MEASURING FINANCIAL AND ECONOMIC INTEGRATION WITH EQUITY PRICES IN EMERGING MARKETS

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Abstract

This paper examines real and financial links simultaneously at the regional and global level for a group of Pacific-Basin countries by analysing the covariance of excess returns on national stock markets over the period 1980-1998. We find overwhelming evidence at the regional and global level and for all sub-periods that financial integration is accompanied by economic integration. This seems to suggest that economic integration provides a channel for financial integration, which explains, at least partly, the high degree of financial integration found in this study and in other studies for this region even in the presence of foreign exchange controls. This result has important implications for the use of restrictions to isolate capital markets from world influences.

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1. Introduction

The recent emergence of new capital markets and the relaxation of foreign capital controls, which has opened the possibility of international investment and portfolio diversification, have increased the interest of academics and practitioners in studying the degree of financial integration of these markets. In this paper, the analysis is focused on the Pacific-Basin region, which constitutes an important part of emerging capital markets. The countries in our sample are: Hong Kong, Indonesia, Korea, Malaysia, Philippines, Singapore, Taiwan and Thailand. In 1998, these markets constituted 43 percent of emerging markets capitalisation, while in 1999 this figure had risen to 47 percent.[1]

Financial integration is measured by testing the law of one price to financial assets with the same risk. For our selected group of countries work has concentrated on testing the international parity conditions. For example, Bhoocha-Oom and Stansell (1990) look at interest rates (adjusted and unadjusted for exchange rates changes) between Hong Kong and Singapore versus US. Faruquee (1992) examines the uncovered interest rate differential between Singapore, Korea and Thailand versus the Japanese LIBOR - taken to represent the world rate of interest.[2] Dooley and Mathieson (1994) look at seven Pacific Basin countries versus US using an analytical framework for interest rate determination, where the prevailing interest rate represents a weighted average of open (US interest rate adjusted for the change in the exchange rate) and closed economy rates that would have existed otherwise.[3] Reisen and

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[1] See "Emerging Stock Market Fact Book", (1998,1999) published by the International Finance Corporation. Excluding Hong Kong and Singapore, which might not be considered as emerging markets, the figures still remain high at 30 percent and 32 percent in 1998 and 1999 respectively.

[2] The change in the exchange rate is assumed to be zero.

[3] This is based on work done by Edwards and Khan (1985) for the case of Singapore and Colombia; and Haque and Montiel (1991) for 15 developing countries.

Yeches (1993) using the same framework examine Korea and Taiwan by applying Kalmar Filter technique to capture changes in the degree of integration over time.

The results of these studies support the view that there is substantial integration between domestic and international financial markets in Hong Kong, Singapore, Malaysia, Philippines and Indonesia, while the views are divided for Korea and Thailand. In Taiwan capital market integration with world financial markets was found to be limited. Using, however, a different method of measuring capital mobility based on a portfolio balance model, Chinn and Maloney (1998) found evidence of greater degree of openness in Taiwan since early 1989. The extensive capital market integration in the Pacific Basin Region has also been supported by Phylaktis (1999), when in addition to looking at long-run comovements of real interest rates, another indicator of the degree of capital market integration was used, namely the speed of adjustment of real interest rates to long-run equilibrium following a shock in one of the markets. Thus, even in countries like Taiwan and to a lesser extent Korea, where controls were substantial in both countries, extensive linkages have been found with world capital markets.

Similar conclusions have been found in studies, which have looked at stock markets and tested whether stocks with the same risk i.e. exposure to a common world factor, have identical expected returns irrespective of the market. If a market is segmented from the rest of the world, its covariance with a common world factor will not be able to explain its expected return. For example, Bekaert and Harvey (1995) examined capital market integration using a one factor asset pricing model, which did not assume the degree of segmentation to be constant through time. They allowed conditionally expected returns in a country to be affected by their covariance with a world benchmark portfolio and by the variance of the country returns. If the market

was perfectly integrated then only covariance counted, while if the market was completely segmented then the variance was the relevant measure of market risk. Bekaert and Harvey (1995) used a conditional regime-switching model to account for periods when national markets were segmented from world capital markets and when they became integrated later in the sample. They applied the model to a group of emerging capital markets including some Pacific Basin markets (Korea, Taiwan, Malaysia and Thailand) over the period 1975 to 1992. They found that integration was substantial for the entire period not only for Malaysia, which had less investment restrictions, but also for Korea and Taiwan, which had substantial foreign ownership restrictions. In the case of Thailand, a large shift in the degree of integration was noted in 1987 when foreign ownership restrictions were relaxed.[4]

The current paper attempts to provide an explanation for the high degree of financial market integration, which has been found even in the presence of foreign exchange controls, by examining whether economic integration plays a role in linking the financial markets. Real economic integration has been measured in many ways and refers to the international trade links between countries. Frequent measures include the degree of openness calculated as the ratio of exports and/or imports between countries to national output; the amount of price and quantitative restrictions on traded goods; and the extent of contemporaneous movement of output growth

[4] The issue of intergration of Japan, another important Pacific-Basin country, with world markets has also been examined in the literature. For example, Gultekin et al (1989) show using multifactor asset pricing models that the risk in the US and Japanese stock markets was different before the enactment of the Foreign Exchange and Foreign Trade Control Law in December of 1980, which liberalised short-term capital movements, but not after. Similarly, Campbell and Hamao (1992) using the predictability of monthly excess returns on US and Japanese equity portfolios over the US Treasury bill found that in post-liberalisation period, i.e. the 1980s, US variables helped forecast excess Japanese stock returns, which is suggestive of integration of long-term capital markets.

Studies examining the international parity condition have also found financial market integration following the abolition of foreign exchange restrictions (see e.g. Otani and Tiwari, (1981), Ito (1988) and Bosner-Neal and Roley (1994)).

between countries, which is based on the theory that substantial trade interdependence transmits economic activity from one country to the other producing a common business cycle.

However one measures economic integration, it can provide channels in linking the financial markets even in the presence of foreign exchange restrictions on international capital flows. For example, economic integration, if that is measured by the contemporaneous movement of output growth of countries, provides a channel for financial integration through the effects of expected economic activity on the expected cash flows of firms and their stock prices. Thus, if two countries experience a comovement in their output then their cash flows will move together and so will their stock markets too. Empirical studies have confirmed the long-run positive relationship between economic activity and stock prices (see e.g. Fama and French (1988), Schwert (1990), Roll (1992) for US and Canova and DeNicole (1995) for the European countries).

A look at the indicators of economic integration for our group of countries provides some evidence that the countries in our group are economically integrated with other countries, such as Japan and US. For example, Table 1 shows exports and imports of each Pacific Basin country (PBC) versus Japan and US as a percent of GDP over a number of years. The ratios seem high for some of the countries, but in the absence of a benchmark one cannot say anything about the degree of economic integration. Neither the amount of tariffs on trade seems to provide an accurate picture of real economic integration as non-tariff barriers to trade might be in existence. The World Bank in its 1987 World Development Report constructed an "outward orientation" index based mainly on the use of direct controls such as quotas and import licensing schemes and the use of export incentives for 41 countries

including most of the countries in our sample for two periods 1963-73 and 73-85. Classifying Korea as a "strongly outward oriented" country in both periods highlights the subjectivity of such measures since the Korean trade regime was considerably more restrictive during the first period compared to the second. Finally, we have computed the correlations of contemporary monthly industrial production for the period 1990-98 (see Table 2). These are on the whole not very big. Contemporaneous movements of output might, however, underestimate the degree of economic integration because of lags in the international transmission of shocks.

The current paper contributes to the literature in the following ways. First it uses a different way to measure financial and economic integration to previous studies on the PBCs based on the framework developed by Ammer and Mei (1996) for Europe and the US, which measures both types of integration by analysing the covariance of excess returns on national stock markets. This approach has several advantages. It examines financial integration by studying the comovement of future returns aggregated over a long horizon instead of the comovement of one period expected returns as used in studies by Bakaert and Harvey (1995, 2000). As Ammer and Mei stress this methodology could detect small but persistent comovements in expected returns and more accurately measure the degree of financial integration than one-period stock returns regression models. Similar comments can be made about the proposed measure of real economic integration compared to measures based on the contemporaneous movements in output.[5] Another advantage of the framework used in this paper is that both types of integration can be examined simultaneously and that is important for examining the role of economic integration in financial integration.

[5] A disadvantage of our method, which also applies to output-based measures of economic integration, is that the positive covariance in economic activity may occur because of a common exogenous shock.

The framework uses the Campbell and Shiller (1988) approximate present value model to decompose excess stock return innovations between different countries into news about excess returns, dividend growth rates, interest rates and exchange rates. By examining the comovements of these different excess return components amongst various countries one can get an insight into the type of international linkage among these economies. Real economic integration is measured by the correlations of dividend innovations between two countries, while financial integration is measured by the correlations between innovations in future expected stock returns. The former is an indicator of economic integration because a real economic shock originating in one country will have a similar effect on the economic growth of the other country through trade interdependencies and therefore, the corporate earnings and dividends of both countries will move together if they are assumed as proxies for long-term real economic activity; while the latter is an indicator of financial integration because if asset returns in different countries are conditionally multivariate normal so that the Capital Asset Pricing Model (CAPM) holds, the conditional means of these excess returns must move together as linear combinations of a set of common risk premiums. In the case of one factor model with fixed factor loadings (betas), any variation over time in mean returns would have to be correlated across assets.[6]

Another contribution of the paper is the examination of the relationship between foreign investment restrictions and the integration of capital markets since the emerging markets in our sample differ in the degree of capital market openness. As Bekaert and Harvey (2000) point out liberalisation may not be enough to induce

[6] See Campbell and Hamao (1992). In our study, we have divided the sample period into two sub-periods, pre and post capital control liberalisation, to increase the possibility of having constant betas.

foreign investors to actually invest in the country. Home bias or other concerns, such as lack of information on company stocks, may impede international investment (see Bekaert (1995) and Levine and Zervos (1996)). A third contribution of the paper is the examination of the issue of regional integration i.e. integration amongst the PBCs, including the more developed stock market of Japan as a possible driving force, in addition to examining integration with world markets as represented by US. Answers to the above questions have important policy implications for the use of restrictions to isolate capital markets from world influences. This research comes at a time when many countries, and especially the East Asian countries, are contemplating the reintroduction of foreign restrictions on international capital flows in the aftermath of the Asian crisis.

The paper is structured as follows. Section 2 draws from Ammer and Mei (1996) and describes the decomposition of domestic and foreign excess stock returns and their variances. Section 3 explains the estimation procedure, while Section 4 applies it to US and PBCs data over the period 1980 to 1998. Section 5 reports the empirical results concerning real and financial links for PBCs at both the regional and global level and Section 6 tests the robustness of these empirical findings to the Asian financial crisis. The final section offers some concluding remarks.

2. Decomposition of excess stock returns and of their variances

2.1 The Components of Domestic and Foreign Excess Stock Returns

This section contains a brief description of the decomposition of domestic and foreign excess stock returns, which is based on the log-linear approximate asset pricing framework of Campbell (1991) and Campbell and Ammer (1993). The domestic unexpected excess stock return can be expressed as a linear function of news

about future dividend growth rates, real interest rates, and excess stock returns as follows:

$$e_{t+1} - \mathrm{E}_t e_{t+1} = (\mathrm{E}_{t+1} - \mathrm{E}_t) \left\{ \sum_{j=0}^{\infty} r^j D d_{t+1+j} - \sum_{j=0}^{\infty} r^j r_{t+1+j} - \sum_{j=1}^{\infty} r^j e_{t+1+j} \right\}, \quad (1)$$

where e_{t+1} is the excess return on a stock held from the end of period t to the end of period $t+1$, relative on the one-period interest rate, d_{t+1} the real dividend paid during period $t+1$, and r_{t+1} the real interest rate from t to $t+1$.[7] Here E_t denotes an expectation formed at the end of period t, conditional on an information set, which includes at least the history of stock prices and dividends, while D denotes a one-period backward difference. All variables are measured in real terms and in logs. The parameter r is a constant of linearization; it assumes a value a little smaller than one[8,9]. In order to simplify the notation in equation (1), we define the three news components as

$$\tilde{e} = \tilde{e}_d - \tilde{e}_r - \tilde{e}_e . \quad (2)$$

In a similar way, the unexpected foreign excess stock return, when expressed in dollars and over the domestic interest rate $(\tilde{f})$, can be decomposed into news about the future dividend growth $(\tilde{f}_d)$, real interest rates $(\tilde{f}_r)$, excess stock returns $(\tilde{f}_f)$, and changes in the real exchange rate $(\tilde{f}_q)$ as shown in equation (3) below

$$\tilde{f} = \tilde{f}_d - \tilde{f}_r - \tilde{f}_q - \tilde{f}_f . \quad (3)$$

[7] Equation (1) is derived by taking a first-order Taylor approximation of the equation relating the log stock returns to log stock prices and dividends. The approximate equation is based on the condition that the log dividend-price ratio does not follow an explosive process (see Campbell and Shiller, (1988)).

[8] The parameter ρ is defined as 1/(1 + exp(d - p)), where (d - p) represents the sample mean of the log dividend-price ratio.

[9] In our empirical work the coefficient ρ assumes a range of values from 0.9584 to 0.9921, for the analysed countries. Campbell and Ammer (1993) testing for the accuracy of equation (1), found that the approximation holds quite well for a wide range of possible values of ρ.

In equations (2) and (3) news of an increase of future dividends are associated with a capital gain today, while an increase in expected future returns is associated with a capital loss today other things being equal. The latter effect is due to the fact that higher future returns can only be generated by future price appreciation from a lower current price. In equation (3) we have the additional term of the innovations related to real exchange rate changes, which is negatively related to unexpected stock returns. The arrival of information that the dollar will appreciate sometime in the future will reduce expected dollar returns on foreign assets at some point in time. The loss will occur today in the absence of information regarding future expected excess returns.

So far we have stated a number of identities relating innovations in long-term asset returns to revisions in investors' expectation of future dividends, real interest rates, real exchange rates and excess long-term asset returns. Our major objectives are: (i) to use these identities to estimate the relative importance of the different components for the historical behaviour of asset returns; and (ii) to measure the degree of financial and economic integration between two economies by evaluating the correlation between the long-run components in equations (2) and (3), of their excess stock returns. In particular, real economic integration between two countries is measured by the correlation between the future domestic dividend innovations, $\tilde{e}_d$, and the future foreign dividend innovations, $\tilde{f}_d$, and financial integration by the correlation between the future domestic expected excess returns innovations $\tilde{e}_e$ and the future foreign expected excess returns innovations, $\tilde{f}_f$.[10]

[10] It should be noted that dividend correlations may be affected by industry dividend policies and as a result be a poor measure of real economic integration across different countries. Changes in dividend policies however will have a greater effect on short-term horizon analysis than in our framework, which captures persistent long-term comovements.

There could be two extreme situations. One where there is real economic integration and no financial integration and will be characterised by a high correlation between $\tilde{e}_d$ and $\tilde{f}_d$, and zero correlation between $\tilde{e}_e$ and $\tilde{f}_f$. In that case, macroeconomic shocks affect output and profits in each country and through the flow of goods, information and labour, effects are transmitted and expected corporate earnings (dividends) are correlated internationally. The other extreme situation is when there is financial integration and no real economic integration. In this case, capital markets are open, but there is no trade of goods between the two countries and no international labour mobility. Thus, there will be zero correlation between $\tilde{e}_d$ and $\tilde{f}_d$ but perfect correlation between $\tilde{e}_e$ and $\tilde{f}_f$. Changes in the stock market risk premium reflect variation in the price of risk and are driven by a common world market factor.

There will be interactions between financial and economic integration if there is correlation between $\tilde{e}_d$ and $\tilde{e}_e$, in which case the stock market premium in the domestic country (cost of capital) is related to the production or long-term profits; and/or if there is correlation between $\tilde{e}_e$ and $\tilde{f}_d$, i.e. the cost of capital in the domestic country (i.e. US in our study) is related to the production and long-term profits in the foreign country (i.e. Pacific-Basin country).

2.2 Variance decomposition and covariances between components of domestic and foreign excess stock returns.

Before calculating the correlations between the long-term components of excess stock returns of US and PBCs we focus our attention on the decomposition of the variances of excess stock returns and the covariances between components of

domestic and foreign excess stock returns. Thus, using the decomposition of equation (2), the variance of the domestic excess return innovation can be defined as the sum of six terms:

$$\text{Var}(\tilde{e}) = \text{Var}(\tilde{e}_d) - 2\,\text{Cov}(\tilde{e}_d, \tilde{e}_r) + \text{Var}(\tilde{e}_r) - 2\,\text{Cov}(\tilde{e}_d, \hat{e}_e) + \text{Var}(\tilde{e}_e) + 2\,\text{Cov}(\tilde{e}_r, \tilde{e}_e). \quad (4)$$

Similarly, using the decomposition of equation (6), the variance of the foreign excess return innovation can be defined as the sum of ten elements:

$$\begin{aligned}\text{Var}(\tilde{f}) = {} & \text{Var}(\tilde{f}_d) - 2\,\text{Cov}(\tilde{f}_d, \tilde{f}_r) - 2\,\text{Cov}(\tilde{f}_d, \tilde{f}_q) - 2\,\text{Cov}(\tilde{f}_d, \tilde{f}_f) \\ & + \text{Var}(\tilde{f}_f) + 2\,\text{Cov}(\tilde{f}_r, \tilde{f}_q) + 2\,\text{Cov}(\tilde{f}_r, \tilde{f}_f) + \text{Var}(\tilde{f}_q) \\ & + 2\,\text{Cov}(\tilde{f}_q, \tilde{f}_f) + \text{Var}(\tilde{f}_f). \end{aligned} \quad (5)$$

Finally, from both equations (2) and (3), the covariance of domestic and foreign excess stock returns is decomposed as follows:

$$\begin{aligned}\text{Cov}(\tilde{e}, \tilde{f}) = {} & \text{Cov}(\tilde{e}_d, \tilde{f}_d) - \text{Cov}(\tilde{e}_d, \tilde{f}_r) - \text{Cov}(\tilde{e}_d, \tilde{f}_q) - \text{Cov}(\tilde{e}_d, \tilde{f}_f) \\ & - \text{Cov}(\tilde{e}_r, \tilde{f}_d) + \text{Cov}(\tilde{e}_r, \tilde{f}_r) + \text{Cov}(\tilde{e}_r, \tilde{f}_q) + \text{Cov}(\tilde{e}_r, \hat{f}_f) \\ & - \text{Cov}(\tilde{e}_e, \tilde{f}_d) + \text{Cov}(\tilde{e}_e, \tilde{f}_r) + \text{Cov}(\tilde{e}_e, \tilde{f}_q) + \text{Cov}(\tilde{e}_e, \tilde{f}_f). \end{aligned} \quad (6)$$

3. Estimation Procedure

To estimate multiperiod expectations composed of domestic and foreign excess stock returns, we combine the asset-pricing framework, described in Section 2, with a vector autoregression system (VAR) in long-term asset returns, interest rates, real exchange rates and other information that helps to forecast these variables.

The application of this technique permits one to write the unobserved components of returns as linear combinations of innovations to observable variables.

The coefficients in these linear combinations are identified by using a time-series model to construct forecasts of the discounted value of future dividends, real interest rates, excess returns and real exchange rates. Revisions in these forecasts are then used as proxies for revisions in investors' expectations[11]. In order to improve the forecasting power of multiperiod expectations of components of excess stock returns, we include instrumental variables in the estimation of the VAR system, such as, dividend yields for each stock market and the change of nominal domestic interest rate (see e.g. Ferson and Harvey (1991)).[12]

We begin the procedure by defining a vector of state of variables, z_t, of which the first four elements are domestic excess stock return, *e*, foreign excess stock returns, *f*, domestic real interest rate, *r*, and changes of real exchange rate, *q*. These variables are chosen to be stationary and for notational convenience we treat them as having zero means[13]. We assume that the state vector follows a first-order VAR process:

$$z_{t+1} = Az_t + \omega_{t+1}, \qquad (7)$$

where the matrix A is the coefficient matrix of the VAR, and w_{t+1} is the error vector. The assumption that the VAR is first-order is not restrictive. Higher-order VAR models are handled by augmenting the state vector and reinterpreting the matrix A as the companion matrix of a system (see e.g. Campbell and Shiller (1988).

Using the fact that

[11] Monte Carlo simulations of Hodrick (1992) and Campbell (1991) show that VAR systems have better finite-sample proprieties than direct regression methods with long-horizon variables. Moreover, this procedure has been widely used in financial literature (see, for instance, Campbell and Shiller, (1987, 1988); Campbell, (1991) and Campbell and Ammer, 1993)).

[12] Another variable, which might have been added to the list of instruments, is the average size of listed companies to account for the size effect, which has been found to be related to a firm's average stock returns (see Banz, (1981)). Such series, however, was not available for our sample of countries.

$$(E_{t+1} - E_t)z_{t+1+j} = A^J \omega_{t+1}, \quad (8)$$

we estimate each component of stock returns as a linear combination of the elements of the error vector w_{t+1}[14]. We estimate the components denoting innovation of future dividend growth as a residual of the elements of equations (2) and (3). For instance, the innovations of future domestic dividend growth is computed as in the equation

$$\tilde{e}_d = \tilde{e} + \tilde{e}_r + \tilde{e}_e . \quad (9)$$

It is important to underline that this procedure permits one to overcome the problem of seasonality and low frequency observations of dividend yield.

In accordance with Campbell (1991), the coefficients of the VAR system and the elements of the variance-covariance matrix of VAR innovations are jointly estimated using the Generalised Method of Moments (GMM) estimator of Hansen (1982). This is to correct for any heteroscedasticity that may be present in the error terms. The GMM parameter estimates are numerically identical to standard OLS estimates, but GMM delivers a heteroskedasticity-consistent variance-covariance matrix for the entire set of parameters (see White, 1984).

We evaluate the statistical significance of variances of the components of excess stock returns, their covariances and correlations, estimating the standard errors of these statistics. Denote the vector of the entire set of estimated parameters as q and the heteroscedasticity adjusted variance-covariance matrix of the estimate of these parameters V. Any statistic such as the correlation between the components attributed to news about future domestic and foreign dividend growth can be written as a non-linear function $f(q)$ of the vector of parameters q. The standard error for

[13] In this empirical work sample means are removed from all variables before estimating the VAR process.

[14] See in Appendix A for details on this computation.

the statistic is then estimated as $\sqrt[2]{f_q' V f_q}$, where f_q is the gradient of the statistic with respect to the vector of parameters q.

4. An application to US and PBCs

4.1 Data

The sample of countries examined in the paper includes: Japan, US, Hong Kong, Indonesia, Korea, Malaysia, Philippines, Singapore, Taiwan and Thailand. The sample period varies for each country depending on the availability of data. For Japan, Singapore, Thailand and US the sample period is 1980.01 to 1998.12; for Hong Kong 1981.01 to 1998.12; and for Malaysia, Indonesia, Korea, Philippines and Taiwan 1990.01 to 1998.12. The data consist of end of the month observations of stock market index prices (1990=100), expressed in domestic currency,[15] local bilateral spot exchange rate expressed as U.S. dollar per Pacific-Basin country currency, dividend yield, consumer price index (1990=100), industrial production index, expressed at constant prices (1990=100), one month Treasury Bill for US and the one month Gensaki rate for Japan. The data were obtained from *Datastream* with the exception of the Consumer Price Index (CPI) for Hong Kong, which was obtained from the *Monthly Statistical Bulletin* published by the Hong Kong Monetary Authority; the one month Gensaki rate in Japan, which was obtained from the *Economic Monthly Statistics Bulletin* published by the Bank of Japan; and the one month Treasury Bill rate in US, which was obtained from *Ibbotson Associates*.

[15] The stock market index prices used are as follows: the Hang Seng Price Index for Hong Kong; the Jakarta Stock Exchange Composite Price Index for Indonesia; the Nikkei 225 for Japan; the Korean Stock Exchange composite for Korea; the Kuala Lumpur Stock Exchange Composite Price Index for Malaysia; the Philippines Stock Exchange Composite Price Index for Philippines; the Singapore Straits Times Price Index for Singapore; the Taiwan Stock Exchange weighted – price index for Taiwan; the Bangkok S.E.T. Price Index for Thailand; and the Standard & Poor's 500 Composition Index for the US.

The logarithm of the real exchange rate q is defined as $ln CPI_t^i - ln e_t^{PBC} - ln CPI_t^{PBC}$, where CPI_t^{PBC} is the consumer price index for the Pacific Basin country, e_t^{PBC} is the nominal exchange rate and CPI_t^i is the consumer price index for US.

4.2 Stock Market Liberalisation

Restrictions affecting stock market participation can take many different forms. They can affect for example, foreign ownership, the purchase of foreign assets by domestic institutional investors and the amount of dividends that can be repatriated. They can also be indirect such as the withholding taxes on dividends. The countries in our sample have liberalised their stock markets at different times. In Table 3.A, we summarize three different signals of liberalisation for each country: the official liberalisation date (OLD), which is based on information obtained from a variety of sources reported in the table, the First Country Fund (FCF) and the First ADR. The latter two signals signify indirect ways of foreign participation in the local stock markets, which are usually available prior to the lifting of various restrictions on foreign investors. What is clear from these various signals of liberalisation is that all countries had either liberalised or started the process of liberalisation by the beginning of the 1990's. Furthermore, in order to show the extent of liberalisation in these countries we present in Table 3.B various indicators of direct and indirect barriers for institutional investors at the end of 1989.[16] As it can be seen our countries differ in the degree of foreign exchange restrictions. We have on the one hand, Hong Kong and Singapore, which have virtually no foreign exchange controls and foreign ownership regulations throughout the period, i.e. they have open markets, and on the

other hand, Indonesia, Philippines and Thailand, which maintained restrictions even after they have opened their markets to foreign investors. Malaysia was a closed market until 1989 and completely open until September 1998. The controls are even more stringent in the case of Taiwan and Korea.

Thus, dividing the sample period into two sub-periods, the pre-liberalisation ending in December 1989, and the post-liberalisation sub-period covering the period between January 1990 and December 1998, seems appropriate for examining the effect of stock market liberalisation on financial links between the countries.

4.3 Variance decomposition for US and Pacific Basin excess stock returns

In the first part of the study, we examine the variance decomposition of excess stock returns of US and each Pacific Basin Country (PBC). Table 4 presents the results for the decomposition of US excess stock returns when the PBC is Hong Kong for the two sub-periods. The results were not quantitatively different if the foreign country was another PBC.[17] Comparing the variance between the two sub-periods one notes that it is lower in the second sub-period. The components of the variance are presented as proportions of the total variance. The biggest contribution to aggregate volatility comes from variation in dividends, in long-term profits, [18] while the contribution of the equity risk premium is much smaller.

Table 5 presents the variance decomposition for the PBCs. The variance of excess stock returns is higher in the second subperiod in two of the four countries (Japan and Thailand) that we have data for both subperiods. This could reflect the effects of the Asian crisis. The main source of variation is also the long-term profits

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[16] We chose that date because many liberalisations clustered in the late 1980's.

[17] The lag structure of one lag was selected using the Akaike Information Criterion. Higher lags did not produce qualitatively different results.

[18] In fact the proportion is higher than one to offset the negative covariances.

while the contribution of risk premium is smaller. In a similar fashion to US, we find the contribution of the covariance between $\tilde{f}_d$ and $\tilde{f}_e$ to be substantial. These results differ from those in Campbell (1991), Campbell and Ammer (1993) and Ammer and Mei (1996), who found that for some of the sample periods the contribution of the equity risk premium was higher than that of the dividends and the covariance between $\tilde{f}_d$ and $\tilde{f}_e$ was close to zero.

5. Real and Financial links between US and the Pacific Basin countries

5.1 Covariance decomposition

The covariance of domestic and foreign stock returns are decomposed in 12 components as shown in equation (6). In Tables 6.A and 6.B we list in the various panels the major contributions to the covariance for two sub-periods, 1980.01-1989.12 and 1990.01-1998.12. We did this exercise not only for US and each PBC but also for every possible pair for our sample of countries.

The major contribution to the covariance of domestic and foreign stock returns comes from correlated news about future dividend growth in the two countries. The other important component comes from the correlated news about future excess returns and news of the interaction between future domestic excess return and future foreign dividend news. The covariance concerning interest rate news makes a relatively small contribution confirming the difficulty in forecasting real interest rates. Similarly the contribution of the real exchange rate was found small for the same reason.

For both sub-periods, the covariance of future dividend news is much higher than the covariance of future excess returns indicating the strength of economic integration in the region. Furthermore, this economic integration seems to have

strengthened during the 1990's for most PBCs. The same can be said about the covariance of future excess returns news and financial integration. Developments between US and PBCs have been different. The covariance of future dividend news has increased only for US versus Japan and Singapore, while the covariance of future excess news has increased only versus Japan. At the same time, the high and statistically significant covariance between future domestic excess returns and future foreign dividend news for both sub-periods indicates the interaction between economic integration and financial integration.

In order to test the robustness of our results to a different specification, we estimated the VAR without the instrumental variables (see Table 8.A and 8.B of Appendix B). This specification did not have a great impact on the decomposition results. Thus, our results remained robust to the different specification of our forecasting model.

5.2 Correlations of the return components

In the next set of Tables, 7.A and 7.B, we present the correlation matrices of the return components for the two sub-periods, 1980.01- 1989.12 and 1990.01-1998.12. In interpreting these results we provide answers to the questions posed in the introduction relating to the effect of stock market openness on financial integration; the importance of regional versus global integration; and the link between economic and financial integration.

5.2.1 Financial integration in pre and post liberalisation periods

During the 1980s there were only five cases out of ten of financial integration (see Table 7.A, Panel C). Those were Singapore versus Hong Kong, Thailand, Japan

and US, and US versus Thailand. In the cases of US versus Singapore and Thailand the correlations were very high indeed. It is interesting to note that Hong Kong, Japan and US were found not to be financially integrated, even though all three markets were open at the time, implying that other factors might have discouraged international investors. The result for Thailand was considered rather strange in view of the substantial restrictions, which existed during this period. The correlations were thus reestimated for the shorter pre-liberalisation period 1980.01 to 1987.08 so that the end of the period coincided exactly with the official liberalisation date for Thailand. The correlation of future excess returns news between US and Thailand was found to be statistically insignificant, implying no financial integration between the two countries.

During the 1990's, all PBCs were found to be financially integrated (see Table 7.B, Panel C). No difference could be observed in the degree of integration amongst the highly open markets, like those of Hong Kong and Singapore, and the less open markets, such as those of Thailand, Indonesia and Philippines. Even in Taiwan and Korea, which were highly regulated, there was a high degree of integration corroborating the results of previous studies. The high financial integration at both the regional and global level found for Thailand in the post-liberalisation period compared to the pre-liberalisation period is also in line with the results of other studies. Bekaert and Harvey (1997) in their time series and cross sectional models of analysing the effect of capital market liberalisation on emerging equity market volatility and allowing for correlations between local market and world market to vary, found that for some countries (Thailand from the PBCs) capital market

liberalisation increased the correlation in post liberalisation periods, i.e. increased financial integration.[19].

The picture for US is very different. Only Philippines and Thailand are financially integrated with US. There is no integration with Singapore unlike the 1980s. Japan the most financially advanced country was not found to be integrated with US. This result is in agreement with Ammer and Mei (1996), who included Japan in their study for the period 1974.01 to 1990.12. They find a negative but statistically insignificant correlation of future excess return news.[20]

5.2.2 Regional versus global integration

Developments in economic integration can be seen by examining correlations of future dividend news. During the 1980s there is economic integration amongst all PBCs (see Table 7.A, Panel B) and that remains strong during the 1990s (see Table 7.B, Panel B).[21] For US the situation is different. It is integrated with all PBCs for which data exist during the 1980s, but only with Hong Kong, Japan and Singapore subsequently.

Comparing the above results of the correlations of future dividend news with the correlations of industrial production growth presented in Table 2 one can observe that these are generally higher. This confirms one of the advantages of using our

[19] In a more recent study Bekaert and Harvey (2000) developed a cross-sectional time-series model and assessed the impact of market liberalisation in emerging equity markets on the cost of capital, volatility, beta and correlation with World market returns and found that correlation increased by a small amount, 4.2 percent, in post-liberalisation periods.

[20] We run the exercise, as they have done, by correcting for the asymmetry in the sense that Japanese excess return was measured relative to the US interest rate. Thus, we undertook a symmetric covariance decomposition and obtained a positive, high and statistically significant correlation (0.936 for the period 1990.01-1998.12) confirming their result although for a different sample period. The different results when measuring the Japanese excess returns in Yen rather in US dollars might reflect the pattern of depreciation of the dollar against the yen during the sample period.

[21] There is only one exception, Japan versus Thailand.

methodology, which picks small but persistent comovements of long-term dividend growth compared to the contemporaneous correlations of output growth, which might understate the degree of integration.

Thus, regional economic integration has been important throughout the period of examination and more so during the 1990's. On the other hand, there is less global integration. These results are in accord with those relating to financial integration outlined in the previous section.

These findings, however, might have been influenced by the Asian financial crisis of mid 1997. Studies on the 1987 stock market crash and the Mexican crisis have shown that correlations between stock markets increase during a crisis (see e.g. Roll, (1989), Calvo and Reinhart, (1996), Longin and Solnik, (1995)) and Malliaris and Urrutia, (1992). Thus, in Section 6, we test the robustness of the results for the period 1990.01 to 1997.06.

5.2.3 The link between economic and financial integration

Combining now the developments in economic and financial integration one can arrive at the following conclusions. First, during the 1980s, there is no case where financial integration has been found without the existence of economic integration. Second, during the 1990s in only two cases out of 38 we find financial integration, which is not accompanied by economic integration, namely Philippines and Thailand versus US. Thirdly, this link between economic integration and financial integration is also highlighted by the correlation of future domestic excess returns and future foreign dividend news. Throughout the period this correlation was high and statistically significant for all the cases where financial integration has been observed.

6. Robustness test to the Asian financial crisis

In Table 7.C we present the correlations for the sub-period prior to the crisis 1990.01 to 1997.06. The results for US are very different for this period compared to the 1990.01 -1998.12. Looking first at the correlations of future dividend news (see Panel B) we find US to be economically integrated with all countries apart from Korea. Furthermore, the degree of economic integration is higher with two of the three countries with which integration was found in the post-crisis period, namely Hong Kong and Singapore.

The results are not very different for financial integration in the pre-crisis period (see Panel C) compared to the post-crisis period. US was integrated with a few countries in both sub-periods; in the pre-crisis period with Indonesia, Singapore and Thailand; and in the post-crisis with Philippines and Thailand. PBCs on the other hand, were economically and financially integrated even before the crisis, but less so. Thus, the Asian financial crisis reduced global economic integration but increased regional economic and financial integration.

The link between economic and financial integration is highlighted also in this sub-period. There is only one case out of 30 where financial integration is not accompanied by economic integration (Japan/Malaysia). As in the previous sub-periods, this link is strengthened by the statistically significant correlation between future excess return and future foreign dividend news (see Panel D).

7. Conclusion

In this paper, we have examined questions relating to real and financial links amongst PBCs and between these countries and US by analysing the covariance of returns on national stock markets. This framework has allowed us to examine these

links simultaneously and more accurately and explore whether economic integration plays a role in linking the financial markets. This research has been motivated by the overwhelming evidence that financial markets can be integrated even in the presence of substantial foreign exchange restrictions. Our main empirical findings are as follows.

First, variation in dividends is the main source of stock return variance in all the countries examined. Correlated news about future dividend growth in each pair of countries is also the major contribution to the covariance of domestic and foreign excess stock returns indicating the strength of economic integration in the region. The substantial trade between each of the PBCs and the two large economies of Japan and US observed in Table 1 provides an important transmission channel for country specific shocks. This channel has been examined and confirmed by Canova and Dellas (1993), Canova and DeNicolo (1995) and Canova and Marrinan (1998) for the European countries, and by Schmitt-Grohe (1998) for the transmission of shocks between US and Canada. If for example, foreign capital goods are used in the production of domestic goods, then "allowing for production interdependencies introduces a previously neglected channel through which idiosyncratic shocks may be propagated across countries".[22] Furthermore, it should be noted that the economic integration observed in our paper is higher than that revealed by the contemporaneous correlation of industrial production confirming one of the advantages of using the methodology in this paper to measure economic integration.

Second, our results emphasised also the link between this economic integration with financial integration. We found overwhelming evidence that financial integration is accompanied by economic integration. This evidence seems to

[22] See Canova and DeNicole (1995) pp 983-84.

suggest that economic integration provides a channel for financial integration. If economic integration relates to countries' comovements of output growth, and economic activity is positively related to stock prices, as has been shown to be the case theoretically and empirically, then it is not surprising to find stock prices moving together as well. In fact the relationship between economic activity and stock prices is stronger if foreign influences are taken into account through consumption and production interdependencies (see Canova and DeNicole (1995)). Thus, our results explain, at least partly, the high financial market integration found in this study and in other studies even in the presence of foreign exchange restrictions. In the current study no differences could be observed in the degree of integration amongst countries with different degrees of stock market openness during the period of the 1990's. These findings do not lend support to the use of restrictions to isolate capital markets from world influences.

Third, the results indicate regional economic and financial integration, which became stronger during the 1990's even prior to the Asian crisis. This provides support to the view that economic integration and trade interdependencies might have played a major role to the contagion effect of the Asian crisis.[23] At the same time, the less pronounced financial integration of the PBCs at the global level before the crisis explains the mild effect of the crisis on world financial markets.

Finally, the results have revealed that some countries have close links with US, and other countries with Japan. For example, Thailand has been greatly financially integrated with US, while only the financial crisis seems to have linked it with Japan and even then less so than in US. On the other hand, Korea and Taiwan have had close links with Japan. They have been financially integrated with Japan

[23] See Glick and Rose, (1999) and Diwan and Hoekman, (2000).

before and after the crisis and have had no links with US. Ng (2000) finds similar links when examining volatility spillover effects from Japan and the US to the PBCs.[24] These close links between Korea and Taiwan with Japan might stem from the substantial Japanese Direct Foreign Investment (DFI) in those countries since the mid 1980s. For example, it accounted for 52% of the DFI stock in Korea and 27% of Taiwan.[25] This DFI became increasingly export oriented, while at the same time imported a lot of parts and equipment from Japan, strengthening the economic and financial links of these countries.[26]

The study has produced some tentative results with regard to the financial and real links in the Pacific Basin region. As more data become available a more accurate picture will emerge. The main finding of the study regarding the importance of economic integration for financial integration needs to be tested for other emerging stock markets.

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[24] It is interesting to note that Thailand is not economically integrated with Japan, and Korea with US, if one concentrates at the pre-crisis period to avoid any possible effects of the crisis on integration. Taiwan, however, is equally economically integrated with both US and Japan.

[25] See Kreinin et al. (2000).

[26] In 1992, the ratio of export sales to total sales of Japanese affiliates in manufacturing was 45% in Asia compared with only 23% in Latin America.

Appendix A: The estimation of components

Given the state of vector and VAR system as in Section III, and defining ι_1 as a vector whose first element is one and whose other elements are zero, the excess stock returns for the domestic country, $\tilde{e}$, can be picked out as ι_1' z. Defining ι_2, ι_3, and ι_4 in an analogous manner, we pick f, r, and q out of z. Finally, the components of domestic excess stock returns, in equations (1) and (2), can be derived as follows

$$\begin{aligned}
\tilde{e}_{e,t+1} &= i_1' \sum_{j=1}^{\infty} r^j A^j w_{t+1} = i_1' rA(I - rA)^{-1} w_{t+1}, \\
\tilde{e}_{r,t+1} &= i_3' \sum_{j=0}^{\infty} r^j A^j w_{t+1} = i_3'(I - rA)^{-1} w_{t+1}, \\
\tilde{e}_{t+1} &= i_1' w_{t+1} \\
\tilde{e}_{d,t+1} &= \tilde{e}_{t+1} + \tilde{e}_{r,t+1} + \tilde{e}_{e,t+1}.
\end{aligned} \tag{A1}$$

In a similar way, the components of the foreign excess stock returns, in equations (5) and (6), can be obtained as

$$\begin{aligned}
\tilde{f}_{f,t+1} &= i_2' \sum_{j=1}^{\infty} (r^*)^j A^j w_{t+1} = i_2' r^* A(I - r^* A)^{-1} w_{t+1}, \\
\tilde{f}_{r,t+1} &= i_3' \sum_{j=0}^{\infty} (r^*)^j A^j w_{t+1} = i_3'(I - r^* A)^{-1} w_{t+1}, \\
\tilde{f}_{q,t+1} &= i_4'(1 - r^*)(I - r^* A)^{-1} w_{t+1}, \\
\tilde{f}_{t+1} &= i_2' w_{t+1}, \\
\tilde{f}_{d,t+1} &= \tilde{f}_{t+1} + \tilde{f}_{r,t+1} + \tilde{f}_{q,t+1} + \tilde{f}_{f,t+1}.
\end{aligned} \tag{A2}$$

Appendix B

Table 8.A: Robustness tests without instrumental variables in the VAR: 1980.01-1989.12[27]

Panel A: Covariances of excess returns

	Hong Kong	Japan	Singapore	Thailand	US
Hong Kong	-				
Japan	0.121** (0.000)	-			
Singapore	0.358** (0.000)	0.065** (0.000)	-		
Thailand	0.284** (0.000)	0.070** (0.000)	0.254** (0.000)	-	
US	0.027** (0.000)	0.055** (0.000)	-.011** (0.000)	0.009** (0.000)	-

Panel B: Covariances of future dividend news

	Hong Kong	Japan	Singapore	Thailand	US
Hong Kong	-				
Japan	0.537** (0.024)	-			
Singapore	1.770** (0.024)	0.477** (0.019)	-		
Thailand	0.964** (0.038)	0.203** (0.013)	1.200** (0.027)	-	
US	0.176** (0.011)	0.190** (0.007)	0.245** (0.008)	0.241** (0.007)	-

Panel C: Covariances of future excess returns news

	Hong Kong	Japan	Singapore	Thailand	US
Hong Kong	-				
Japan	0.186** (0.012)	-			
Singapore	0.589** (0.014)	0.219** (0.011)	-		
Thailand	0.199** (0.020)	0.091** (0.007)	0.363** (0.014)	-	
US	0.012** (0.004)	0.020** (0.002)	0.042** (0.003)	0.053** (0.005)	

Panel D: Covariances of future domestic excess return and future foreign dividend news

	Hong Kong	Japan	Singapore	Thailand	US
Hong Kong	-				
Japan	0.416** (0.018)	-			
Singapore	1.070** (0.021)	0.296** (0.016)	-		
Thailand	0.346** (0.032)	0.099** (0.003)	0.616** (0.023)	-	
US	0.180** (0.011)	0.095** (0.005)	0.266** (0.008)	0.212** (0.008)	-

[27] For Hong Kong the sample period covers 1981.01 to 1989.12.

Table 8.B: Robustness tests without instrumental variables in the VAR: 1990.01-1998.12

Panel A: Covariances of excess returns

	H-K	Indon	Japan	Korea	Malay	Philip	Singap	Taiwan	Thai
H-K	-								
Indon	0.642** (0.000)	-							
Japan	0.152** 0.000)	0.173** (0.000)	-						
Korea	0.336** (0.080)	0.434** (0.000)	0.358** (0.000)	-					
Malay	0.586** (0.000)	0.760** (0.000)	0.182** (0.000)	0.305** (0.000)	-				
Philip	0.550** (0.000)	0.649** (0.000)	0.183** (0.000)	0.317** (0.000)	0.724** (0.000)	-			
Singap	0.411** (0.000)	0.482** (0.000)	0.219** (0.000)	0.250** (0.001)	0.540** (0.001)	0.516** (0.001)	-		
Taiwan	0.457** (0.000)	0.433** (0.000)	0.253** (0.000)	0.379** (0.000)	0.593** (0.002)	0.606** (0.000)	0.405** (0.000)	-	
Thai	0.617** (0.000)	0.432** (0.000)	0.240** (0.000)	0.517** (0.000)	0.884** (0.000)	0.855** (0.000)	0.549** (0.000)	0.548** (0.000)	-
US	-.035** (0.000)	0.025** (0.000)	0.009** (0.000)	0.006** (0.000)	-.004** (0.000)	-.011** (0.000)	-.029** (0.000)	0.008** (0.000)	-.07** (0.000)

Panel B: Covariances of future dividend news

	H-K	Indon	Japan	Korea	Malay	Philip	Singap	Taiwan	Thai
H-K	-								
Indon	2.970** (0.038)	-							
Japan	0.571** (0.016)	1.010** (0.030)	-						
Korea	1.680** (0.033)	3.230** (0.032)	1.550** (0.037)	-					
Malay	2.800** (0.045)	4.4450** (0.038)	1.160** (0.031)	2.850** (0.096)	-				
Philip	2.640** (0.035)	4.410** (0.080)	1.040** (0.040)	2.030** (0.056)	4.760** (0.116)	-			
Singap	1.700** (0.020)	2.310** (0.033)	0.967** (0.019)	1.270** (0.025)	2.640** (0.048)	2.740** (0.038)	-		
Taiwan	1.980** (0.023)	2.090** (0.057)	1.350** (0.041)	1.820** (0.041)	2.540** (0.050)	3.510** (0.069)	1.720** (0.031)	-	
Thai	2.780** (0.038)	3.630** (0.075)	1.090** (0.035)	2.740** (0.078)	4.920** (0.093)	4.680** (0.081)	2.780** (0.046)	2.530** (0.066)	-
US	0.098** (0.004)	0.093** (0.010)	0.046** (0.006)	0.019** (0.001)	0.017** (0.008)	0.127 (0.001)	0.087** (0.004)	0.069** (0.006)	0.079** (0.009)

Panel C: Covariances of future excess returns news

	H-K	Indon	Japan	Korea	Malay	Philip	Singap	Taiwan	Thai
H-K	-								
Indon	0.832** (0.019)	-							
Japan	0.139** (0.008)	0.359** (0.017)	-						
Korea	0.515** (0.018)	1.250** (0.060)	0.449** (0.020)	-					
Malay	0.826** (0.025)	1.590** (0.071)	0.427** (0.018)	1.230** (0.058)	-				
Philip	0.791** (0.022)	1.7200** (0.049)	0.370** (0.023)	0.796** (0.035)	1.760** (0.070)	-			
Singap	0.441** (0.010)	0.708** (0.019)	0.276** (0.001)	0.417** (0.014)	0.808** (0.026)	0.885** (0.022)	-		
Taiwan	0.523** (0.012)	0.661** (0.032)	0.429** (0.021)	0.593** (0.023)	0.704** (0.028)	1.220** (0.039)	0.456** (0.016)	-	
Thai	0.792** (0.021)	1.270** (0.033)	0.330** (0.019)	0.963** (0.044)	1.640** (0.053)	1.550** (0.046)	0.869** (0.025)	0.716** (0.036)	-
US	-.014** (0.002)	0.033** (0.004)	0.066** (0.004)	-.006** (0.003)	-.025** (0.002)	0.043** (0.004)	-.001 (0.002)	-.025** (0.002)	0.044** (0.003)

Panle D: Covariances between future domestic excess return and future foreign dividend news.

	H-K	Indon	Japan	Korea	Malay	Philip	Singap	Taiwan	Thai
H-K	-								
Indon	1.350** (0.027)	-							
Japan	0.243** (0.013)	0.741** (0.027)	-						
Korea	0.823** (0.022)	2.240** (0.084)	0.826** (0.026)	-					
Malay	1.500** (0.035)	3.020** (0.099)	0.647** (0.026)	1.940** (0.080)	-				
Philip	1.380** (0.029)	3.070** (0.065)	0.592** (0.033)	1.250** (0.049)	2.770** (0.093)	-			
Singap	0.863** (0.015)	1.480** (0.028)	0.485** (0.015)	0.707** (0.020)	1.460** (0.037)	1.660** (0.031)	-		
Taiwan	0.964** (0.019)	1.320** (0.049)	0.729** (0.033)	1.010** (0.033)	1.220** (0.043)	1.940** (0.056)	0.829** (0.024)	-	
Thai	1.500** (0.029)	2.520** (0.067)	0.568** (0.023)	1.710** (0.068)	2.940** (0.074)	2.860** (0.063)	1.560** (0.011)	1.410** (0.047)	-
US	0.139** (0.004)	0.199** (0.009)	0.069** (0.005)	0.083** (0.008)	0.094** (0.005)	0.211** (0.009)	0.141** (0.004)	0.101** (0.006)	0.204** (0.008)

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Table 1: Exports and Imports from each PBC to U.S. and Japan over their GDP

Panel A: Exports and Imports from each PBC to U.S over its GDP

		1980	1985	1990	1995	1996	1997	1998	1999
Hong Kong	Exports	18.63	26.71	26.52	25.73	24.90	23.96	24.88	26.18
	Imports	9.58	8.08	8.90	10.11	10.16	9.48	8.42	8.02
Indonesia	Exports	5.93	4.62	3.03	3.21	3.04	5.30	4.51	5.92
	Imports	1.94	1.93	2.00	2.42	2.26	4.03	2.25	1.36
Korea	Exports	8.07	11.81	7.79	4.96	4.39	8.07	6.25	6.96
	Imports	8.54	7.18	6.19	6.24	6.72	11.21	5.53	5.87
Malaysia	Exports	8.83	6.16	11.31	17.52	14.20	20.09	21.22	23.54
	Imports	6.80	5.89	11.22	14.48	12.09	18.29	15.29	14.50
Philippines	Exports	4.97	5.52	8.07	8.55	8.43	14.62	14.87	14.15
	Imports	6.08	4.47	6.60	7.18	7.56	12.59	10.09	8.59
Singapore	Exports	20.23	26.12	29.44	25.82	25.08	27.58	26.20	25.52
	Imports	28.28	21.57	25.73	22.41	23.43	26.70	22.51	22.01
Taiwan	Exports			14.92	11.32	11.03	11.13	12.51	12.62
	Imports			7.21	7.25	6.55	6.73	6.66	6.55
Thailand	Exports	2.56	3.59	6.07	6.20	5.57	11.09	8.84	10.09
	Imports	4.15	2.70	4.17	5.23	5.13	8.62	6.29	4.65

Panel B:Exports and Imports from each PBC to Japan over its GDP

		1980	1985	1990	1995	1996	1997	1998	1999
Hong Kong	Exports	3.28	3.67	6.26	7.20	7.68	6.68	5.58	5.94
	Imports	18.58	19.67	17.75	19.44	17.47	16.75	14.21	13.25
Indonesia	Exports	14.89	9.82	3.03	6.24	5.59	9.25	5.83	7.34
	Imports	4.71	3.07	4.92	4.68	3.81	6.11	2.75	3.45
Korea	Exports	5.31	4.98	5.06	3.51	3.23	5.53	3.32	3.73
	Imports	10.23	8.27	7.44	6.69	6.33	10.41	4.56	5.68
Malaysia	Exports	12.33	11.84	10.22	10.52	10.46	13.78	10.31	12.50
	Imports	10.30	8.86	16.01	24.23	19.18	23.98	15.32	17.32
Philippines	Exports	4.80	2.91	4.22	3.77	4.44	6.92	6.21	6.28
	Imports	5.15	2.49	6.23	8.67	8.37	13.13	9.34	8.28
Singapore	Exports	13.02	11.62	12.12	11.03	11.15	10.56	8.66	9.85
	Imports	35.97	24.26	32.19	31.48	25.92	27.77	20.39	21.41
Taiwan	Exports			2.94	5.38	5.32	4.12	3.73	4.44
	Imports			4.93	10.89	9.24	9.10	8.45	10.08
Thailand	Exports	3.06	5.01	4.60	5.83	5.21	8.68	5.43	6.77
	Imports	6.08	6.29	11.75	13.30	11.36	16.07	7.39	10.00

Source: The GDP per each PBC is from the *International Financial Statistics YearBook*, IMF publication; the Export and Import from each PBC to Japan and U.S. as well as total Exports and Imports of each PBC are from the *Direction of Trade Statistics Yearbook*, IMF publication. The only exception is for Taiwan were the GDP is from *Datastream*.

Table 2: Correlations of monthly industrial production: 1990.01-1998.12

	Japan	**Korea**	**Malay**	**Phil**	**Sing**	**Taiw**	**Thai**	**US**
H-K	**-.130**							**0.167**
Indon	**0.181**							**-.022**
Japan	-							
Korea	0.266	-						
Malay	0.241	0.199	-					
Phil	-0.029	0.191	0.021	-				
Sing	0.039	0.378	0.517	0.198	-			
Taiw	0.042	0.454	0.530	0.066	0.847	-		
Thai	0.249	0.362	0.150	-0.134	0.200	0.306	-	
US	0.025	0.123	0.102	-0.081	-0.059	0.012	-0.069	-

For Hong-Kong and Indonesia only the quarterly correlations with Japan and US are reported due to data availability (Bold values).

Table 3.A: Comparison of different signals of liberalisation

Country	Official Liberalisation date	First Country Fund	First ADR
Hong Kong	01.73[a]	-	-
Indonesia	09.89[b]	02.89[b]	04.91[e]
Malaysia	12.88[b]	12.87[b]	08.92[b]
Philippines	06.91[c]	05.86[b]	03.91[b]
Singapore	06.78[a]	-	-
Thailand	09.87[d]	07.85[b]	01.91[b]
Korea	01.92[b]	08.84[b]	11.90[b]
Taiwan	01.91[b]	05.86[b]	12.91[b]

Source:

[a] Exchange Arrangements and Restrictions, IMF publications, (various issues).

[b] Bekaert and Harvey (1998) and coincides with the International Finance Corporation (IFC) official liberalisation date, which is based on the Investable Index and represents the ratio of the market capitalisation of stocks that foreigners can legally hold to market capitalisation. A large jump in the Index is considered as evidence of an official liberalisation.

[c] Bekaert, and Harvey (2000). The date is in accord with the Foreign Investment Act, which removed, over a period of three years, all restrictions on foreign investments. Under the provisions, foreign investors are required only to register with the Securities and Exchange Commission and most sectors of the economy are opened to 100 percent foreign ownership. This date differs from the IFC official liberalisation date, which is October 1989, and is not associated with any particular regulatory changes.

[d] Bekaert and Harvey (2000). This date is in accord with the inauguration of the Stock Exchange of Thailand's Alien Board, which allows foreigners to trade stocks of those companies that have reached their foreign investment limits. Thais continue to trade stocks on the Main Board. Bailey and Jagtiani, (1994) report the same liberalisation date. This date differs, however, from the IFC liberalisation date, which is December 1988, and is not associated with any particular regulatory changes.

[e] Bekaert and Harvey (2000). In Bekaert and Harvey (1998) 02.1992 is reported as the first ADR.

Table 3.B: Emerging stock markets - Direct and indirect barriers for institutional investors (end-1989)

	Foreign ownership Limit	Dividends Repatriation	Capital Repatriation	Withholding Taxes on Dividend	Taxes on Capital Gains
Hong Kong	100%	Free	Free	0.0%	0.0%
Indonesia	49%(25%)[a]	Free	Free	20.0%	20.0%
Malaysia	100%[b]	Free	Free	35%(0%)	0.0%
Philippines[c]	40%[d]	Free	Free	15.0%	0.25%
Singapore	100%	Free	Free	0.0%	0.0%
Thailand	49% (25%)[e]	Free[f]	Free	20%(10)	25%(10)
Korea	10%(8%)[g]	Some Restrictions[h]	Some Restrictions[h]	25.0% (10-21.5%)	0.0% (11-27%[i])
Taiwan[c]	Special Funds only[l]	Free	Free	20.0%	0.6%

Source: The table is based on the information provided in the IFC' s Factbook, Harrison (1994), the Euromoney Annual Report and the Exchange Arrangements and Restrictions, IMF. All the data are as of end-1989. Rates shown in brackets apply only to approved new Country Funds, where these may be different from normal treatment.

[a] The limit is reduced to 25% of own capital for foreign exchange banks and non-bank financial institutions.

[b] Foreign acquisition of investments exceeding M$ 5 million in value or equivalent of 15% or more of voting power in a Malaysian company requires the prior approval of the Foreign Investment Committee. In September 1998, the financial markets were completely closed to foreigners.

[c] Transaction taxes on gross transaction value.

[d] Foreign nationals may purchase shares up to 40% of a company's shares via B shares. Foreign participation beyond 40% needs to have prior approval by the Board of Investment (BOI). Investment not exceeding 40% need simply to be reported to BOI and the Central Bank of the Philippines for purposes of repatriation of capital and remittance of profits.

[e] Foreign investors are allowed to hold up to 49% of companies listed on the SET with the exception of the commercial banks and finance companies, where foreign ownership is restricted to 25% of the capital.

[f] A report is required for the repatriation of dividends and capital gains.

[g] Foreign ownership restriction of up to 10% of market capitalisation for "non-limited" industries and of up to 8% of market capitalisation for "limited" industries.

[h] The repatriation of initial capital, capital gains and dividend is subject to approval by the Ministry of Finance.

[i] Of net capital gains or gross sales proceeds, respectively.

[l] Foreign investors who open an account in a local brokerage house may only invest in three listed funds – Kwang Hua Growth Fund, NITC Fuyuan Fund and Citizen Fund. Domestic residents are allowed to remit outwards up to US$5 million per annum.

Table 4: Variance of US excess stock returns

The table gives the variance decomposition of US stock excess returns using a VAR specification. The VAR is in excess return on US stocks, excess return on Hong Kong stocks, US real interest rate, change in US nominal interest rate, US dividend yield and Hong Kong dividend yield. Excess returns are measured in dollars relative to the one-month Treasury Bill rate. Dividend yields are computed as the sum of dividends over the last 12 months divided by the current price. The components of the variance are given in equation (7). The standard errors of each statistic are in parentheses. All variables are measured in logs. Variables are measured in real terms unless otherwise stated. * denotes significance at 10 % level and ** at the 5% level.

	1981.01 - 1989.12	1990.01 - 1998.12
Var($\tilde{e}$)	0.179**	0.086
	(0.047)	(0.036)
	Proportion (%)	Proportion (%)
Var($\tilde{e}_d$)	1.382**	1.681**
	(0.421)	(0.333)
-2 cov($\tilde{e}_d$, $\tilde{e}_r$)	-0.074	-0.124**
	(0.069)	(0.025)
Var($\tilde{e}_r$)	0.025**	0.008**
	(0.008)	(0.001)
-2 cov($\tilde{e}_d$, $\tilde{e}_e$)	-0.540**	-1.119**
	(0.070)	(0.025)
Var($\tilde{e}_e$)	0.192	0.551**
	(0.200)	(0.232)
2 cov($\tilde{e}_r$, $\tilde{e}_e$)	0.015	0.074**
	(0.045)	(0.017)

Table 5: Variance decomposition of PBC excess stock returns.

The table gives the variance decomposition of each PBC excess stock returns using a VAR specification. The VAR is in excess return on US stocks, excess return on PBC stocks, US real interest rates, change in US nominal interest rate, the real exchange rate, US dividend yield and PBC dividend yield. Excess returns are measured in dollars relative to the one-month Treasury Bill rate. Dividend yields are computed as the sum of dividends over the last 12 months divided by the current price. The components of the variance are given in equation (8). All variables are measured in logs and are in real terms unless otherwise stated. * denotes significance at 10 % level and ** at the 5% level.

	Hong Kong		**Japan**	
	1981.01 - 1989.12	1990.01 - 1998.12	1980.01 - 1989.12	1990.01 – 1998.12
Var($\tilde{f}$)	1.23** (0.113)	0.721** (0.085)	0.365** (0.060)	1.78** (0.077)
	Proportion(%)	Proportion (%)	Proportion(%)	Proportion (%)
Var($\tilde{f}_d$)	1.066** (0.219)	0.881** (0.148)	1.536** (0.409)	1.029** (0.432)
-2 cov($\tilde{f}_d$, $\tilde{f}_r$)	0.014 (0.025)	0.002 (0.006)	-0.086** (0.044)	-0.040** (0.009)
-2 cov($\tilde{f}_d$, $\tilde{f}_q$)	0.004** (0.000)	0.000 (0.000)	0.012** (0.000)	0.001** (0.000)
- 2 cov ($\tilde{f}_d$, $\tilde{f}_f$)	-0.154 (0.155)	0.098 (0.099)	-0.712** (0.349)	-0.112 (0.330)
Var($\tilde{f}_r$)	0.004 (0.145)	0.001 (0.541)	0.011 (1.077)	0.000 (0.001)
2 cov($\tilde{f}_r$, $\tilde{f}_q$)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.008)
2cov($\tilde{f}_r$, $\tilde{f}_f$)	0.018 (0.015)	-0.002 (0.004)	0.076** (0.032)	0.006** (0.000)
Var($\tilde{f}_q$)	0.000 (0.000)	0.000 (0.000)	0.000 (0.001)	-0.000 (0.000)
2 cov($\tilde{f}_q$, $\tilde{f}_f$)	-0.001** (0.000)	-0.000 (0.000)	-0.002 (0.122)	-0.000 (0.226)
Var($\tilde{f}_f$)	0.048 (0.044)	0.020* (0.011)	0.165 (0.122)	0.116 (0.226)
	Singapore		**Thailand**	
	1980.01 - 1989.12	1990.01 – 1998.12	1980.01 - 1989.12	1990.01 – 1998.12
Var($\tilde{f}$)	0.693** (0.084)	0.436** (0.067)	0.402** (0.065)	1.32** (0.119)
	Proportion (%)	Proportion (%)	Proportion(%)	Proportion (%)
Var($\tilde{f}_d$)	1.232** (0.179)	1.070** (0.257)	1.744** (0.765)	1.456** (0.272)
-2 cov($\tilde{f}_d$, $\tilde{f}_r$)	0.016** (0.000)	0.002 (0.009)	0.002 (0.072)	0.004 (0.006)
-2 cov($\tilde{f}_d$, $\tilde{f}_q$)	0.010 (0.022)	0.002** (0.000)	0.008** (0.000)	0.012** (0.005)
- 2 cov ($\tilde{f}_d$, $\tilde{f}_f$)	-0.318** (0.135)	-0.096 (0.190)	-0.870 (0.671)	-0.530** (0.214)
Var($\tilde{f}_r$)	0.005 (1.790)	0.001 (0.311)	0.009 (5.321)	0.000 (0.006)
2 cov($\tilde{f}_r$, $\tilde{f}_q$)	0.000 (0.032)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
2cov($\tilde{f}_r$, $\tilde{f}_f$)	0.020 (0.016)	-0.008 (0.006)	-0.004 (0.016)	0.000 (0.005)
Var($\tilde{f}_q$)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.005)
2 cov($\tilde{f}_q$, $\tilde{f}_f$)	0.000 (0.000)	0.000 (0.000)	-0.002** (0.000)	-0.002 (0.004)
Var($\tilde{f}_f$)	0.044 (0.054)	0.029 (0.045)	0.113 (0.192)	0.060* (0.032)

	Indonesia	**Korea**	**Malaysia**	**Philippines**	**Taiwan**
	1990.01 – 1998.12	1990.01 - 1998.12	1990.01 – 1998.12	1990.01-1998.12	1990.01-1998.12
Var($\tilde{f}$)	1.41** (0.130)	1.22** (0.118)	1.340** (0.118)	1.08** (0.109)	1.49** (0.125)
	Proportion(%)	Proportion (%)	Proportion (%)	Proportion (%)	Proportion (%)
Var($\tilde{f}_d$)	1.544** (0.401)	1.305** (0.345)	1.110** (0.335)	1.763** (0.435)	1.166** (0.217)
-2 cov($\tilde{f}_d$, $\tilde{f}_r$)	0.013** (0.002)	0.014** (0.005)	0.017** (0.006)	0.008 (0.009)	-0.001 (0.003)
-2 cov($\tilde{f}_d$, $\tilde{f}_q$)	0.022** (0.003)	0.012** (0.002)	0.012** (0.005)	0.006** (0.001)	-0.000 (0.000)
- 2 cov ($\tilde{f}_d$, $\tilde{f}_f$)	-0.754** (0.370)	-0.496 (0.374)	-0.205 (0.274)	-0.923** (0.405)	-0.229 (0.173)
Var($\tilde{f}_r$)	0.000 (0.260)	0.001 (0.032)	0.001 (0.018)	0.000 (0.531)	0.000 (0.031)
2 cov($\tilde{f}_r$, $\tilde{f}_q$)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
2cov($\tilde{f}_r$, $\tilde{f}_f$)	-0.012* (0.007)	-0.007** (0.003)	0.011** (0.005)	-0.006 (0.007)	-0.008** (0.003)
Var($\tilde{f}_q$)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
2 cov($\tilde{f}_q$, $\tilde{f}_f$)	-0.006** (0.003)	0.001** (0.000)	-0.002 (0.003)	-0.002** (0.000)	0.000 (0.000)
Var($\tilde{f}_f$)	0.193 (0.158)	0.170 (0.138)	0.056 (0.086)	0.151 (0.148)	0.072 (0.071)

Table 6.A: Covariance Decomposition of US and PBCs: 1980.01-1989.12

This table reports the major contributions to the excess covariance among US and PBCs. The VAR is in excess return on US stocks, excess return on PBC stocks, US real interest rates, change in US nominal interest rate, the real exchange rate, US dividend yield and PBC dividend yield. Excess returns are measured in dollars relative to the one-month Treasury Bill rate. Dividend yields are computed as the sum of dividends over the last 12 months divided by the current price. The components of the variance are given in equation (9). All variables are measured in logs and are in real terms unless otherwise stated. For Hong Kong the sample period covers 1981.01 to 1989.12. * denotes significance at 10 % level and ** at the 5% level.

Panel A: Covariances of excess returns

	Hong Kong	Japan	Singapore	Thailand	US
Hong Kong	-				
Japan	0.122** (0.000)	-			
Singapore	0.358** (0.000)	0.064** (0.000)	-		
Thailand	0.287** (0.000)	0.074** (0.000)	0.254** (0.000)	-	
US	0.026** (0.000)	0.055** (0.000	-.029** (0.000)	0.009** (0.000)	-

Panel B: Covariances of future dividend news

	Hong Kong	Japan	Singapore	Thailand	US
Hong Kong	-				
Japan	0.546** (0.002)	-			
Singapore	1.770** (0.022)	0.475** (0.017)	-		
Thailand	0.939** (0.034)	0.163** (0.014)	1.200** (0.025)	-	
US	0.176* (0.105)	0.190** (0.087)	0.686 (0.561)	0.241** (0.099)	-

Panel C: Covariances of future excess returns news

	Hong Kong	Japan	Singapore	Thailand	US
Hong Kong	-				
Japan	0.190** (0.012)	-			
Singapore	0.589** (0.013)	0.219** (0.010)	-		
Thailand	0.190** (0.019)	0.084** (0.008)	0.364** (0.013)	-	
US	0.007** (0.002)	0.020** (0.002)	0.042** (0.003)	0.053** (0.004)	

Panel D: Covariances of future domestic excess return and future foreign dividend news

	Hong Kong	Japan	Singapore	Thailand	US
Hong Kong	-				
Japan	0.423** (0.018)	-			
Singapore	0.060** (0.020)	0.279** (0.014)	-		
Thailand	0.336** (0.029)	0.085** (0.011)	0.615** (0.020)	-	
US	0.180** (0.011)	0.094** (0.005)	0.266** (0.007)	0.212** (0.001)	-

Table 6.B: Covariance Decomposition of US and PBCs: 1990.01-1998.12

Panle A: Covariances of excess returns

	H-K	Indon	Japan	Korea	Malay	Philip	Singap	Taiwan	Thai
H-K	-								
Indon	0.683** (0.000)	-							
Japan	0.132** (0.000)	0.133** (0.000)	-						
Korea	0.350** (0.080)	0.409** (0.000)	0.358** (0.000)	-					
Malay	0.611** (0.000)	0.729** (0.000)	0.182** (0.000)	0.305** (0.000)	-				
Philip	0.558** (0.000)	0.651** (0.000)	0.218** (0.000)	0.318** (0.000)	0.724** (0.000)	-			
Singap	0.411** (0.000)	0.471** (0.000)	0.253** (0.000)	0.250** (0.001)	0.540** (0.001)	0.516** (0.001)	-		
Taiwan	0.457** (0.000)	0.407** (0.000)	0.240** (0.000)	0.379** (0.000)	0.593** (0.002)	0.606** (0.000)	0.405** (0.000)	-	
Thai	0.617** (0.000)	0.465** (0.000)	0.300** (0.000)	0.517** (0.000)	0.884** (0.000)	0.855** (0.000)	0.550** (0.000)	0.547** (0.000)	-
US	-.035** (0.000)	0.025** (0.000)	0.126** (0.000)	0.006** (0.000)	-.001** (0.000)	-.011** (0.000)	-.010** (0.000)	0.008** (0.000)	-.07** (0.000)

Panel B: Covariances of future dividend news

	H-K	Indon	Japan	Korea	Malay	Philip	Singap	Taiwan	Thai
H-K	-								
Indon	3.100** (0.041)	-							
Japan	0.519** (0.018)	0.699** (0.034)	-						
Korea	1.800** (0.042)	2.980** (0.108)	1.550** (0.039)	-					
Malay	3.000** (0.044)	4.280** (0.111)	1.160** (0.028)	2.850** (0.094)	-				
Philip	2.610** (0.035)	4.310** (0.072)	1.030** (0.039)	2.030** (0.007)	4.760** (0.093)	-			
Singap	1.710** (0.017)	2.230** (0.034)	0.967** (0.016)	1.270** (0.026)	2.640** (0.040)	2.740** (0.027)	-		
Taiwan	1.960** (0.016)	1.770** (0.059)	1.350** (0.020)	1.820** (0.038)	2.540** (0.041)	3.480** (0.037)	1.720** (0.021)	-	
Thai	2.780** (0.029)	2.810** (0.059)	1.090** (0.030)	2.740** (0.072)	4.920** (0.070)	4.670** (0.054)	2.780** (0.038)	2.520** (0.050)	-
US	0.098** (0.021)	0.093 (0.102)	0.558** (0.142)	0.019 (0.012)	0.017** (0.008)	0.127 (0.112)	0.245** (0.132)	0.069 (0.052)	.079** (0.009)

Panel C: Covariances of future excess returns news

	H-K	Indon	Japan	Korea	Malay	Philip	Singap	Taiwan	Thai
H-K	-								
Indon	0.865** (0.021)	-							
Japan	0.136** (0.009)	0.242** (0.020)	-						
Korea	0.602** (0.029)	1.150** (0.064)	0.448** (0.021)	-					
Malay	0.912** (0.026)	1.520** (0.067)	0.427** (0.016)	1.230** (0.056)	-				
Philip	0.791** (0.020)	1.660** (0.044)	0.365** (0.022)	0.795** (0.035)	1.760** (0.058)	-			
Singap	0.445** (0.009)	0.679** (0.020)	0.276** (0.009)	0.416** (0.014)	0.808** (0.022)	0.886** (0.016)	-		
Taiwan	0.516** (0.009)	0.528** (0.034)	0.429** (0.012)	0.593** (0.023)	0.705** (0.023)	1.200** (0.023)	0.456** (0.012)	-	
Thai	0.792** (0.015)	1.070** (0.036)	0.330** (0.005)	0.962** (0.041)	1.640** (0.040)	1.540** (0.031)	0.870** (0.021)	0.711** (0.027)	-
US	-.013** (0.002)	0.031** (0.004)	0.066** (0.004)	-.006** (0.003)	-.026** (0.002)	0.043** (0.003)	-.060** (0.002)	-.025** (0.002)	0.043** (0.008)

Panle D: Covariances between future domestic excess return and future foreign dividend news.

	H-K	Indon	Japan	Korea	Malay	Philip	Singap	Taiwan	Thai
H-K	-								
Indon	1.410** (0.029)	-							
Japan	0.206** (0.015)	0.559** (0.031)	-						
Korea	0.929** (0.028)	2.120** (0.094)	0.826** (0.027)	-					
Malay	1.540** (0.035)	2.940** (0.092)	0.646** (0.024)	1.940** (0.024)	-				
Philip	1.490** (0.026)	3.000** (0.055)	0.585** (0.030)	1.250** (0.050)	2.770** (0.077)	-			
Singap	0.871** (0.013)	1.440** (0.029)	0.485** (0.012)	0.706** (0.021)	1.460** (0.031)	1.660** (0.023)	-		
Taiwan	0.952** (0.016)	1.140** (0.052)	0.729** (0.019)	1.010** (0.032)	1.220** (0.012)	1.920** (0.034)	0.829** (0.019)	-	
Thai	1.500** (0.020)	1.950** (0.053)	0.568** (0.024)	1.710** (0.065)	2.940** (0.058)	2.860** (0.041)	1.560** (0.027)	1.400** (0.034)	-
US	0.140** (0.004)	0.197** (0.009)	0.392** (0.005)	0.083** (0.009)	0.094** (0.005)	0.211** (0.009)	0.142** (0.004)	0.102** (0.003)	0.204** (0.008)

Table 6.C: Covariance Decomposition of US and PBCs: 1990.01-1997.06

Panel A: Covariances of future dividend news

	H-K	Indon	Japan	Korea	Malay	Philip	Singap	Taiwan	Thai
H-K	-								
Indon	1.600** (0.027)	-							
Japan	0.057** (0.019)	-.241** (0.026)	-						
Korea	0.507** (0.010)	0.132** (0.027)	0.778** (0.021)	-					
Malay	1.100** (0.012)	1.38** (0.026)	0.274** (0.017)	0.307** (0.008)	-				
Philip	1.200** (0.018)	1.960** (0.032)	0.299** (0.030)	0.276** (0.023)	1.580** (0.021)	-			
Singap	0.987** (0.008)	0.968** (0.013)	0.657** (0.017)	0.324** (0.011)	1.000** (0.013)	1.480** (0.022)	-		
Taiwan	1.310** (0.018)	1.340** (0.055)	1.130** (0.016)	1.160** (0.017)	1.290** (0.022)	2.820** (0.025)	1.210** (0.022)	-	
Thai	1.130** (0.018)	1.630** (0.037)	0.392** (0.032)	0.354** (0.021)	1.640** (0.018)	2.340** (0.042)	1.380** (0.023)	1.080** (0.047)	-
US	0.127** (0.001)	0.175** (0.001)	0.031** (0.000)	-.011** (0.000)	0.109** (0.000)	0.119** (0.000)	0.121** (0.000)	0.119** (0.000)	0.143** (0.001)

Panel B: Covariances of excess returns

	H-K	Indon	Japan	Korea	Malay	Philip	Singap	Taiwan	Thai
H-K	-								
Indon	0.332** (0.000)	-							
Japan	0.036** (0.000)	0.006** (0.000)	-						
Korea	0.137** (0.000)	0.072** (0.000)	0.187** (0.000)	-					
Malay	0.289** (0.000)	0.227** (0.000)	0.107** (0.000)	0.088** (0.000)	-				
Philip	0.359** (0.000)	0.325** (0.000)	0.066** (0.000)	0.084** (0.000)	0.352** (0.000)	-			
Singap	0.234** (0.000)	0.163** (0.000	0.148** (0.000)	0.109** (0.000)	0.230** (0.001)	0.314** (0.000)	-		
Taiwan	0.340** (0.000)	0.205** (0.000)	0.208** (0.000)	0.316** (0.000)	0.303** (0.000)	0.505** (0.000)	0.284** (0.000)	-	
Thai	0.325** (0.000)	0.289** (0.000)	0.091** (0.000)	0.087** (0.000)	0.359** (0.000)	0.531** (0.000)	0.285** (0.000)	0.299** (0.000)	-
US	0.012** (0.000)	0.043** (0.000)	0.020** (0.000)	0.010** (0.000)	0.035** (0.000)	0.012** (0.000)	0.023** (0.000)	0.012** (0.000)	0.010** (0.000)

Panel C: Covariances of future excess returns news

	H-K	Indon	Japan	Korea	Malay	Philip	Singap	Taiwan	Thai
H-K	-								
Indon	0.478** (0.015)	-							
Japan	0.015 (0.010)	0.001 (0.015)	-						
Korea	0.118** (0.005)	-0.027* (0.016)	0.211** (0.011)	-					
Malay	0.291** (0.006)	0.478** (0.015)	0.015** (0.009)	0.081** (0.005)	-				
Philip	0.268** (0.009)	0.670** (0.017)	0.086** (0.016)	0.054** (0.012)	0.461** (0.011)	-			
Singap	0.259** (0.005)	0.323** (0.008)	0.193** (0.010)	0.052** (0.006)	0.279** (0.008)	0.434** (0.023)	-		
Taiwan	0.305** (0.009)	0.459** (0.032)	0.366** (0.011)	0.275** (0.009)	0.347** (0.012)	0.928** (0.016)	0.318** (0.013)	-	
Thai	0.247** (0.009)	0.538** (0.022)	0.113** (0.018)	0.092** (0.012)	0.475** (0.010)	0.640** (0.022)	0.407** (0.013)	0.222** (0.025)	-
US	0.002** (0.000)	0.039** (0.000)	0.004** (0.002)	-.024** (0.000)	-.003** (0.000)	0.013** (0.000)	0.014** (0.000)	-.016** (0.000)	0.025** (0.000)

Panel D: Covariances between future domestic excess return and future foreign dividend news.

	H-K	Indon	Japan	Korea	Malay	Philip	Singap	Taiwan	Thai
H-K	-								
Indon	0.797** (0.022)	-							
Japan	-.036** (0.014)	-.132** (0.022)	-						
Korea	0.204** (0.008)	0.047** (0.019)	0.414** (0.015)	-					
Malay	0.590** (0.008)	0.009 (0.029)	0.012 (0.015)	0.189** (0.007)	-				
Philip	0.587** (0.004)	1.280** (0.028)	0.135** (0.012)	0.086** (0.018)	0.815** (0.019)	-			
Singap	0.519** (0.007)	0.673** (0.012)	0.302** (0.014)	0.109** (0.008)	0.536** (0.011)	0.865** (0.017)	-		
Taiwan	0.604** (0.017)	0.990** (0.044)	0.620** (0.018)	0.498** (0.016)	0.611** (0.023)	1.510** (0.029)	0.589** (0.019)	-	
Thai	0.566** (0.013)	1.030** (0.032)	0.152** (0.025)	0.207** (0.018)	0.869** (0.049)	1.230** (0.029)	0.709** (0.016)	0.530** (0.033)	-
US	0.099** (0.001)	0.120** (0.001)	0.037** (0.000)	0.009** (0.000)	0.046** (0.000)	0.098** (0.000)	0.087** (0.000)	0.037** (0.009)	0.099** (0.001)

Table 7.A: Correlations of US and PBCs: 1980.01-1989.12

This table reports the results of correlations of US and PBCs excess stock returns components. . The VAR is in excess return on US stocks, excess return on PBC stocks, US real interest rates, change in US nominal interest rate, the real exchange rate, US dividend yield and PBC dividend yield. Excess returns are measured in dollars relative to the one-month Treasury Bill rate. Dividend yields are computed as the sum of dividends over the last 12 months divided by the current price. The components of the variance are given in equation (9). All variables are measured in logs and are in real terms unless otherwise stated. For Hong Kong the sample period covers 1981.01 to 1989.12. * denotes significance at 10 % level and ** at the 5% level.

Panel A: Correlations of excess returns

	Hong Kong	Japan	Singapore	Thailand	US
Hong Kong	-				
Japan	0.184** (0.001)	-			
Singapore	0.409** (0.000)	0.137** (0.000)	-		
Thailand	0.393** (0.000)	0.012** (0.000)	0.491** (0.000)	-	
US	0.055** (0.000)	0.215** (0.000)	-.035** (0.000)	0.033** (0.000)	-

Panel B: Correlations of future dividend news

	Hong Kong	Japan	Singapore	Thailand	US
Hong Kong	-				
Japan	0.127* (0.082)	-			
Singapore	0.484** (0.046)	0.228** (0.073)	-		
Thailand	0.310** (0.103)	0.056 (0.080)	0.496** (0.054)	-	
US	0.311* (0.192)	0.484** (0.101)	0.532** (0.098)	0.552** (0.018)	-

Panel C: Correlations of future excess returns news

	Hong Kong	Japan	Singapore	Thailand	US
Hong Kong	-				
Japan	0.120 (0.146)	-			
Singapore	0.576** (0.087)	0.345** (0.125)	-		
Thailand	0.255 (0.193)	0.077 (0.144)	0.501** (0.094)	-	
US	0.139 (0.485)	0.436 (0.328)	0.799** (0.275)	0.975** (0.329)	

Panel D: Correlations of future domestic excess return and future foreign dividend news

	Hong Kong	Japan	Singapore	Thailand	US
Hong Kong	-				
Japan	0.285** (0.113)	-			
Singapore	0.555** (0.079)	0.245** (0.011)	-		
Thailand	0.200 (0.182)	0.085 (0.109)	0.481** (0.116)	-	
US	0.851** (0.242)	0.640** (0.182)	0.961** (0.053)	0.996** (0.015)	-

Table 7.B: Period 1990.01-1998.12

Panle A: Correlations of excess returns

	H-K	Indon	Japan	Korea	Malay	Philip	Singap	Taiwan	Thai
H-K	-								
Indon	0.616** (0.000)	-							
Japan	0.234** 0.000)	0.197** (0.000)	-						
Korea	0.363** (0.080)	0.316** (0.000)	0.425** (0.000)	-					
Malay	0.617** (0.000)	0.577** (0.000)	0.210** (0.000)	0.263** (0.000)	-				
Philip	0.624** (0.000)	0.516** (0.000)	0.279** (0.000)	0.277** (0.000)	0.627** (0.000)	-			
Singap	0.724** (0.000)	0.628** (0.000)	0.454** (0.000)	0.335** (0.001)	0.708** (0.001)	0.725** (0.001)	-		
Taiwan	0.441** (0.000)	0.297** (0.000)	0.250** (0.000)	0.276** (0.000)	0.416** (0.002)	0.486** (0.000)	0.494** (0.000)	-	
Thai	0.642** (0.000)	0.537** (0.000)	0.314** (0.000)	0.415** (0.000)	0.698** (0.000)	0.706** (0.000)	0.768** (0.000)	0.386** (0.000)	-
US	-.140** (0.000)	0.069** (0.000)	0.276** (0.000)	0.016** (0.000)	-.116** (0.000)	-.034** (0.000)	-.154** (0.000)	0.020** (0.000)	-.200** (0.000)

Panel B: Correlations of future dividend news

	H-K	Indon	Japan	Korea	Malay	Philip	Singap	Taiwan	Thai
H-K	-								
Indon	0.666** (0.043)	-							
Japan	0.223** (0.055)	0.243** (0.063)	-						
Korea	0.452** (0.044)	0.516** (0.085)	0.428** (0.051)	-					
Malay	0.699** (0.032)	0.718** (0.061)	0.319** (0.065)	0.533** (0.086)	-				
Philip	0.638** (0.037)	0.644** (0.044)	0.320** (0.081)	0.321** (0.075)	0.774** (0.031)	-			
Singap	0.735** (0.027)	0.610** (0.044)	0.485** (0.051)	0.369** (0.073)	0.775** (0.029)	0.798** (0.005)	-		
Taiwan	0.476** (0.042)	0.589** (0.068)	0.330** (0.043)	0.286** (0.061)	0.417** (0.048)	0.541** (0.026)	0.479** (0.052)	-	
Thai	0.659** (0.039)	0.662** (0.052)	0.321** (0.068)	0.467** (0.078)	0.806** (0.030)	0.754** (0.032)	0.767** (0.036)	0.387** (0.072)	-
US	0.322** (0.085)	0.180 (0.197)	0.724** (0.171)	0.039 (0.198)	0.038 (0.172)	0.249 (0.224)	0.344** (0.144)	0.139 (0.106)	0.15 (0.194)

Panel C: Correlations of future excess returns news

	H-K	Indon	Japan	Korea	Malay	Philip	Singap	Taiwan	Thai
H-K	-								
Indon	0.686** (0.076)	-							
Japan	0.212* (0.117)	0.310** (0.118)	-						
Korea	0.524** (0.081)	0.622** (0.107)	0.446** (0.095)	-					
Malay	0.774** (0.054)	0.810** (0.082)	0.415** (0.119)	0.731** (0.088)	-				
Philip	0.656** (0.067)	0.677** (0.066)	0.369** (0.142)	0.429** (0.127)	0.832** (0.043)	-			
Singap	0.732** (0.053)	0.373** (0.066)	0.523** (0.102)	0.443** (0.114)	0.832** (0.052)	0.811** (0.030)	-		
Taiwan	0.498** (0.086)	0.281** (0.125)	0.408** (0.088)	0.422** (0.092)	0.440** (0.100)	0.577** (0.024)	0.452** (0.105)	-	
Thai	0.669** (0.066)	0.675** (0.088)	0.335** (0.125)	0.871** (0.038)	0.497** (0.245)	0.778** (0.048)	0.804** (0.054)	0.379** (0.136)	-
US	-.543 (0.508)	0.321 (0.441)	0.414 (0.692)	-0.525 (0.339)	-.320 (0.751)	0.546** (0.109)	-0.027 (0.854)	-.524 (0.347)	0.812** (0.213)

Panel D: Correlations between future domestic excess return and future foreign dividend news.

	H-K	Indon	Japan	Korea	Malay	Philip	Singap	Taiwan	Thai
H-K	-								
Indon	0.643** (0.074)	-							
Japan	0.189 (0.128)	0.226** (0.109)	-						
Korea	0.602** (0.023)	0.571** (0.133)	0.438** (0.061)	-					
Malay	0.757** (0.053)	0.800** (0.046)	0.338** (0.103)	0.639** (0.077)	-				
Philip	0.693** (0.043)	0.760** (0.048)	0.315** (0.114)	0.394** (0.106)	0.811** (0.041)	-			
Singap	0.766** (0.047)	0.775** (0.052)	0.355** (0.050)	0.394** (0.093)	0.800** (0.039)	0.846** (0.030)	-		
Taiwan	0.472** (0.079)	0.306** (0.117)	0.352** (0.048)	0.306** (0.080)	0.383** (0.093)	0.534** (0.079)	0.446** (0.088)	-	
Thai	0.719** (0.050)	0.647** (0.086)	0.285** (0.122)	0.555** (0.114)	0.865** (0.043)	0.794** (0.051)	0.804** (0.050)	0.412** (0.099)	-
US	0.803** (0.086)	0.706** (0.193)	0.830** (0.369)	0.443 (0.432)	0.521** (0.241)	0.797** (0.189)	0.848** (0.096)	0.527** (0.183)	0.761** (0.161)

Table 7.C: Period 1990.01-1997.06

Panel A: Correlations of excess returns

	H-K	Indon	Japan	Korea	Malay	Philip	Singap	Taiwan	Thai
H-K	-								
Indon	0.595** (0.000)	-							
Japan	0.123** (0.000)	0.061** (0.000)	-						
Korea	0.287** (0.000)	0.176** (0.000)	0.359** (0.000)	-					
Malay	0.646** (0.000)	0.570** (0.000)	0.210** (0.003)	0.210** (0.000)	-				
Philip	0.600** (0.000)	0.523** (0.000)	0.094** (0.000)	0.115** (0.000)	0.609** (0.000)	-			
Singap	0.636** (0.000)	0.489** (0.000	0.383** (0.000)	0.292** (0.000)	0.726** (0.001)	0.703** (0.000)	-		
Taiwan	0.378** (0.000)	0.269** (0.000)	0.212** (0.000)	0.314** (0.000)	0.380** (0.000)	0.450** (0.000)	0.439** (0.000)	-	
Thai	0.515** (0.000)	0.464** (0.000)	0.135** (0.000)	0.154** (0.000)	0.637** (0.000)	0.665** (0.000)	0.636** (0.000)	0.288** (0.000)	-
US	0.067** (0.000)	0.226** (0.000)	0.120** (0.000)	0.053** (0.000)	0.198** (0.000)	0.026** (0.000)	0.090** (0.000)	0.064** (0.000)	0.041** (0.000)

Panel B: Correlations of future dividend news

	H-K	Indon	Japan	Korea	Malay	Philip	Singap	Taiwan	Thai
H-K	-								
Indon	0.049** (0.061)	-							
Japan	0.077 (0.064)	0.047 (0.082)	-						
Korea	0.255** (0.055)	0.164* (0.098)	0.377** (0.077)	-					
Malay	0.660** (0.032)	0.701** (0.047)	-0.192 (0.337)	0.192** (0.054)	-				
Philip	0.515** (0.045)	0.613** (0.047)	0.100 (0.094)	0.084 (0.088)	0.626** (0.034)	-			
Singap	0.647** (0.030)	0.600** (0.043)	0.387** (0.070)	0.210** (0.066)	0.731* (0.032)	0.732** (0.033)	-		
Taiwan	0.363** (0.056)	0.397** (0.091)	0.269** (0.039)	0.263** (0.048)	0.396** (0.065)	0.566** (0.043)	0.431** (0.075)	-	
Thai	0.417** (0.048)	0.499** (0.088)	0.133 (0.102)	0.167** (0.080)	0.665** (0.043)	0.622** (0.058)	0.667** (0.047)	0.243** (0.097)	-
US	0.535** (0.094)	0.550** (0.162)	0.223** (0.102)	-0.055 (0.104)	0.476** (0.148)	0.280* (0.162)	0.609** (0.122)	0.275** (0.080)	0.397** (0.166)

Panel C: Correlations of future excess returns news

	H-K	Indon	Japan	Korea	Malay	Philip	Singap	Taiwan	Thai
H-K	-								
Indon	0.685** (0.112)	-							
Japan	0.020 (0.018)	0.019 (0.157)	-						
Korea	0.210* (0.113)	-0.140 (0.202)	0.394** (0.150)	-					
Malay	0.657** (0.060)	0.785** (0.068)	0.989** (0.014)	0.192* (0.289)	-				
Philip	0.436** (0.098)	0.664** (0.074)	0.107 (0.189)	0.050 (0.181)	0.645** (0.065)	-			
Singap	0.650** (0.061)	0.668** (0.071)	0.400** (0.145)	0.126 (0.141)	0.720** (0.070)	0.753** (0.060)	-		
Taiwan	0.333** (0.112)	0.473** (0.156)	0.323** (0.085)	0.232** (0.101)	0.401** (0.132)	0.652** (0.077)	0.411** (0.154)	-	
Thai	0.335** (0.096	0.512** (0.158)	0.132 (0.197)	0.174 (0.162)	0.681** (0.087)	0.583** (0.259)	0.689** (0.083)	0.186 (0.180)	-
US	0.109 (0.553)	0.867** (0.239)	0.496 (1.414)	-.755** (0.176)	-0.085 (0.486)	0.157 (0.549)	0.714** (0.549)	-0.392 (0.560)	0.726** (0.324)

Panel D: Correlations between future domestic excess return and future foreign dividend news.

	H-K	Indon	Japan	Korea	Malay	Philip	Singap	Taiwan	Thai
H-K	-								
Indon	0.687** (0.122)	-							
Japan	-0.040 (0.160)	-0.081 (0.132)	-						
Korea	0.237** (0.104)	0.034 (0.142)	0.387** (0.098)	-					
Malay	0.684** (0.068)	0.665** (0.078)	0.012 (0.149)	0.234** (0.061)	-				
Philip	0.494** (0.089)	0.635** (0.081)	0.089 (0.147)	0.066 (0.144)	0.624** (0.083)	-			
Singap	0.690** (0.057)	0.632** (0.075)	0.327** (0.114)	0.153 (0.113)	0.746** (0.070)	0.780** (0.044)	-		
Taiwan	0.346** (0.097)	0.373** (0.143)	0.294** (0.035)	0.299** (0.082)	0.368** (0.130)	0.559** (0.073)	0.404** (0.117)	-	
Thai	0.427** (0.077)	0.519** (0.014)	0.095 (0.156)	0.164 (0.145)	0.679** (0.084)	0.595** (0.077)	0.645** (0.060)	0.209** (0.141)	-
US	0.787** (0.103)	0.785** (0.129)	0.400** (0.288)	0.110 (0.163)	0.523* (0.312)	0.572* (0.303)	0.866** (0.103)	0.478** (0.187)	0.631** (0.055)