysia, Singapore, and Thailand adopt Common Law, while Indonesia, Japan, Korea, and Taiwan adopt Civil Law. In addition, La Porta *et al.* rank Japan, Hong Kong, Malaysia, and Singapore as high and Indonesia, Korea, Taiwan, and Thailand as low in their protection of shareholder rights. Interestingly, all Common Law countries also adopt International Accounting Standards (IAS), while all Civil Law countries have not adopted IAS yet.

In addition to considering the size of firms, we will also examine their book-to-market (*BM*) ratios and turnover (*TN*) ratios. While most of the firms outside the Japanese market have their fiscal year-end in December, most of the Japanese firms have their fiscal year-end in March. Therefore, we adopt two different methods to compute the book-to-market ratios of the firms in our sample. For all markets except Japan, the book-to-market ratio is computed as the ratio of the book equity of a firm at the fiscal year-end that falls in year t-1 to the firm's market capitalization at the end of December in year t-1. For the Japanese market, the *BM* ratio is computed as the ratio of the book equity of a firm at the fiscal year-end that falls in the 12-month

period before April of year *t* to the firm's market capitalization at the end of March in year *t*. These *BM* ratios are used to rank stocks from June in year *t* to May in year *t*+1 and are updated annually.[8] In contrast to the *BM* ratio, the turnover ratio (*TN*) is updated monthly. The turnover ratio of a stock is computed as the past six-month average of the ratio of the stock's monthly number of shares traded to its number of shares outstanding.

Our data sources on group affiliations and corporate ownership structures are similar to those in Claessens, Djankov, and Lang (2000), except for Japan and Korea. Specifically, the Worldscope database is the starting point for our data collection. It provides the names and holdings of the six largest owners of the companies. The Worldscope data is supplemented with ownership information from the Asian Company Handbook 1999, the Handbook of Indonesian Companies 1996, the Japan Company Handbook 1999, the Thailand Companies Handbook 1998, the 1997 Annual Reports of the Hong Kong, Jakarta, Seoul, Kuala Lumpur, and the Singapore Investment Guide 1998. The data used to identify the business groups are obtained from various country sources. Firms that are controlled by other firms in the same group or are controlled by the same family are classified as group affiliated firms. Firms that are not group-affiliated firms are classified as independent firms. For the classification of corporate groups in Japan, we follow previous research that use the 1994/1995 edition of Dodwell's Industrial Groupings in Japan and other sources to identify firms that belong to industrial groups and those that do not. In particular, we use firms associated with the six biggest banks and two medium size banks to form our group classification. The Korean group classification is based on the firms affiliated with the largest 30 *chaebols*.[9]

[8] The six-month gap between the fiscal year-end and the start of the holding period for all markets except Japan is used, because these markets require firms to report their annual financial statements no more than six month after their fiscal year ended. In contrast, Japanese firms are required to report their annual financial statements no more than three months after their fiscal year ended.

[9] The authors thank Takeshi Yamada, Kee-Hong Bae and Joseph Fan for providing us with data for Japan, Korea and the remaining markets, respectively.

B. Returns on Momentum Portfolios

To make our findings comparable to those obtained by Jegadeesh and Titman (JT) (1993, 2000) and Rouwenhorst (1998, 1999), we examine a momentum strategy that forms portfolios based on the stocks' past six-month returns and hold the stocks for six months. However, in contrast to JT, because of the illiquidity of the smaller Asian stocks, we value-weight instead of equally weight the long and short positions of the portfolios. The stocks in the bottom 30 percent are assigned to the loser (L) portfolio, while those in the top 30 percent are assigned to the winner (W) portfolio. We use the top and bottom 30% rather than the 10% cutoffs used by JT because of the smaller sample sizes in most countries. In addition, to minimize the effect of bid-ask bounce and lead-lag effects, we skip a month between the ranking periods and the holding periods. The returns are all measured in U.S. dollars.[10]

As in JT, to increase the power of our tests we construct overlapping momentum portfolios. For instance, the winner portfolio formed in November (i.e., the holding period return in next January) is the equally weighted combination of those stocks with the highest cumulative returns over the previous June to November period, the previous May to October period and so on up to the previous January to June period. If a stock has a missing return during the holding period, we replace it with the corresponding value-weighted market return. If the stock return is no longer available, we rebalance the portfolio at the end of the month.

Table II presents the average US dollar monthly returns (%) on various zero-cost momentum portfolios. In Panel A, we report returns from these momentum portfolios formed on our entire sample and a second sample that excludes Japanese stocks. These returns are reported for the entire 1976 to 2000 sample period and for sample periods both before and after the start of the 1997 financial crisis.

[10] Our findings in this study will not be altered if we measure returns in local dollars. To save space, we will only present the results obtained from returns measured in U.S. dollars.

[Insert Table II here]

The average returns reported for the entire sample are smaller than those reported in JT (0.376 percent per month), and are not statistically significant. However, when Japan is excluded from the sample, the returns are quite similar to those reported in JT for their top minus bottom decile portfolio and are somewhat larger than the returns that are generated if a top 30 percent minus bottom 30 percent strategy is applied to U.S. stocks (see, Moskowitz and Grinblatt (1999)). The momentum returns are quite strong and are significant prior to the financial crisis (1.45 percent per month). After the crisis the returns are somewhat lower (0.54 percent per month), but they cannot be measured precisely because of the short time period of the sample and the high volatility of the returns.

Panel B of Table II reports the returns of country-neutral momentum portfolios. These portfolios are formed by assigning percentile rankings for stocks in each of the individual countries and buying the stocks ranked in the top 30 percent in their countries and selling the stocks that are ranked in the bottom 30 percent. To form these portfolios, we effectively create eight country-specific value-weighted momentum portfolios that are equally weighted to form the country-neutral momentum portfolio. The average momentum profit is about 0.33-0.35 percent per month in the sample with and without Japanese stocks. These returns are substantially lower than the corresponding momentum returns without Japanese stocks reported in Panel A, which suggests that part of the momentum profits observed in Panel A is generated from momentum in the individual market indexes. As we will show in Table III, this is indeed true. The results in Panel B of Table II also confirm the findings in Panel A that the momentum profit is much higher before the crisis than after the crisis. Actually, the momentum profit is significantly positive before the crisis, but is negative after the crisis.

To generate the results reported in Table III, we form market portfolios for each country, and at the end of each month the portfolios are ranked in ascending order based on their past six-

month cumulative returns. Using value-weights, the bottom two country portfolios are assigned as the 'L' portfolio and the top two country portfolios as the 'W' portfolio. The profit from this momentum strategy (the W minus L returns) is slightly more than 0.8 percent per month both before and after the financial crisis. The magnitudes of the returns are quite high, but are quite volatile and as a result, are not statistically significant. However, when Japan is removed from our analysis, the momentum profits increase slightly and become marginally significant for both the entire sample period and before the crisis.

[Insert Table III here]

C. Post-Holding Period Returns of Momentum Portfolios

JT (2000) discuss three potential explanations for the profitability of momentum strategies and examine the performance of momentum portfolios over longer horizons in order to differentiate between these hypotheses. The three explanations include: (1) stock prices underreact to information, (2) there is a delayed overreaction to information, and (3) the profits are generated from cross-sectional differences in expected returns.

The first two explanations are consistent with some recent behavioral models. For example, the underreaction explanation is consistent with the Barberis, Shleifer and Vishny (1998) model where a "conservatism bias" can lead investors to underreact or underweight new information. In the case with a pure conservatism bias, once the information is fully incorporated in prices, there is no predictability in stock returns. In this case, the expected post-holding period returns are zero.

There are a number of behavioral models that are consistent with a delayed overreaction. Barberis, Shleifer and Vishny (1998) also discuss this possibility and describe what they call the "representative heuristic," which suggests that investors may overly extrapolate a firm's past extraordinary earning growths into the future and hence overreact to positive (or negative) information that is preceded by positive (or negative) information. In addition, Daniel,

Hirshleifer, and Subramanyam (1998) argue that delayed overreaction can arise because of "self-attribution (or cognitive) bias." That is, investors tend to become more overconfident when their stock picks become winners and take more aggressive positions that push up the prices of winners above their fundamental values. Finally, Hong and Stein (1999) propose a model with two groups of investors: informed investors and technical traders, who do not fully take into account the actions of each other. As a result, information is incorporated slowly into stock prices, providing a potential profit opportunity for technical traders. These traders, however, tend to push prices of past winners above their fundamental values. In each of these behavioral models, prices tend to eventually overreact to information and then reverse when prices eventually revert to their fundamentals.

The third explanation is consistent with an efficient market where stocks have different expected rates of return because of different risk exposures. In particular, Conrad and Kaul (1998) emphasize that there would be some evidence of momentum even if there were no time-series variation in expected returns since stocks with high (low) expected returns would be expected to have the highest (lowest) returns in adjacent periods. This explanation suggests that the profits from a momentum strategy should be the same in any post-ranking period.

To test these competing hypotheses we examine the post-holding period returns of momentum portfolios. Panels A and B of Table IV presents the post-holding period cumulative returns for momentum portfolios formed from all stocks in the samples and for country-neutral momentum portfolios, respectively. Panels C and D report the average monthly cumulative returns for momentum portfolios formed from all firms and country-neutral portfolios, respectively. The construction of these portfolios is described in detail in the previous subsection. We find that when momentum portfolios are formed from all firms in all countries, there are no significant momentum profits for any post-holding periods except a 2.89 percent cumulative return on the momentum portfolio from Month 4 to Month 10. When Japanese firms

are excluded from the sample, momentum profits continue to be positive up to Month 9 with a cumulative profit of 7.25 percent (i.e., an average profit of 0.81 percent per month). Afterward, the momentum portfolio exhibits return reversals. The average profit is –0.69 percent per month in the months 10 through 12, –0.03 percent in the second year, –0.49 percent in the third year, –0.14 percent in the fourth year, and –0.50 percent in the fifth year (see Panel C).

[Insert Table IV here]

The results in Panel B indicate that the country-neutral momentum portfolio, including Japan, exhibits a profit of 0.31 percent per month in the first ten months and then exhibits return reversals. The average profit is –0.36 percent per month in months 11 through 12, –0.27 percent in the second year, –0.10 in the third year, -0.45 percent in the fourth year, and –0.27 percent in the fifth year (Panel D). Excluding Japan, momentum profits are slightly larger but the pattern is virtually the same.

In sum, excluding Japan, the average monthly return of –0.32 percent for the momentum portfolio formed from all firms in all countries from 9 months after the formation date through the fifth year is reliably less than zero (*t*-value = –2.27). The findings are consistent with the behavioral models that predict that the momentum profits will eventually reverse. The results from the country-neutral momentum portfolio also draw the same conclusion with an average monthly return of –0.30 percent (*t*-value = –5.48). Our return reversals are basically consistent with and slightly larger than those documented by JT (2000) and Lee and Swaminathan (2000) for the U.S. market.

D. Momentum Investment Strategies by Country

Our findings reported in Tables II-IV indicate that momentum strategies are highly profitable when implemented on Asian stocks outside Japan with a holding period of no more than nine months and suggest that momentum strategies are only marginally profitable within Japan. To

explore this further, we examine the profitability of momentum strategies in each of the eight individual countries.

As we show in Panel A of Table V, all but two countries (Indonesia and Korea) exhibit positive momentum profits over our entire sample period. The momentum profits, however, are statistically significant only in Hong Kong (0.94 percent per month). The lack of statistical significance in some countries is due to the volatility of the momentum portfolio during the financial crisis. For the period prior to the financial crisis, momentum profits are significantly positive in Malaysia, Singapore, Thailand, and Hong Kong as well. The momentum portfolios generate positive profits in only half of the countries after the 1997 financial crisis, and there is no apparent cross-sectional relationship between the magnitude of momentum profits before and after the crisis.

[Insert Table V here]

Panel B of Table V and Figure 1 present the cumulative returns of momentum portfolios for different post-holding periods for each country. Since we need a holding period of 60 months, the results do not include the financial crisis period. Among the four countries (Hong Kong, Malaysia, Singapore, and Thailand) that exhibit momentum in our six-month holding period tests, all except Thailand continue to exhibit momentum only up to Month 9 or 10 and then start to experience a return reversal. This evidence of a reversal appears to be significant for all countries except for Hong Kong. The momentum profits in Thailand last for two years, then level off in the third year, and eventually reverse in the fourth and fifth years. Korea is the only country that continues to exhibit contrarian profits for the first three years and then levels off. These results from the individual countries are in general consistent with those from the aggregate sample. Average monthly momentum returns from Month 10 through Month 60 are negative in all markets. Among them, except Thailand and Hong Kong, all are significant. That is, momentum profits are generally reversed over time.

[Insert Figure 1 here]

E. Momentum Profits and the Legal Environment

In a series of papers, La Porta *et al.* (1997, 1998, 2000) emphasize the importance of the legal environment to the development of financial markets. While we are unaware of any theories that have examined reasons why the legal environment can potentially affect the profitability of a momentum strategy, we will offer two conjectures. The first conjecture suggests that the momentum effect should be stronger in countries with weak investor protection, while the second conjecture suggests the opposite.

To understand our first conjecture, assume that the public information generated about a company is more reliable in a legal environment that encourages more disclosure and better shareholder protection. In legal environments where investor protection is weaker, stock prices are likely to be less sensitive to public information (which may be less reliable) and thus more sensitive to private information. Hence, arguments in DHS (1998), which indicate that overconfident investors are likely to overreact to their private information, suggest that the momentum effect is likely to be stronger when investor protection is weaker. This argument suggests that momentum is likely to be stronger in Civil Law countries and countries which La Porta *et al.* classify as having poor investor protection laws.

The second conjecture pertains to the possibility that stock prices can be manipulated, and that this occurs more frequently in Civil Law countries where it is more difficult to enforce security laws. Market manipulation can potentially offset the momentum effect if manipulators tend to induce negative serial correlation in stock returns by pushing stock prices above their intrinsic values with false disclosures and then let the prices subsequently collapse.[11]

[11] For instance, insiders may buy stocks prior to favorable information and they then manipulate prices to push the prices up further (beyond its intrinsic value) so that they can subsequently get out of the stock. When they subsequently dump the stock, prices decline. If the subsequent price decline occurs less than 6 months after the initial runup, this will dampen the momentum effect.

Our evidence tends to support the second conjecture. The countries with significant momentum returns, Hong Kong, Malaysia, Singapore, and Thailand, are all common law countries and the other countries, Indonesia, Japan, Korea and Taiwan, all have civil legal codes. The second La Porta *et al.* indicator of investor protection is not, however, as good an indicator of momentum returns. This indicator provides similar classifications for countries, except Japan is rated highly on this dimension and Thailand is given a low rating. This second measure is an indicator of the extent to which corporate managers can take actions that are not in the interest of shareholders and may thus provide some information about the quality of disclosures in these countries. This measure, however, cannot be viewed as a proxy for the enforceability of security laws that may affect the extent to which stock prices can be manipulated.

II. Momentum Profits and Firm Characteristics

This section examines sub-samples of stocks segmented along various firm characteristics. These characteristics include the book-to-market ratio, market capitalization, and turnover, which were previously examined in studies of the U.S. market. We will also be separately examining stocks that are part of family groups and the stocks of independent firms.

We have two motivations for segmenting stocks by their characteristics. First, we are interested in characteristics, which, in theory, may be related to the extent to which a stock is likely to be subject to the momentum effect. Second, we are interested in segmenting by different proxies for expected returns in order to partially control for the momentum effect that arises because of the cross-sectional variation in expected returns.

The first characteristic that we consider is the book-to-market ratio. Of the variables we consider, the book-to-market ratio is the best predictor of expected returns. In addition, Daniel and Titman (1999) argue that overconfidence is likely to influence the perception of investors relatively more, when they analyze fairly vague and subjective information, and use book-to-

market ratios to proxy for information vagueness. Consistent with their hypothesis, they find that momentum profits are negatively related to the firm's book-to-market ratio in the U.S. market.[12]

Trading volume or turnover could also proxy for information vagueness. As suggested by asymmetric information models (see, for example, Blume, Easley, and O'Hara (1994)), trading volume reflects investors' disagreement on a stock's intrinsic value. The more vague the information used to value the firm, the more disagreement among the investors, and hence, the greater the trading volume. Therefore, the momentum effect should be stronger for firms with high trading volume or turnover. Lee and Swaminathan (2000) find that momentum profits are indeed higher for firms with high turnover ratios in the U.S. market.

In contrast, Hong and Stein (1999) predict that stocks with slow information diffusion should exhibit stronger momentum. Hong, Lim, and Stein (2000) provide tests that support this prediction. In particular, except for the very smallest decile stocks, the profitability of momentum investment strategies declines sharply with firm size.[13]

Our procedure for examining how momentum profits in the Asian markets relate to firm size, book-to-market ratios, and turnover ratios is as follows. At the end of each month, stocks in each country are allocated into three groups: small (bottom 30%), medium (middle 40%), and large (top 30%), based on the three firm characteristics. Within each group, we form country-specific momentum portfolios that buy the 30 percent of stocks with the highest past cumulative returns and sell the 30 percent with the lowest cumulative returns. The country-specific momentum portfolios are then aggregated to form a country-neutral momentum portfolio, which is an

[12] Firms with low book-to-market ratios have more growth options, and therefore these firms are more difficult to value than firms with high book-to-market ratios.

[13] Hong, Lim, and Stein (2000) also look at momentum profits and analyst coverage and find that holding size fixed, momentum strategies work better for stock with low analyst coverage. In addition, they find that the effect of analyst coverage is greater for stocks that are past losers than for past winners. They conclude that their findings are consistent with the gradual-information-diffusion model of Hong and Stein (1999).

equally weighted portfolio of the country-specific momentum portfolios. We consider three country-neutral momentum portfolios. The first one includes all the eight countries, the second one excludes the Japanese firms, and the third one excludes the stocks in Korea, and Indonesia, because these two countries did not exhibit the momentum effect. We require at least two countries in each country-neutral portfolio at any point in time during our sample period.

A. Momentum Profitability and Firm Size

Table VI presents the average monthly returns of the size-country-specific and size-country-neutral momentum portfolios. The results provide relatively weak evidence that momentum profits are stronger for smaller firms, which is consistent with the U.S. evidence. In particular, we find that for the country-neutral portfolio consisting of only those countries that exhibit at least some momentum (all except Korea and Indonesia), the momentum effect is monotonically decreasing in firm size with or without including the post-crisis period. The momentum spread between small firms and large firms is 2.16 and 2.88 percent per year excluding Korea and Indonesia for the period that includes and does not include the post-crisis, respectively.

[Insert Table VI here]

B. Momentum Profits and Book-to-Market Ratios

The results in Table VII provide evidence that momentum profits are larger for firms with lower book-to-market ratios. Specifically, the results from country-neutral portfolios that are formed from all countries, all except Japan, or all except Indonesia and Korea for the whole sample period indicate that the momentum effect is monotonically decreasing in the book-to-market ratio. The momentum spread between low *BM* and high *BM* firms is 3.96 and 1.92 percent per year excluding Korea and Indonesia for the period with and without including the post-crisis, respectively. The results appear to be consistent with the findings in the U.S. (Daniel

and Titman (1999), however, the magnitude and statistical significance of this result is somewhat weaker.

[Insert Table VII here]

C. Momentum Profits and Turnover Ratios

Results presented in Panel A of Table VIII suggest that for the whole period, in five out of eight countries momentum profits are higher in stocks with high turnover ratios (*TN*). For the period prior to the financial crisis, in six out of eight countries, momentum profits are higher in stocks with high turnover ratios.

[Inset Table VIII here]

Average profits on the TN-country-neutral portfolios are reported in Panel B of Table VIII. The results from both the whole period and the period prior to the financial crisis show that momentum profits are increasing with turnover ratios. In the whole period, the returns on the high TN-country-neutral momentum portfolios are about four to five times larger than are the returns on the low TN-country-neutral momentum portfolios with a spread of 5.2-6.7% per year. In the period prior to financial crisis, the spreads between the returns on high TN- and low TN-country-neutral portfolios are about 4.0-5.2% per year. Our results from the relationship between momentum profits and turnover ratios are consistent with the finding in the U.S. by Lee and Swaminathan (2000) and provide support for the overconfidence hypothesis.

III. Momentum Profits and Corporate Ownership Structure

Claessens, Djankov, and Lang (2000) refer to a business group as "a corporate organization where a number of firms are linked through cross-ownership or where a single individual, family, or coalition of families owns a number of different firms." Group affiliation in East Asia is a ubiquitous phenomenon, but its relationship with stock price performance is poorly understood.

Independent firms in the current study are those firms that do not have a close tie with any business group.

The distinction between group and independent firms can be potentially important for two reasons. First, the cross-holdings and/or pyramid-holdings of group-affiliated firms make accounting information more difficulty to understand and evaluate, which according to the overconfidence hypothesis, increases the momentum effect. On the other hand, the cross-ownership structure within a business group can reduce the momentum effect if groups tend to take actions that increase the stability of their individual stock prices. They can do this through cross-subsidies in their product markets, through capital injections as well as through direct buying and selling of each other's stocks. If cross-subsidization of this type is not anticipated, then the group firms will exhibit less momentum.[14]

To test these two competing hypotheses, we construct momentum portfolios in sub-samples consisting of group-affiliated and independent firms. The classification we adopt is similar to the one used in Claessens, Djankov, and Lang (2000) and other studies. We form ownership-country-specific and ownership-country-neutral momentum portfolios in the same way we formed characteristic-based momentum portfolios in the previous section.

Panel A of Table IX presents the average monthly profits on the country-specific momentum portfolios. The table documents that over the entire sample period, the momentum profits are larger for independent firms in five out of eight countries. These five countries are Hong Kong, Malaysia, Singapore, Taiwan, and Thailand.

[Insert Table IX here]

[14]One could potential tell an ad hoc behavioral story that would explain why you would expect less momentum for group firms. Suppose that group and independent firms both take actions (like a share issuance) that should be viewed as a signal indicating that the firm has a 20% chance of experiencing a very negative earnings realization. If overconfident investors put too little weight on this information, they will underreact more to the information about the independent firm if the group firm is subsidized and if the bad event is in fact realized.

The average profits for ownership-country-neutral momentum portfolios are shown in Panel B of Table IX. The differences in momentum profits for independent firms and group-affiliated firms are positive although not very significant in the whole sample period and only significant at the 10% level in the pre-crisis period. When Japan is excluded or when Korea and Indonesia are excluded, the momentum spread between independent firms and group-affiliated firms ranges from 3.5 – 4.2 percent per year, which are statistically significant (t-values from 1.91 to 2.78). In general, our results support the price stability hypothesis that the momentum effect is stronger for independent firms.

Group-affiliated firms may have less momentum profits than the independent firms because the former are larger. To examine this possibility, we form momentum portfolios based on the corporate ownership structure and firm size (*SZ*). We classify all stocks into three groups, small (bottom 30%), medium (middle 40%), and large (top 30%), based on firm size in each ownership structure in each country. Momentum portfolios are formed in each ownership-*SZ* classification. Panel A of Table X reports the average monthly profits for the ownership-SZ-country-specific momentum portfolios. For the whole sample period, momentum profits are larger for independent firms than for group-affiliated firms in all size groups in Hong Kong and Taiwan. While the difference in momentum profits between independent firms and group-affiliated firms in Thailand is positive in the medium- and large-size groups, it is positive in the small and large size groups in Singapore. This difference is positive in the small size group in Korea, in the medium size group in Indonesia, and in the large size group in Malaysia. This difference is close to zero in all size groups in Japan.

[Insert Table X here]

The profits for the ownership-SZ-country-neutral momentum portfolios, presented in Panel B of Table X, support our previous findings. In this panel, momentum profits are shown to be larger for independent firms than for group-affiliated firms in all the size groups for the whole

sample period and also for the pre-crisis period, although the difference is not significant. When the sample includes all the eight countries, the difference in momentum profits in the whole sample period and the pre-crisis period range from 1.0-2.2 percent per year. When Japan is excluded or Korea and Indonesia are excluded from the sample, the difference in momentum profits increases for all cases (1.3-3.4 percent per year) except for the case of non-Japanese medium-size firms for the whole period. In summary, our findings suggest that the difference in momentum profits across the corporate ownership structure is not driven by the difference in firm size between independent firms and group-affiliated firms.

IV. Momentum Profits and Foreign Ownership

Recent research has documented some stylized regularities in the trading behavior of investors. Grinblatt, Titman, and Wermers (1995) find that U.S. mutual fund managers tend to pursue momentum strategies. Using data from the Korean market, Choe, Kho, and Stulz (1999) find that foreign investors tend to be momentum investors. Froot, O'Connell, and Seasholes (2000) examine the relation between equity flows and stock market returns with trades of the institutions using State Street Bank and Trust as their repository and find that past returns explain 60-85% of the quarterly variation between equity flows and stock index returns. Grinblatt and Keloharju (2000) find that foreign investors in Finland tend to be momentum investors and their portfolios appear to outperform the portfolios of households, who tend to be contrarian. This section examines whether the different trading patterns of foreign investors affect return patterns in Asian countries.

A. Cross-Sectional Evidence in Japan

The Nikkei database provides data on shares held by foreign individuals and institutions at each fiscal year-end for each Japanese company. Unfortunately, we do not have this data for other countries.

To measure the effect of foreign ownership on momentum we first compute the foreign ownership ratio, which is shares held by foreign individuals and institutions divided by the number of shares outstanding.[15] Firms with fiscal year-ends that fall between April of year *t*-1 to March year *t* are matched with the firms' number of share outstanding at the end of June in year *t*. Foreign ownership ratios measured in March of year *t* are matched with future returns in the period from July of year *t* to June of year *t*+1. Starting from July of 1975, all stocks are sorted into five groups according to their foreign ownership ratios (from low to high). All stocks in each ownership group are further divided into three sub-groups based on the stocks' past returns (from low (bottom 30%) to high (top 30%)). This procedure yields fifteen foreign ownership-past returns portfolios. These portfolios are value-weighted and held for six months. To avoid the bid-ask bounce effect, returns on these portfolios are measured one month after the formation date. To increase the power of the test, we form over-lapping momentum portfolios.

Table XI reports the results of momentum profits and foreign ownership of Japanese firms for the two different periods. Figure 2 indicates that foreign ownership in Japanese firms started to increase substantially in 1980, fell a bit in 1987, and started to rise again afterward. At the end March of 1998, foreigners owned about seven percent of the Japanese market.

The results reported in Table XI indicate that although momentum profits are not significant in any foreign ownership quintile, momentum profits do increase with foreign ownership. The differences in momentum profits between the highest and the lowest foreign ownership samples are statistically significant at the 10 percent level with a range of 0.52-0.57 percent per month. In sum, the results provide relatively weak evidence that the foreign ownership increases the momentum effect.[16,17]

[15] Although cross-holdings are very popular in Japan, using floats rather than the number of shares outstanding does not affect our results.

[16] In unreported regressions we find that foreign investors in Japan follow momentum strategies in the 1990s and 1970s but not in the 1980s. However, when the whole sample period is divided into two subperiods using 1990 as the cutoff year, the momentum spread between the highest and lowest quintiles in foreign ownership is virtually the

[Insert Table XI and Figure 2 here]

B. Momentum Profits and Market Opening

Although we do not have cross-sectional data on foreign ownership in the non-Japanese markets in our sample, we can identify dates when these markets allowed foreign ownership of their stocks. This allows us to further investigate the extent to which foreign institutions affect momentum.

Table XII reports the momentum profits before and after the stock markets opened to foreign investors. The month for the first stock market liberalization in each country is taken from Henry (2000b). Four of the countries in our sample experienced stock market liberalizations in our sample period: Korea, Malaysia, Taiwan, and Thailand. Our sample period in each country is divided into two sub-periods using the month one-year after the market liberalization as the breakpoint. Panel A reports the average monthly returns (in percentage) in US dollars on the momentum portfolios, while Panel B reports the average monthly returns on the momentum portfolios classified by group membership. We also report the returns for the portfolios that are equally weighted from all of the four country portfolios. The results indicate that among the four markets, only Thailand experienced an increased momentum effect after financial liberalization. All the other three countries actually experienced a decrease in the momentum effect after the market opening. The results based on the country/group-affiliation classification are almost the same as those based on the country classification. Both group-affiliated and independent firms experienced a decrease in momentum profits after the market opening except Thailand and the independent firms in Taiwan.

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same. In addition, the momentum effect for the highest foreign ownership quintile is insignificant in both subperiods. Using data after 1980 (the year when foreign ownership rose substantially), the results improve only very slightly.

[17] We also replicate the analysis of the momentum effect for the Japanese ADRs listed in NYSE/Amex/Nasdaq (26 in total) and find that the momentum effect is weak and insignificant. The average monthly momentum return is only 0.18 percent (t-value = 0.49) for the entire period of July 1975– December 1998.

[Insert Table XII here]

The previous tests may have very little power because foreign investors participate in very few stocks in these markets. Unfortunately, we do not have data on foreign ownership in these markets. However, since foreign institutions tend to buy the most liquid stocks, we can use the dollar trading volume as a proxy for foreign ownership.[18]

To test whether foreign investors affect the momentum effect, we divide all stocks within each country into three groups based on their past six-month dollar trading volume: low (bottom 30%), medium (medium 40%), and high (30%). We focus on the high turnover group in the following analyses. The results are reported in the last three columns of Panel A. The results are mixed and do not support the hypothesis that foreign participation actually improves momentum profits. Specifically, even for the high turnover group, only Malaysia and Thailand show an increase in momentum profit after market liberalization, while Korea and Taiwan actually experience a reversal in momentum profits after market liberalization. In addition, the results for the aggregate sample from all four countries indicate that momentum profits actually decline for all three turnover groups. In sum, our results from the four countries that opened their markets in late 1980s do not indicate that market liberalization increases the momentum effect.

V. Conclusions

Momentum strategies, that have been shown to generate significant returns in the U.S. and Europe, also generate significant profits in Asia. The magnitude and pervasiveness of these profits, however, are somewhat weaker. In particular, the momentum effect in Japan is quite

[18] Kang and Stulz (1997) study the stock ownership of Japanese firms by foreign investors and find that foreign investors tend to hold stocks of firms that are likely to be internationally visible. Specifically, these are firms that export more, have greater share turnover, and have American Deposit Receipts (ADRs).

small and is not statistically significant. In addition, momentum strategies are not profitable in either Korea or Indonesia.

Cross-sectional determinates of momentum profits are quite similar in Asia and the United States. In particular, small stocks exhibit more momentum than large stocks, growth stocks exhibit more momentum than value stocks, and high turnover stocks exhibit more momentum than low turnover stocks. We also examine whether group affiliation affects momentum and find that group firms exhibit significantly less momentum than independent firms. This could reflect the possibility that group-affiliated firms are subsidized when they are doing poorly and can be taxed by the group when they are doing well. This could potentially generate return reversals (rather than continuations) if the subsidies are not anticipated.

At the outset, we mentioned that it is interesting to compare Asian to Western markets because of potential cultural differences as well as institutional differences. This is especially important when we think that returns can be determined in part by behavioral attributes like overconfidence. In order to test whether momentum is determined by investor attributes we classify stocks in Japan by the extent to which they are held by foreign institutions and examine other Asian markets both before and after they are opened to foreign investors. We find relatively weak evidence that stocks held by foreign investors in Japan exhibit more momentum, but no support for the idea that Asian markets exhibit more momentum when they are opened to foreign investors.

We also present evidence that suggests that institutional differences can affect momentum. Specifically, we find reliable evidence of momentum in all four of the countries in our sample with legal systems with common law origins and do not find any evidence of momentum in the four countries with legal systems with civil law origins. We conjecture that the absence of momentum in civil law countries might be explained by the greater potential to manipulate stock prices, in these countries, in ways that would induce negative serial correlation that would offset

the momentum effect. Although it is not clear how this conjecture can be tested, this is potentially an interesting area for future research.

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Table I
Summary Statistics

This table reports the market capitalization (in million US dollar) in each country at three different times: the first month of the sampling period, December 1990, and February 2000. To be included into our sample, each stock should have observation on market capitalization at the end of each month during our sample periods. Furthermore, each stock should have enough data to compute the past six-month cumulative returns. The average market capitalization (in million US dollar) and the number of firms used to calculate the statistics are reported in parentheses and brackets, respectively.

The data are from various sources. The data for the Japanese market are obtained from the NEEDS data tapes, the PACAP data tapes, and the Datastream for the months before January 1975, between January 1975 to December 1997, and after December 1997, respectively. The data for the Korean market are obtained from the PACAP data tapes before January 1996 and from Datastream after December 1995. For other countries, the data are obtained from the PACAP data tapes before January 1998 and from Datastream afterward. Since there are only a few observations available before the start of our sampling periods in Indonesia and Thailand, these data are not included. The source of law origin and shareholder rights protection is adopted from La Porta *et al*. (1998, 2000). If a country adopts International Accounting Standards, IAS is "yes," otherwise, IAS is "no."

Country/ Period	Legal Origin	Shareholder Rights	IAS	Market cap (US$MM)	Start	Dec. 1990	Feb. 2000
Hong Kong Feb. 1981 - Feb. 2000	Common Law	High	Yes	Market cap Average # of firms	32,890 (299) [110]	89,411 (371) [241]	475,705 (1,069) [445]
Indonesia Feb. 1990 - Feb. 2000	Civil Law	Low	No	Market cap Average # of firms	1,768 (68) [26]	4,928 (88) [56]	42,579 (249) [171]
Japan Feb. 1972 - Feb. 2000	Civil Law	High	No	Market cap Average # of firms	80,780 (70) [1,154]	2,870,205 (1,795) [1,599]	3,183,128 (1,928) [1,651]
Korea Feb. 1978 - Feb. 2000	Civil Law	Low	No	Market cap Average # of firms	3,296 (16) [206]	97,790 (154) [635]	133,874 (271) [494]
Malaysia Jan. 1978 - Feb. 2000	Common Law	High	Yes	Market cap Average # of firms	4,495 (31) [145]	41,170 (179) [230]	150,480 (285) [528]
Singapore Feb. 1976 - Feb. 2000	Common Law	High	Yes	Market cap Average # of firms	2,340 (39) [60]	31,752 (252) [126]	169,722 (898) [189]
Taiwan Feb. 1976 - Feb. 2000	Civil Law	Low	No	Market cap Average # of firms	2,014 (38) [53]	109,470 (615) [178]	354,575 (1,091) [325]
Thailand Feb. 1986 - Feb. 2000	Common Law	Low	Yes	Market cap Average # of firms	1440 (36) [40]	20,812 (121) [172]	38,160 (144) [265]

Table II
Momentum Profits from All Stocks in the Samples

At the end of each month all stocks are ranked in ascending order based on past six-month cumulative returns. The minimum number of countries in our sample at any point in time must be at least two. Stocks in the bottom 30 percent of past returns are assigned as the 'L' portfolio and in the top 30 percent as the 'W' portfolio. These portfolios are value-weighted based on the market capitalization at the end of the formation month and are held for six months. To increase the power of our tests, overlapping portfolios are constructed. The winner (loser) portfolio is an overlapping portfolio that consists of 'W' ('L') portfolios in the previous six ranking months. For instance, a winner portfolio formed in November comprises 30 percent of the stocks with the highest cumulative returns over the previous June to November period, the previous May to October period, and so on up to the previous January to June period. Returns on these portfolios are measured one month after ranking. Returns on the winner and loser portfolios are the simple average of the returns on the six 'W' and the six 'L' portfolios, respectively. For example, the January return on the winner portfolio is the simple average of the January returns on the six 'W' portfolios that are constructed from June to November in the previous years. If a stock has missing return during the holding period, it is replaced by the corresponding value-weighted market return. If the stock return is no longer available, the portfolio is rebalanced at the end of the month. The momentum portfolio is the zero-cost, winner minus loser (W-L) portfolio. The average monthly returns (%) on these portfolios in U.S. dollar are reported in Panel A. Panel B reports the average monthly returns on country-neutral portfolios. Country-neutral momentum portfolios are formed by ranking stocks based on past six-month returns from the same country only. Stocks in the top 30 percent of past returns are assigned as the Winner portfolio and the bottom 30 percent as the Loser portfolio. These Winner and Loser portfolios are value-weighted. The country-neutral Winner (Loser) portfolio is an equally weighted portfolio of these country specific Winner (Loser) portfolios. June 1997 is used as the cutoff month for the Asian financial crisis. The corresponding t-statistics are in parentheses.

Country	Period	Winner (W)	Loser (L)	W-L
Panel A: Sample consists of all stocks in each country				
All	Feb. 1976 – Feb. 2000	1.400 (3.74)	1.025 (2.42)	0.376 (1.26)
	Feb. 1976 – June 1997	1.434 (3.80)	1.227 (3.23)	0.208 (0.77)
	July 1997 – Feb. 2000	1.125 (0.75)	-0.599 (-0.26)	1.724 (1.06)
All except Japan	Feb. 1976 – Feb. 2000	1.610 (3.61)	0.580 (1.10)	1.030 (2.53)
	Feb. 1976 – June 1997	1.780 (4.01)	0.688 (1.45)	1.450 (2.76)
	July 1997 – Feb. 2000	0.244 (0.13)	-0.287 (-0.10)	0.530 (0.28)
Panel B: Country-neutral portfolios				
All	Feb. 1976 - Feb. 2000	1.477 (4.09)	1.148 (2.74)	0.329 (1.81)
	Feb. 1976 - June 1997	1.665 (4.99)	1.255 (3.76)	0.410 (3.36)
	July 1997 – Feb. 2000	-0.035 (-0.02)	0.292 (0.11)	-0.327 (-0.25)
All except Japan	Feb. 1976 - Feb. 2000	1.458 (3.71)	1.109 (2.43)	0.349 (1.71)
	Feb. 1976 - June 1997	1.667 (4.58)	1.202 (3.26)	0.465 (3.18)
	July 1997 – Feb. 2000	-0.218 (-0.11)	0.363 (0.13)	-0.581 (-0.41)

Table III
Momentum Profits of Value-Weighted Market Portfolios

The market portfolio in each country consists of all stocks in that country. A portfolio's monthly return and market value are the value-weighted averages for all stocks in the portfolios. At the end of each month, all market portfolios are ranked in ascending order based on past six-month cumulative returns. The bottom two countries are assigned as the 'L' portfolio, while the top two countries are assigned as the 'W' portfolio. Monthly returns on the 'L' and 'W' portfolios are the value-weighted average of the market returns in these portfolios. To increase the power of tests, overlapping portfolios are constructed. The winner (loser) portfolio is an overlapping portfolio that consists of the 'W' ('L') portfolios in the previous six ranking months. The momentum portfolio (W-L) is a zero-cost, winner minus loser portfolio. Returns on these portfolios are measured one month after the ranking took place. This table reports the average monthly returns (%) on these portfolios in U.S. dollar. June 1997 is used as the cutoff month for the Asian financial crisis. The corresponding *t*-statistics are in parentheses.

Country	Period	Winner (W)	Loser (L)	W-L
All	Feb. 1976 – Feb. 2000	2.799 (5.08)	1.924 (3.67)	0.875 (1.56)
	Feb. 1976 – June 1997	2.820 (5.15)	1.937 (3.92)	0.883 (1.55)
	July 1997 – Feb. 2000	2.671 (1.28)	1.842 (0.83)	0.829 (0.43)
All except Japan	Feb. 1976 – Feb. 2000	2.996 (4.93)	1.900 (3.23)	1.096 (1.91)
	Feb. 1976 – June 1997	2.984 (4.88)	1.907 (3.37)	1.077 (1.82)
	July 1997 – Feb. 2000	3.073 (1.39)	1.857 (0.77)	1.216 (0.64)

Table IV
Post-Holding Period Returns of Momentum Portfolios

The momentum portfolios are formed based on 6-month lagged returns. The formation procedures of momentum portfolios are identical those described in Table II, except the holding periods range from one month to 36 months. Panels A and C reports returns of momentum portfolios from all stocks in the samples, while Panels B and D reports returns of country-neutral momentum portfolios. The construction of momentum portfolios from all stocks and country-neutral momentum portfolios is described in Table II. Autocorrelation consistent estimates of standard errors are used to compute the t-statistics (shown in parentheses) for cumulative returns.

Month	All Stocks in Each Country		All Countries except Japan	
	Monthly Return	Cumulative Return	Monthly Return	Cumulative Return
Panel A: Portfolios consisted of all stocks				
1	-0.49 (-1.20)	-0.49 (-1.20)	0.11 (0.19)	0.11 (0.19)
2	-0.26 (-0.66)	-0.75 (-1.07)	0.22 (0.43)	0.33 (0.33)
3	-0.08 (-0.22)	-0.83 (-0.87)	0.32 (0.61)	0.65 (0.50)
4	-0.07 (-0.21)	-0.90 (-0.77)	0.74 (1.43)	1.39 (0.93)
5	0.16 (0.45)	-0.75 (-0.54)	0.89 (1.70)	2.28 (1.21)
6	0.40 (1.19)	-0.35 (-0.23)	1.39 (2.85)	3.67 (1.80)
7	0.81 (2.54)	0.45 (0.28)	1.73 (3.48)	5.41 (2.43)
8	0.78 (2.34)	1.23 (0.70)	1.15 (2.16)	6.56 (2.62)
9	0.56 (1.77)	1.80 (0.97)	0.69 (1.43)	7.25 (2.76)
10	0.19 (0.59)	1.99 (1.01)	-0.26 (-0.51)	6.99 (2.41)
11	-0.59 (-1.78)	1.40 (0.66)	-0.91 (-1.88)	6.08 (1.88)
12	-0.91 (-2.80)	0.49 (0.21)	-0.91 (-1.92)	5.18 (1.37)
24	-0.06 (-0.22)	1.21 (0.35)	-0.83 (-1.85)	4.79 (0.95)
36	-0.05 (-0.19)	0.21 (0.08)	-0.07 (-0.14)	-1.13 (-0.20)
48	-0.09 (-0.29)	-3.05 (-1.11)	-1.00 (-2.54)	-2.82 (-0.41)
60	-0.14 (-0.48)	-4.16 (-2.05)	-0.05 (-0.13)	-8.82 (-1.25)
Panel B: Country-neutral portfolios				
1	0.02 (0.12)	0.02 (0.12)	0.07 (0.30)	0.07 (0.30)
2	0.19 (1.02)	0.21 (0.63)	0.20 (0.89)	0.27 (0.69)
3	0.16 (0.87)	0.37 (0.82)	0.13 (0.60)	0.40 (0.76)
4	0.23 (1.26)	0.60 (1.07)	0.23 (1.03)	0.63 (0.97)
5	0.41 (2.49)	1.01 (1.58)	0.48 (2.36)	1.11 (1.55)
6	0.42 (2.88)	1.43 (1.91)	0.50 (2.86)	1.61 (1.99)
7	0.66 (4.56)	2.09 (2.67)	0.77 (4.42)	2.38 (2.87)
8	0.61 (4.24)	2.70 (3.17)	0.71 (4.22)	3.09 (3.54)
9	0.28 (1.81)	2.98 (3.35)	0.31 (1.78)	3.40 (3.24)
10	0.10 (0.66)	3.08 (3.32)	0.09 (0.52)	3.49 (3.58)
11	-0.23 (-1.47)	2.85 (3.08)	-0.24 (-1.35)	3.25 (3.07)
12	-0.50 (-3.24)	2.35 (2.32)	-0.52 (-2.91)	2.73 (2.36)
24	-0.17 (-1.36)	-0.84 (-0.50)	-0.24 (-1.62)	-1.06 (-0.50)
36	-0.16 (-1.03)	-2.04 (-1.07)	-0.12 (-0.64)	-2.11 (-0.84)
48	-0.33 (-2.20)	-5.08 (-2.05)	-0.45 (-2.63)	-5.09 (-1.67)
60	-0.23 (-1.33)	-10.45 (-4.04)	-0.31 (-1.54)	-11.78 (-3.93)

Panel C: Average monthly cumulative returns for portfolios consisted of all stocks							
Months	1-9	10-12	13-24	25-36	37-48	49-60	10-60
All	0.20 (1.10)	-0.44 (-2.02)	0.06 (0.41)	-0.08 (-0.65)	-0.27 (-3.03)	-0.09 (-0.64)	-0.12(-1.74)
All but Japan	0.81 (2.76)	-0.69 (-1.52)	-0.03 (-0.11)	-0.49 (-2.43)	-0.14 (-0.64)	-0.50 (-3.13)	-0.32(-2.27)
Panel D: Average monthly cumulative returns for Country-neutral portfolios							
All	0.33 (3.35)	-0.21 (-1.29)	-0.27 (-2.96)	-0.10 (-1.14)	-0.25 (-2.56)	-0.45 (-3.88)	-0.26(-5.31)
All but Japan	0.38 (3.69)	-0.22 (-1.41)	-0.32 (-2.83)	-0.09 (-1.00)	-0.25 (-2.45)	-0.56 (-4.47)	-0.30(-5.48)

Table V
Momentum Profits by Country

At the end of each month, all stocks in each country are ranked in ascending order based on the past six-month cumulative returns. Stocks in the bottom 30 percent are assigned as the 'L' portfolio and those in the top 30 percent as the 'W' portfolio. These portfolios are value-weighted based on the market capitalization at the end of the ranking month as the weight and are held for six months. To increase the power of tests, overlapping portfolios are constructed. The winner (loser) portfolio is an overlapping portfolio that consists of 'W' ('L') portfolios in the previous six ranking months. Returns on these portfolios are measured one month after ranking. Returns on the winner and loser portfolios are the simple average of the returns on the six 'W' and the six 'L' portfolios, respectively. If a stock has missing return during the holding period, it is replaced by the corresponding value-weighted market return. If the stock return is no longer available, the portfolio is rebalanced at the end of the month. The momentum portfolio (W-L) is a zero-cost, winner minus loser portfolio. Panel A of this table reports the average monthly returns (%) on these portfolios in local dollar and in U.S. dollar. June 1997 is used as the cutoff month for the Asian financial crisis. Panel B reports the average cumulative returns in US dollar on the momentum portfolio for different post-holding periods in each country. Corresponding *t*-statistics are in parentheses. The Newey-West estimator is used to estimate the standard error for cumulative returns.

Panel A: Average monthly returns

Country	Period	Local Dollar			US Dollar		
		Winner (W)	Loser (L)	W-L	Winner (W)	Loser (L)	W-L
Hong Kong	Feb. 1981 – Feb. 2000	1.933 (3.11)	0.990 (1.41)	0.943 (3.00)	1.799 (2.79)	0.863 (1.19)	0.936 (2.99)
	Feb. 1981 – June 1997	2.059 (3.33)	1.239 (1.89)	0.820 (2.93)	1.905 (2.94)	1.094 (1.60)	0.811 (2.91)
	July 1997 – Feb. 2000	1.162 (0.50)	-0.542 (-0.18)	1.705 (1.17)	1.147 (0.49)	-0.556 (-0.18)	1.703 (1.17)
Indonesia	Feb. 1990 – Feb. 2000	0.930 (0.98)	0.903 (0.74)	0.027 (0.03)	-0.003 (-0.00)	0.038 (0.02)	-0.041 (-0.05)
	Feb. 1990 – June 1997	1.167 (1.35)	0.868 (0.97)	0.299 (0.55)	0.890 (1.00)	0.585 (0.65)	0.305 (0.56)
	July 1997 – Feb. 2000	0.269 (0.10)	0.999 (0.25)	-0.730 (-0.27)	-2.485 (-0.57)	-1.482 (-0.25)	-1.003 (-0.36)
Japan	Feb. 1972 – Feb. 2000	1.021 (3.46)	0.801 (2.38)	0.220 (0.93)	1.418 (3.77)	1.200 (2.92)	0.218 (0.92)
	Feb. 1972 – June 1997	1.027 (3.29)	0.945 (2.97)	0.082 (0.39)	1.436 (3.72)	1.348 (3.49)	0.088 (0.42)
	July 1997 – Feb. 2000	0.967 (1.07)	-0.571 (-0.31)	1.539 (1.02)	1.248 (0.85)	-0.206 (-0.09)	1.454 (0.98)
Korea	Feb. 1978 – Feb. 2000	1.224 (2.17)	1.331 (2.09)	-0.107 (-0.23)	0.862 (1.60)	0.986 (1.54)	-0.124 (-0.27)
	Feb. 1978 – June 1997	1.159 (2.46)	1.317 (2.63)	-0.158 (-0.45)	0.891 (1.82)	1.053 (2.02)	-0.163 (-0.46)
	July 1997 – Feb. 2000	1.703 (0.53)	1.436 (0.37)	0.268 (0.09)	0.652 (0.24)	0.493 (0.13)	0.159 (0.06)

Table V (continued)

Country	Period	Local Dollar			US Dollar		
		Winner (W)	Loser (L)	W-L	Winner (W)	Loser (L)	W-L
Malaysia	Jan. 1978 – Feb. 2000	1.523 (2.60)	1.307 (1.90)	0.216 (0.60)	1.360 (2.22)	1.140 (1.61)	0.220 (0.62)
	Jan. 1978 – June 1997	1.635 (2.98)	1.176 (2.16)	0.459 (1.72)	1.621 (2.90)	1.162 (2.10)	0.458 (1.73)
	July 1997 – Feb. 2000	0.706 (0.25)	2.265 (0.54)	-1.558 (-0.69)	-0.545 (-0.18)	0.980 (0.23)	-1.525 (-0.69)
Singapore	Feb. 1976 – Feb. 2000	1.326 (2.93)	1.168 (2.20)	0.158 (0.59)	1.466 (3.07)	1.312 (2.36)	0.154 (0.58)
	Feb. 1976 – June 1997	1.403 (3.11)	0.987 (2.07)	0.417 (1.89)	1.637 (3.49)	1.218 (2.48)	0.419 (1.90)
	July 1997 – Feb. 2000	0.701 (0.37)	2.623 (0.90)	-1.922 (-1.21)	0.087 (0.04)	2.062 (0.66)	-1.975 (-1.23)
Taiwan	Feb. 1976 – Feb. 2000	1.885 (2.83)	1.626 (2.38)	0.259 (0.73)	1.986 (2.89)	1.723 (2.46)	0.263 (0.73)
	Feb. 1976 – June 1997	2.031 (2.85)	1.824 (2.49)	0.207 (0.60)	2.188 (2.98)	1.974 (2.63)	0.214 (0.62)
	July 1997 – Feb. 2000	0.713 (0.38)	0.030 (0.02)	0.683 (0.41)	0.365 (0.19)	-0.291 (-0.15)	0.656 (0.40)
Thailand	May 1986 – Feb. 2000	2.115 (2.43)	1.702 (1.53)	0.413 (0.62)	1.832 (2.11)	1.384 (1.30)	0.448 (0.69)
	May 1986 – Jun. 1997	2.445 (2.74)	1.394 (1.66)	1.051 (2.28)	2.447 (2.75)	1.396 (1.67)	1.051 (2.28)
	July 1997 – Feb. 2000	0.733 (0.29)	2.991 (0.65)	-2.259 (-0.79)	-0.747 (-0.29)	1.332 (0.31)	-2.080 (-0.76)

Panel B: Average monthly cumulative returns for different post-holding periods

Country	Months						
	1-9	10-12	13-24	25-36	37-48	49-60	10-60
Hong Kong	0.64 (3.00)	-0.05 (-0.14)	-0.08 (-0.75)	-0.15 (-0.75)	0.19 (0.96)	-0.31 (-1.36)	-0.08 (-0.85)
Indonesia	-0.01 (-0.03)	0.88 (1.55)	-0.22 (-0.64)	-0.37 (-0.97)	-0.74 (-1.45)	-1.29 (-2.56)	-0.57 (-3.43)
Japan	0.02 (0.17)	-0.40 (-2.23)	-0.12 (-1.26)	-0.11 (-0.94)	-0.25 (-2.86)	-0.09 (-0.79)	-0.16 (-2.06)
Korea	-0.05 (-0.21)	-0.69 (-1.91)	-0.56 (-2.55)	-0.24 (-0.96)	0.02 (0.05)	-0.32 (-1.25)	-0.30 (-1.94)
Malaysia	0.44 (2.22)	-0.16 (-0.47)	-0.50 (-2.45)	-0.42 (-2.83)	-0.20 (-0.89)	-0.67 (-3.50)	-0.43 (-4.78)
Singapore	0.36 (2.14)	-0.07 (-0.33)	-0.23 (-1.48)	-0.23 (-1.32)	-0.30 (-2.74)	-0.45 (-2.10)	-0.29 (-4.23)
Taiwan	0.26 (1.17)	-0.50 (-1.27)	-0.62 (-2.27)	0.45 (2.34)	-0.48 (-1.99)	-0.30 (-1.09)	-0.25 (-2.02)
Thailand	0.79 (2.99)	0.93 (1.36)	1.06 (3.09)	0.02 (0.06)	-0.57 (-1.54)	-1.18 (-2.79)	-0.10 (-0.41)

Table VI
Momentum Profits and Firm Size

All stocks in each country are divided into three size (SZ) groups: small (S, bottom 30%), medium (M, medium 40%), and large (L, top 30%), based on their market capitalization at the end of ranking month. Within each SZ group, firms in the top 30 percent of the past returns are assigned as the 'W' portfolio, and the bottom 30 percent as the 'L' portfolio. These portfolios are value-weighted and formed monthly and are held for six months. SZ-country winner and loser portfolios are overlapping portfolios constructed from these 'W' and 'L' portfolios. Returns on 'W' and 'L' portfolios are measured one month after formation. If a stock has missing return during the holding period, it is replaced by the corresponding value-weighted market return. If the stock return is no longer available, the portfolio is rebalanced at the end of the month. The SZ-country-specific momentum portfolio (W-L) is a zero-cost, winner minus loser portfolio. Panel A reports the average monthly returns (%) on these portfolios in U.S. dollar.

Panel B reports the average monthly returns (%) on the SZ-country-neutral momentum portfolio. This portfolio is an equally weighted portfolio of the SZ-country-specific momentum portfolios. The minimum number of countries in each country-neutral portfolio at any point in time is two. June 1997 is used as the cutoff month for the Asian financial crisis. The corresponding t-statistics are in parentheses.

Country	Size			Size		
	S	M	L	S	M	L
Panel A: Returns on SZ-country-specific momentum portfolios						
Hong Kong	Feb. 1981 - Feb. 2000			Feb. 1981 - June 1997		
	0.81	1.11	0.66	0.82	1.35	0.43
	(1.95)	(3.25)	(2.20)	(2.10)	(4.28)	(1.61)
Indonesia	Feb. 1990 - Feb. 2000			Feb. 1990 - June 1997		
	-1.05	0.36	0.22	-1.11	0.78	0.62
	(-1.17)	(0.47)	(0.24)	(-1.79)	(1.31)	(0.92)
Japan	Feb. 1972 - Feb. 2000			Feb. 1972 - June 1997		
	0.10	0.16	0.24	0.17	0.11	0.06
	(0.59)	(0.93)	(1.03)	(1.09)	(0.69)	(0.26)
Korea	Feb. 1978 - Feb. 2000			Feb. 1978 - June 1997		
	0.20	0.14	0.02	0.17	0.30	-0.00
	(0.42)	(0.39)	(0.04)	(0.54)	(0.86)	(-0.01)
Malaysia	Jan. 1978 - Feb. 2000			Jan. 1978 - June 1997		
	0.46	0.23	0.27	0.65	0.48	0.43
	(1.43)	(0.72)	(0.78)	(2.10)	(1.80)	(1.71)
Singapore	Feb. 1976 - Feb. 2000			Feb. 1976 - June 1997		
	0.32	0.48	0.16	0.37	0.64	0.38
	(1.01)	(1.79)	(0.61)	(1.27)	(2.85)	(1.69)
Taiwan	Feb. 1976 - Feb. 2000			Feb. 1976 - June 1997		
	0.53	0.05	0.12	0.64	0.01	0.01
	(1.35)	(0.18)	(0.34)	(1.60)	(0.04)	(0.04)
Thailand	May. 1986 - Feb. 2000			May. 1986 - June 1997		
	0.49	0.56	0.47	0.50	0.88	0.93
	(0.68)	(0.80)	(0.71)	(0.95)	(1.62)	(1.79)
Panel B: Returns on SZ-country-neutral momentum portfolios						
All	Feb. 1976 -Feb. 2000			Feb. 1976 – June 1997		
	0.400	0.406	0.295	0.470	0.525	0.327
	(2.27)	(2.48)	(1.78)	(3.39)	(3.95)	(2.74)
All except Japan	Feb. 1976 - Feb. 2000			Feb. 1976 - June 1997		
	0.473	0.455	0.300	0.545	0.602	0.367
	(2.29)	(2.39)	(1.61)	(3.19)	(3.75)	(2.60)
All except Korea and Indonesia	Feb. 1976 - Feb. 2000			Feb. 1976 – June 1997		
	0.504	0.422	0.324	0.583	0.528	0.343
	(2.91)	(2.61)	(1.98)	(3.84)	(3.87)	(2.70)

Table VII
Momentum Profits and Book-to-Market Equity

All stocks in each country are allocated into three book-to-market (BM) groups: low (L, bottom 30%), medium (M, medium 40%), and high (H, top 30%) based on their book-to-market ratio at the end of the portfolio formation month. For all countries except Japan, the book-to-market ratio of a stock from June of year *t* to May of year *t*+1 is computed as the ratio between its book value in year *t*-1 and its market capitalization in the end of December in year *t*-1. For stocks in Japan, the book-to-market ratio of a stock from June of year *t* to May of year *t*+1 is computed as the ratio between its book value in its fiscal-year end during April of year *t*-1 to March of year *t* and its market capitalization in the end of March in year *t*. Country-specific and country-neutral momentum portfolios are formed based on these book-to-market ratio and the past returns. The formation of these winner-loser portfolios is described in Table VI. Panel A reports the average monthly returns (%) on country-specific momentum portfolios in U.S. dollar, while Panel B reports the average monthly returns on country-neutral momentum portfolios. June 1997 is used as the cutoff month for the Asian financial crisis. The corresponding t-statistics are in parentheses.

Country	Book–to-market			Book-to-market		
	L	M	H	L	M	H
Panel A: Returns on BM-country-specific momentum portfolios						
Hong Kong	Feb. 1982 - Feb. 2000			Feb. 1982 - June 1997		
	0.91	0.95	-0.23	0.59	1.08	0.10
	(2.09)	(2.66)	(-0.57)	(1.62)	(3.21)	(0.26)
Indonesia	Feb. 1990 - Feb. 2000			Feb. 1990 - June 1997		
	-0.56	-1.64	0.17	0.31	-0.69	1.06
	(-0.43)	(-1.80)	(0.12)	(0.38)	(-1.06)	(1.46)
Japan	Feb. 1976 - Feb. 2000			Feb. 1976 - June 1997		
	0.25	0.20	0.18	-0.01	0.02	0.14
	(0.82)	(0.78)	(0.74)	(-0.05)	(0.09)	(0.65)
Korea	Feb. 1983 - Feb. 2000			Feb. 1983 - June 1997		
	-0.47	-0.31	-0.62	-0.61	-0.33	-0.48
	(-0.97)	(-0.61)	(-0.98)	(-1.35)	(-0.77)	(-1.03)
Malaysia	Feb. 1979 - Feb. 2000			Feb. 1979 - June 1997		
	0.35	0.13	-0.40	0.64	0.42	-0.13
	(0.84)	(0.37)	(-1.04)	(2.06)	(1.57)	(-0.44)
Singapore	Feb. 1977 - Feb. 2000			Feb. 1977 - June 1997		
	-0.02	0.10	0.24	0.30	0.29	0.26
	(-0.06)	(0.33)	(0.82)	(1.03)	(1.13)	(0.91)
Taiwan	Feb. 1977 - Feb. 2000			Feb. 1977 - June 1997		
	0.62	0.11	-0.01	0.46	0.15	0.03
	(1.50)	(0.31)	(-0.01)	(1.13)	(0.48)	(0.07)
Thailand	May. 1986 - Feb. 2000			May. 1986 - June 1997		
	0.33	0.42	0.63	0.47	1.88	1.59
	(0.51)	(0.54)	(0.61)	(0.92)	(3.58)	(2.11)
Panel B: Returns on BM-country-neutral momentum portfolios						
All	Feb. 1977 - Feb. 2000			Feb. 1977 - June 1997		
	0.29	0.16	0.06	0.33	0.38	0.25
	(1.37)	(0.88)	(0.28)	(2.24)	(2.93)	(1.69)
All except Japan	Feb. 1977 - Feb. 2000			Feb. 1977 - June 1997		
	0.31	0.20	0.06	0.40	0.47	0.29
	(1.34)	(0.95)	(0.26)	(2.34)	(3.28)	(1.57)
All except Korea and Indonesia	Feb. 1977 - Feb. 2000			Feb. 1977 - June 1997		
	0.42	0.31	0.09	0.42	0.51	0.26
	(2.03)	(1.73)	(0.44)	(2.71)	(3.71)	(1.68)

Table VIII
Momentum Profits and Turnover

All stocks in each country are allocated into three turnover (TN) groups: low (L, bottom 30%), medium (M, medium 40%), and high (H, top 30%), based on their past six-month average turnover ratio at the end of the ranking month. Turnover ratio of a stock is computed as its monthly number of shares traded divided by its number of shares outstanding. Country-specific and country-neutral momentum portfolios are formed based on these turnover ratio and the past returns. The formation of these winner-loser portfolios is described in Table VI. Panel A reports the average monthly returns (%) for country-specific momentum portfolios in U.S. dollar. Panel B reports the average monthly returns for country-neutral momentum portfolios. June 1997 is used as the cutoff month for the Asian financial crisis. The corresponding t-statistics are in parentheses.

Country	Turnover			Turnover		
	L	M	H	L	M	H
Panel A: Returns on TN-country-specific momentum portfolios						
Hong Kong	Feb. 1981 - Feb. 2000			Feb. 1981 - June 1997		
	0.44	0.56	1.98	0.66	0.65	1.76
	(1.22)	(1.57)	(4.57)	(2.00)	(2.14)	(4.79)
Indonesia	Feb. 1990 - Feb. 2000			Feb. 1990 - June 1997		
	-0.38	0.16	0.92	0.76	0.51	0.92
	(-0.31)	(0.19)	(1.26)	(0.89)	(0.80)	(1.53)
Japan	Jan. 1976 - Feb. 2000			Jan. 1976 - June 1997		
	0.36	0.20	0.29	0.15	0.11	0.09
	(1.26)	(0.78)	(0.94)	(0.57)	(0.45)	(0.33)
Korea	Feb. 1978 - Feb. 2000			Feb. 1978 - June 1997		
	-0.01	-0.08	0.28	-0.02	-0.11	0.32
	(-0.03)	(-0.17)	(0.51)	(-0.04)	(-0.29)	(0.77)
Malaysia	Jan. 1978 - Feb. 2000			Jan. 1978 - June 1997		
	-0.00	0.16	-0.07	0.08	0.41	0.24
	(-0.00)	(0.52)	(-0.18)	(0.32)	(1.51)	(0.69)
Singapore	Feb. 1976 - Feb. 2000			Feb. 1976 - June 1997		
	0.32	0.38	0.29	0.55	0.41	0.49
	(1.08)	(1.20)	(0.93)	(1.82)	(1.59)	(1.88)
Taiwan	Feb. 1976 - Feb. 2000			Feb. 1976 - June 1997		
	-0.20	0.28	0.39	-0.21	0.28	0.23
	(-0.55)	(0.82)	(1.00)	(-0.55)	(0.94)	(0.60)
Thailand	May. 1986 - Feb. 2000			May. 1986 - June 1997		
	0.26	0.60	1.12	0.77	1.42	1.12
	(0.41)	(0.87)	(1.81)	(1.52)	(2.82)	(1.81)
Panel B: Returns on TN-country-neutral momentum portfolios						
All	Feb. 1976 – Feb. 2000			Feb. 1976 - June 1997		
	0.18	0.33	0.63	0.30	0.43	0.63
	(0.94)	(1.90)	(3.48)	(2.20)	(3.58)	(4.13)
All except Japan	Feb. 1976 – Feb. 2000			Feb. 1976 – June 1997		
	0.14	0.35	0.70	0.30	0.48	0.73
	(0.64)	(1.79)	(3.45)	(1.92)	(3.37)	(4.13)
All except Korea and Indonesia	Feb. 1976 – Feb. 2000			Feb. 1976 – June 1997		
	0.23	0.38	0.66	0.30	0.49	0.63
	(1.30)	(2.14)	(3.81)	(2.04)	(3.94)	(3.90)

Table IX
Momentum Profits and Corporate Ownership Structures

All stocks in each country are divided into two corporate ownership structures: independent (I) and group-affiliated (G) firms. Within each ownership structure in each country, stocks in the top 30 percent of the past returns are assigned as the 'W' portfolio, while the bottom 30 percent as the 'L' portfolio. These portfolios are value-weighted and formed monthly and are held for six months. Ownership-country-specific winner and loser portfolios are the overlapping portfolios constructed from these 'W' and 'L' portfolios. The formation of overlapping portfolios is described in Table I. Returns on 'W' and 'L' portfolios are measured one month after formation. If a stock has missing return during the holding period, it is replaced by the corresponding value-weighted market return. If the stock return is no longer available, the portfolio is rebalanced at the end of the month. The ownership-country-specific momentum portfolio (W-L) is a zero-cost, winner minus loser portfolio. Panel A reports the average monthly returns (%) on these portfolios and their difference (Diff) between I and G portfolios in U.S. dollar.

Panel B reports the average monthly returns (%) on the ownership-country-neutral momentum portfolio. This portfolio is an equally weighted portfolio of the ownership-country-specific momentum portfolios. The minimum number of countries in each country-neutral portfolio at any point in time is two. June 1997 is used as the cutoff month for the Asian financial crisis. The corresponding t-statistics are in parentheses.

Country	I	G	Diff	I	G	Diff.
Panel A: Profits on ownership-country-specific momentum portfolios						
Hong Kong	Feb. 1981 - Feb. 2000			Feb. 1981 - June 1997		
	1.32	0.72	0.60	1.21	0.60	0.61
	(2.74)	(2.35)	(1.26)	(3.12)	(2.10)	(1.62)
Indonesia	Feb. 1990 - Feb. 2000			Feb. 1990 - June 1997		
	-0.65	0.10	-0.74	-0.45	0.49	-0.94
	(-0.74)	(0.10)	(-0.82)	(-0.62)	(0.70)	(-1.00)
Japan	Feb. 1972 - Feb. 2000			Feb. 1972 - June 1997		
	0.20	0.23	-0.03	0.02	0.12	-0.10
	(0.74)	(0.93)	(-0.14)	(0.10)	(0.54)	(-0.45)
Korea	Feb. 1978 - Feb. 2000			Feb. 1978 - June 1997		
	-0.23	0.11	-0.34	-0.22	0.04	-0.25
	(-0.49)	(0.23)	(-0.75)	(-0.59)	(0.10)	(-0.67)
Malaysia	Jan. 1978 - Feb. 2000			Jan. 1978 - June 1997		
	0.31	0.15	0.16	0.59	0.38	0.21
	(0.88)	(0.42)	(0.64)	(2.28)	(1.32)	(0.93)
Singapore	Feb. 1976 - Feb. 2000			Feb. 1976 - June 1997		
	0.60	0.14	0.45	1.00	0.40	0.60
	(1.39)	(0.52)	(1.54)	(2.54)	(1.78)	(1.60)
Taiwan	Feb. 1976 - Feb. 2000			Feb. 1976 - June 1997		
	0.66	-0.15	0.81	0.66	-0.21	0.87
	(1.59)	(-0.46)	(2.20)	(1.61)	(-0.65)	(2.16)
Thailand	May. 1986 - Feb. 2000			May. 1986 - June 1997		
	0.34	0.32	0.02	1.88	0.96	0.92
	(0.51)	(0.48)	(0.03)	(1.76)	(1.84)	(-0.15)
Panel B: By Country and Group-Affiliation						
All	Feb. 1976 – Feb. 2000			Feb. 1976 - June 1997		
	0.45	0.25	0.20	0.56	0.33	0.23
	(2.35)	(1.47)	(1.55)	(3.84)	(2.69)	(1.71)
All except Japan	Feb. 1976 - Feb. 2000			Feb. 1976 - June 1997		
	0.53	0.24	0.29	0.67	0.35	0.34
	(2.45)	(1.24)	(1.91)	(3.92)	(2.40)	(2.14)
All except Korea and Indonesia	Feb. 1976 - Feb. 2000			Feb. 1976 - June 1997		
	0.60	0.26	0.33	0.70	0.35	0.35
	(3.04)	(1.58)	(2.43)	(4.49)	(2.78)	(2.78)

Table X
Momentum Profits, Corporate Ownership Structure, and Firm Size

All stocks in each country are classified into two corporate ownership structures: independent firms (I) and group-affiliated firms (G). Within each corporate ownership structure, stocks are allocated into three size (SZ) groups based on their market capitalization at the end of the ranking month. The top 30 percent of the stocks from each ownership-SZ sub-group in each country with the highest past returns are assigned as the 'W' portfolio, and the bottom 30 percent are assigned as the 'L' portfolio. These value-weighted portfolios are formed monthly and are held for six months. Ownership-SZ-country-specific and ownership-SZ-country-neutral momentum portfolios are formed using the procedures described in Table IX. Panel A reports the average monthly returns (%) on these portfolios and their differences (Diff) in U.S. dollar, while Panel B reports the average monthly returns (%) on the country-neutral portfolios. The minimum number of countries in each country-neutral portfolio at any point in time is two. June 1997 is used as the cutoff month for the Asian financial crisis. The corresponding t-statistics are in parentheses.

Panel A: Returns on ownership-SZ-country-specific momentum portfolios

Country	Size	I	G	Diff	I	G	Diff
		Feb. 1981 - Feb. 2000			Feb. 1981 - June 1997		
Hong Kong	S	0.97 (1.16)	0.39 (0.92)	0.58 (0.64)	0.87 (0.96)	0.48 (1.17)	0.39 (0.39)
	M	1.72 (3.09)	1.27 (3.83)	0.45 (0.87)	1.80 (3.76)	1.38 (4.42)	0.42 (0.95)
	L	0.89 (1.61)	0.44 (1.34)	0.45 (0.70)	0.54 (1.23)	0.27 (0.95)	0.27 (0.55)
		Feb. 1990 - Feb. 2000			Feb. 1990 - June 1997		
Indonesia	S	-0.90 (-0.82)	-0.31 (-0.44)	-0.59 (-0.58)	-0.64 (-0.75)	-0.27 (-0.46)	-0.37 (-0.36)
	M	-0.07 (-0.09)	-0.62 (-0.69)	0.55 (0.58)	0.24 (0.31)	0.14 (0.21)	0.10 (0.09)
	L	-0.63 (-0.79)	0.34 (0.36)	-0.97 (-0.89)	-0.19 (-0.24)	0.60 (0.74)	-0.79 (-0.36)
		Feb. 1972 - Feb. 2000			Feb. 1972 - June 1997		
Japan	S	-0.04 (-0.20)	0.10 (0.57)	-0.14 (-1.04)	-0.01 (-0.03)	0.19 (1.11)	-0.20 (-1.43)
	M	0.18 (0.98)	0.15 (0.80)	0.03 (0.26)	0.10 (0.55)	0.13 (0.76)	-0.03 (-0.30)
	L	0.19 (0.74)	0.29 (1.20)	-0.10 (-0.44)	-0.05 (-0.20)	0.15 (0.61)	-0.20 (-0.81)
		Feb. 1978 - Feb. 2000			Feb. 1978 - June 1997		
Korea	S	0.38 (0.87)	0.00 (0.00)	0.38 (0.82)	0.27 (0.84)	0.38 (0.88)	-0.11 (-0.28)
	M	0.04 (0.13)	0.34 (0.84)	-0.30 (-0.85)	0.14 (0.45)	0.30 (0.75)	-0.16 (-0.46)
	L	-0.18 (-0.40)	0.39 (0.96)	-0.57 (-1.20)	-0.06 (-0.15)	0.27 (0.68)	-0.33 (-0.74)
		Jan. 1978 - Feb. 2000			Jan. 1978 - June 1997		
Malaysia	S	0.26 (0.73)	0.45 (1.19)	-0.19 (-0.49)	0.38 (1.11)	0.62 (1.62)	-0.24 (-0.59)
	M	0.20 (0.58)	0.54 (0.55)	-0.34 (-1.22)	0.46 (1.58)	0.79 (2.53)	-0.33 (-1.19)
	L	0.37 (0.97)	0.15 (0.42)	0.22 (-0.80)	0.60 (2.27)	0.23 (0.79)	0.37 (1.40)

Table X (continued)

Country	Size	I	G	Diff	I	G	Diff
Singapore		Feb. 1976 - Feb. 2000			Feb. 1976 - June 1997		
	S	0.51 (1.03)	0.17 (0.56)	0.34 (0.70)	0.49 (1.04)	0.20 (0.68)	0.29 (0.59)
	M	0.20 (0.46)	0.44 (1.62)	-0.24 (-0.56)	0.38 (0.84)	0.49 (2.20)	-0.11 (-0.23)
	L	0.56 (0.98)	0.27 (0.95)	0.29 (0.50)	0.80 (1.50)	0.48 (1.87)	0.32 (0.61)
Taiwan		Feb. 1976 - Feb. 2000			Feb. 1976 - June 1997		
	S	0.56 (1.05)	-0.09 (-0.33)	0.65 (1.17)	0.73 (1.32)	-0.02 (-0.07)	0.75 (1.29)
	M	0.55 (1.41)	-0.10 (-0.35)	0.65 (1.73)	0.59 (1.40)	-0.15 (-0.55)	0.74 (1.88)
	L	0.58 (1.43)	-0.11 (-0.30)	0.69 (1.69)	0.48 (1.18)	-0.26 (-0.70)	0.74 (1.64)
Thailand		May 1986 - Feb. 2000			May 1986 - June 1997		
	S	-0.15 (-0.20)	-0.01 (-0.01)	-0.14 (-0.16)	-0.03 (-0.05)	0.18 (0.26)	-0.21 (-0.23)
	M	1.18 (1.66)	0.90 (1.11)	0.28 (0.44)	1.65 (3.31)	1.25 (1.79)	0.40 (0.61)
	L	0.61 (0.88)	0.34 (0.52)	0.27 (0.38)	0.75 (1.09)	0.75 (1.44)	0.00 (0.00)

Panel B: Returns on Ownership-SZ-country-neutral momentum portfolios

Country	Size	I	G	Diff	I	G	Diff
All		Feb. 1976 - Feb. 2000			Feb. 1976 - June 1997		
	S	0.38 (1.75)	0.20 (1.10)	0.18 (0.87)	0.44 (2.20)	0.32 (2.17)	0.12 (0.53)
	M	0.52 (2.88)	0.44 (2.70)	0.08 (0.55)	0.63 (4.00)	0.54 (4.07)	0.09 (0.63)
	L	0.37 (2.02)	0.29 (1.85)	0.08 (0.46)	0.40 (2.60)	0.30 (2.42)	0.10 (0.57)
All except Japan		Feb. 1976 - Feb. 2000			Feb. 1976 - June 1997		
	S	0.50 (1.90)	0.22 (1.06)	0.28 (1.10)	0.56 (2.28)	0.35 (1.96)	0.21 (0.82)
	M	0.58 (2.77)	0.51 (2.73)	0.07 (0.44)	0.73 (3.83)	0.62 (4.10)	0.11 (0.57)
	L	0.41 (2.02)	0.27 (1.53)	0.14 (0.72)	0.48 (2.69)	0.30 (2.13)	0.18 (0.92)
All except Korea and Indonesia		Feb. 1976 – Feb. 2000			Feb. 1976 - June 1997		
	S	0.44 (1.89)	0.22 (1.31)	0.22 (0.94)	0.50 (2.22)	0.31 (2.03)	0.19 (0.76)
	M	0.61 (3.20)	0.50 (3.08)	0.11 (0.76)	0.72 (4.11)	0.57 (4.15)	0.15 (0.93)
	L	0.51 (2.51)	0.25 (1.56)	0.26 (1.44)	0.49 (2.85)	0.27 (2.03)	0.22 (1.25)

Table XI
Momentum Profits and Foreign Ownership: Japanese Companies during 1976 February – 1999 June

This table reports momentum profits (% in USD) based on foreign ownership for the Japanese market. Data on the foreign ownership are obtained from the Nikkei data tapes. Foreign ownership ratio is computed as shares held by foreign individuals and institutions divided by number of shares outstanding. Data on shares held by foreign individuals and institutions are observed at fiscal year-end. Firms with their fiscal year-end fall between April of year *t*-1 to March year *t* are matched with the firms' number of share outstanding at the end of June in year *t*. Data on number of shares outstanding, returns, and firm size are obtained from the PACAP data tapes. Past return of a stock in month *s* is computed as the cumulative returns of that stock in the previous six months. Firm size of a stock in month *s* is its market capitalization in that month. Foreign ownership ratios measured in March of year *t* are matched with future returns and firm size in the period from July of year *t* to June of year *t*+1. Starting from July of 1975, all stocks are sorted into five groups according to their foreign ownership ratios (from low to high). All stocks in each ownership group are further divided into three sub-groups based on the stocks' past returns (from low (bottom 30%) to high (top 30%)). This procedure yields fifteen foreign ownership-past returns portfolios. These portfolios are value-weighted and held for six months. To avoid the bid-ask bounce effect, we measure returns on these portfolios one month after the formation. To increase the power of the test, we follow Jegadeesh and Titman (1993) methodology to form over-lapping momentum portfolios. Panels A and B report results for the periods of February 1976 – June 1997 and February 1976 – June 1999, respectively. *t*-statistics are in parentheses.

	Past Return Ranking							
Foreign Ownership Ratio	*Panel A: February 1976 – June 1997*				*Panel B: February 1976 – June 1999*			
	Loser	2	Winner	Winner-Loser	Loser	2	Winner	Winner-Loser
Lowest	1.72	1.51	1.40	-0.32 (-1.18)	1.50	1.28	1.19	-0.31 (-0.98)
2	1.43	1.81	1.49	0.06 (0.28)	1.27	1.54	1.29	0.02 (0.08)
3	1.28	1.43	1.45	0.16 (0.71)	1.16	1.28	1.39	0.23 (0.88)
4	1.21	1.38	1.42	0.21 (0.80)	1.07	1.23	1.33	0.26 (0.92)
Highest	1.23	1.29	1.43	0.20 (0.82)	1.12	1.13	1.34	0.22 (0.84)
(High Winner-Loser) – (Low Winner-Loser) =				0.52 (1.77)				0.53 (1.80)

Table XII
Momentum Profits before and after Stock Market Opening

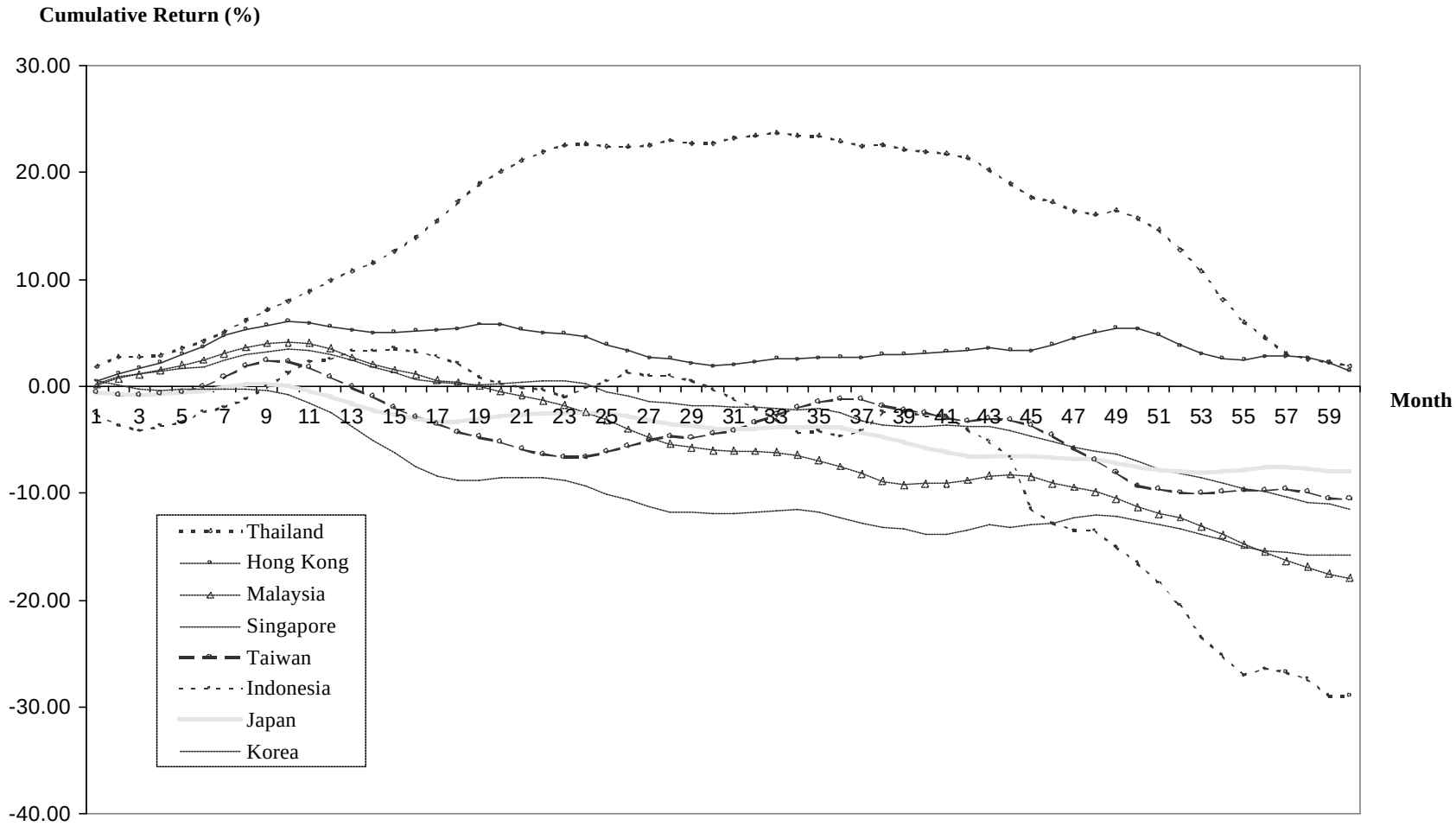
This table reports momentum profits (%) in US dollar before and after the stock market opening. The month for the first stock market liberalization in each country (in parentheses) is adopted from Henry (2000b). The sample period in each country is divided into two sub-periods using the month one year after market liberalization as the breakpoint. Panel A reports average monthly returns on momentum portfolios from all firms as well as from three separate groups: low (bottom 30%), medium (medium 40%), and high (top 30%) based on past 6-month dollar trading volume. Panel B reports average monthly returns on momentum portfolios classified by group ownership. The 'All' portfolio is an equally weighted portfolio of the four country portfolios. *t*-statistics are in the parentheses.

Panel A: By Country

Country	Period	All Firms	Dollar Trading Volume		
			Low	Medium	High
Korea (June 1987)	Feb. 1978 – June 1988	0.56 (1.16)	0.92 (2.23)	0.65 (1.75)	0.67 (1.21)
	July 1988 – June 1997	-1.00 (-1.94)	0.03 (0.06)	-0.26 (-0.47)	-0.92 (-1.68)
	July 1988 – Feb. 2000	-0.73 (-0.98)	-0.34 (-0.39)	-0.43 (-0.61)	-0.67 (-0.92)
Malaysia (May 1987)	Jan. 1978 – May 1988	0.55 (1.52)	0.14 (0.07)	0.13 (0.22)	-0.30 (-0.33)
	June 1988 – June 1997	0.35 (0.90)	0.54 (1.28)	0.30 (0.68)	0.62 (1.31)
	June 1988 – Feb. 2000	-0.08 (-0.13)	0.56 (1.18)	0.06 (0.10)	0.09 (0.15)
Taiwan (May 1986)	Feb. 1976 – May 1987	0.34 (0.89)	0.29 (0.47)	0.83 (1.94)	0.34 (1.00)
	June 1987 – June 1997	0.08 (0.12)	0.15 (0.19)	0.38 (0.50)	-0.38 (-0.78)
	June 1987 – Feb. 2000	0.20 (0.33)	-0.10 (-0.14)	0.27 (0.42)	-0.06 (-0.11)
Thailand (Jan. 1988)	May 1986 – Jan. 1989	0.46 (0.67)	-0.46 (-0.41)	0.97 (1.26)	0.17 (0.17)
	Feb. 1989 – June 1997	1.24 (2.18)	0.48 (0.84)	0.36 (0.57)	0.85 (1.14)
	Feb. 1989 – Feb. 2000	0.45 (0.56)	-0.21 (-0.27)	0.34 (0.44)	0.20 (0.22)
All	Feb. 1978 – Jan. 1989	0.53 (2.19)	0.61 (1.75)	1.02 (3.74)	0.41 (1.30)
	Feb. 1989 – June 1997	0.06 (0.21)	0.24 (0.72)	0.09 (0.29)	-0.03 (-0.10)
	Feb. 1989 – Feb. 2000	-0.12 (-0.29)	-0.06 (-0.13)	-0.02 (-0.04)	-0.14 (-0.35)

Panel B: By Country and Group-Affiliation

Country	Period	Independent (I)	Group (G)	I – G
Korea (June 1987)	Feb. 1978 – June 1988	0.71 (1.49)	0.52 (0.96)	0.19 (0.37)
	July 1988 – June 1997	-1.29 (-2.36)	-0.52 (-0.87)	-0.77 (-1.43)
	July 1988 – Feb. 2000	-1.08 (-1.36)	-0.25 (-0.33)	-0.83 (-1.14)
Malaysia (May 1987)	Jan. 1978 – May 1988	0.72 (1.99)	0.43 (1.11)	0.29 (1.00)
	June 1988 – June 1997	0.44 (1.19)	0.33 (0.76)	0.11 (0.32)
	June 1988 – Feb. 2000	-0.05 (-0.09)	-0.09 (-0.15)	0.04 (0.10)
Taiwan (May 1986)	Feb. 1976 – May 1987	0.51 (1.04)	-0.06 (-0.18)	0.57 (1.16)
	June 1987 – June 1997	0.82 (1.23)	-0.38 (-0.67)	1.20 (1.84)
	June 1987 – Feb. 2000	0.79 (1.22)	-0.23 (-0.43)	1.02 (1.89)
Thailand (Jan. 1988)	May 1986 – Jan. 1989	-0.50 (-0.36)	-0.03 (-0.03)	-0.47 (-0.33)
	Feb. 1989 – June 1997	1.13 (2.13)	1.15 (1.95)	-0.02 (-0.02)
	Feb. 1989 – Feb. 2000	0.46 (0.62)	0.37 (0.49)	0.09 (0.15)
All	Feb. 1978 – Jan. 1989	0.59 (2.28)	0.45 (1.79)	0.14 (0.58)
	Feb. 1989 – June 1997	0.26 (0.86)	-0.06 (-0.22)	0.32 (1.10)
	Feb. 1989 – Feb. 2000	-0.01 (-0.01)	-0.23 (-0.58)	0.22 (0.74)



Figigure 1. Post-holding Period Cumulative Returns by Country

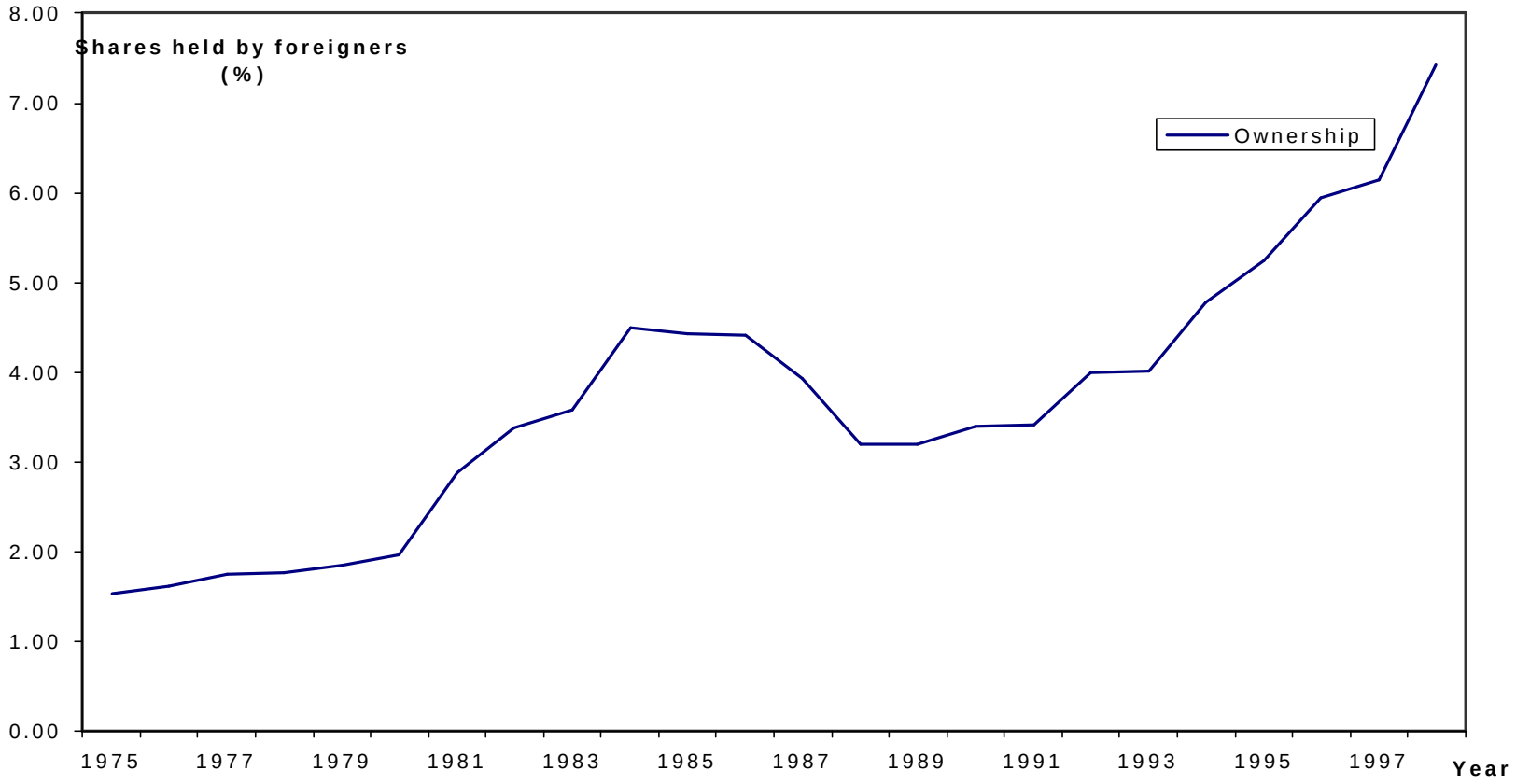


Figure 2. Average Foreign Ownership for Japanese Firms by Year