College of Business Administration
University of Rhode Island

William A. Orme
WORKING PAPER SERIES
encouraging creative research

Size of Firm and Market Returns in Six Asian (Pacific-Basin) Financial Markets

Jeffrey E. Jarrett, Zhenzhen Sun

2009/2010 No. 5

This working paper series is intended to facilitate discussion and encourage the exchange of ideas. Inclusion here does not preclude publication elsewhere. It is the original work of the author(s) and subject to copyright regulations.
Size of Firm and Market Returns in Six Asian (Pacific-Basin) Financial Markets

Jeffrey E. Jarrett, Ph.D.*

Zhenzhen Sun**

University of Rhode Island
Ballentine Hall
Faculty of Management Science and Finance
7 Lippitt Road
Kingston RI 02881, 0802
(401, 874, 4169, Voice, 401, 874, 4312, Fax)

* Prime Contact is jejarrett@mail.uri.edu
** Zhenzhen_sun@mail.uri.edu
Abstract

Authors study the relationship between firm size and stock market returns for listed firms on the financial exchanges in Hong Kong, Japan, Taiwan, Thailand, South Korea, and Malaysia. They study the correlation of size quartiles returns with the six Pacific-Basin financial markets and across these same markets. They investigate whether these correlations are due to negative or positive shocks on the large stocks quintile with asymmetric regressions. Last, the authors replicate the study assuming autocorrelation in quintiles returns using both previously mentioned asymmetric regression and sub period regression using dummy variables.

Key Terms: Asian stock markets, asymmetric regressions, autocorrelation, contemporaneous returns, cross-autocorrelation, directional asymmetry, lagged returns, portfolio returns, size effect, synchronized and unsynchronized portfolios
Introduction

Studies examining the associative relationships between the returns to large and small stocks in the United States Financial Markets include Lo and MacKinlay, 1990(a, b). By extending this research to Asian financial markets and the U.S. Market (Chang, McQueen and Pinegar, 1999), hereafter CMP indicated the need for additional study of association between factors affecting the returns for firms listed on Asian stock exchanges. A more recent study by Lau, Lee and McInish (2002), hereafter LLM, indicated association between firm size and stock returns for firms traded on the two Asian exchanges (Singapore and Malaysia). In this study, we attempt to validate earlier studies for the cross-autocorrelation in six Asian markets and their association with firm size. This is especially important since these markets are better developed then were for the six financial markets of Asia studied by CMP. In addition, we extend the study of LLM concerning firm size. We will verify that cross-autocorrelations are present in the data for all Pacific-Basin markets and attempt to explain some of the apparent cross-autocorrelations. The six financial markets are the domestic markets of Hong Kong, Japan, Malaysia, South Korea, Taiwan, and Thailand. [Complete data sets were available for these six financial markets at the initiation of this study, data from other sources were incomplete and/or nonexistent.]

Others [including Fama and French, 2004, Fama and French, 2006, Chordia and Shivakumar, 2006, and the sizable literature review by van Dijk, 2007] studied the relationships of firm size, stock market returns and explanations of their relationship for different samples in different financial markets as well. Our findings will include observations for both synchronized and unsynchronized portfolios, the regression of one domestic market’s stock portfolio’s by size with contemporaneous and lagged large stock portfolio (quintile) returns of other domestic markets, directionally asymmetric analysis of the four smaller sized quintiles with the largest sized stock portfolios and asymmetric regressions of the four smaller versus largest stock returns after accounting for smaller stock autocorrelation and sub period regressions of smaller versus largest
stock contemporaneous and lagged portfolio returns. These additional tests often yield results that are problematic for those who theorize on the relationships of these portfolios. Our approach is similar to CMP but not the same. We study more recent data and study all firms in these financial markets according to their size grouped in quintiles. Our study uses large quantities of data on the Asian markets similar to Jarrett (2008) on Hong Kong and Japan and Alexii (2006) on Italy. This permit us to explore more deeply the various factor relationships between size of firm, market efficiency, price transmission and other factors which co-integrate in Pacific-Basin financial markets.

We organize this study with the following section containing tables to describe the data, reports some summary statistics, and institutional characteristics (potentially related to market inefficiencies) of the six Asian markets. In turn, analyses of those factors lead to new conclusions concerning the explanation of the stock market behavior. Finally, we summarize and draw conclusions concerning the operation and characteristics of the six markets studied.

**The Data Base**

Data for the six Asian or Pacific-Basin markets (Hong Kong, Japan, Taiwan, Thailand, South Korea and Malaysia) are selected from the Pacific-Basin Capital Markets Research Center (PACAP) a resource which tabulates and stores data originating from the capital markets. Data for all the capital markets start from January, 1989 and extend through December, 2003 for Japan, December 2001 for Taiwan and Thailand, and December, 2000 for South Korea and Malaysia. The returns are denominated in local currencies and include dividends as well as closing prices. For each domestic market, we sorted the firms into five portfolios each year based on the market value of the security at the termination of the previous year. Hence, we have five separate portfolios of securities for each financial market under study.

Table 1 reports summary descriptive statistics on firm size, number of firms, number of firms trading for both the first (smallest) and fifth (largest) quintile. We produced Boxplots of these data for comparison purpose but do not report them here because the information received duplicated all of the information produced in this table. Further, for
purposes of brevity, we do not include them here. Although expressed in local currencies, all returns examined throughout the study for purposes of comparisons, we express market capitalizations in US dollars. Our portfolios are thus not market weighted to give us comparisons with the previous study of CMP. The mean size firm in Quintile 5 (the large size firm portfolio) is only $257.8MM for Taiwan, $675MM for Thailand, $759.1MM for South Korea and $935.8MM for Malaysia. The large size portfolio for Japan and Hong Kong are $7191.6MM and $2780.1MM respectively indicating that the definition of large size portfolios varies from domestic market to domestic market.

Hence, comparisons of the large size portfolios of these Pacific-Basin markets will vary due to the definition of large size varying for each domestic market. One would expect this to be true from an *a priori* basis since the sizes of the financial markets differ greatly. Table 2 reports summary statistics on monthly returns for the smallest through largest quintile (numbered one through five) portfolios of firms in Hong, Japan, Taiwan, Thailand, South Korea and Malaysia. All returns are denominated in local currencies and include dividends to yield returns rather than only closing prices. The mean (average) returns for the smallest firms (Quintile 1) tend to be greater for each domestic market than the mean returns for Quintile 1 through 4 (largest firms) in the same market. The exception is Japan whose Quintile 2 had the highest mean percentage return. Note also that the standard deviation of returns do not follow the same pattern as observed for the mean returns. For Hong Kong, the standard deviations tend to become smaller as we proceed from Quintile 1 to Quintile 5. The same is true for Japan Taiwan, South Korea and Malaysia. The exception is Thailand where the standard deviation is largest for Quintile 5 followed by Quintile 1 and smallest in Quintile 3.

--Insert Table 1--

The Ljung-Box Q-statistic (1978; see also Ljung (1993)) for both all sizes of firms (Quintiles 1,2,3,4 and 5) are significant at.01 level or less in every case except for one. Only Hong Kong’s Quintile 1 is significant at the .05 level. Again except for Quintile 1, Hong Kong, all the coefficients for the Autocorrelations of lags 1, 2 or 3 are significant at the .01 level or less. For Hong Kong Quintile 1, Lag 1 Autocorrelation is significant at .05 , Lag 2 Autocorrelation is significant at .10 and Lag 3 Autocorrelation is not significant (Note: this is the only coefficient in table that is not significant). At this point,
we can observe that the lagged autocorrelations are significant with a slightly different result for the smallest quintile of firms for the Hong Kong market. We should note that the standard deviation of returns is very large for this group which contains a relatively small number of firms subject to a great deal of speculation and variety. McQueen et al. (1996) note that small firms’ stocks react slowly to macroeconomic news, the small stock portfolio should be auto correlated as well as crossautocorrelated with the portfolio of large firm’s stocks.

--Insert Table 2—

We did not report new information on volume, transaction costs, and the number of analysts since previous studies Harrison (1994) Chan et al. (1998b), and CMP indicated that Japan is by far the largest Pacific-Basin market in terms of market capitalization and number of firms listed. A simple observation of the financial information of the six markets studied indicated that the situation did not change remarkably. All this is important because many explanations of firm behavior relate to these factors of volume, transaction costs and number of analysts. Only Hong Kong can be considered a major market and it is still small in all the factors in comparison with the Japanese capital market.

The Analysis of Cross-Autocorrelation

Campbell, Lo and MacKinlay (1997, 74-78) noted that that individual security returns exhibit weak negative autocorrelation. CMP found supporting evidence. On the other hand, portfolio returns which are means of individual returns show usually positive autocorrelation. One very plausible explanation of this is the notion of “large positive cross-autocorrelations across individual securities across time.” Table 3 documents the cross-autocorrelation developed by Lo and MacKinlay (1990a) and utilized by CMP, regresses monthly returns and Asian markets with the following specification:

$$R_{i,t} = \alpha + \beta_0 R_{5,t} + \beta_1 R_{5,t-1} + \epsilon_t.$$  

(1)

Within each country, the stock portfolio monthly returns for each Quintile, $R_{i,t}$ is regressed on the concurrent, $R_{5,t}$ and lagged, $R_{5,t-1}$ large stock portfolio returns. Because of the lack of homoscedasticity of the error terms in specification (1), we correct all of
the standard errors in this article using the methods outlined in Newey and West (1987), allowing for autocorrelation up to three lags. The table is divided into two Panels; A for unsynchronized portfolios and B for synchronized portfolios and for Quintiles 1, 2, 3 and 4.

In Panel A, (unsynchronized portfolios), note the β₀ coefficient is positive and significant at .01 for small firms (Quintile 1). We note the same conclusion for Quintiles 2, 3 and 4. In the same Panel for β₁, note the same conclusion for Quintiles 1, 2, 3 and 4 the conclusions are the same (although at different significance levels) for Hong Kong, Japan, Taiwan and South Korea indicating the size is not important in explaining this behavior. The exchanges in Thailand and Malaysia do not show β₁ as significant. Malaysia and Thailand contain firms that have relatively large standard deviation of returns with respect to their mean. This would indicate that statistical significance is less likely in these cases.

--- Insert Table 3 --

A problem exists for smaller firms when news occurs at the end of a month. Smaller firms tend not to be active and this reflects itself when smaller firms do not react to news quickly. Hence, at the end of a month, news will not affect trading in smaller firms until later than for active larger firms. A small on-active firm initial post-news event will often occur in the next month. Hence, monthly cross-autocorrelation may be the result of non-synchronous trading. Therefore, in Panel B (synchronized portfolios) the portfolio returns reflect only actions taken on the last trading day of the month. Obviously, the next trading day is part of new month. We find in Panel only one case (Thailand, Quintile 1) where the β₁ coefficient is significant (at .05 levels) and in that case the coefficient estimate is negative. Upon creating these synchronous portfolios, we do not find evidence of cross autocorrelation. Unlike the study of CMP, we conclude that non-synchronous trading explains a portion of the cross autocorrelation. The main exception to this conclusion is Thailand where the β₁ coefficient changed from positive to negative (both significant). With a synchronized portfolio, the coefficients indicate even more strikingly that non-synchronous trading explains an important portion of the cross-autocorrelation. The size and significance for the β₁ coefficients for Hong Kong, Japan, Taiwan and South Korea suggest differences between them and the smaller markets of Malaysia and
Thailand. Last, we should note that $\beta_0$ is significant at .01 or less for all unsynchronized portfolios. Since $\beta_0$ is the coefficient for the intercept, we cannot conclude that the multilinear relation produces an estimated regression model that goes through the origin. Some financial economists would conclude that this means that there are other variables that would explain more variation in the respondent variable. However, this may require data not available at the present time. The conclusion supports the notion that size of firm relates to domestic market returns.

**Cross-Autocorrelation in Asian Markets by Size of Firm**

Previous studies noted before indicate that cross-autocorrelation between small and large firms within a country and within markets in their geographic area of the world is prevalent. Little is known about whether stock returns for various sizes of firms in one domestic market lag large stock returns in another domestic market. In Table 4, we estimate the cross-autocorrelation to ascertain whether the size of firm in Asian markets stock returns are correlated with lagged large stock returns of other markets. We follow the discussion of CMP at this time to determine price transmission between markets for firms of various sizes. Unlike other studies on price transmission, we focus on the size effect. Again the large firms are in Quintile 5 and the other firms form by size Quintile 1, 2, 3 and 4. For example, whether small stock (Quintile 1) returns in Hong Kong are correlated with lagged large stock returns (Quintile 5) in Japan, Taiwan, South Korea, and Malaysia and whether Quintile 1 stock returns in Japan are correlated with Quintile 5 stock returns in Hong Kong and so forth. The authors examine the same relationship for the remaining quintiles. Specifically, Table 4 reports results from the following regressions:

$$R_{1,t,i} = \alpha + \beta_{0} R_{5,t,i} + \beta_{1} R_{5,t-1,j} + \varepsilon_{i},$$  \hspace{1cm} (2)$$

where $R_{1,t,i}$ is the small stock (Quintile 1) portfolio return for month $t$ in country $i$, and $R_{5,t,i}$ and $R_{5,t-1,j}$ are the contemporaneous and lagged large stock (Quintile 5) portfolio return in country $j$. Table 4 reports the $\beta_{1,i}$ coefficients from specification (2). The coefficients on the diagonal of Table 4 are for own-country cross-autocorrelation, $i = j$. Thus, they repeat results found in Table 3. The off-diagonal results capture relationships
among the six Pacific-Basin markets. $R_{1t}^{i}$ and $R_{5t}^{j}$ are the monthly first, second and fourth and large-cap (fifth) quintile portfolio returns in countries i and j, respectively, in month t. Then entries in the table report $\beta_{ij}$ coefficients that estimate the response of quintile 1 though 4 stocks in country i to lagged large stocks (quintile 5) in country j. [t-statistics are in parentheses. *, **, and *** indicate significance at the 10, 5, 1 percent level.] Although the results are mixed, we have evidence of some effect of price transmission as one would expect. The Asian markets are not independent of each other.

For each Panel, the diagonal coefficients refer to the correlation within a markets Quintile i ($i = 1, 2, 3, 4$) stock returns and Quintile 5. In Panel A where $i = 1$ all have significant correlations at level of .10 or less with the exception of Malaysia. For Panel B where $i = 2$, Thailand and Malaysia do not have significant correlations. For Panel C where $i = 3$, Thailand and Malaysia again do not have statistical significant correlations. Last for Panel D where $i = 4$, again Thailand and Malaysia do not have statistical significant correlations. Hence, for the diagonal coefficients, one may surmise that there is correlation between the largest firms’ returns and firms of smaller size groups in the markets of Hong Kong, Japan, Taiwan and South Korea. For Thailand and Malaysia this conclusion is not valid. Again these are the smallest markets indicating that there is a size effect.

--Insert Table 4--

The off-diagonal coefficients in Table 4 provide mixed messages that do not entirely corroborate the study of CMP. In Panel A, Hong Kong is statistically correlated with only South Korea. Japan is correlated only with Hong Kong (.10 levels). Taiwan is not correlated at all. Thailand is correlated with Hong Kong, South Korea and Malaysia (.01 levels). South Korea is correlated with Hong Kong and Malaysia. Last, Malaysia is statistically correlated with South Korea (.01 level) and Thailand (.05 level).

Panel B coefficients where $i = 2$ (Quintile 2), one observes even fewer statistically significant coefficients. Only Hong Kong’s Quintile 5 is related to the other markets Quintile 2 (the exception is Taiwan). Malaysia’s Quintile 2 is statistically related to Thailand and South Korea.

For Panel C, the pattern is very similar to that of Panel B. Finally for Panel D, one observes even fewer significant correlations with Hong Kong’s Quintile 5 correlated with
Quintile 4 for Thailand and South Korea. Malaysia’s Quintile 5 is statistically related to Quintile 4 for Thailand and South Korea. Hence the regression of a firm’s stock return taken by size is usually not statistically related to the contemporaneous and lagged fifth quintile returns of other Asian markets. Only in the case of Hong Kong’s Quintile 5 do we find many statistically related correlations with smaller size portfolios (Quintiles 1 through 4) of other Asian markets. We note that the regression is on monthly returns on contemporaneous and lagged fifth quintile stock portfolio returns of the other Asian domestic market.

Observe that in numerous cases these new results do not dispute entirely CMP’s results. The diagonal relationships tend to be the same as CMP’s limited studies. However, the off-diagonal differ from CMP to some degree. Generally, stock returns from various size portfolios tend not to react slowly to the variation in stock returns of other markets largest stocks. However, this is not universally true since we found a number of exceptions to this in Table 4. Smaller stock returns are more likely to react to the returns of large stock in their own markets with exception of Malaysia. Cross-autocorrelation among the six markets tends to be a pervasive within domestic market phenomenon. However, the results are mixed for between markets.

**Directionally Asymmetric Regressions on the Largest Firms Stock Returns**

McQueen, Pinegar and Thorley (1996) and CMP noted that cross-autocorrelation is often directly asymmetric with small firms’ stocks (Quintile 1) responding to *good* news but not responding to *bad* news. Their earlier discussion and those of others [Mech (1993), Chan (1993), BRW (1994), Grinblatt *et al.* (1995), Keim and Madhaven (1995) and Lamoureux and Pannikath (1994)] inspired us to study relationships between the small quintiles stock returns on contemporaneous and lagged own-country large stock portfolio (quintile) returns. In Table 5, we estimate the regression as:

\[ R_{i,t} = \alpha + \beta_{0,up} \cdot \delta_{0} \cdot R_{5,i} + \beta_{0,dn} \cdot (1 - \delta_{0}) \cdot R_{5,i} + \beta_{1,up} \cdot \delta_{1} \cdot R_{5,i-1} + \beta_{1,dn} \cdot (1 - \delta_{1}) \cdot R_{5,i-1} + \varepsilon_{1} \]

where \( I = 1, 2, 3 \) or 4, \( \delta_{0} \) and \( \delta_{1} \) are dummy variables that indicate, respectively, that \( R_{5,i} \) and \( R_{5,i-1} \) are positive, \( \beta_{0,up} \) and \( \beta_{0,dn} \) measure the small stock response to contemporaneous upward and downward movements in large stock returns. \( \beta_{1,up} \) and \( \beta_{1,dn} \)
measure the small stock response to lagged upward and downward movements in large stock returns.

Panel A contains the results for Quintile 1, Panel B contains the results for Quintile 2, Panel C contains the results for Quintile 3 and last, Panel D contains the results for Quintile 4.

We observe for Hong, Taiwan, Thailand and South Korea, coefficients $\beta_0^{UP}$, $\beta_0^{dn}$, and $\beta_1^{UP}$ are almost entirely significant at reasonable levels (.10, .05 or .01 or less), for Japan, all four $\beta$ coefficients are significant in Panels A, B and C, and for Malaysia only $\beta_1^{UP}$ is not significant in all Panels. In addition we tested for directionally equal lagged responses, $\beta_0^{UP} = \beta_0^{dn}$, $\beta_1^{UP} = \beta_1^{dn}$ and $\beta_0^{UP} + \beta_1^{UP} = \beta_0^{dn} + \beta_1^{dn}$. Noting from Table 5 (last three columns), we reject almost all hypotheses of no differences and most at the significance level of .01 or less. Malaysia in Panels C and D, one cannot reject the null hypothesis of $\beta_1^{UP} = \beta_1^{dn}$. Hence, we find directional symmetry in most cases which differs from the earlier findings of CMP. Their findings need additional research. Only the stock returns for Malaysia tend to lead to other conclusions or none at all. Hence, future research should determine if the directional symmetry is a universal phenomenon and not only with these six Pacific-Basin markets.

**Autocorrelation and Cross-Autocorrelation**

Previously, BRW claimed and CMP investigated whether cross-autocorrelation is mislabeled and show that small stock autocorrelation is a better explanation for the anomaly. McQueen, Pinegar and Thorley (1996) counter that if some small stocks respond slowly to news, and then returns for a portfolio of small stocks will be correlated with its own past returns and with lagged large stock returns. Following Richardson and Peterson (1999), Hameed's (1997) and Fargher and Weigand's (1998) Granger (1984) causality tests, we examine whether some cross-autocorrelation is present even after controlling for small stock autocorrelation. We test for this possibility in Table 6 and employ CMP’s two step process. Step 1, we estimate the relationship between a Quintile’s stock returns and their return in the previous time period. This is an autoregression and not simply a regression as specified by CMP. In the second step, we
estimate the relationship between the errors from the previous autoregression on simultaneous and lagged large stock returns.

Step 1: \( R_{i,t} = \alpha + \beta_0 R_{1,t-1} + \epsilon_1 \)

Step 2: \( \epsilon_i = \alpha + \beta_{0UP} \delta_0 * R_{5,t} + \beta_{0dn} (1- \delta_0) * R_{5,t} + \beta_{1UP} \delta_1 * R_{5,t-1} + \beta_{1dn} (1- \delta_1) * R_{5,t-1} + \eta_t \), \( (4) \)

where \( \beta_{1UP} \) and \( \beta_{1dn} \) measure the response of small stock portfolio residuals to positive \( (\delta_1 = 1 \text{ when } R_{5,t-1} \text{ is positive and zero otherwise}) \) and negative lagged large stock portfolio returns after accounting for small stock autocorrelation.

From Table 6, we observe that coefficients \( \beta_{0UP} \) and \( \beta_{0dn} \) of the twenty-four regressions are significant at levels of .01 or less or in one case at .05. In addition, for \( \beta_{1UP} \) Panel A only South Korea and Malaysia have significant coefficient; for Panel B, Taiwan, South Korea and Malaysia have significant coefficients; for Panel C, Thailand, Taiwan and Malaysia have significant coefficients; and for Panel D, only Taiwan has a significant coefficient. In the case of \( \beta_{1dn} \), observe only 6 of the 24 regressions resulted in a significant coefficient. Hence, we obtained data that indicate a quintiles stock autocorrelation residual response to contemporaneous upward and downward movements in quintile 5 stock returns. On the other hand, we do not find universally that each quintile’s stock autocorrelation residuals respond to lagged upward and downward movements in quintile 5’s stock returns. As before, the Malaysian data is most difficult to explain. Our analysis differs from CMP who found inconsistencies across the six Pacific-Basin markets. The current analysis indicates a great deal of consistency with only a relatively few number of exceptions. Size of firm is an important effect in determining behavior.

--Insert Table 6--

In this study, we will not try to make grandiose conclusions concerning the behavior of Asian firms on their stock exchanges, but follow the suggestion of Shefrin and Statman (1994) who suggest testing and examining models of firm behavior to ascertain their validity. Behavioral investors should understand that all Asian markets do not behave in the same manner. Note also, because our time frame differs from CMP, we should further
surmise that behavior changes over time and no one period studied can realistically predict behavior perfectly in another time period.

**On Cross-Autocorrelation Stability**

Since Fargher and Weigand (1998) found less cross-autocorrelation in the 1976-1992 sub-periods than in the 1962-1975 sub-periods, we examine sub-period regressions of Asian stock returns by size of firm. In Table 7 similar to CMP, we perform similar stability tests using monthly returns in the Pacific-Basin markets. The Table 7 regressions use the following specification:

\[
R_{i,t} = \alpha + \beta_0 * R_{5,t} + \beta_0^\Delta * L * R_{5,t} + \beta_1 * R_{5,t-1} + \beta_1^\Delta * L * R_{5,t-1} + \epsilon_t
\] (5)

where \(L\) equals 0 for observations in the early sub sample, January 1989 through December 1995, and one otherwise. Table 7 contains the estimated overall lagged response coefficient, \(\beta_1\), and the change in the coefficient in the later sub period, \(\beta_1^\Delta\).

Each Panel as before contains the results of either Quintile 1 or 2 or 3 or 4 regressions. For \(\beta_0\), all twenty-four regressions resulted in significant coefficients (at level .01). For \(\beta_0^\Delta\), Japan and Thailand produced significant coefficients (at level .05) in Panel A; Japan Taiwan and Thailand had significant coefficients in Panel B; Hong Kong, Taiwan and Thailand had significant coefficients in Panel C; and Hong Kong, Taiwan, Thailand and South Korea in Panel D. For \(\beta_1\), Japan had consistently significant coefficients regardless of quintile size. Only a few others had significant coefficients. Finally, for \(\beta_1^\Delta\), the results were similar to that for \(\beta_1\), statistically significant coefficients were estimated for Japan with only a scattering of significant coefficients estimated for the other Asian markets.

The observed results with the possible exception of Japan tend to support earlier findings of CMP. Findings for the second, third and fourth quintiles corroborate findings for the first quintile. The most important determinants for Japan are both the lagged and contemporaneous components. For the other firms, there does not appear to be a consistent pattern for each size of firm for the contemporaneous and lagged components. One should not conclude too much because Japan is by far the largest of the Asian stock
exchanges studied and just because of its size (by volume or capitalization) may be different than the other exchanges.

--Insert Table 7—

**Summary and Conclusion**

The purpose of this study was to extend the research on cross-autocorrelation of Asian domestic market’s stock returns by size of firm grouped by quintiles. First, we wish to examine the important markets of the Pacific-Basin to show that cross-autocorrelation is present in the data of these six markets. Within each domestic market, monthly returns on a portfolio of small stock correlate with the lagged returns of portfolios of large stocks. The evidence is strong in all six markets studied and is not inconsistent with the notion that smaller and emerging markets may possess heterogeneous microstructure within their own market. Note also that the nature of cross-autocorrelation may cause one not to believe other behavioral patterns based on market friction unique to a single domestic market. The six Pacific-Basin markets distinguish themselves in many ways and so do the explanations of their firm behavior.

We document evidence on cross-autocorrelation of the six markets and then continue to provide some additional examination to identify some empirical characteristics of the cross auto-autocorrelation. We found evidence of the relationships between monthly stock returns of various size firms in six markets on contemporaneous and lagged own-domestic market large stock portfolio returns for unsynchronized portfolios. We estimated the relationship for the synchronized portfolio by grouped size for all six markets. In turn, we found mixed evidence on the relationship of one domestic market’s stock portfolio by size group on contemporaneous and lagged largest stock portfolio returns of the same domestic market. The other statistical tests, in general, were broadly significant. Asymmetric regressions of monthly portfolio stock returns by size group on contemporaneous same domestic market largest stock returns after accounting for all grouped firm size autocorrelations were entirely significant. Conversely, we found largely non-significant coefficients in the asymmetric regression on lagged stock returns in Table 6. Only Malaysia reported significant coefficients for all four terms that differed consistently from the others in asymmetric regressions. The last analysis studied the sub-period regressions of small stock monthly returns on contemporaneous and lagged same
domestic market large stock portfolio returns. Only Japan indicated significant coefficients for all regression parameters estimated for each quintile size. Also, only the coefficient for the early period contemporaneous same domestic market large stock portfolio was universally significant for all markets by quintile size group.

Much of our evidence is not totally consistent with a similar earlier study by CMP and should contribute to a new theory of a firm’s stock portfolio behavior. These results are not inconsistent with Chan (2003) who concluded that firms that experience good news are much bigger than firms that experience bad news over a similar period but for a different sample of firms our conclusions and findings are true for only those markets studied and for the time periods studied. With this ordinary research limitation, researchers must continue to study the stock markets behaviors to understand the nature of investment and why markets and firms differ but also have many similar properties.


Chan, K., Hameed, A., Tong, W., 1998a. Profitability of momentum strategies in the international equity markets, working paper, *Hong Kong University of Science and Technology, Hong Kong*.


Founded in 1892, the University of Rhode Island is one of eight land, urban, and sea grant universities in the United States. The 1,200-acre rural campus is less than ten miles from Narragansett Bay and highlights its traditions of natural resource, marine and urban related research. There are over 14,000 undergraduate and graduate students enrolled in seven degree-granting colleges representing 48 states and the District of Columbia. More than 500 international students represent 59 different countries. Eighteen percent of the freshman class graduated in the top ten percent of their high school classes. The teaching and research faculty numbers over 600 and the University offers 101 undergraduate programs and 86 advanced degree programs. URI students have received Rhodes, Fulbright, Truman, Goldwater, and Udall scholarships. There are over 80,000 active alumnae.

The University of Rhode Island started to offer undergraduate business administration courses in 1923. In 1962, the MBA program was introduced and the PhD program began in the mid 1980s. The College of Business Administration is accredited by The AACSB International - The Association to Advance Collegiate Schools of Business in 1969. The College of Business enrolls over 1400 undergraduate students and more than 300 graduate students.

**Mission**

Our responsibility is to provide strong academic programs that instill excellence, confidence and strong leadership skills in our graduates. Our aim is to (1) promote critical and independent thinking, (2) foster personal responsibility and (3) develop students whose performance and commitment mark them as leaders contributing to the business community and society. The College will serve as a center for business scholarship, creative research and outreach activities to the citizens and institutions of the State of Rhode Island as well as the regional, national and international communities.

The creation of this working paper series has been funded by an endowment established by William A. Orme, URI College of Business Administration, Class of 1949 and former head of the General Electric Foundation. This working paper series is intended to permit faculty members to obtain feedback on research activities before the research is submitted to academic and professional journals and professional associations for presentations.

An award is presented annually for the most outstanding paper submitted.

Ballentine Hall Quadrangle
Univ. of Rhode Island
Kingston, Rhode Island