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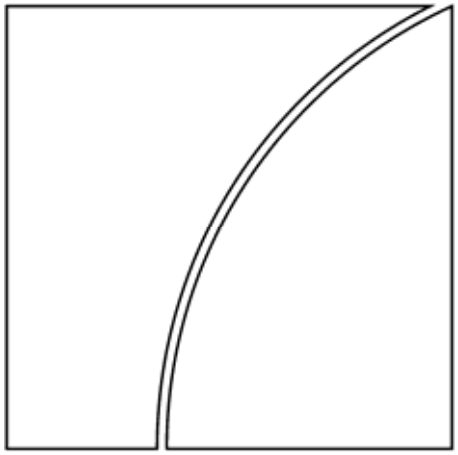

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Regional financial integration in Asia: present and future

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Foreword

Since its launch in September 2006, the Asian Research Programme has focused on policy-oriented studies for central banks and supervisory authorities in the Asia-Pacific region. Under the programme, research projects are undertaken by economists at the BIS Representative Office for Asia and the Pacific in collaboration with the research departments of central banks and supervisory authorities in Asia and the Pacific. The subjects of interest have included improving monetary policy and operations, developing financial markets, maintaining financial stability and strengthening prudential policy. To complement the Asian Research Programme, the BIS Asian Office set up two research networks in early 2007, one focusing on monetary policy and exchange rates and the other focusing on financial markets and institutions. The network members share information on policy issues, identify collaborative projects and organise workshops.

The BIS Asian Office and the Hong Kong Institute for Monetary Research jointly organised the first annual workshop of the Asian Research Network on Financial Markets and Institutions in Hong Kong SAR on 21 January 2008. More than 30 participants took part in the workshop, including senior research officers and economists from Asia-Pacific central banks and supervisory authorities as well as an academic and a market participant. The theme of the workshop was *Regional financial integration in Asia: present and future*. Eight papers were presented around the following four topics: (1) Asia financial integration – how far and why?; (2) financial liberalisation and cooperation in Asia; (3) aspects of economic and financial integration; and (4) India's integration in the global financial system. This volume makes available revised versions of all papers presented during the workshop.

Programme

Monday 21 January 2008

Session I	***Asia Financial Integration – How Far and Why?***	
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	Authors:	Laurence Fung, Chi-sang Tam and Ip-wing Yu (Hong Kong Monetary Authority)
	Discussant:	Naoyuki Yoshino (Financial Services Agency, Japan)
	Paper:	Why is there so little regional financial integration in Asia?
	Authors:	Alicia García-Herrero (Banco Bilbao Vizcaya Argentaria), Doo-yong Yang (Korea Institute for International Economic Policy) and Philip Wooldridge (Bank for International Settlements)
	Discussant:	Prasanna Gai (Australian National University)
	Chairperson:	Hans Genberg (Hong Kong Monetary Authority)

Session II	***Financial Liberalisation and Cooperation in Asia***	
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	Discussant:	Katrina Ellis (Australian Prudential Regulation Authority)
	Paper:	Regional financial cooperation in Asia: challenges and path to development
	Author:	Jee-young Jung (Bank of Korea)
	Discussant:	Wimboh Santoso (Bank Indonesia)
	Chairperson:	Wimboh Santoso (Bank Indonesia)

Session III ***Aspects of Economic and Financial Integration***

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	Paper:	Volatility and persistence of capital flows
	Authors:	Chris Becker and Clare Noone (Reserve Bank of Australia)
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	Chairperson:	Christopher Kent (Reserve Bank of Australia)

Session IV ***India's Integration in the Global Financial System***

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	Discussant:	Hans Genberg (Hong Kong Monetary Authority)
	Paper:	Integration of India's stock market with global and major regional markets
	Authors:	Janak Raj and Sarat Dhal (Reserve Bank of India)
	Discussant:	Eli Remolona (Bank for International Settlements)
	Chairperson:	Eli Remolona (Bank for International Settlements)

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Assessing the integration of Asia's equity and bond markets[1]

Laurence Kang-por Fung[2], Chi-sang Tam[3] and Ip-wing Yu[4]

1. Introduction

Ten years after the financial crisis of 1997–98 that devastated Asian financial markets and economies, several regional initiatives, including the Chiang Mai Initiative and the Asian Bond Markets Initiative, have been put in place to strengthen financial cooperation and integration in the region.[5] Globalisation in the 1990s made Asia a more integrated region through increased cross-border trades and economic activities. Strong intraregional economic links have resulted in increased cross-border financial activities. Furthermore, economies in the region have made efforts to diversify their sources of funding, diminishing their reliance on the banking sector in favour of other financing instruments such as equities and bonds. Despite these developments, intraregional financial integration appears to lag behind the increase in intraregional trade.[6] Such asymmetric development in economic and financial integration may affect financial stability in the region.

Financial integration would benefit the region through more efficient allocation of capital, greater opportunities for risk diversification, a lower probability of asymmetric shocks and a more robust market framework (Pauer (2005)). These effects would help improve the capacity of the economies to absorb shocks and foster development. Moreover, financial integration may also promote financial development and hence enhance economic growth in the region.[7] However, intensified financial linkages in a world of high capital mobility may also increase the risk of cross-border financial contagion, in particular when the region's economies become more interdependent. In other words, financial instability in one country could be transmitted to neighbouring countries more rapidly. At times of financial crisis, this contagion might have important consequences for financial stability. Against this background, it is essential to have appropriate measures for monitoring and assessing the progress of

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1 The views expressed in this paper are solely our own and not necessarily those of the Hong Kong Monetary Authority (HKMA). We are grateful to Hans Genberg, Cho-hoi Hui and Dong He of the HKMA, as well as to seminar participants, for their useful comments. All remaining errors are ours.

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5 In addition to these initiatives, an Asian currency basket and Asian currency union for intraregional exchange rate stability have been proposed as medium- and long-term policy objectives (Institute for International Monetary Affairs (2006)).

6 See Danareksa Research Institute (2004).

7 As de Brouwer and Corbett (2005) point out, financial market integration creates powerful internal pressures for financial reform and development by encouraging further financial liberalisation and upgrading of financial capacity.

financial integration in the region.[8] This study provides a discussion of different indicators and measures and addresses the following questions in particular:

- To what extent are equity and bond markets in the region integrated?
- What are the evolution and the current level of integration in the equity and the bond markets? Is integration in either market progressing, at a standstill or even regressing?
- What is the relative importance of regional (within Asia) factors, compared with global factors (proxied by the corresponding asset returns in the United States) in intraregional equity and bond market integration?
- Given the concern about possible contagion effects and their importance for risk management, to what extent are returns in equity and bond markets correlated within and across economies?

Unlike most studies, which focus on the integration of either the equity markets or the bond markets, this study compares the different experiences of the region's equity and government bond markets with integration. In addition, the co-movement of equity and bond returns at the national and regional levels has important implications for contagion and risk management.[9]

The indicators in this study are mostly of high frequency and permit an assessment of the dynamic evolution of financial market integration.[10] Like other integration measures in the literature, the indicators proposed in this study vary in their scope and focus. For example, the return dispersion measure uses the idea of price convergence to assess integration, whereas the correlation analysis uses the extent of asset return co-movement as an indication of the degree of integration. The combined use of these indicators provides information on different dimensions of integration and thus gives policymakers a more balanced picture. That said, the empirical results derived from these indicators should be interpreted with caution as all of the indicators are statistical or model-based measures subject to technical limitations and modelling assumptions. For monitoring purposes, these indicators should, if possible, be supplemented by other integration measures, such as the size of capital flows or cross-border holdings of financial assets.[11]

The remainder of this paper is organised as follows. In Section 2 we provide a brief review of the current issues related to financial integration in Asia and of the traditional approaches to assessing the degree of financial integration. The various indicators used in this study are also presented. Data used in the study and some preliminary analyses of the data series are discussed in Section 3. The estimation results from the integration indicators are presented and their behaviours examined in Section 4. Section 5 provides a summary and discussion.

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[8] The informative value of these integration measures or indicators for ongoing efforts to monitor the degree of financial integration in the euro area is highlighted in publications from the European Central Bank (ECB) and the European Commission (EC). See ECB (2005) and EC (2005).

[9] In addition to examining the degree of integration within a specific financial asset market, Cappiello, Engle and Sheppard (2003) and Kim, Moshirian and Wu (2006) also studied the correlations of equity and bond returns in Europe.

[10] Traditional measures of financial market integration, such as the savings-investment correlation proposed by Feldstein and Horioka (1980), are not suitable for continuous monitoring on a regular basis.

[11] These alternative measures, however, may not be as timely and frequent as the indicators proposed in this paper.

2. Recent studies on financial integration and their measures

The issue of financial market integration in Asia, particularly equity market integration, has been examined extensively in the literature, using different measures and methodologies. However, there are few empirical works on bond market integration in Asia. And the degree of financial integration in Asia remains a matter of vigorous debate.

For example, the Danareksa Research Institute (2004) finds that financial integration in Asia is still far behind that in Europe prior to the latter's unification in the 1990s. Using the 10-year government bond benchmark yield to examine the status of government bond market integration in the ASEAN+3 group of economies, Danareksa Research Institute (2004) finds no significant convergence pattern. It concludes that the underdeveloped state of bond markets in most East Asian countries bears the main responsibility for the slow convergence in bond market yields in the region. Using the size of cross-border assets such as securities and bank claims to estimate the gravity model of bilateral financial asset holdings and the consumption risk-sharing model, Kim, Lee and Shin (2006) conclude that the East Asian financial markets are less integrated with each other than they are with the global market. They argue that the low level of financial integration within East Asia is attributable to the lack of incentives for portfolio diversification within the region, the low degree of development and deregulation of the financial markets and the instability of monetary and exchange rate regimes.

On the other hand, Jeon, Oh and Yang (2006) find that the degree of financial integration in East Asia has increased recently, but that this is due to integration with the global market rather than with regional counterparts. Based on the data for intraregional foreign direct investment (FDI), Kawai (2005) notes that the rise in Asia's newly industrialised economies' investment contributes to the integration of the East Asian economies through FDI and FDI-driven trade. Using data from the international bond market and the international syndicated loan market, McCauley, Fung and Gadanecz (2002) show that East Asian investors and banks have on average allocated half of the funds in bonds underwritten and loans syndicated to borrowers in East Asia. Based on this measure, they assert that the financial markets of East Asia are more integrated than is often suggested. The Asian Development Bank (2005) notes that cross-country differentials in bond yields have been declining. Although these differentials remain significant, there are signs of increased co-movement in bond yields, suggesting that bond market integration is making progress.

There is, in general, no universal definition of financial integration. Financial openness, free movement of capital and integration of financial services are mentioned in a broad range of definitions frequently cited in the literature.[12] In one commonly used definition, financial markets are said to be integrated when the law of one price holds. This implies that assets generating identical cash flows should command the same return, regardless of the domicile of the issuers and the asset holders. Discrepancies in prices or returns on identical (or comparable) assets would tend to be used as evidence that financial markets are not integrated. In the literature, there are largely two broad categories of financial integration measures – price-based measures and quantity-based measures.[13]

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[12] In some studies, regulatory and institutional factors, such as the relaxation of capital controls, financial liberalisation, prudential regulations, efficiency of the legal system and standardisation of market frameworks, are also cited as measures of financial integration. These measures, however, are less popular than the price- and quantity-based ones in a regular monitoring framework as they are not available in a timely manner.

[13] For a survey of the literature and various indicators, see Adam et al (2002), Dennis and Yusof (2003), Cavoli, Rajan and Siregar (2004), Baele et al (2004) and Vo (2005).

a. Price-based measures

Price- or return-based measures of financial integration seek to equate the rates of returns of comparable assets across different economies. Many research studies rely on interest rate parity, including covered interest rate parity (CIP), uncovered interest rate parity (UIP) and real interest rate parity (RIP), to test for the degree of financial market integration. Yield differentials, co-movement of financial asset returns and return dispersion measures are also used.

b. Quantity-based measures

The traditional quantity-based measure considers the savings-investment correlation, as in the Feldstein and Horioka (1980) test of capital mobility. Feldstein and Horioka argue that, with perfect capital mobility, there should be no relation between domestic savings and investment – ie if financial markets are well integrated, the correlation between investment and savings should be low.[14] The net capital flow, which captures cross-border transactions involving financial assets, is another measure for assessing financial market integration.[15]

For monitoring purposes, it is desirable for policymakers to have indicators, such as the price-based ones, that are frequently available. In this study, we make use of high frequency data to construct several indicators for measuring different dimensions of equity and bond market integration in Asia, including

1. cross-market return dispersion and differentials;
2. time-varying ß estimated via Haldane and Hall (1991) Kalman filter method;
3. rolling estimates of the standardised trace statistics from dynamic cointegration analysis;
4. rolling concordance index from market cycle synchronisation analysis; and
5. dynamic conditional correlation.

These indicators are mostly model-based and provide high frequency measures for regular monitoring purposes (see Table 1 for a summary of the integration measures in this study).[16] Detailed discussions on the methodologies for constructing these indicators, and on the interpretation of the indicators, are presented in the appendix.

It is worth noting that financial market integration has different dimensions, and its definition varies depending on the focus of the study. This paper attempts to give an assessment of financial market integration in different dimensions through the use of various price-based indicators. Some of the indicators look into price convergence; others pay attention to the sensitivity, co-movement, cycle synchronisation and return correlation as evidence of integration. It is, therefore, not surprising to have different results regarding the extent and

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[14] The Feldstein and Horioka capital mobility test is based on the following cross-country regression equation: $\left(I/Y\right)_i = \alpha + \beta\left(S/Y\right)_i$,

where I denotes investments in country i, Y is the gross domestic product of country i, and S is savings in country i. Theoretically, a very small ß coefficient indicates perfect capital mobility. On the other hand, in a closed economy with little capital mobility, the ß coefficient will be high and close to one.

[15] See Vo (2005) for a review of the quantity-based integration concept.

[16] ECB (2005) provides a survey of the integration measures it uses in monitoring financial market integration in Europe. Among the integration measures proposed in this study, the return dispersion is adopted from ECB (2005), while the other indicators make use of recent advances in the literature in measuring the time-varying degree of integration.

the speed of equity market integration from these indicators, especially during some sub-sample periods in this study. Given that the construction of these indicators is subject to technical limitations and modelling assumptions, these indicators should be interpreted with caution and taken as indicative but not conclusive evidence on the general trend of the integration process.[17]

Table 1

Summary of integration measures for equity and bond markets

Method	Indicator	Indication of market integration
Cross-market return dispersion and maximum-minimum return differential	Hodrick-Prescott filtered standard deviation of equity returns and 12-month moving average of maximum-minimum return differentials	Falling return dispersion and smaller return differential imply higher return convergence
Haldane and Hall (1991) Kalman filter method	Time-varying ß estimated via Kalman filter	Average ß moving towards zero indicates an increasing sensitivity to regional influence
Dynamic cointegration analysis	Rolling estimates of the standardised trace statistics	Standardised trace statistics consistently greater than one indicate the presence of a long-run relationship between financial markets
Market cycle synchronisation	Rolling concordance index (*RCI*)	An upward trend in the *RCI* signals increasing market concordance
Dynamic conditional correlation (DCC) model	Time-varying correlation estimated from the DCC model	The higher the correlation, the greater the co-movement between markets is

3. The data and their time series properties

Ten economies in the Asian region are covered in this study, namely China, Hong Kong SAR, Indonesia, Japan, Korea, Malaysia, the Philippines, Singapore, Taiwan (China) and Thailand. In addition to the aggregate indicators for all these economies, indicators for regional blocs are also constructed. These regional blocs are

[17] It should be noted that most of these aggregate indicators are obtained by taking the simple average of the indicators estimated for individual economies. However, as the starting dates of the bond yield data in this study are different (as are their estimated indicators), the number of individual indicators on bond market integration being averaged will increase over time. For instance, government bond yield data were not available in Indonesia before January 2003. Thus, the estimated bond market integration indicators for Indonesia are not included in the aggregation until January 2003. In this regard, the general trend of these aggregate bond market integration indicators should be interpreted with caution.

1. Greater China region: China, Hong Kong SAR and Taiwan (China);[18]
2. Four-dragon bloc: Hong Kong SAR, Korea, Singapore and Taiwan (China);[19] and
3. Emerging Asia: Indonesia, Malaysia, the Philippines and Thailand.

Table 2a

Benchmark equity indices

Equity market	Benchmark index
Asia	
Japan	Nikkei 225 Stock Average
China	Shanghai A and Shenzhen A
Hong Kong SAR	Hang Seng Index (HSI), Hang Seng China Enterprises Index (H-shares)
Taiwan, China	TSE Composite Index
Korea	KSE Composite Index
Singapore	Straits Times Index
Malaysia	KLSE Composite Index
Thailand	SET Index
Indonesia	JSX Composite Index
Philippines	PSE Index
World influence	
United States	Dow Jones Industrial Average
Regional influence	
MSCI Far East	MSCI AC Far East Free Index

Sources: IMF; Bloomberg; CEIC; Datastream.

Table 2a highlights the benchmark indices of these economies in the study of equity markets, while Table 2b provides the details of the sovereign (government) bond data used in this paper. Data are examined for bonds with maturities of two years, five years and 10 years issued by these 10 economies. As the empirical results, shown below, indicate that the pattern and extent of integration is very similar for bonds with different maturities, this paper shows only the results for the 10-year bond, for illustration.[20] As government bond issuance varies for the different economies, each bond yield series has a different starting date (see Table 2b). The Dow Jones Industrial Average (DJIA) and the yield on the US 10-year Treasury bond are used as proxies for the external (or world) equity and bond markets, respectively. The MSCI AC Far East Free Index is taken as the regional equity market

[18] For Hong Kong SAR, the Hang Seng China Enterprises Index (H-shares) is included as one of the equity markets in the greater China region along with the benchmark Hang Seng Index. The bond market data for Hong Kong SAR are those of the Exchange Fund Notes (EFN).

[19] For Hong Kong SAR, only the benchmark Hang Seng Index is included in the four-dragon bloc.

[20] Interested readers may refer to Yu, Fung and Tam (2007) for details of the results for the other two maturities.

benchmark.[21] The regional bond market benchmark will be either the unweighted cross-country government bond return average or the JPMorgan EMBIG Asia Sovereign Return Index.[22] Data on benchmark equity indices from 16 March 1994 to October 2007 are used in the estimation.[23]

Table 2b

Government bonds used in this study[1, 2]

	Bond data starting date
Hong Kong SAR[3], Taiwan (China), Japan, Korea, Malaysia, Thailand, the Philippines and the US Treasury bond	Oct–96
China	May–01
Singapore	Jun–98
Indonesia	Jul–03
JPMorgan EMBIG Asia Sovereign yield	Dec–97

[1] Sovereign (government) bonds with a 10-year maturity. [2] All bond data are in terms of yields and the data sample ends at October 2007. [3] Yields are those of Exchange Fund Notes.

Sources: IMF; Bloomberg; CEIC; Datastream.

Most of the indicators derived in this paper, as in other studies, are based on daily returns, except for the estimation of the dynamic conditional correlation indicator, which is based on weekly returns. For equity markets, all integration indicators are derived using the benchmark equity index levels expressed in terms of the US dollar.[24] For bond markets, the derivations of integration indicators are based on the holding period returns (bond returns) in terms of the US dollar.[25, 26]

[21] The MSCI AC Far East Free Index is a free float-adjusted market capitalisation weighted index consisting of indices for the following 10 economies: China, Hong Kong SAR, Indonesia, Japan, Korea, Malaysia, the Philippines, Singapore, Taiwan (China) and Thailand.

[22] The choice of regional bond market proxy is different in different integration measures. For the Haldane and Hall Kalman filter method, the proxy is the unweighted cross-country government bond return average. For each bond market, this regional benchmark bond return proxy is calculated as the average cross-country bond return, excluding the bond return of that market itself. For instance, when calculating the 10-year regional benchmark bond return for Hong Kong SAR, the 10-year EFN return of Hong Kong SAR is excluded from the cross-country average calculation. On the other hand, the JPMorgan EMBIG Asia Sovereign return is used as the regional bond market proxy for all economies for the estimations of the dynamic conditional correlations. A common regional bond market proxy reduces the number of data series used in the estimations and thus makes the estimation process more efficient.

[23] All integration indicators are derived using the benchmark equity index levels expressed in terms of US dollars. One exception is the indicator from the common component approach, in which the index levels are expressed in terms of local currency. The benchmark index is converted into US dollars by dividing the local currency index level by the local currency per US dollar exchange rate.

[24] The benchmark equity index is converted into US dollars by dividing the local currency index level by the local currency per US dollar exchange rate. Equity market returns are calculated as daily (or weekly) log first differences.

[25] In this study, the bond return is approximated by the daily holding period return for a government bond based on Shiller (1979). For bonds selling at or near par value, Shiller suggests an approximate expression for the n-period holding period return $H_t^{(n)}$. In the approximate expression, the n-period holding period return, $H_t^{(n)}$, is

Table 3a

Stationarity and serial correlation tests of equity return series

	Stationarity test		Serial correlation test Ljung-Box (Q) test statistics	
	On the level	On the difference	Q(4)	$Q^2(4)$
Equity return series				
China				
Shanghai A	7.87	–59.79*	10.34*	109.73*
Shenzhen A	4.41	–56.30*	13.67*	146.58*
Hong Kong SAR				
HSI	1.40	–58.20*	14.34*	75.01*
H-shares	5.54	–53.09*	11.32*	83.89*
Taiwan, China	–1.79	–57.57*	2.93	136.87*
Japan	–1.77	–64.52*	0.09	12.31*
Korea	1.11	–55.36*	14.53*	234.12*
Singapore	1.31	–54.39*	10.97*	89.64*
Malaysia	–1.06	–51.48*	26.81*	210.35*
Thailand	–1.83	–54.19*	25.19*	78.86*
Indonesia	–0.52	–49.16*	10.84*	243.95*
Philippines	–1.13	–49.12*	23.02*	45.93*
United States	–1.05	–60.60*	2.28	58.69*
Regional	–0.88	–57.96*	0.76	50.53*

The tests are conducted based on the benchmark equity return indices expressed in US dollars. * indicates significance at the 5% confidence level. The critical value at the 5% level of the PP test is –2.86. Q(4) and $Q^2(4)$ are the Ljung-Box statistics based on the level and the squared level of the weekly equity return series, respectively, up to the 4th order. Both statistics are asymptotically distributed as $\chi^2(4)$. The critical value of $\chi^2(4)$ at the 5% level is 9.5.

Source: HKMA staff estimates.

approximated as $H_t^{(n)} = (R_t^{(n)} - \gamma_n R_{t+1}^{(n-1)})/(1-\gamma^{n-1})$, $\gamma_n = \gamma(1-\gamma^{n-1})/(1-\gamma^n)$, $\gamma = 1/(1+\overline{R})$, where $R_t^{(n)}$ is the yield to maturity and $\overline{R}$ is the mean value of the yield to maturity. Once the local currency bond return is calculated, it is expressed in terms of the US dollar by dividing the local currency bond return by the daily percentage change in the local currency per US dollar exchange rate. The indicators derived from the cross-country bond return dispersion and differential analysis, and the dynamic conditional correlation model, are based on the bond returns. For the Haldane and Hall Kalman filter method, the indicators are based on the bond indices calculated from the bond return series.

[26] In the integration literature, it is common to express the asset returns in terms of the same currency.

To perform cointegration analysis, the non-stationary property of the data series in question must be established. We use the Phillips-Perron (PP) test to determine the unit root property of the equity and bond return indices. Furthermore, the Ljung-Box tests for serial correlation on the weekly equity return series (in the log difference of the equity index level) and the weekly bond return series (based on the weekly holding period return) are performed on their levels and their squared levels. Tables 3a and 3b provide the time series properties of equity and bond returns, respectively.

The results of the PP tests in Tables 3a and 3b show that all benchmark equity indices and bond return indices are non-stationary on their levels (the null hypothesis of the presence of a unit root on the level cannot be rejected), but they are stationary on the first differences. Given that these indices possess unit roots, the Johansen (1988) procedure is applied, based on a rolling window with a constant sample size, to consider whether the individually non-stationary series are cointegrating. The Ljung-Box tests for serial correlation on the weekly equity return and bond return series, as shown by the Q statistics in Tables 3a and 3b, provide evidence of serial correlation in their levels (for most return series) as well as the squared levels (except the bond return series of Japan). Thus, univariate GARCH models are first estimated for each return series, and their standardised residuals will then be used in the DCC model to estimate the time-varying conditional correlations between asset returns.

Table 3b

Stationarity and serial correlation tests of bond return series

	Stationarity test		**Serial correlation test Ljung-Box (Q) test statistics**	
	On the level	**On the difference**	**Q(4)**	**Q^2(4)**
Bond return series				
China	–1.70	–40.93*	5.36	11.25*
Hong Kong SAR	–0.77	–52.00*	20.56*	41.22*
Taiwan, China	–0.63	–55.30*	64.42*	25.51*
Japan	–2.30	–53.33*	1.40	4.77
Korea	–0.01	–49.93*	189.33*	241.83*
Singapore	–0.21	–47.37*	3.46	38.36*
Malaysia	0.69	–46.66*	28.42*	113.58*
Thailand	0.08	–55.67*	18.60*	146.00*
Indonesia	–0.12	–35.77*	31.12*	18.99*
Philippines	1.32	–53.45*	14.78*	37.40*
United States	–1.33	–52.03*	1.65	14.11*
Regional	–0.70	–54.93*	25.95*	106.51*

The tests are conducted based on the benchmark bond return indices expressed in US dollars. * indicates significance at the 5% confidence level. The critical value at the 5% level of the PP test is –2.86. Q(4) and Q^2(4) are the Ljung-Box statistics based on the level and the squared level of the weekly bond return series, respectively, up to the 4th order. Both statistics are asymptotically distributed as χ^2 (4). The critical value of χ^2 (4) at the 5% level is 9.5.

Source: HKMA staff estimates.

4. Results and presentation of integration indicators

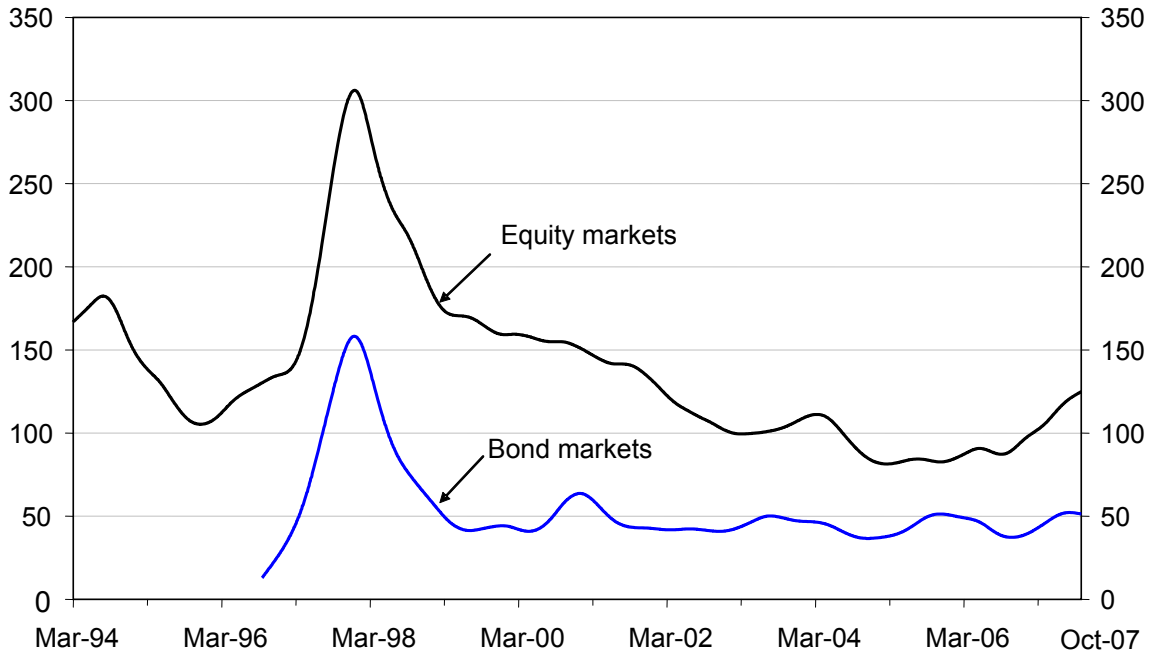
4.1 Cross-market return dispersion

The series of return dispersion is calculated as the cross-market standard deviation of the daily returns of the 10 Asian benchmark equity markets. The series is filtered using the Hodrick-Prescott smoothing technique to reveal the long-term trend component of the series.[27] Figure 1 presents the Hodrick-Prescott filtered equity and bond return dispersions.

Figure 1

Hodrick-Prescott filtered return dispersion in Asian economies

In basis points



Source: HKMA staff estimates.

Figure 1 shows that the return dispersion is larger in equity markets than in bond markets, suggesting that the return divergence is larger for equities than for bonds. The two return dispersion series depict a rapid decline after the Asian financial crisis. For equity markets, the return dispersion dropped from a high of 305 basis points (bps) during the Asian financial crisis to a low of 82 bps at the end of February 2005. The decline in return dispersion during this period implies greater equity market integration. However, the dispersion has been trending upward, widening to 125 bps at end-October 2007. For bond markets, the return dispersion dropped from its peak of 160 bps in early 1998 to fluctuate between 40 and 50 bps beginning in mid-2001. Given that the perceived credit risk or liquidity of the relevant government bonds could be different even in a fully integrated market, the bond return

[27] The daily smoothing parameter of the Hodrick-Prescott filter is 6,812,100, which is set following the frequency power rule of Ravn and Uhlig (2002) with a power of 2. While a larger smoothing parameter number results in more smoothing, we find that the general trend of the filtered return dispersion is not affected by the choice of the smoothing parameter.

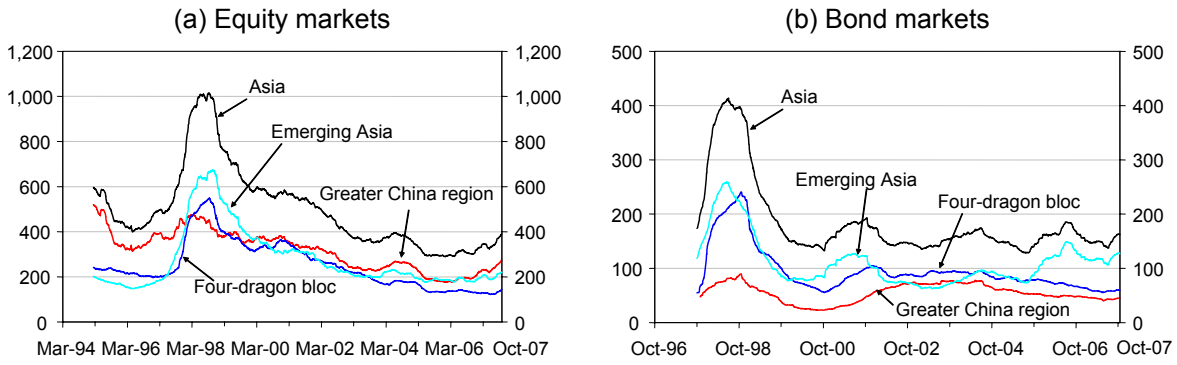
dispersion indicator may not fall further even when there is increased integration in the bond markets.

Figures 2a and 2b illustrate the 250-day moving average of maximum-minimum equity and bond return differentials, respectively.

Figure 2

Twelve-month moving average of maximum-minimum return differentials in Asian economies

In basis points



Source: HKMA staff estimates.

Similar patterns are also observed for the maximum-minimum return differential indicator in Figure 2 after the Asian financial crisis. For Asia as a whole, the maximum-minimum return differential across equity markets fell from over 1,000 bps between 1998 and 1999 to around 300 to 400 bps during 2007. The falling return differentials also exhibit for the regional blocs, suggesting that the narrowing of return differentials is common within equity markets in the Asia region. A similar pattern is observed in Europe, with the falling return dispersion considered to be an indication of return convergence.[28] Among the regional blocs, equity markets in the four-dragon bloc showed a relatively smaller return differential, and thus a higher degree of integration, than the other two blocs. The return differentials in the greater China region and emerging Asia have increased slightly since late 2005, suggesting a tendency towards return divergence. For bond markets, the greater China region has a relatively smaller return differential than the others. Bond return differentials in the four-dragon bloc and emerging Asia used to have similar patterns and magnitudes, but, since late 2005, the return differentials between bond markets in emerging Asia have been trending upwards, while those in the other two regional blocs have remained steady.

4.2 Haldane and Hall (1991) Kalman filter method

When examining equity market integration, we take the US equity market as the dominant external market and the MSCI AC Far East Free Index, which is a free float-adjusted market capitalisation weighted index, as the proxy for the dominant regional market.[29] For bond

[28] ECB (2005) shows that the equity return dispersion of countries in the euro area has more than halved, from over 500 bps in 1999 to around 200 bps by the end of 2005.

[29] There is no clear-cut finding as to a single dominant equity market in Asia. Japan is a natural choice because of its economic and financial strength in Asia. Nonetheless, Masih and Masih (1999) find that Hong Kong SAR is the dominant Southeast Asian market. For the purpose of examining regional sensitivity as an indicator of regional integration, the use of a weighted index to proxy the dominant regional market may be more

market integration, the bond return index of the 10-year US Treasury bond is taken as the dominant external factor, while the bond indices of dominant regional benchmarks are proxied by the average cross-country bond indices.[30] Based on the signal equation of equation (1) in the appendix, the estimated ß measures the sensitivity of individual countries' equity (bond) market index to the corresponding index in the United States, relative to the dominant regional market. Equity (bond) markets that are more sensitive to the movements of the dominant regional market will show ß trending close to zero, which is interpreted as a sign of price convergence with the dominant regional market. Any tendency for ß to move further away from zero indicates return divergence. Negative values for ß suggest that the equity (bond) market diverges from the regional and US markets. Figures 3a and 3b show the patterns of unweighted average ß for equity and bond markets, respectively.

Figure 3 shows that the sensitivity indicators for equity markets are less volatile than those for bond markets. Nonetheless, the patterns seem to be very similar. As shown in Figure 3, both the equity and the bond markets in Asia appear to be slightly more responsive to the regional benchmark than to the US benchmark. Average ß for Asian equity markets fell from 0.53 in 1994 to a low of around 0.35 in mid-2001, and then edged up slowly again to 0.45 by end-October 2007. For bond markets, average ß for Asia as a whole also dropped to a low of 0.16 by mid-September 2001 and then rose to 0.46 by the end of October 2007. Hence, the sensitivity to regional equity and bond influences, though still significant, appears to have declined in recent years. Among the regional blocs, the sensitivity indicator for the four-dragon equity markets is closer to zero, indicating that these markets are more affected by the movements of the dominant regional market than markets in the other blocs. However, the sensitivity indicator appears to have been moving upwards, at around 0.41, during the past three years. At the other extreme, equity markets in emerging Asia appear to have moved away from the dominant regional market since late 2000, as the sensitivity indicator moves closer to one. Compared with their European counterparts, the equity markets in Asia are far from price convergence.[31] A notable difference is observed between the equity and bond markets in the greater China region. While average ß for equity markets in the greater China region declined steadily throughout the study period, suggesting that the regional benchmark has greater influence than the US benchmark, average ß for bond markets has been on a rising trend since late 2001, reaching 0.65 at end-October 2007. This suggests that the region's sensitivity to the US Treasury bond is greater than its sensitivity to the regional benchmark.

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appropriate than picking a benchmark index of a single equity market. However, it should be noted that conclusions as to whether the equity markets are converging or diverging may well differ, depending on the choice of dominant regional external markets.

[30] The regional benchmark bond return index for each economy is calculated as the average cross-country bond index of the corresponding maturity, excluding the bond return index of that market itself. For instance, when calculating the 10-year regional benchmark bond return index for Hong Kong SAR, the 10-year EFN return index of Hong Kong SAR is excluded from the cross-country average calculation. It should be noted that conclusions as to whether the bond markets are converging or diverging may well differ, depending on the choice of dominant regional external markets.

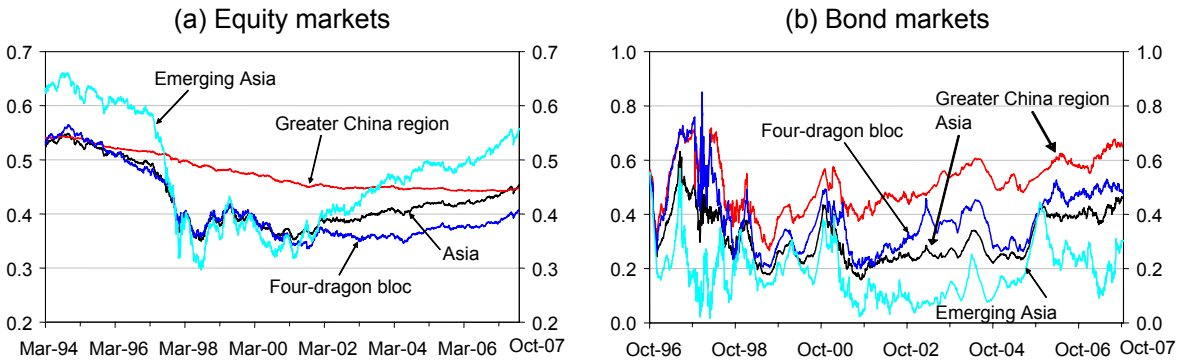
[31] Based on a similar methodology, Aggarwal, Lucey and Muckley (2004) show that the 12 European equity markets are highly sensitive to the equity markets in both Frankfurt and London, with their estimated indicators tending towards zero over the period from 1989 to 2002. These results are interpreted as indicating price convergence among the 12 European equity markets.

Figure 3

Haldane and Hall sensitivity indicator (ß)

(Equity market equation:): $\ln E_{MSCI,t} - \ln E_{i,t} = \alpha_{ei,t} + \beta_{ei,t}\left(\ln E_{MSCI,t} - \ln E_{US,t}\right) + \varepsilon_{ei,t}$

(Bond market equation: $\ln Y^{i}_{RBM,t} - \ln Y_{i,t} = \alpha_{yi,t} + \beta_{yi,t}(\ln Y^{i}_{RBM,t} - \ln Y_{US,t}) + \varepsilon_{yi,t}$)



In the above equations, $E_{i,t}$ is the equity market index level of country *i* at time *t*; $E_{MSCI,t}$ is the equity market index level of the MSCI index at time *t*, which is proxied as the dominant regional market; and $E_{US,t}$ is the dominant external market at time *t* proxied by the US equity market. $Y_{i,t}$ is the local government bond return index of economy *i* at time *t*, $Y^{i}_{RBM,t}$ is the regional benchmark bond return index (ie the simple average government bond return indices of all economies except economy *i*) of economy *i* at time *t* and $Y_{US,t}$ is the dominant external factor at time *t* proxied by the US Treasury bond return index.

Source: HKMA staff estimates.

4.3 Dynamic cointegration analysis

The standardised trace statistic, which is the ratio between the trace statistics obtained from the Johansen (1988) cointegration estimation and the corresponding 95% critical value, is used as a test of the null hypothesis of no cointegration. In this indicator, the presence of a long-term relationship between two markets is interpreted as a sign of market integration.[32] If the standardised trace statistic is consistently greater than one, it suggests that the null hypothesis of no cointegration can be rejected. On the other hand, if the standardised trace statistic is less than one, the null hypothesis of no cointegration cannot be rejected. One can also assess the number of cointegrating relationships (through the examination of the number of cointegrating vectors) discovered within regional blocs of financial markets. The more cointegrating relationships one finds, the higher the cointegration between the financial markets in the group.[33] Here we adopt a three-year rolling cointegration estimation for equity

[32] Kasa (1992) was one of the first to use the cointegration technique to assess the integration of stock indices. Kasa notes that in a system with *n* indices, a condition for complete integration is that there be *n* – 1 cointegrating vectors. In our study of 11 Asian equity markets (or indices), convergence has occurred if 10 cointegrating vectors are found between the equity markets, and these markets are said to be completely integrated. For the various regional blocs with four equity markets (or indices) involved, if three cointegrating vectors are found, equity markets in these regional blocs are said to be completely integrated.

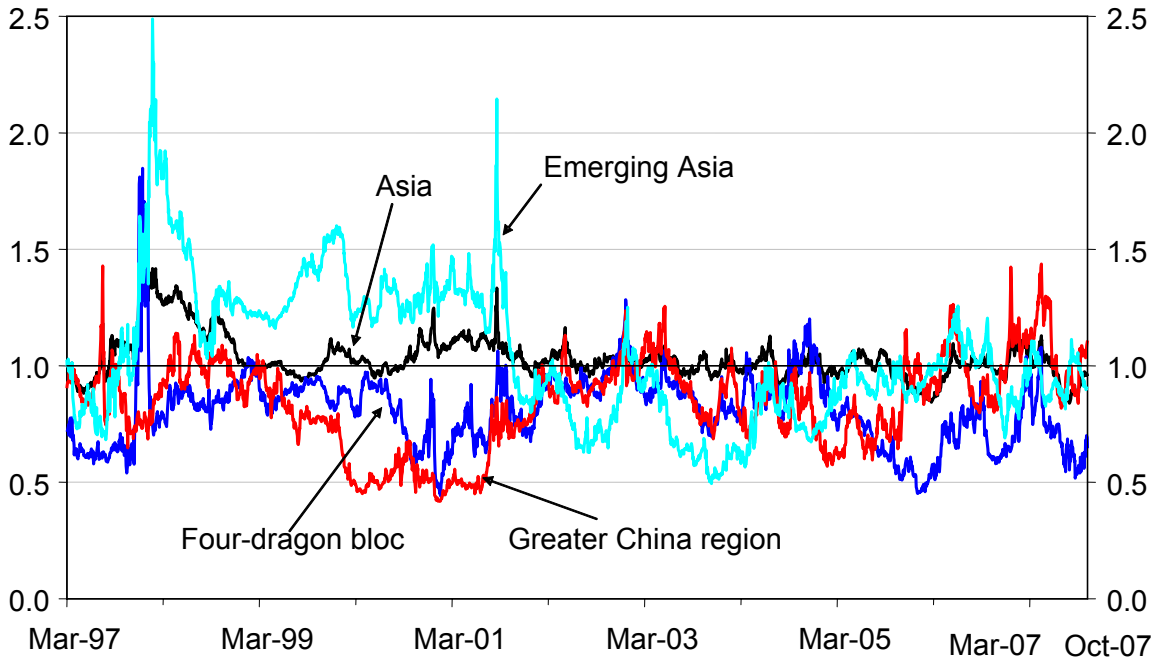
[33] In a system of *n* series, a condition for complete cointegration is that there be *n* – 1 cointegrating vectors. For example, with 10 bond indices for Asia as a whole, if nine cointegrating vectors are found between these indices convergence has occurred, and these bond markets are said to be completely integrated.

markets and a two-year one for bond markets, and their standardised trace statistics are plotted over time in Figures 4 and 5, respectively.[34]

Figure 4

Equity market cointegration

Three-year rolling standardised trace statistics



Source: HKMA staff estimates.

As shown in Figure 4, the standardised trace statistics for Asian equity markets as a group show very weak signs of a cointegrating relationship as they are not consistently greater than one. Tests of the null hypothesis of more than one cointegrating vector are rejected for Asia as a whole.[35] The same applies to the other regional blocs, and their respective standardised trace statistics fluctuate widely. A significant indication of cointegration was found during the Asian financial crisis, when the standardised trace statistics of the four-dragon markets and the emerging Asian markets surged and were consistently greater than one, indicating that these Asian equity markets were more likely cointegrated.[36] After the crisis, the indicator for the emerging Asian markets remained significantly greater than one until mid-2001, while that for the four-dragon markets dropped below one. At other times during the study period,

[34] Ideally, a wider window (say, three years) is better to capture the long-run relationship in the cointegration measure. However, due to the unavailability of data, the rolling window for bond markets is fixed at two years.

[35] In our rolling analysis, no more than one cointegrating vector is found either for Asia as a whole or for the three regional blocs. This result is similar to that of Click and Plummer (2005), who employ the Johansen VAR model to examine the cointegration between the ASEAN 5 equity markets over the full sample period, from July 1998 to December 2002, and find only one cointegrating vector.

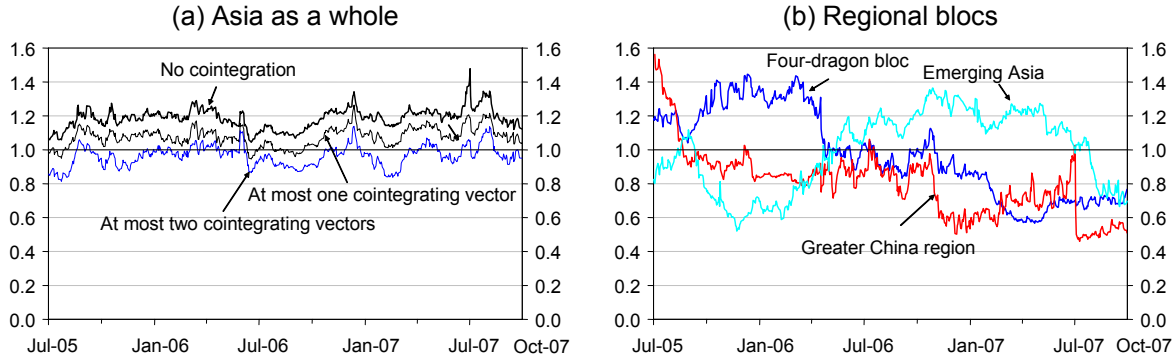
[36] However, one should be cautious in interpreting the cointegration results as a sign of market integration during the Asian financial crisis. Market contagion and volatility spillover may also have contributed to the strong cointegrating relationship during that period.

the statistics were not consistently greater than one, suggesting no cointegration between the equity markets in the regional blocs.[37]

Figure 5

Bond market cointegration

Two-year rolling standardised trace statistics



Source: HKMA staff estimates.

Figure 5a shows that for bond markets in Asia as a whole, the null hypothesis of no cointegration can be rejected as the standardised trace statistics are consistently greater than one. However, the null hypotheses of more than one cointegrating relationship (through the examination of the number of cointegrating vectors) are mostly rejected as the standardised trace statistics are less than one. This suggests that there is only a weak cointegration among the 10 government bond markets in the region since only one cointegrating relationship can be found. Asian bond markets are much less cointegrated than bond markets in the EU countries, suggesting a low degree of integration in Asia.[38] For regional blocs, Figure 5b indicates that cointegration was found between bond markets in the four-dragon bloc between 2005 and mid-2006, but that this cointegrating relationship disappeared afterwards. Such a cointegrating relationship was shown among bond markets in emerging Asia from March 2006 to July 2007. Judging from these results, the extent of integration in equity and bond markets is weak.

4.4 Market cycle synchronisation

The extent of integration between different markets can be measured by whether the market cycles of different economies are synchronised or not. As pointed out by Edwards, Biscarri and de Gracia (2003), the construction of the cycle synchronisation indicator, the concordance index, depends on the proper identification of different phases in the market cycles. In Figure 6, as an example, we show the evolution of the Hang Seng Index (in

[37] Our results are in line with the findings of Manning (2002) and Click and Plummer (2005), which show that Asian equity markets only partially converge and that the integration process is not complete. Findings for the European markets are similar. Using the same rolling approach, Pascual (2003) and Aggarwal, Lucey and Muckley (2004) find no evidence of increasing cointegration among different European equity markets.

[38] Using the same dynamic cointegration approach, Lucey, Kim and Wu (2004) show that the number of cointegrating vectors from 10 EU countries' bond markets ranges from three to seven over the study period, from January 1999 to October 2003. They conclude that the 10 European bond markets form an integrated system but that there is little evidence that the system is increasingly converging.

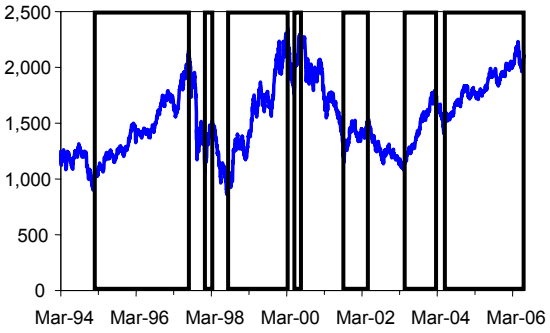
US dollars) and Hong Kong SAR's 10-year EFN return index, respectively, with their bull periods framed for visual inspection using the methodology suggested by Edwards, Biscarri and de Gracia.[39]

Figure 6

Equity and bond market cycles in Hong Kong SAR

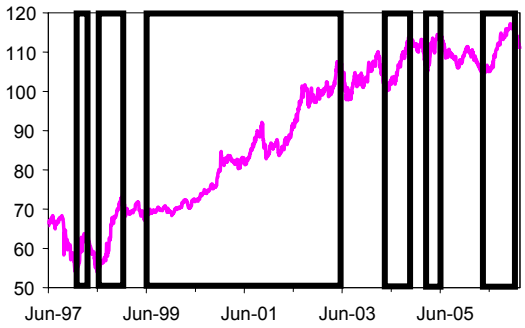
(a) Hang Seng Index

Price index denominated in US dollars



(b) 10-year EFN return index

Return index denominated in US dollars



Framed areas represent bull phases.

Source: HKMA staff estimates.

Pairwise concordance indices derived from equation (3) of the appendix over the respective sample periods for equity and bond markets are presented in Tables 4 and 5.[40]

Except for the equity markets in China and Thailand, the concordances of other Asian equity markets are quite high, averaging about 0.66 or above. This implies that for the whole period, over 66% of the time the cycles of Asian equity markets were aligned. The two equity markets in China have the lowest concordance indices of all the markets in the region; cycles in China's equity markets were aligned with those of other Asian markets only about 57% of the time. In terms of regional blocs, if we take the MSCI AC Far East Free Index as representative of the whole Asia region, the four-dragon bloc has an average concordance of 0.79 with the MSCI Index, which is higher than those of the greater China region (0.63) and emerging Asia (0.73). These results suggest that the equity market cycles in the four-dragon bloc are more aligned than those in the other blocs with equity market cycles in the region.

Table 5 shows that the pairwise concordances of bond markets are slightly lower than those of equity markets, averaging 0.6 and above, with the exception of Japan, which averages 0.47. This implies that over the sample periods, the bond market cycles in the region are aligned with one another more than 60% of the time.

[39] Refer to the appendix for the rules for identifying peaks and troughs.

[40] As bond market cycles are quite similar for all maturities, this section presents only the finding for the 10-year government bond indices.

Table 4

Concordance indices of equity markets

	China		HK									Region	
	SHA	SZA	H-shares	HSI	TW	SG	KR	ID	MY	TH	PH	JP	MSFE	US
China														
SHA	1	1.00	0.59	0.53	0.61	0.46	0.55	0.45	0.50	0.44	0.58	0.55	0.52	0.44
SZA		1	0.59	0.53	0.61	0.46	0.42	0.45	0.50	0.44	0.58	0.55	0.52	0.44
HK														
H-shares			1	0.70	0.74	0.60	0.57	0.82	0.70	0.70	0.74	0.62	0.57	0.64
HSI				1	0.81	0.79	0.68	0.77	0.83	0.54	0.70	0.77	0.76	0.79
TW					1	0.69	0.61	0.79	0.79	0.61	0.72	0.74	0.68	0.77
SG						1	0.83	0.72	0.82	0.67	0.75	0.87	0.94	0.66
KR							1	0.70	0.77	0.71	0.67	0.78	0.77	0.64
ID								1	0.86	0.70	0.78	0.71	0.70	0.72
MY									1	0.66	0.76	0.77	0.80	0.76
TH										1	0.65	0.63	0.61	0.58
PH											1	0.79	0.80	0.59
JP												1	0.92	0.59
Region														
MSFE													1	0.63
US														1

HSI = Hong Kong SAR's Hang Seng Index; H-shares = Hong Kong SAR's Hang Seng China Enterprises Index; HK = Hong Kong SAR; ID = Indonesia; JP = Japan; KR = Korea; MSFE = MSCI AC Far East Free Index; MY = Malaysia; PH = Philippines; SG = Singapore; SHA = Shanghai A shares; SZA = Shenzhen A shares; TH = Thailand; TW = Taiwan (China); US = equity market in the United States with a one-day lag.

Source: HKMA staff estimates.

Table 5

Concordance indices of Asian government bond markets (10-year maturity)

	China	HK	TW	SG	KR	PH	TH	ID	MY	JP
China	1	0.76	0.63	0.67	0.74	0.73	0.65	0.48	0.70	0.61
HK		1	0.72	0.65	0.64	0.66	0.74	0.54	0.72	0.43
TW			1	0.61	0.74	0.64	0.68	0.44	0.80	0.50
SG				1	0.71	0.54	0.58	0.83	0.61	0.46
KR					1	0.69	0.73	0.73	0.77	0.45
PH						1	0.73	0.70	0.83	0.46
TH							1	0.77	0.78	0.46
ID								1	0.69	0.49
MY									1	0.37
JP										1

HK = Hong Kong SAR; ID = Indonesia; JP = Japan; KR = Korea; MY = Malaysia; PH = Philippines; SG = Singapore; TH = Thailand; TW = Taiwan (China). It should be noted that as the starting dates of the government bond data are different (see Table 2b), the number of data samples involved in the derivation of the concordance indices for each pair of economies is not the same. For instance, the starting date in the calculation of the concordance index between the bond markets of Hong Kong SAR and Taiwan (China) is July 1997, January 2002 for China and Hong Kong SAR and March 2004 for Hong Kong SAR and Indonesia. Caution should be taken when comparing the concordance indices.

Source: HKMA staff estimates.

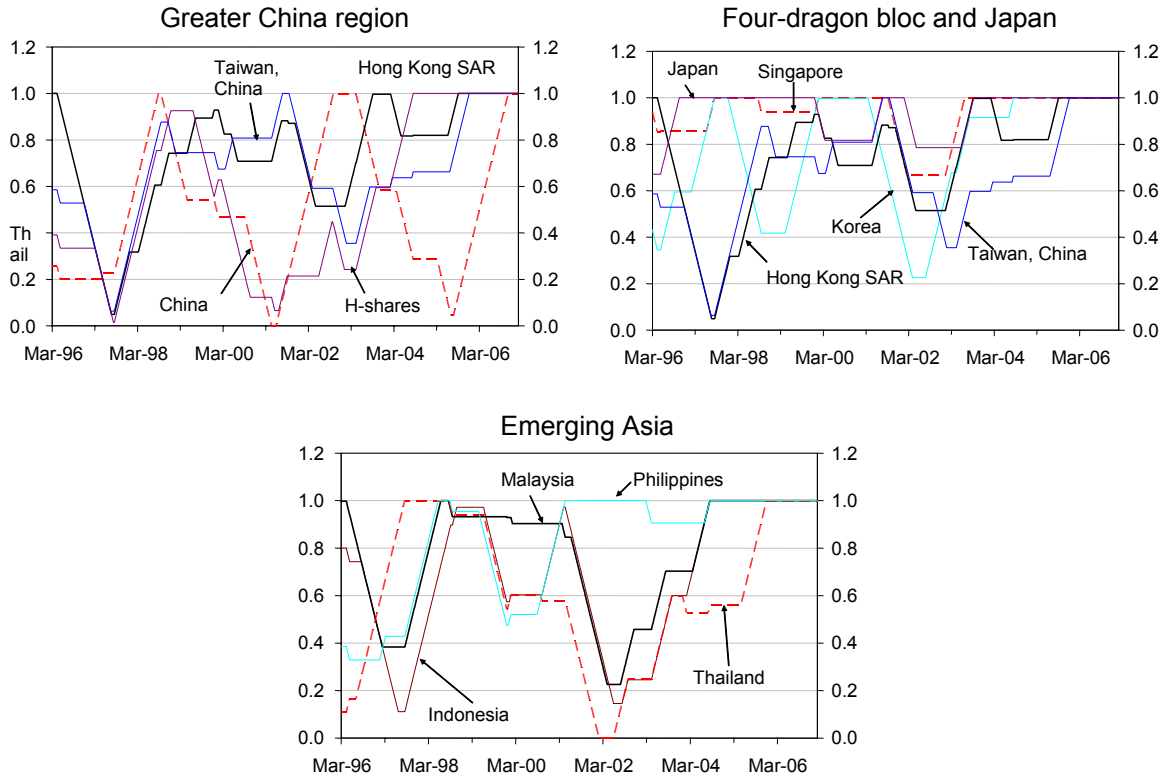
Using a window of 16 months (which is equivalent to the length of one complete market cycle), the pairwise intramarket rolling concordance indices (*RCI*s) are derived for economies *i* and *j* (based on equation (3) in the appendix). The value of the *RCI* ranges from zero

(perfect misalignment of phases) to one (perfect alignment). An upward (downward) trend in the *RCI* signals increased (decreased) market cycle concordance, which is regarded as a sign of greater (less) market integration. Plotting the *RCI* over time thus provides a picture of how an economy's financial market cycle coincides with other markets' cycles. Taking the MSCI AC Far East Index as the regional equity market proxy, Figure 7 shows the *RCI*s between the regional proxy and individual Asian equity markets.[41]

The graphs in Figure 7 show that equity markets in the four-dragon bloc and Japan have consistently higher *RCI*s – over 0.5 – while the *RCI*s of equity markets in China vary considerably. These suggest that equity market cycles in China are not very synchronised with the regional proxy. The *RCI*s of equity markets in emerging Asia also fluctuate widely. All the *RCI*s reached the reading of one recently, suggesting that equity market cycles in the region are in perfect synchronisation. In summary, the equity market cycles in the four-dragon bloc and Japan are highly coincident with the regional market proxy. Those in emerging Asia and China are less aligned in general, but they also reached perfect synchronisation over the past year.

Figure 7

***RCI*s of Asian equity markets against regional market proxy**



It should be noted that as the local peak or trough is located by comparing the bond index level at time *t* with the levels throughout *t* – 174 days and *t* + 174 days (approximately eight months before and after time *t*), the *RCI*s are calculated up to February 2007, which is eight months before the end of the sample period.

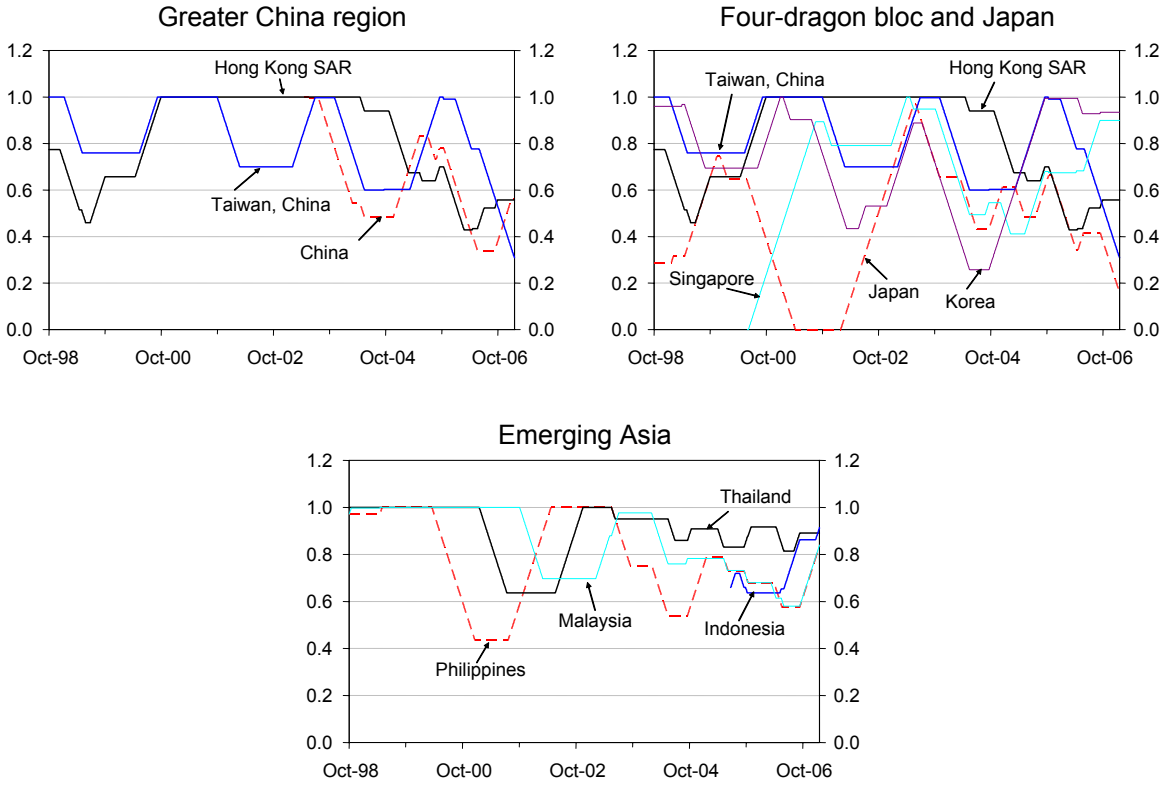
Source: HKMA staff estimates.

[41] During the search for peaks and troughs, multiple peaks (troughs) were found, but only the highest (lowest) of consecutive peaks (troughs) was taken as the peak (trough) of the cycle. Hence, for a complete cycle, there is only one peak and one trough.

The graphs in Figure 8 show that bond market cycles are quite synchronised for the Asian region as a whole. The *RCI*s for bond markets in the region – except those of Japan, Korea and Singapore – tend to fluctuate within a narrow range. It is noted that the *RCI*s for bond markets in the greater China region (China, Hong Kong SAR and Taiwan (China)) and Japan are lower than those for emerging Asia as well as for Korea and Singapore. While the *RCI*s for equity markets are more divergent and more volatile than those for bond markets, they are closer to one than the *RCI*s for the bond markets. This greater synchronisation suggests that Asia's equity markets are more integrated than its bond markets.

Figure 8

_RCI_s of Asian government 10-year bond indices against regional bond proxies



The individual bond market's regional index is proxied by the cross-country average bond index of the corresponding maturity, excluding the bond index of that market itself. It should be noted that as the local peak or trough is located by comparing the bond index level at time *t* with the levels throughout *t* – 174 days and *t* + 174 days (approximately eight months before and after time *t*), the *RCI*s are calculated up to February 2007, which is eight months before the end of the sample period.

Source: HKMA staff estimates.

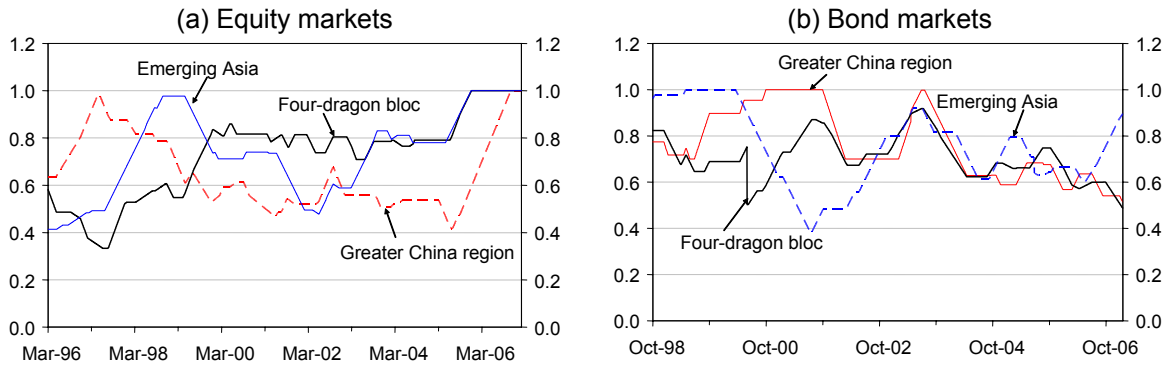
Figure 9 takes a closer look at the average *RCI*s for the three regional blocs.

Figure 9a shows that the equity market cycles in the greater China region are generally less synchronised with each other than those in the other two regional blocs. Nonetheless, since 2006 the average *RCI* of the greater China region has picked up rapidly and, recently, the market cycles of the equity markets within the individual regional blocs have been perfectly aligned (*RCI*s equal to one). For the bond markets, Figure 9b shows that the *RCI*s for the greater China region and the four-dragon blocs have declined since late 2003 and were around 0.5 recently. On the other hand, the *RCI*s for emerging Asia rose sharply, to 0.9, over the past year. Judging from the synchronisation analysis, Asian equity markets have become

more integrated at both the economy level and the regional bloc level, while their bond market counterparts are less integrated.

Figure 9

Average *RCI* of regional blocs



Source: HKMA staff estimates.

4.5 Dynamic conditional correlation (DCC)

The GARCH (1,1)-DCC model using a two-step estimation procedure is estimated using weekly equity and bond returns. The extent of intra- and intermarket integration is given by the correlations estimated from this model. Tables 6 and 7 highlight the average pairwise intramarket DCCs over the study period.

Table 6

Average conditional correlations of equity markets

	China		HK											Region
	SHA	SZA	HSI	H-shares	TW	SG	KR	TH	MY	PH	ID	JP	US	MSFE
China														
SHA	1	0.92	0.13	0.21	0.07	0.09	0.05	0.05	0.11	0.07	0.10	0.08	0.02	0.10
SZA		1	0.10	0.17	0.06	0.06	0.04	0.02	0.12	0.04	0.08	0.07	0.01	0.09
HK														
HSI			1	0.59	0.38	0.64	0.47	0.41	0.40	0.34	0.38	0.38	0.46	0.53
H-shares				1	0.24	0.43	0.33	0.32	0.29	0.25	0.30	0.21	0.24	0.33
TW					1	0.40	0.38	0.32	0.31	0.30	0.26	0.27	0.29	0.38
SG						1	0.44	0.52	0.53	0.46	0.49	0.40	0.39	0.56
KR							1	0.39	0.26	0.32	0.29	0.39	0.33	0.51
TH								1	0.42	0.43	0.48	0.29	0.27	0.41
MY									1	0.37	0.46	0.28	0.26	0.40
PH										1	0.47	0.26	0.26	0.34
ID											1	0.24	0.22	0.35
JP												1	0.30	0.93
US													1	0.37
Region														
MSFE														1

HSI = Hong Kong SAR's Hang Seng Index; H-shares = Hong Kong SAR's Hang Seng China Enterprises Index; HK = Hong Kong SAR; ID = Indonesia; JP = Japan; KR = Korea; MSFE = MSCI AC Far East Free Index; MY = Malaysia; PH = Philippines; SG = Singapore; SHA = Shanghai A shares; SZA = Shenzhen A shares; TH = Thailand; TW = Taiwan (China); US = United States.

Source: HKMA staff estimates.

Table 6 shows that while Asian equity markets are positively correlated, the markets in China are far less correlated with the rest of the equity markets in the region, with average conditional correlations typically around 0.1 or less. The DCCs for Hong Kong SAR range from 0.12 (with China) to 0.64 (with Singapore). In terms of regional blocs, if we take the MSCI AC Far East Free Index as representative of the whole region, the four-dragon bloc has an average DCC of 0.49 with the MSCI Index, which is higher than that of the greater China region (0.29) and emerging Asia (0.37).[42]

Table 7 shows that, in general, return correlations are not very high between the bond markets in the region. Individual bond markets' DCCs with the regional benchmark return proxy (the JPMorgan EMBIG Asia Sovereign return) range from 0.08 to 0.36. While most of the pairwise average DCCs are positive, the DCCs between the bond returns of Indonesia and those of China, Hong Kong SAR and Japan are negative. Tables 6 and 7 show that the correlation between equity markets is higher than that between bond markets, implying that equity markets have greater co-movement and are more integrated than bond markets.

Table 7

Average conditional correlations of bond markets

	China	HK	TW	SG	KR	TH	MY	PH	ID	JP	US	Region JPMGBI
China	1	0.53	0.32	0.45	0.19	0.28	0.13	0.00	**−0.16**	0.31	0.69	0.32
HK		1	0.33	0.46	0.29	0.26	0.21	0.04	**−0.08**	0.29	0.58	0.36
TW			1	0.37	0.31	0.30	0.17	0.11	0.15	0.31	0.24	0.13
SG				1	0.41	0.32	0.18	0.11	0.02	0.43	0.39	0.26
KR					1	0.31	0.18	0.10	0.11	0.36	0.15	0.22
TH						1	0.23	0.16	0.16	0.25	0.17	0.18
MY							1	0.19	0.21	0.12	0.08	0.21
PH								1	0.31	0.03	**−0.08**	0.18
ID									1	**−0.08**	**−0.20**	0.08
JP										1	0.25	0.13
US											1	0.41
Region JPMGBI												1

HK = Hong Kong SAR; ID = Indonesia; JP = Japan; JPMGBI = JPMorgan EMBIG Asia Sovereign return index; KR = Korea; MY = Malaysia; PH = Philippines; SG = Singapore; TH = Thailand; TW = Taiwan (China); US = United States. Red and bold numbers indicate negative correlation. It should be noted that as the starting dates of the government bond return series are different (see Table 2b), the number of return series involved in the estimation of the DCCs will increase as time passes. For instance, between March 1996 and March 1998, there are six return series in the DCC estimation. The number of return series increases to nine between April 1998 and August 1998, to 10 between September 1998 and July 2001, to 11 between August 2001 and September 2003 and to 12 from October 2003 onwards. Caution should be taken when comparing the DCCs.

Source: HKMA staff estimates.

Financial market integration in the region can also be assessed by examining the interactions between the equity and bond markets of different economies. Understanding these interactions is in fact important, as they underpin the contagion effect in the region. To carry out this assessment, the average pairwise intermarket DCCs between equity and bond markets are estimated and presented in Table 8.

[42] The results may be different depending on the choice of the regional benchmark index or the composition (and weights) of the equity markets in calculating a specific index as a proxy for the regional benchmark.

Table 8

Average conditional correlations between equity and bond markets

Equity markets	Bond markets: China	HK	TW	SG	KR	TH	MY	PH	ID	JP	US	Region JPMGBI
China												
SHA	**−0.04**	**−0.01**	0.03	0.06	0.07	0.09	0.04	0.08	0.16	0.06	**−0.08**	0.05
SZA	**−0.05**	**−0.03**	0.01	0.04	0.07	0.08	0.03	0.06	0.08	0.06	**−0.08**	0.04
HK												
HSI	**−0.15**	0.09	0.08	0.04	0.19	0.16	0.05	0.20	0.19	0.02	**−0.15**	0.16
H-shares	**−0.09**	0.04	0.08	0.04	0.09	0.06	0.06	0.12	0.26	**−0.02**	**−0.17**	0.12
TW	**−0.20**	**−0.03**	0.18	0.03	0.09	0.11	0.07	0.21	0.32	**−0.04**	**−0.16**	0.10
SG	**−0.10**	0.08	0.12	0.15	0.23	0.21	0.16	0.29	0.36	0.06	**−0.16**	0.19
KR	**−0.12**	0.01	0.12	0.03	0.34	0.13	0.07	0.22	0.27	**−0.01**	**−0.14**	0.18
TH	**−0.05**	0.05	0.13	0.09	0.20	0.30	0.14	0.22	0.21	0.05	**−0.09**	0.20
MY	**−0.06**	0.02	0.11	0.06	0.14	0.14	0.23	0.23	0.24	0.02	**−0.07**	0.13
PH	**−0.10**	0.03	0.10	0.08	0.12	0.17	0.17	0.42	0.28	**−0.03**	**−0.13**	0.24
ID	**−0.03**	0.05	0.10	0.16	0.24	0.15	0.22	0.33	0.43	0.04	**−0.10**	0.19
JP	**−0.10**	**−0.02**	0.11	0.07	0.19	0.11	0.02	0.14	0.22	0.28	**−0.10**	0.16
US	**−0.28**	**−0.04**	**−0.04**	**−0.02**	0.13	0.01	**−0.03**	0.09	0.13	**−0.08**	**−0.13**	0.18
Region												
MSFE	**−0.12**	0.02	0.14	0.08	0.24	0.16	0.07	0.21	0.27	0.23	**−0.15**	0.19

HK = Hong Kong SAR; HSI = Hong Kong SAR's Hang Seng Index; H-shares = Hong Kong SAR's Hang Seng China Enterprises Index; ID = Indonesia; JP = Japan; JPMGBI = JPMorgan Asia Sovereign return index; KR = Korea; MSFE = MSCI AC Far East Free Index; MY = Malaysia; PH = Philippines; SG = Singapore; SHA = Shanghai A shares; SZA = Shenzhen A shares; TH = Thailand; TW = Taiwan (China); US = United States. Red and bold numbers indicate negative correlation. Bond markets are in the horizontal rows across the table and equity markets are in the vertical columns. For instance, the upper left entry is the correlation between the 10-year bond return in China and Shanghai A share index return. Immediately to the right of this entry is the correlation between 10-year Hong Kong EFN return and Shanghai A share index return.

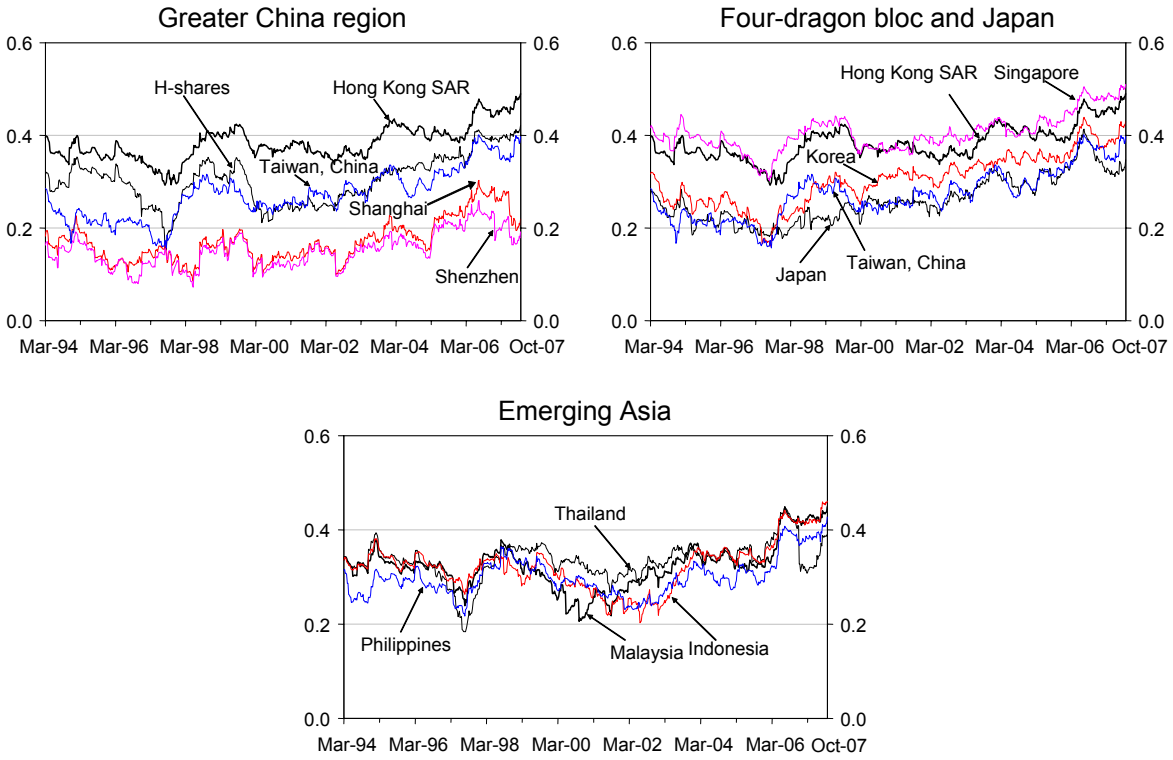
Source: HKMA staff estimates.

Table 8 presents several observations. First, all the equity markets surveyed are negatively correlated with bond markets in China and the United States, even though the degree of correlation is low. Second, equity and bond markets within all of the Asian economies – with the exception of China – are positively correlated. The equity-bond intermarket correlation within an economy ranges from a high of 0.43 in Indonesia to a low of 0.09 in Hong Kong SAR. Third, each Asian equity market is either negatively correlated with at least one bond market in another economy (China) or correlation is positive but very low (less than 0.1). This implies that portfolio risk can be diversified across economies in Asia or internationally. However, risk diversification through intermarket holdings of equities and bonds within an Asian economy may not be effective due to the positive correlation of returns. Fourth, there seems to be asymmetry in the correlation of a few markets. For instance, while the correlation between the Hong Kong SAR's bond market and the equity benchmark of MSCI AC Far East Free Index is 0.02, the correlation between the Hong Kong SAR's equity market and the bond benchmark of the JPMorgan EMBIG Asia Sovereign return index is much higher, at 0.16. The same is true for Taiwan (China) and Singapore. While China's bond market is negatively correlated with the MSCI equity benchmark index, its two A share equity markets are positively correlated with the JPMorgan bond index. The asymmetry implies that one should choose the appropriate markets (or benchmark) with care to obtain optimal risk diversification.

Figures 10 to 12 depict the time-varying intramarket return correlations in the Asia region, while Figures 13 to 15 show the time-varying intermarket return correlations.

Figure 10

DCCs of individual Asian equity markets with other equity markets



Source: HKMA staff estimates.

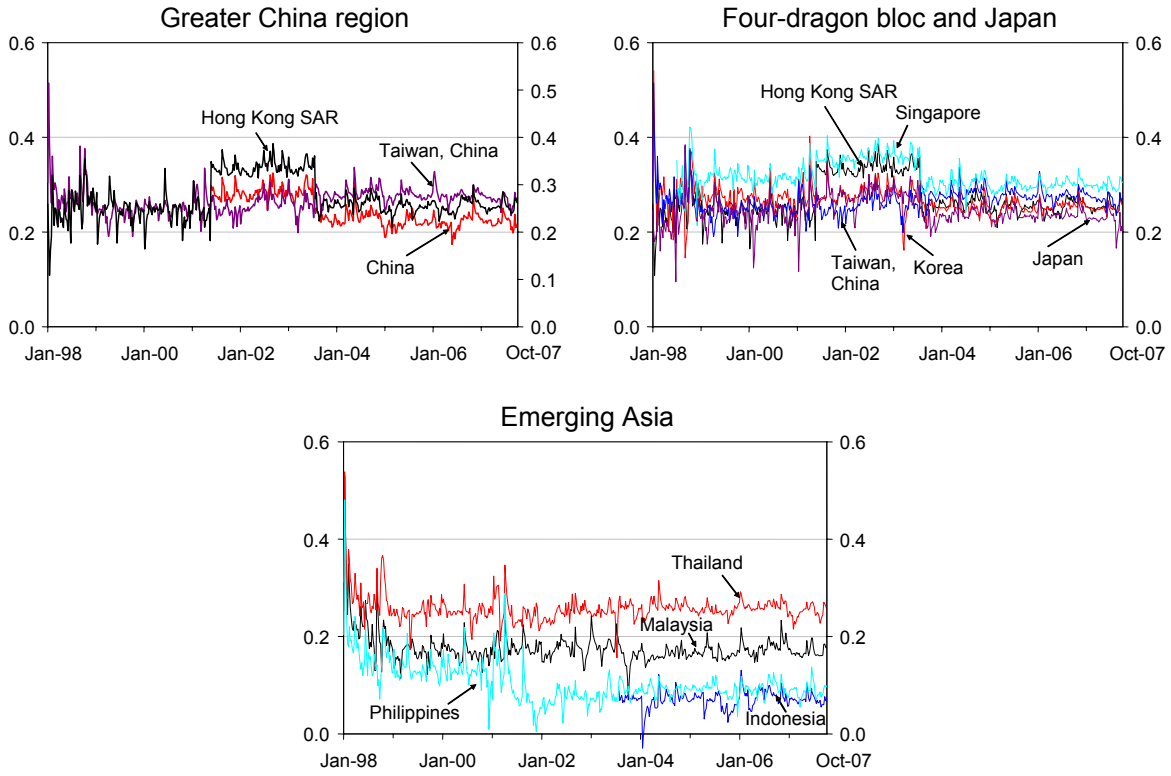
The graphs in Figure 10 show that among the equity markets in the greater China region, those in China have the lowest correlation with other Asian markets. Even though there have been signs that correlation with other markets in the region has been increasing in the past two years, it is still only around 0.2, compared with equity markets in Taiwan (China) and Hong Kong SAR's H-shares (between 0.2 and 0.4) and Hong Kong SAR (between 0.3 and 0.5). Among the equity markets in the four-dragon bloc, the correlations of Hong Kong SAR and Singapore with the other Asian equity markets are quite similar and range from 0.3 to 0.5. The correlations of Taiwan (China), Korea and Japan are slightly lower, ranging from 0.16 to 0.43. The DCCs of emerging Asia's equity markets are similar to those in the four-dragon bloc and are closely packed together, with correlations ranging between 0.19 and 0.46. Overall, except for the equity markets in China and Japan, Asia's equity markets have shown increasing correlation with each other in the past year, but correlation remains low, between 0.4 and 0.5. The return correlation given by the DCC in Asia is slightly smaller than that in the European Economic and Monetary Union (EMU).[43]

Figure 11 depicts the average intrabond market DCCs between the returns of individual markets' 10-year bonds and those of the other bond markets.

[43] In their investigation of the correlation of global equity returns, Cappiello, Engle and Sheppard (2003) show that equity return correlations both within and outside the EMU increased after 1999, with average DCCs rising from 0.5 to 0.7.

Figure 11

DCCs of individual Asian bond markets with other bond markets



Source: HKMA staff estimates.

The graphs in Figure 11 indicate a fairly low level of average correlation, about 0.1 to 0.3 at the end of October 2007, between bond returns in individual markets and those in the other bond markets. The DCCs of Indonesia, the Philippines and Malaysia – less than 0.2 – are among the lowest in the region. A much greater degree of return correlation is found in Europe.[44] The DCCs for bond returns are also more volatile and lower than those for equity returns. The rather flat DCCs in Figure 11 also indicate that there has not been much progress in terms of bond market integration within Asia.

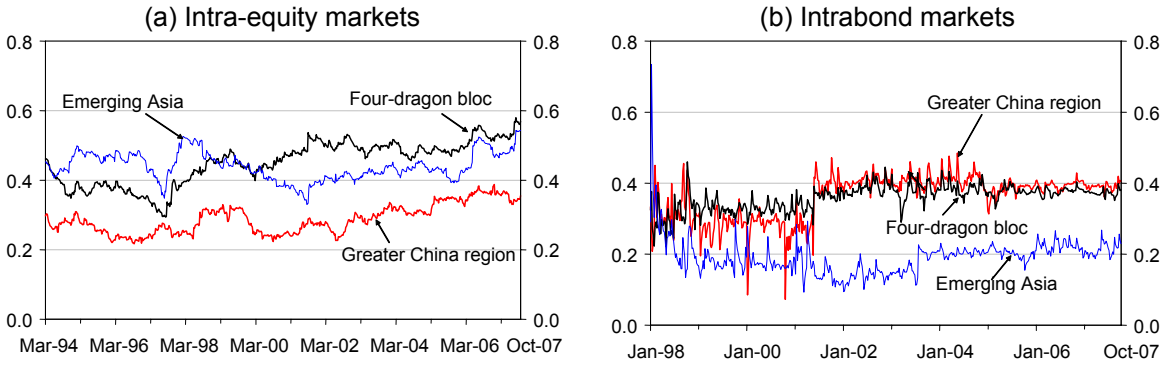
Figure 12 focuses on the patterns of the average intra-equity and intrabond market DCCs of the three regional blocs. Figure 12a shows that equity markets in the greater China region are less integrated with each other than those in the four-dragon bloc or even emerging Asia. Nonetheless, equity markets in all three regional blocs, with rising DCCs, show signs of increasing integration. It is noted that the average DCC of the equity markets in emerging Asia was higher than that of the four-dragon bloc before 2000. After 2000, the DCC of the four-dragon bloc surpassed that of emerging Asia, suggesting that the equity markets' integration is higher in the four-dragon bloc than in the other two regional blocs. In Figure 12b, bond markets in the greater China region and the four-dragon bloc are relatively more correlated with each other than with those in emerging Asia. Nonetheless, the degree

[44] In their investigation of bond return correlation between members of the EMU, Cappiello, Engle and Sheppard (2003) show that the average DCC fluctuated between 0.7 and 0.9 before 1999 and that correlation was almost perfect after the introduction of the euro in January 1999.

of correlation, which is only about 0.4, is not high, and it is also lower than that of the equity markets. Furthermore, while the intra-equity market DCCs within the three regional blocs show signs of increasing integration, the intrabond market DCCs show no such signs.

Figure 12

Average intramarket DCCs of regional blocs

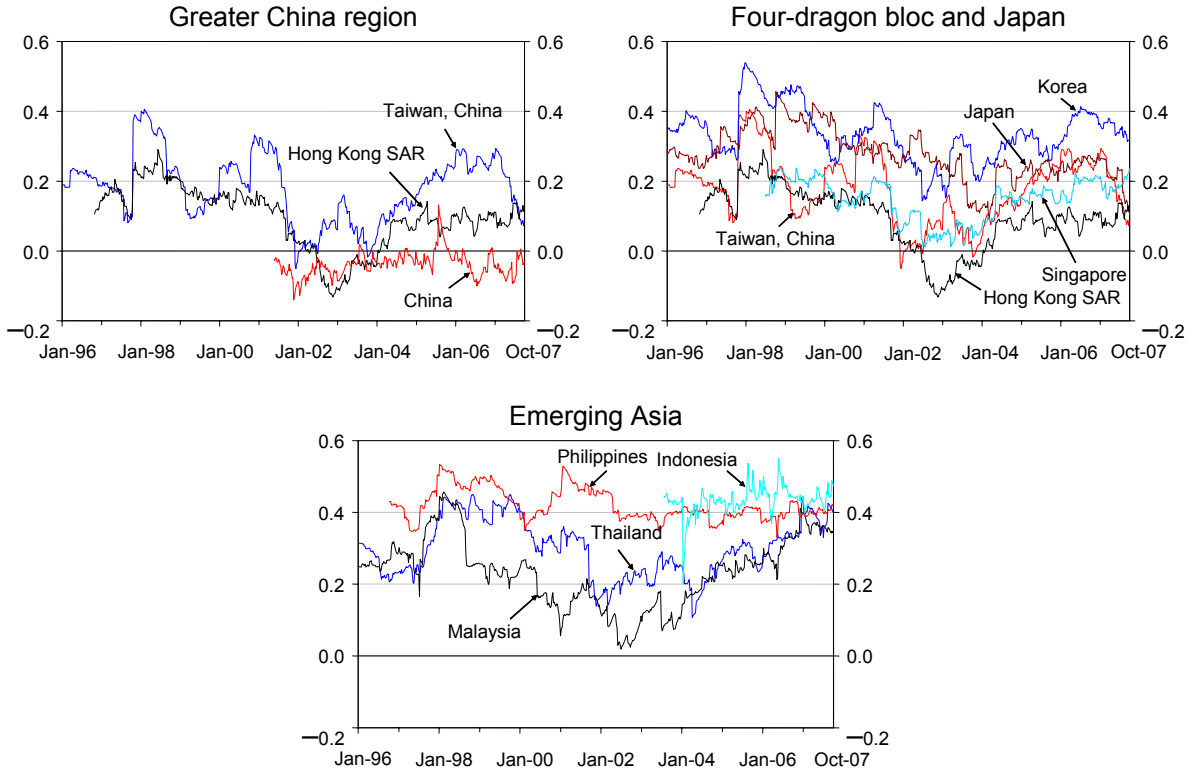


Source: HKMA staff estimates.

Financial market integration among different assets in the region can also be assessed by examining the intermarket co-movement of bond and equity returns. Figures 13 to 15 illustrate the inter-equity-bond market return correlations within and across Asian economies.

Figure 13

DCCs of inter-equity-bond markets within an economy



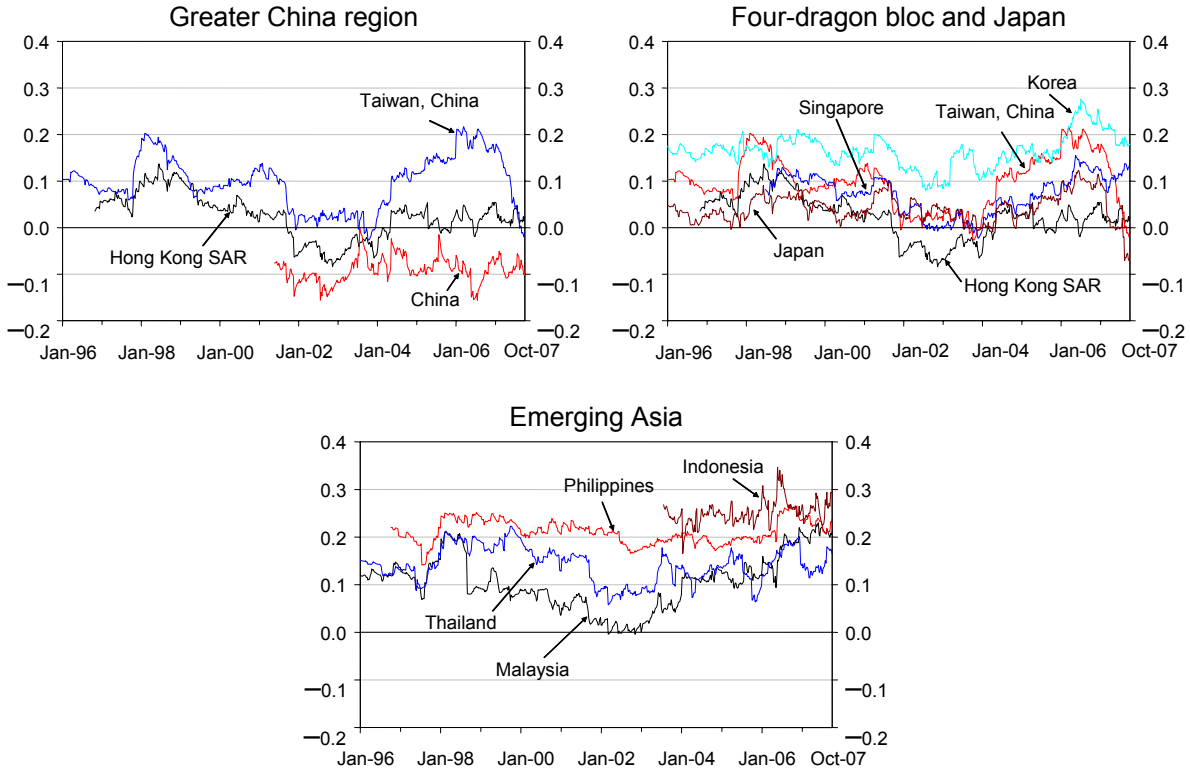
Source: HKMA staff estimates.

The graphs in Figure 13 show that except for China's equity and bond markets, the DCCs of inter-equity-bond markets within an economy are mostly positive over the study period. While the inter-equity-bond correlations in Malaysia and Thailand have been increasing over the past five years, the correlations in other Asian economies have either remained steady (Hong Kong SAR, Singapore, the Philippines and Indonesia) or shown signs of declining (Japan, Korea and Taiwan, China).

The graphs in Figure 14 show the average DCCs between individual bond market returns and Asian equity market returns. Again, the DCCs of bond market returns in China are negatively correlated with Asian equity market returns, while the DCCs of other Asian bond markets are mostly positively correlated with Asian equity market returns. That said, we note that the DCCs of bond market returns in Japan and Taiwan (China) have been negatively correlated with Asian equity market returns since September 2007. Figure 15 compares the inter-equity-bond correlations within and across the regional blocs.

Figure 14

DCCs of individual bond markets with other Asian equity markets



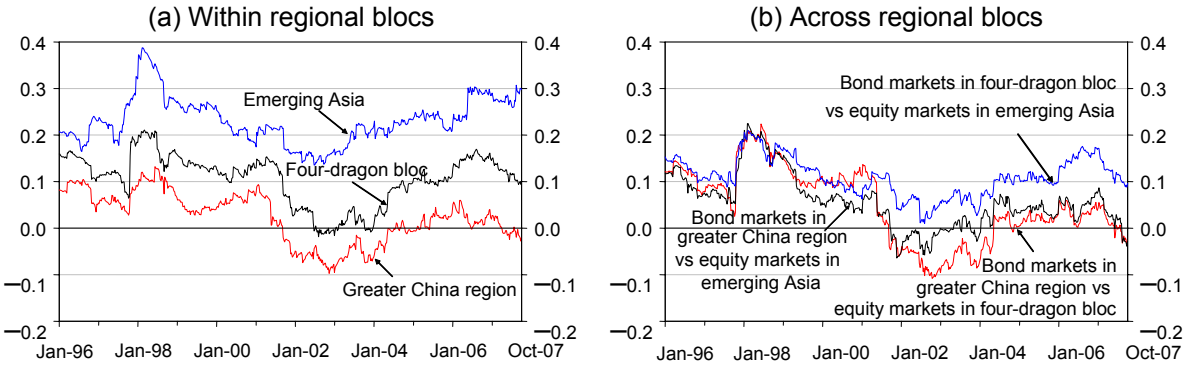
Source: HKMA staff estimates.

Figure 15a shows the average DCCs between individual bond market returns and equity market returns within the same regional bloc, whereas Figure 15b shows the inter-equity-bond DCCs across different regional blocs. The patterns are very similar. Focusing on Figure 15a, the positive inter-equity-bond market correlation increased sharply during the Asian financial crisis and declined steadily (and turned negative for the greater China region) between 1999 and 2002. The declining trend was reversed in 2003, but the correlations have been falling again over the past year. Among the three regional blocs, emerging Asia has the highest inter-equity-bond market DCCs, while those of the greater China region are the lowest (and are sometimes negative). Therefore, diversification of risk between equities and bonds is more effective in the greater China region than in emerging Asia.

Turning to Figure 15b, the average DCCs across the various regional blocs show similar patterns and more co-movement than in Figure 15a, at least before 2001. As in Figure 15a, the cross-regional inter-equity-bond correlations were mostly positive, and they rose sharply during the Asian financial crisis. The positive correlations declined after the crisis. Figure 15b also shows that the inter-equity-bond correlations between bond markets within the greater China region and the equity markets of the other two regional blocs turned negative between October 2001 and May 2004. While the correlations reverted to positive after May 2004, they were again slightly negative at the end of October 2007. On the other hand, the inter-equity-bond correlations between bond markets within the four-dragon bloc and equity markets within emerging Asia remained positive throughout the study period. The results suggest that risk could be diversified by investing in bonds in the greater China region and equity markets in the other two regional blocs.

Figure 15

Inter-equity-bond DCCs within and across regional blocs



Source: HKMA staff estimates.

5. Summary and discussion

Table 9 provides a summary of the current status of equity and bond market integration, broken down by the first four indicators, while Table 10 shows the results by DCC.

Given the different focus of each of the indicators in Tables 9 and 10, the picture that emerges from the empirical results is not completely uniform. Nevertheless, most indicators suggest that both the equity and the bond markets in Asia are only weakly integrated and the integration process is not complete. The equity return dispersions or differentials have been rising since 2006 after years of decline, suggesting an increased equity return divergence within Asia. Meanwhile, bond return dispersion and differentials have fluctuated in a narrow range since 2001, indicating that a reasonable degree of bond market integration has been achieved but that further improvement has not been observed. The results from the Haldane and Hall (1991) approach indicate that the integration process, as illustrated by the sensitivity indicator, is far from complete, as individual equity and bond market indices are more or less equally responsive to both global and regional influences. The results from the dynamic cointegration method also indicate weak integration. A finding common to all four indicators is that the price convergence process appears to be more complete in the mature markets of the region, such as Hong Kong SAR, Japan, Korea and Singapore (as suggested by the indicators from the return dispersion and differentials, as well as the Haldane and Hall (1991) approach), than those in the markets of emerging Asia. In the region, equity market cycles are more aligned than bond market cycles in terms of return co-movement based on the

DCC. In other words, the integration of Asia's equity markets is more advanced than the integration of its bond markets. While China's equity markets were less integrated than equity markets in other regional blocs, the degree of integration of its bond markets was similar to that in the four-dragon bloc.

Table 9

Summary of current financial market integration in Asia

Method	Indication of market integration	Current status of market integration	
		Equity market	Bond market
Cross-market return dispersion and return differential	Lower return dispersion and smaller return differential imply higher return convergence	After years of falling return dispersion and differentials, both indicators edged up slightly in 2007	Both indicators have fluctuated steadily since 2001, suggesting that a reasonable degree of integration has been achieved
Haldane and Hall (1991) Kalman filter method	Unweighted average ß moving towards zero indicates an increasing sensitivity to regional influence	Considerable progress in integration was observed in both markets during the 1990s, but no significant improvement has been observed since 2002	
Dynamic cointegration analysis	Standardised trace statistics consistently greater than one indicate the presence of a long-run relationship between equity markets	Only weak cointegration and no indication of further improvement in both markets	
Market cycle synchronisation	An upward trend in the *RCI* signals increased market concordance	The average *RCI*s of equity markets are higher than those of bond markets, suggesting greater equity market concordance	

Table 10

Summary of current financial market integration in Asia

Method	Indication of market integration	Current status of market integration		
		Intra-equity market	Intrabond market	Inter-equity-bond market
Dynamic conditional correlation (DCC)	The higher the time-varying correlation, the larger the co-movement between markets	Higher and improving level of DCCs (0.2 to 0.5)	Low level of DCCs (0.1 to 0.3) and no improvement	Mostly positively correlated at a low level (less than 0.3), except for China's bond market and Asian equity markets, which are negatively correlated

On the evolution and status of integration, much progress was made in the region during the 1990s with respect to greater return convergence. However, the convergence process has appeared to be at a standstill, or even regressing, since 2002. On the other hand, return co-movements have increased between Asian equity markets, with the exception of China's, while Asian bond market correlation was at a standstill. In addition to indicating greater integration of Asian equity markets, the increased equity return correlation may heighten concern about the contagion effect between Asian equity markets.

On the question of the relative importance of regional and global factors, this study, based on the Haldane and Hall (1991) approach, shows that both factors are important to Asian equity and bond markets. For Asia as a whole, sensitivity to the United States' influence has been increasing since 2001. However, the impacts on the financial markets in different economies are not the same. For instance, while equity markets in emerging Asia are becoming more sensitive to the influence of US markets, Asia's bond markets are less sensitive to their US counterparts than they are to those in the other two regional blocs.

With regard to the issues of contagion and risk diversification, the DCC results show that, except for China, inter-equity-bond correlations are mostly positive in Asian economies. This suggests that risk diversification through equities and bonds within the same economy is ineffective. On the other hand, equity and bond investment within or across regional blocs may contribute to risk diversification. This is particularly true for equity-bond-investment within the greater China region, or for using bond markets in the greater China region as the anchor against equity market investment in the other two regional blocs.

In summary, the empirical results from these indicators provide a general picture of equity and bond market integration, but the extent and speed of integration in the region varies. The evidence broadly supports the observation that Asia has witnessed a lot of progress over the years in achieving greater regional financial integration in the equity and bond markets. However, the extent of integration still seems to be limited. The process appears to have stalled in recent years, and the two major regional blocs – mature and emerging markets – seem to have different degrees of integration. Quantity-based measures presented by Chu et al (2006) in terms of the share of Asia's total overseas portfolio investment and Asian investors' holdings of Asian assets also indicate a lower degree of regional integration in Asian capital markets. In comparison, European equity and bond markets appear to be more integrated as (a) the equity return dispersion in Europe dropped by more than half between 1999 and 2005, from over 500 bps to about 200 bps, and the yield spread dispersion has been zero since 2001, (b) their index movements are more sensitive to the regional benchmark index and (c) their return correlations are much higher.

Apart from local or idiosyncratic factors such as credit or liquidity risks in some Asian economies, the divergence and the lack of progress in financial market integration may be attributed to a number of factors. The first is the absence of links between jurisdictions across the whole spectrum of financial infrastructure – the trading, payment, clearing, settlement and custodian systems. Such links would facilitate movements of capital and savings across jurisdictions, leading to more financial intermediation. The second is the failure to harmonise standards in the region's capital markets – for example, the adoption of minimum acceptable international standards, which would improve investor confidence and enhance the flow of capital within the region. The third relates to the need to strengthen cooperation in financial system development, which would increase the diversity of financial intermediation channels in individual jurisdictions. Last but not least is the need to relax non-supervisory restrictions on the access of foreign financial intermediaries to domestic financial markets. Greater competition through financial services liberalisation enhances efficiency.[45]

[45] There are discussions in the region about a possible role for currency cooperation, in terms of a regional exchange rate arrangement, in reducing uncertainties about exchange rate movements, providing stability for

As pointed out by Jeon, Oh and Yang (2006), the lack of success in policy coordination may also hamper financial integration.

Financial market integration is important to the region's economic development. The lack of momentum and the different degrees of integration warrant continuous monitoring. They also pose a challenge for policymakers, despite the fact that Asian countries have shown their political support for greater financial cooperation and integration. Obstacles in areas such as differences in economic structure and development, and maturity of individual markets and infrastructure, need to be addressed. A coordinated strategy for promoting the stability and efficiency of financial intermediation across jurisdictions in Asia is required to clear these obstacles and facilitate integration.

regional currencies and facilitating cross-border financial transactions. However, due to differences in economic structure and development across jurisdictions, even if there is the political will to move towards monetary integration, it will take years. See also Park (2004) on the challenges and prospects.

Appendix: Methodology and interpretation: indicators of financial market integration

This appendix provides in detail the methodologies for constructing the different indicators for assessing financial market integration in Asia and their interpretation. All integration indicators are derived using the benchmark equity indices (or bond return indices) expressed in terms of the US dollar. For the equity market, the conversion of the benchmark index into US dollars is done by dividing the local currency index level by the local currency per US dollar exchange rate. For the bond market, returns are approximated using the holding period return, as discussed in Shiller (1979).[46] Once the bond return series (in local currency) are derived, they are converted into US dollar return series by dividing the local currency bond return series by the percentage change in the local currency per US dollar exchange rate of the respective economies.

i. Cross-market return dispersion

The idea behind the cross-market return dispersion approach introduced by Solnik and Roulet (2000) is simple and intuitive. This can be used as an alternative to the time series approach to estimating the level of correlation of financial markets. Following the law of one price, identical or comparable assets across different countries should generate the same return. If there is a large discrepancy in financial market returns across countries, as measured by the cross-market return dispersion, it will imply that the financial markets are not fully integrated in the sense of return convergence. In this measure, low return dispersion implies higher market integration and vice versa.[47] Based on Solnik and Roulet (2000), Adjaouté and Danthine (2003) and Baele et al (2004) use the negative relationship between dispersion and integration to assess equity market integration in Europe.

Cross-market dispersion is calculated as the standard deviation of the log differences of the benchmark equity indices (or the standard deviation of the holding period returns for bonds) of various economies. Once a time series of standard deviations is obtained, it is filtered using the Hodrick-Prescott smoothing technique to estimate the long-term trend component of the series. In addition, a 12-month moving average of the cross-market maximum-minimum return differential, which also captures the dispersion of returns across markets, is used to assess the market integration process among regional blocs. The smaller the maximum-minimum return differential between markets, the greater their return convergence.

ii. Haldane and Hall (1991) Kalman filter method

The notion of convergence or integration is that the difference between two (or more) series should become arbitrarily small or the series should converge to a constant, *c,* over time, such that $\lim_{k \to \infty} E(X_{t+k} - Y_{t+k}) = 0$ *or* c, where X and Y are the two series. The convergence may be a gradual, ongoing process. If we expect convergence to increase over time, we need a measure that allows for dynamic structural change. This measure will be useful in describing the process of structural change in terms of both degree and timing. The Kalman

[46] See Footnote 25 for the formula of holding period returns.

[47] It should be noted that financial markets in different countries are not homogeneous in the sense that their returns may not be absolutely equal even though these markets are fully integrated.

filter approach suggested by Haldane and Hall (1991) is a method that can be used to measure the time-varying convergence dynamic.[48]

The Haldane and Hall method estimates a simple equation via the Kalman filter estimation with the signal equation as

$$\ln E_{B,t} - \ln E_{i,t} = \alpha_{i,t} + \beta_{i,t}\left(\ln E_{B,t} - \ln E_{US,t}\right) + \varepsilon_{i,t}, \qquad \varepsilon_{i,t} \sim N(0,V) \tag{1}$$

and the state equations as

$$\alpha_{i,t} = \alpha_{i,t-1} + \xi_t, \qquad \xi_t \sim N(0,U)$$

$$\beta_{i,t} = \beta_{i,t-1} + \mu_t, \qquad \mu_t \sim N(0,W), \tag{2}$$

where $E_{i,t}$ is the equity market index level (or bond market return index) of country *i* at time *t*, $E_{B,t}$ is the equity market index level (or bond market return index) of a dominant regional market (ie a regional equity (or bond return) index or a major market index) at time *t* and $E_{US,t}$ is the dominant external market at time *t* proxied by the US equity market (or the US Treasury bond return).

We obtain the estimated parameter ß$_i$ over time via the Kalman filter. From equation (1), using equity markets as an example, it is easy to show that if E_i and E_B converge (the equity market of country *i* converges to the dominant regional market), we would expect ß$_i$ to approach zero. Conversely, if E_i and E_{US} converge (the equity market of country *i* converges to the dominant external US market instead of the regional market), we would find that ß$_i$ approaches one. In this measure, a tendency for ß$_i$ to move towards zero indicates the increasing sensitivity of an individual equity (or bond) market to the influence of a regional market, suggesting a higher degree of price convergence with the regional market.[49, 50]

iii. Dynamic cointegration analysis

In the literature, cointegration analysis is one of a number of traditional methods for estimating the nature and extent of financial market integration. The essence of cointegration is that the series that are cointegrated cannot deviate too much from each other, implying that there exists a long-run relationship between them. Kasa (1992) was one of the first to use the cointegration technique for stock indices to assess equity market integration. In a system with *n* equity market indices, a condition for complete integration is that there be $n - 1$ cointegrating vectors (Kasa (1992)). Using the Johansen (1988) cointegration technique, Manning (2002) analyses nine Asian equity markets and finds a minimum of two common trends in these indices, indicating only partial convergence. Click and Plummer

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[48] Serletis and King (1997) and Manning (2002) use the Haldane and Hall approach to measure the convergence of equity markets in the European Union and in Southeast Asia, respectively.

[49] By rearranging equation (1), we obtain the following:

$$(1 - \beta_{i,t})\ln E_{B,t} + \beta_{i,t}\ln E_{US,t} - \alpha_{i,t} - \varepsilon_{i,t} = \ln E_{i,t}. \tag{A1}$$

It can be seen from equation (A1) that when ß$_i$ approaches zero, the movement in $E_{i,t}$ would be increasingly influenced by that in $E_{B,t}$, suggesting that the two series are converging. On the other hand, when ß$_i$ approaches one, the influence of $E_{B,t}$ is decreasing, while that of $E_{US,t}$ is increasing, which suggests that $E_{i,t}$ and $E_{US,t}$ are converging. When β_i is greater than one or becomes negative, $E_{i,t}$ appears to be diverging from $E_{B,t}$ and $E_{US,t}$.

[50] One caveat of the Haldane and Hall approach is that the conclusion of whether the equity (or bond) markets are converging or diverging may well differ depending on the choice of dominant regional market and dominant external market.

(2005) also apply the Johansen (1988) technique to five equity markets in the ASEAN countries and find only one cointegrating vector among the five equity indices. Click and Plummer therefore conclude that the five ASEAN equity markets are integrated in the economic sense, but that the integration is not complete.

A major issue regarding the use of a cointegration technique in examining market integration is that it says little about the dynamics of convergence because it fails to take into account the fact that convergence is a gradual and ongoing process. To examine the time-varying nature of convergence, a recursive cointegration test can be used. The Johansen approach, In particular, generates a statistic that can be used for this purpose. The trace statistic is a test of the general question of whether one or more cointegrating vectors exist. In the recursive cointegration approach used with an expanding sample size in Hansen and Johansen (1992), the trace statistics can be plotted over time to examine the time-varying nature of market integration. If markets are cointegrating (ie converging), the standardised trace statistic, which is the ratio between the trace statistics and the corresponding 95% critical values, should be consistently greater than one, suggesting that the null hypothesis of no cointegration can be rejected. If markets are diverging or not cointegrated in any sense, the standardised trace statistics will be less than one. The more cointegrating vectors found in a group of financial variables, the greater their cointegration.

Rangvid (2001) uses this recursive approach to examine the convergence among European equity markets and observes the upward trend for the trace statistics, which indicates the increasing convergence of European equity markets but without determining whether it is due to the reduction of the number of underlying stochastic trends over time as the equity markets become more integrated, or to the fact that the sample size increases over time (also known as the "the power of the test" effect). Pascual (2003) therefore proposes conducting rolling cointegration tests with a constant sample size as the estimation rolls over to the next period. Under these conditions, an upward trend in the estimated trace statistics can be interpreted as evidence of more cointegration. Based on this rolling estimation approach, Pascual finds no evidence of increasing cointegration among the same group of European equity markets examined in Rangvid (2001). In this study, we adopt Pascual's rolling estimation approach to eliminate the effect of increasing sample size.

iv. Synchronisation of financial market cycle approach

Another indication of market integration is whether market cycles "align" in time across the region, ie we try to identify whether, at a given moment in time, the financial markets in the region are in the same phase of the financial market cycle. If the financial market cycles in the region are more or less "synchronised", it may provide another indication (or evidence) of financial market integration.

The first step in the analysis of the cycle phases is the determination of the turning points – the peaks and the troughs that signal the change in the trend of the market from bearish to bullish and vice versa. Following the rules from Edwards, Biscarri and de Gracia (2003) for locating the turning points, we identify the peaks and the troughs of financial market cycles as follows:

1. The local peak (trough) is located by comparing the market index level at time t with its index levels throughout $t - 174$ days and $t + 174$ days (approximately eight months before and after time t).[51]

[51] Edwards, Biscarri and de Gracia (2003) note that the results of locating peaks and troughs may be sensitive to the choice of the window width. In this study, as in Edwards, Biscarri and de Gracia, a total cycle length of 16 months is chosen, as suggested by Pagan and Sossounov (2003).

2. Once the peaks and troughs are identified, censoring rules are applied to ensure that we do not identify spurious phases:

   – turning points within eight months of the beginning/end of the series are eliminated;

   – the peak or trough next to the endpoint of the series is eliminated if it is lower/higher than the endpoint;

   – cycles of less than 16 months are eliminated;

   – phases of less than four months are eliminated;

   – enforced alternation so that a peak is always followed by a trough and vice versa;

   – if consecutive peaks (troughs) occur, take the highest (lowest) one.

3. For periods identified as bull phases (S_t), S_t = 1, and for those identified as bear phases (B_t), B_t = 1. A rolling concordance index (*RCI*), using a window of 16 months (which is equivalent to one complete market cycle), is constructed for markets *i* and *j*, as follows:[52]

$$RCI_{ij} = \frac{1}{350}\sum_{\tau=1}^{350}\left[S_{i,t-\tau}S_{j,t-\tau} + B_{i,t-\tau}B_{j,t-\tau}\right]. \quad (3)$$

The value of the concordance index ranges from zero (perfect misalignment of phases) to one (perfect alignment).[53] An upward (downward) trend in the *RCI* signals increasing (decreasing) market concordance, implying greater (less) market integration.

v. Correlation using DCC model

Simple (or rolling) correlation analysis is one of the simplest methods for examining the co-movement of financial markets. Basically, higher correlation between markets implies greater co-movement and greater integration. The DCC model proposed by Engle and Sheppard (2001) and Engle (2002) is a new class of multivariate model particularly well suited to the examination of correlation dynamics among assets. The DCC approach has the flexibility of univariate GARCH but without the complexity of a general multivariate GARCH. As the parameters to be estimated in the correlation process are independent of the number of series to be correlated, a large number of series can be considered in a single estimation. Furthermore, Wong and Vlaar (2003) show that the DCC model outperforms other alternatives in modelling time-varying correlations.

To measure intra- and intermarket correlations, a two-step estimation procedure of the DCC model is used. Univariate GARCH models are first estimated for each asset return series. The standardised residuals from the first step are then used to estimate the dynamic conditional correlations between asset returns. Specifically, let $z_{i,t}$ and $z_{j,t}$ be the standardised residuals of asset returns of countries *i* and *j* at time *t,* respectively, $i \neq j$. The GARCH process, as suggested in Engle (2002), is as follows:

$$q_{ij,t} = \bar{\rho}_{ij} + \alpha(z_{i,t-1}z_{j,t-1} - \bar{\rho}_{ij}) + \beta(q_{ij,t-1} - \bar{\rho}_{ij}) \quad (4)$$

and

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[52] A rolling window width of 16 months is used as this length represents one complete cycle.

[53] The concordance index is used in Harding and Pagan (2000, 2002).

$$\rho_{ij,t} = \frac{q_{ij,t}}{\sqrt{q_{ii,t} q_{jj,t}}} \tag{5}$$

where q_{ij} is the off-diagonal elements of the variance-covariance matrix, $\bar{\rho}_{ij}$ is the unconditional expectation of the cross product $z_{i,t}z_{j,t}$ and $\rho_{ij,t}$ is the conditional correlation between the asset returns of countries *i* and *j* at time *t*.[54]

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[54] See Engle (2002) for a detailed description of the simple DCC model and the estimation procedure.

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Why is there so little regional financial integration in Asia?

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Introduction

In the 10 years that have elapsed since the Asian financial crisis, the conditions needed for financial integration have improved. Asian economies have accumulated enormous amounts of foreign assets, particularly international reserves, due to domestic savings that have exceeded investment. In addition, Asian economies have learned the lesson of balance sheet weaknesses, which has resulted in the rapid decline of the share of foreign currency denominated debt. This does not mean, however, that foreign capital has abandoned the region. In fact, it continues to pour in through foreign direct investment as well as through portfolio flows, including exchange-traded funds, private equity and hedge funds. All in all, cross-border financial transactions (both the export and the import of capital) have increased substantially in Asia in the past 10 years. Such progress in financial integration will certainly have an impact on Asian economies and therefore deserves analysis.

In general terms, a country's financial integration with the rest of the world has many benefits but also some drawbacks. The most important benefits are risk-sharing and allocative efficiency, which contribute to economic growth and integration. Portfolio diversification allows the sharing of idiosyncratic risks across countries, facilitating the insurance of income against country-specific shocks, thereby smoothing consumption over time. Financial integration, by facilitating the allocation of capital to its most productive use, should foster economic growth (Edison et al (2002); Rogoff et al (2006)). The drawbacks of financial integration are also well known: in a world with imperfect capital markets, financial integration may heighten a country's vulnerability to macroeconomic and financial crises. In particular, contagion and reversals of capital flows could result in higher output volatility and even lower average growth for a certain period of time, although the evidence is inconclusive (Rogoff et al (2006)). In any event, the benefit of faster, sustainable growth should, in principle, outweigh the risks in the long run, although countries' initial circumstances as well as the type of financial integration may tilt that balance somewhat differently.

The importance of countries' initial circumstances has received attention in the literature. There is overwhelming evidence – including from the Asian crisis – that countries with poorly developed financial systems are more vulnerable to crises (Demirguc-Kunt and Detragiache (1999)). The type of financial integration has been partially analysed, in particular the different kinds of flows a country receives (foreign direct investment, for example, being considered more stable than short-term flows). However, much less is known about the direction of cross-border flows and how that might change the costs and benefits of financial integration. In other words, the financial integration of a country with countries whose

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business cycles are very different (and not with its main economic partners) may have a bearing on the costs and benefits of financial integration.

In principle, regional financial integration should be more likely to reinforce economic integration than risk-sharing, inasmuch as business cycles tend to be more closely correlated among neighbouring countries than among distant ones. The mirror case would be global financial integration, which basically consists of linkages with major financial centres. In fact, network externalities and economies of scale make financial integration a much more uneven process than economic integration. There is already some evidence that risk-sharing is better achieved through global financial integration, all the more so the more specialised the countries are (Imbs (2004)). The European Union is probably the best example of regional financial integration reinforcing economic integration. Peer pressure has facilitated the upgrading and harmonisation of local practices in the functioning of the financial system, including accounting, tax treatment and even regulation and supervision. Finally, the importance of local information and common time zones for financial markets could still create a role for regional integration in improving welfare.

Considering the volume of foreign investment in Asia, it is fair to say that the region is financially globalised but that less progress has been made towards financial integration within the region (García-Herrero and Wooldridge (2007)). Financial globalisation in Asia implies – given the region's position as a net capital exporter – a large flow of capital from the Asian economies to the developed world, which obviously does not follow the neoclassical model and is more in line with the Lucas paradox. As shown in Graph 1, Asians direct only about one quarter of their foreign portfolio investment to other Asian economies. This is strikingly different from trade patterns in the region – intraregional flows account for over half of Asia's trade. It is also in stark contrast with investment patterns in Europe – over half of the region's portfolio investment is in other European countries

The pattern of capital flows in Asia raises several concerns. One is its sustainability, a key question in the current juncture. Another is the missed opportunity for capital market development in the region and the fact that capital market development would reinforce economic integration. More generally, there are several reasons why it is useful to better understand geographical patterns in financial links. The first is that such patterns may influence the matrix of correlations in asset prices (Forbes and Chinn (2003)); another is that these patterns may affect the degree of business cycle synchronisation (Rogoff et al (2006); Imbs (2004); García-Herrero and Ruiz (2007)).

Recent empirical research has found that the degree of financial integration between two countries – measured as the value of bilateral portfolio holdings – is well depicted by the usual gravity model (Portes and Rey (2005)). This means that the size of the economy and the financial market has a positive effect on bilateral financial integration, while distance has a negative effect because of transaction and information costs. Beyond the usual determinants of a gravity model, trade relations have also been found to foster financial integration between two economies (Shin and Yang (2006)). This basically implies that bilateral trade in goods and bilateral trade in assets are complementary.

Both the results from the gravity model – especially distance – and the complementarity of trade and financial linkages are at odds with the Asian economies being more integrated with the rest of the world than with each other.

One hypothesis is that risk-sharing is the driving force behind financial integration. Since the East Asian economies display relatively synchronised business cycles, limited opportunities for risk diversification within the region may explain the more rapid increase in financial integration with other areas of the world. This is especially true for the major financial centres, which offer a much greater choice of financial instruments for risk-sharing. Using the consumption-smoothing model developed by Asdrubali et al (1996), Jeon et al (2005) estimate the degree of global consumption risk-sharing in East Asia and confirm that some degree of risk-sharing is obtained through Asian economies' integration with major financial

centres. The paper does not compare the importance of the risk-sharing motive with that of other motives, however. In fact, there may be other explanations worth exploring, such as the underdevelopment of Asian financial markets relative to their size and tax- and risk-adjusted returns.

Against this background, it is important to identify the factors responsible for the slow pace of financial integration within the region to date. This is what we attempt in this paper, using data on cross-border portfolio holdings for more than 40 economies – seven of which are in Asia – for 2001–05. We show that limited liquidity in Asian financial markets helps to explain why regional financial integration lags behind integration with the major financial centres.

Model and data

We analyse the determinants of foreign investment using a gravity model. Gravity models, originally developed to explain gravitational forces in physics, were adopted by economists to explain bilateral trade in goods. They proved very successful, with most empirical studies finding that trade between two countries is related positively to their national income and negatively to the distance between them. Gravity models were subsequently employed to explain cross-border financial flows.

Theoretical support for the use of gravity models to explain trade in goods was expounded by Anderson (1979), Bergstrand (1985) and Evenett and Keller (2002). In its simplest form, the gravity equation can be expressed as follows:

$$\ln(Trade_{sdt}) = Costs_{sdt} + \ln(GDP_{st}) + \ln(GDP_{dt}), \quad (1)$$

where $Trade_{sdt}$ denotes trade in goods and services between the source country *s* and the destination country *d* at time *t*; $Costs_{sdt}$ represents transaction costs associated with trade between the source and the destination countries – *s* and *d*, respectively – including transportation costs and trade barriers. Finally, GDP_{st} and GDP_{dt} represent gross domestic product for countries *s* and *d*, respectively.

Equation (1) can be extended by permitting the coefficients of GDP to be freely estimated and specifying transaction costs in terms of observable variables. Transaction costs are typically modelled as a function of geographical or cultural distance, the argument being that costs are likely to be lower between trading partners that are geographically close or have similar cultural histories, perhaps owing to colonial links. The gravity model then takes the following form:

$$\begin{aligned}\ln(Trade_{sdt}) = {} & \beta_0 + \beta_1 \ln(GDP_{st}) + \beta_2 \ln(GDP_{dt}) \\ & + \beta_3 \ln(Dist_{sd}) + \beta_4 Border_{sd} + \beta_5 Colony_{sd} + \beta_6 Language_{sd} + \varepsilon_{sdt},\end{aligned} \quad (2)$$

where $Dist_{sd}$ is the distance between countries *s* and *d*; $Border_{sd}$ is a binary variable that equals one if *s* and *d* share a land border; $Colony_{sd}$ is a binary variable equal to one if *d* was once a colony of *s*; and $Language_{sd}$ is a binary variable that equals one if *d* and *s* share a common language.

Theoretical justifications have recently been offered for the use of gravity models to explain financial transactions. Martin and Rey (2004) show that under a number of assumptions – namely that markets for financial assets are segmented, cross-border asset trade entails transaction or information costs and the supply of assets is endogenous – bilateral asset

holdings should be positively related to the size of the market, negatively related to transaction and information costs and positively related to expected returns on assets. Using a similar theoretical model, Faruquee et al (2004) also show that the gravity equation emerges naturally.

Numerous empirical studies, including Portes and Rey (2005) and Shin and Yang (2006), have found that such models explain cross-border transactions in financial assets well. In these studies, the distance variables are proxies for information frictions. Asymmetric information is likely to be less of an obstacle to investment between countries that are geographically or culturally close.

Some studies of the determinants of trade in financial assets include trade in goods and services as an explanatory variable, to capture complementarities between trade flows and financial flows. Equation (2) then becomes the following:

$$\begin{aligned}\ln(Assets_{sdt}) &= \beta_0 + \beta_1 \ln(GDP_{st}) + \beta_2 \ln(GDP_{dt}) \\ &+\beta_3 \ln(Dist_{sd}) + \beta_4 Border_{sd} + \beta_5 Colony_{sd} + \beta_6 Language_{sd} \\ &+\beta_7 \ln(Trade_{sdt}) + \varepsilon_{sdt}\end{aligned} \tag{3}$$

Another potentially important influence on foreign investment is the risk-return profile of available assets. Returns, risk and correlations are key inputs in the construction of a diversified portfolio. Withholding taxes can have a significant impact on returns, and thus the tax treatment of non-resident investors is also an important consideration. So are capital controls that might restrict the entry of foreign investors into country *d* or their exit from country *s*. We control for these factors in the following way:

$$\begin{aligned}\ln(Assets_{sdt}) &= \beta_0 + \beta_1 \ln(GDP_{st}) + \beta_2 \ln(GDP_{dt}) \\ &+\beta_3 \ln(Dist_{sd}) + \beta_4 Border_{sd} + \beta_5 Colony_{sd} + \beta_6 Language_{sd} \\ &+\beta_7 \ln(Trade_{sdt}) + \beta_8 Sharpe_{dt} + \beta_9 Sharpe\_FX_{dt} \\ &+\beta_{10} Tax_{dt} + \beta_{11} Controls\_out_{st} + \beta_{12} Controls\_in_{dt} + \varepsilon_{sdt}\end{aligned} \tag{4}$$

where $Sharpe_{dt}$ denotes risk-adjusted returns on investments in country *d* as measured by the Sharpe ratio (ie returns less the risk-free rate divided by the standard deviation of returns) and calculated in the currency of country *d*; $Sharpe\_FX_{dt}$ denotes risk-adjusted currency returns, to capture exchange rate gains and losses on investments in country *d*; Tax_{dt} is the withholding tax applied in country *d*; $Control\_out_{st}$ measures controls on capital outflows from country *s* and $Control\_in_{st}$ measures controls on capital inflows to country *d*.

The final variable we introduce is market liquidity. There is a growing body of literature on the role of liquidity in asset prices and, thus, in investors' decisions (Acharya and Pedersen (2005); Morris and Shin (2004)). The absence of trading activity can be a significant deterrent to foreign investment because it raises the costs of entering and exiting financial positions. This gives our final specification:

$$\begin{aligned}\ln(Assets_{sdt}) &= \beta_0 + \beta_1 \ln(GDP_{st}) + \beta_2 \ln(GDP_{dt}) \\ &+\beta_3 \ln(Dist_{sd}) + \beta_4 Border_{sd} + \beta_5 Colony_{sd} + \beta_6 Language_{sd} \\ &+\beta_7 \ln(Trade_{sdt}) + \beta_8 Sharpe_{dt} + \beta_9 Sharpe\_FX_{dt} \\ &+\beta_{10} Tax_{dt} + \beta_{11} Controls\_out_{st} + \beta_{12} Controls\_in_{dt} \\ &+\beta_{13} Liquidity_{dt} + \varepsilon_{sdt}\end{aligned} \tag{5}$$

where $Liquidity_{dt}$ is the turnover of assets in country *d*.

To estimate equations (3) to (5), we require data on bilateral investment. The most comprehensive source of such data is the IMF's Coordinated Portfolio Investment Survey (CPIS). In this survey, investors in as many as 73 economies report their holdings of foreign securities, disaggregated by the residency of the issuer and type of security. The survey captures foreign investment in short- and long-term debt securities as well as in equity securities. Securities held as official reserves and those deemed to be foreign direct investment are excluded.

The quality of the CPIS data has improved over time but there are still shortcomings. The coverage of portfolio investors is incomplete. Some investments – especially investments through collective vehicles – are misallocated across countries. There is no information on the currency composition of investments in individual markets. Although the first survey was carried out in 1997, we limit our analysis to surveys from 2001 to 2005, which are more comparable in terms of data quality and coverage.

Gravity models typically specify flows as the dependent variable, but use of the CPIS data requires us to replace flows with outstanding stocks. The CPIS data refer to portfolio holdings, not flows. Changes in holdings are not a good proxy for flows because the reporting population changed between surveys and holdings are valued at market prices. In any case, holdings are less volatile than flows and so arguably better capture long-term influences on portfolio allocations. Short-term market conditions have an important impact on flows.

The 73 source economies that report CPIS data comprise 23 industrial and 50 developing economies. Every source economy is asked to report its investment in each of almost 200 destination economies. This allows us to construct source-destination pairs for holdings of short-term debt securities, holdings of long-term debt securities and holdings of equity securities. The sample is restricted to observations where there are no missing data for holdings, GDP and trade. This leaves 42 source economies, including seven in Asia: Hong Kong SAR, Indonesia, Korea, Macao SAR, the Philippines, Singapore and Thailand. We have five years of annual data; thus, the final panel has 11,617 observations. The number of observations varies each year so the panel is unbalanced.

GDP data are from the IMF's International Financial Statistics, trade data from the IMF's Direction of Trade Statistics. Nominal (US dollar) data on portfolio holdings and trade flows were converted to real values using the US GDP deflator. Other gravity variables are from Andrew Rose's website.

The Sharpe ratio is computed using five years of annualised monthly returns. A five-year period was taken to smooth the impact of economic cycles. Portfolio returns are denominated in the currency of the destination economy, and currency returns are measured in terms of the destination currency against the source currency.

For equity securities, returns are based on the main local market index, as disseminated by either Bloomberg or Datastream. For long-term debt securities, returns are based on JPMorgan's Emerging Market Bond Index (EMBI) and Government Bond Index (GBI). The EMBI comprises US dollar- and euro-denominated sovereign bonds and excludes industrial and high-income countries. The GBI comprises local currency government bonds, mainly from industrial and high-income countries. Many institutional investors aim to replicate these indices, so their performance is likely to be representative. For those countries included in both the EMBI and the GBI – Hungary, Korea, Mexico, Poland and South Africa – we calculate a weighted average of returns, where the weights are based on the country's outstanding stocks of foreign currency and local currency debt. For short-term debt securities, returns refer to onshore three-month interbank rates.

Taxes refer to withholding taxes on dividends and interest income for equity investments and bond investments, respectively. We also consider bilateral tax treaties between countries,

since different source countries have different withholding tax rates in a destination country. These data are compiled annually by PriceWaterhouseCoopers. For controls on capital inflows and outflows, we use the dummy variables defined by the IMF for a range of current and capital account transactions and published in the *Annual Report on Exchange Arrangements and Exchange Restrictions.*

Finally, data availability restricts us to using market turnover as a proxy for liquidity. Average annual turnover shows the order flow the market typically accommodates, and, in this sense, is a measure of market depth. Tightness and resiliency are also important dimensions of liquidity, but they are more difficult to measure. Turnover data are available for many of the markets that interest us, whereas bid-ask spreads and other measures of liquidity are more difficult to obtain.

Turnover is positively related to the size of the market. To control for differences in market size across countries, we compute the turnover ratio: turnover divided by market capitalisation. Turnover and market capitalisation data for many equity markets are available from the World Federation of Exchanges (FIBV). For long-term debt securities, we use data from national sources on the turnover of local government bonds. For short-term debt securities, turnover data are not readily available; we therefore use the turnover of local government bonds as a proxy.

We estimate equations (3) to (5) with random effects, based on the following specification of the error term: $\varepsilon_{it} = \lambda_i + u_{it}$, where λ_i is heterogeneity specific to investment flows between *s* and *d*.[2] For an efficient estimator, we assume that $E\left(\lambda_i^2\right) = \sigma_i^2$, $E\left(u_{it}^2\right) = \sigma_u^2$, $E\left(\varepsilon_{it}^2\right) = \sigma_\lambda^2 + \sigma_u^2$, $t = s$ but $E\left(\varepsilon_{it}^2\right) = \sigma_\lambda^2$, $t \neq s$, and $E\left(X_{kit}\lambda_i\right) = 0$ for all *k*, *i*, and *t*. The random effects estimator is estimated by feasible generalised least square (FGLS) over all individual groups in the dataset: $\widehat{\beta}_{RE} = \left[\sum_{i=1}^{N}\left(X_i'\Omega^{-1}X_i\right)\right]^{-1}\sum_{i=1}^{N}\left(X_i'\Omega^{-1}y_i\right)$, where *X* is an independent variable, *y* is the dependent variable and $\Omega = \sigma_u^2 I + \sigma_\lambda^2 ee'$.

Stylised facts

A few facts are worth highlighting before presenting our results. As shown in Table 1 on summary statistics, the cross-sectional variation in liquidity tends to be higher than the cross-sectional variation in returns. In other words, differences in turnover across markets are larger than differences in performance. This is especially true of debt securities markets. In bond markets, the coefficient of variation equals 0.46 for $Sharpe_{dt}$, compared with 1.59 for $Liquidity_{dt}$.

Sharpe ratios differ significantly across asset classes. The average Sharpe ratio is highest for bonds at 0.65, followed by equities at 0.44 and, finally, currency returns at –0.12. However, the differences in levels are less pronounced within a given asset class. Returns are much higher in developing than in developed economies, but so too is volatility. Consequently, Sharpe ratios are similar, as shown in Graphs 2 and 3. In equity markets, the

[2] We do not report the fixed-effect "within" estimation results because of the impossibility of estimating time-invariant factors such as distance, area, land border and language. We include time dummies in the error term of the specification. However, the span of our sample is too short to capture the time-specific component. Therefore, we do not report the time dummies.

Sharpe ratio averages 0.43 among developed economies and 0.53 among developing economies. In bond markets, the difference is even smaller.

Turnover ratios also differ significantly across asset classes. The average turnover ratio is highest for bonds, at 6.48, and then for equities, at 0.74. But in contrast with Sharpe ratios, there is considerable dispersion around those averages (Graphs 2 and 3). In equity markets, the turnover ratio is nearly twice as high in developed as in developing economies: 0.94 versus 0.55. In bond markets, the difference between developed and developing economies is even larger.

A possible explanation for such differences in cross-country variation is that financial integration facilitates the equalisation of risk-adjusted (expected) returns, whereas liquidity tends to concentrate in a few instruments and markets. Notably, the relationship between liquidity and returns is weak. More generally, correlation among the explanatory variables is low, as indicated in Table 2.

Correlations among dependent variables are reported in Table 3. Equities and long-term debt securities move loosely together, with a coefficient of 0.74. Equities and short-term debt securities are not highly correlated. Long-term and short-term debt securities are less highly correlated than equities and bonds. Overall, the correlation coefficients are not so high as to create serious endogeneity problems in the gravity model estimation.

Results

We now turn to the empirical exploration of hypotheses behind the direction of cross-border financial positions. The question is first analysed for the world as a whole, using our sample of 42 economies and distinguishing among different kinds of assets. Second, different subsamples are examined, in order to compare Asia with other relevant groups of countries. In particular, we compare the results for the eight Asian economies in our sample (Australia, Hong Kong SAR, Indonesia, Korea, Macao SAR, the Philippines, Singapore and Thailand) with developed countries, emerging markets and members of the European Union.

We test the hypotheses embedded in the models outlined in the second section as building blocks, since we find that all of them play a role, albeit to varying extents. The first hypothesis is based on the gravity model only – ie the destination of cross-border financial transactions is attributable to geographical and cultural distance as well as to economic size. The second hypothesis is that trade relations may be the driving force behind financial linkages. The third hypothesis – novel to this paper – puts risk-return considerations at the forefront, both tax-adjusted and not. It also controls for the feasibility of such transactions by considering controls on capital inflows and outflows. The fourth and last hypothesis – also novel – deals with the development of the financial system, with special attention given to the degree of liquidity in domestic markets.

Is the gravity model a good starting point?

Table 4 reports the estimation results of equation (2). Separate regressions are conducted for the three main types of financial assets. The gravity model fits well for all kinds of cross-border holdings. In particular, the sizes of the source and destination economies are always positive and significant determinants of cross-border linkages. The same is true when two countries share the same language. In fact, language is generally a key component of the network effects that influence international economic relations (Rauch (2001)). Geographical distance – a proxy for information frictions – discourages financial exposures, as expected.

Do trade links matter?

Including bilateral trade relations in the gravity model, as in equation (3), clearly improves the fit of the model in all three specifications. The results are reported in Table 5. Trade between two countries is positive and significant in fostering financial linkages.

The complementarity between bilateral trade and financial transactions is not surprising, for several reasons. First, trade in goods entails corresponding financial transactions, such as trade credit and export insurance. Second, as Obstfeld and Rogoff (2001) show, there is a close connection between the gains from international financial diversification and the volume of trade in goods. Finally, openness in goods markets may increase countries' willingness to conduct cross-border financial transactions, reducing home bias through some kind of "familiarity" effect.

What about risk-return considerations?

We now add risk-adjusted returns to equation (3). Specifically, we consider two components of portfolio returns: the return on assets in the currency of the destination country and the return stemming from the exchange rate gains and losses when converted to the currency of the source country. This new model, summarised in Table 6, offers a better fit than the previous one both for equity and for bonds. In fact, both aspects of the risk-adjusted return are significant. The Sharpe ratio for portfolio returns is positive and significant, as one would expect. The Sharpe ratio for currency returns is also significant, but the sign is positive for equities and negative for bonds. For equities, this result implies that the appreciation of the destination country's currency against that of the source country would induce more cross-border equity flows.

Risk-adjusted returns may well differ depending on the tax treatment of non-residents. We include this potential explanatory variable as an additional regressor, as depicted in equation (4). In the same equation, we also control for restrictions on the entry of foreign capital into the destination country as well as on the exit of capital from the source country. The results are presented in Table 7. Most of the previous results are maintained, although exchange rate-related gains are now significant and negative for holdings of bonds and no longer significant for equities.

Some of the new variables are found to be significant, which explains the better fit both for equities and for bonds. First, withholding taxes are seen to discourage cross-border equity holdings, as one would expect. No significant impact is found on bond holdings, though. This latter result is probably driven by shortcomings in our data that prevent us from distinguishing between local currency and foreign currency (international) bonds. Withholding taxes are applied to onshore transactions and so they affect mainly local currency bonds. Consequently, withholding taxes might influence the type of instruments investors choose to buy but do not necessarily deter foreign investment in bonds altogether.

Second, the source country's controls on capital outflows discourage all kinds of bilateral financial linkages. The estimated coefficients are not only highly significant but also very large, as one would expect. By contrast, the destination country's controls on inflows do not seem to be effective; indeed, they are found to encourage cross-border portfolio holdings. While this appears to be counterintuitive, it is possible that such controls are generally introduced in countries experiencing a boom in capital inflows or that the controls are simply ineffective.

The role of liquidity in the financial sector

We now include in our analysis the degree of liquidity in the destination country, as in equation (5). As shown in Table 8, market turnover is significant for bond and equity holdings

and positive, as expected. In addition, the model fits the data better than in previous cases, as shown by the higher R-squared.

Are there differences across country groups?

We now look into whether the Asian economies differ markedly from other groups of source countries. Using equation (5), we compare four groups of economies: developed, emerging, European and Asian.

The results for developed countries, reported in Table 9, differ from the results for all other countries (Table 8) in several ways. First, investors respond to exchange rate gains in the same way, whether they are generated by equities or bonds. Second, the withholding tax is not statistically significant in discouraging bilateral asset holdings because most developed countries no longer apply a withholding tax.

The group of emerging economies, as shown in Table 10, yields fewer significant results. In particular, exchange rate-related gains do not seem to affect the destination of emerging economies' investment. The Sharpe ratio for portfolio returns is relevant only for equities. The withholding tax in the destination country is insignificant, as are the source country's controls on capital outflows. However, controls on inflows do discourage cross-border investment in equities. The liquidity of destination markets is found to be relevant in explaining the destination of bond holdings.

The results for western European countries, in Table 11, also differ from those of developed countries as a group on a number of important points. First, the risk-adjusted return in the source country's domestic currency does not necessarily foster investment from Europe and actually discourages investment in short-term bonds. Second, capital controls on inflows always discourage investment from European countries, in both equities and bonds. Third, more liquidity in the destination country does not seem to encourage investment from European countries; if anything, it discourages investment in bonds.

Finally, Asian economies, as shown in Table 12, exhibit a unique characteristic, even when compared with emerging economies as a group. This is the very significant positive influence of liquidity in explaining holdings of equities and bonds from Asian economies by the rest of the world. Recall that the CPIS data on portfolio holdings exclude securities held as part of official reserves, and so our results are not biased by the large portfolios of central banks in the region (which are presumably even more heavily weighted towards liquid assets).

Among Asian economies, the risk-adjusted return in local currency and even exchange rate gains do not seem to matter. This is also true for withholding taxes in the host economy. Finally, controls on capital outflows in the source economy are very relevant, which is definitely not the case for other emerging economies.

Conclusions

We use data on cross-border equity and bond holdings for over 40 economies in order to analyse empirically why countries maintain financial linkages with some economies and not with others in an attempt to understand why the Asian economies have focused on financial integration with economies outside the region, notwithstanding the demonstrated relevance of distance and trade in explaining financial linkages. Our results point to market liquidity as an important factor. The lack of liquidity in Asian financial markets explains why Asian investors prefer to access the major financial centres. The importance of liquidity is unique to Asia, compared with developed countries as a group or the subsample of European countries. Emerging economies as a group are also affected by liquidity considerations when

directing their cross-border financial investment, but to a much lesser extent than the Asian economies.

On the basis of these results, it would appear that Asian economic authorities should take measures to deepen the liquidity of their financial markets if they want to promote financial integration within the region. Further research on this point seems warranted. In particular, the robustness of our results could be confirmed by estimating alternative specifications of the gravity equation. As noted in the introduction, one interesting extension would be to incorporate a measure of risk-sharing as an explanatory variable.

Table 1

Summary statistics

	Mean	**Std. Dev**
ln($Assets_{sdt}$) – equity securities	4.12	3.29
ln($Assets_{sdt}$) – long-term debt securities	4.29	2.80
ln($Assets_{sdt}$) – short-term debt securities	3.88	2.54
ln(GDP_{st})	8.69	1.21
ln(GDP_{dt})	8.55	1.19
ln($Dist_{sd}$)	7.99	0.87
$Border_{sd}$	0.03	0.17
$Colony_{sd}$	0.05	0.21
$Language_{sd}$	0.14	0.34
ln($Trade_{sdt}$)	2.32	3.28
$Sharpe_{dt}$ – equity securities	0.44	0.39
$Sharpe_{dt}$ – long-term debt securities	0.65	0.30
$Sharpe_{dt}$ – short-term debt securities		
$Sharpe\_FX_{sdt}$	–0.12	0.43
Tax_{dt} – dividend income	17.4	8.02
Tax_{dt} – interest income	14.1	7.87
$Controls\_out_{st}$	0.56	0.49
$Controls\_in_{dt}$	0.38	0.48
$Liquidity_{dt}$ – equity securities	0.74	0.53
$Liquidity_{dt}$ – long-term debt securities	6.48	10.29
$Liquidity_{dt}$ – short-term debt securities	7.79	11.30

These summary statistics are based on the bilateral variables for the portfolio holdings.

Table 2

Correlation among explanatory variables

Dependent variable		Liquidity$_{dt}$	GDP$_{dt}$	Sharpe$_{dt}$
Equity securities	Liquidity$_{dt}$	1.000		
	GDP$_{dt}$	–0.012	1.000	
	Sharpe$_{dt}$	–0.102	–0.102	1.000
Long-term debt securities	Liquidity$_{dt}$	1.000		
	GDP$_{dt}$	–0.017	1.000	
	Sharpe$_{dt}$	0.000	–0.102	1.000
Short-term debt securities	Liquidity$_{dt}$	1.000		
	GDP$_{dt}$	–0.005	1.000	
	Sharpe$_{dt}$	–0.007	0.097	1.000

Table 3

Correlation among dependent variables

	Equities	Long-term debt	Short-term debt
Equities	1.000		
Long-term debt	0.739	1.000	
Short-term debt	0.590	0.682	1.000

Table 4

Gravity model

Regressors	Dependent variable		
	Equity	**Long-term debt**	**Short-term debt**
$\ln(GDP_{st})$	0.559*** [0.027]	0.536*** [0.022]	0.221*** [0.029]
$\ln(GDP_{dt})$	0.579*** [0.027]	0.554*** [0.023]	0.391*** [0.031]
$\ln(Dist_{sd})$	–0.671*** [0.068]	–0.893*** [0.056]	–0.509*** [0.073]
$Border_{sd}$	0.187 [0.318]	0013 [0.056]	0.236 [0.318]
$Colony_{sd}$	0.083 [0.342]	0.036 [0.285]	–0.376 [0.338]
$Language_{sd}$	0.669*** [0.155]	0.217*** [0.132]	0.502*** [0.167]
Observations	6732	8010	2935
R-squared	0.227	0.274	0.186

Dependent variables are bilateral portfolio flows between source country *s* and destination country *d*. All explanatory variables except the dummy variables are logs. Robust standard errors of the estimated coefficients are reported in parentheses. Intercepts are included (not reported). ***, ** and * indicate that the estimated coefficients are statistically significant at the 1%, 5% and 10% levels, respectively.

Table 5

Model with trade

Equation (3)

	Equity	**Long-term debt**	**Short-term debt**
$\ln(GDP_{st})$	0.337*** [0.037]	0.166*** [0.031]	–0.109** [0.049]
$\ln(GDP_{dt})$	0.371*** [0.035]	0.230*** [0.029]	0.091** [0.045]
$\ln(Dist_{sd})$	–0.411*** [0.072]	–0.491*** [0.059]	–0.169*** [0.080]
$Border_{sd}$	0.137 [0.308]	–0084 [0.274]	0.113 [0.305]
$Colony_{sd}$	–0.161 [0.339]	–0.255 [0.279]	–0.611 [0.331]
$Language_{sd}$	0.584*** [0.155]	0.072 [0.128]	0.441*** [0.160]
$\ln(Trade_{sdt})$	0.214*** [0.024]	0.334*** [0.020]	0.310 [0.034]
Observations	6666	7911	2899
R-squared	0.26	0.33	0.24

Dependent variables are bilateral portfolio flows between source country *s* and destination country *d*. All explanatory variables except the dummy variables are logs. Robust standard errors of the estimated coefficients are reported in parentheses. Intercepts are included (not reported). ***, ** and * indicate that the estimated coefficients are statistically significant at the 1%, 5% and 10% levels, respectively.

Table 6

Model with risk-adjusted returns

	Equity	Long-term debt	Short-term debt
$\ln(GDP_{st})$	0.311*** [0.049]	–0.103** [0.056]	–0.107 [0.071]
$\ln(GDP_{dt})$	0.263*** [0.051]	0.033 [0.057]	0.050 [0.063]
$\ln(Dist_{sd})$	–0.580*** [0.091]	–0.436*** [0.103]	–0.579*** [0.099]
$Border_{sd}$	–0.325 [0.365]	0.601 [0.488]	–0.058 [0.397]
$Language_{sd}$	0.863*** [0.189]	0.565 [0.222]	0.590*** [0.192]
$\ln(Trade_{sdt})$	0.322*** [0.033]	0.656*** [0.035]	0.336*** [0.044]
$Sharpe_{dt}$	0.826*** [0.055]	0.376*** [0.071]	[1]
$Sharpe\_FX_{sdt}$	0.190*** [0.052]	–0.547*** [0.062]	–0.347*** [0.096]
Observations	5016	3420	2379
R-squared	0.28	0.42	0.23

Dependent variables are bilateral portfolio flows between source country *s* and destination country *d*. All explanatory variables except the dummy variables are logs. Robust standard errors of the estimated coefficients are reported in parentheses. Intercepts are included (not reported). ***, ** and * indicate that the estimated coefficients are statistically significant at the 1%, 5% and 10% levels, respectively.

[1] Results could not be reported due to lack of data.

Table 7

Model with taxes and capital controls

Equation (4)

	Equity	**Long-term debt**	**Short-term debt**
$\ln(GDP_{st})$	0.363*** [0.045]	–0.107** [0.065]	–0.221*** [0.071]
$\ln(GDP_{dt})$	0.354*** [0.054]	–0.009 [0.065]	0.009 [0.074]
$\ln(Dist_{sd})$	–0.557*** [0.095]	–0.353*** [0.123]	0.012 [0.119]
$Border_{sd}$	–0.113 [0.374]	0.205 [0.563]	–0.179 [0.418]
$Language_{sd}$	1.09*** [0.207]	0.424** [0.239]	0.643*** [0.214]
$\ln(Trade_{sdt})$	0.240*** [0.035]	0.690*** [0.042]	0.359*** [0.053]
$Sharpe_{dt}$	0.606*** [0.052]	0.187** [0.076]	[1]
$Sharpe\_FX_{sdt}$	–0.049 [0.049]	0.328*** [0.068]	–0.263*** [0.115]
Tax_{dt}	–0.039*** [0.004]	0.012 [0.007]	0.002 [0.009]
$Controls\_out_{st}$	–1.690*** [0.091]	–0.758*** [0.100]	–1.196*** [0.162]
$Controls\_in_{dt}$	0.035*** [0.094]	0.645*** [0.167]	–0.362 [0.16]
Observations	4046	3420	1581
R-squared	0.36	0.42	0.25

Dependent variables are bilateral portfolio flows between source country *s* and destination country *d*. All explanatory variables except the dummy variables are logs. Robust standard errors of the estimated coefficients are reported in parentheses. Intercepts are included (not reported). ***, ** and * indicate that the estimated coefficients are statistically significant at the 1%, 5% and 10% levels, respectively.

[1] Results could not be reported due to lack of data.

Table 8

Model with liquidity

Equation (5)

	Equity	**Long-term debt**	**Short-term debt**
$\ln(GDP_{st})$	0.305*** [0.058]	0.130* [0.079]	–0.271*** [0.106]
$\ln(GDP_{dt})$	0.240*** [0.063]	0.212** [0.083]	0.053 [0.090]
$\ln(Dist_{sd})$	–0.442*** [0.110]	–0.356** [0.148]	0.015 [0.140]
$Border_{sd}$	–0.157 [0.435]	1.15* [0.660]	0.038 [0.468]
$Language_{sd}$	1.13*** [0.223]	0.929*** [0.274]	0.778*** [0.243]
$\ln(Trade_{sdt})$	0.314*** [0.041]	0.468*** [0.056]	0.436*** [0.064]
$Sharpe_{dt}$	0.687*** [0.062]	0.059** [0.086]	[1]
$Sharpe\_FX_{sdt}$	0.045 [0.062]	–0.33*** [0.085]	–0.197 [0.137]
Tax_{dt}	–0.026*** [0.005]	–0.045*** [0.014]	–0.003 [0.013]
$Controls\_out_{st}$	–1.70*** [0.108]	–0.691*** [0.123]	–1.21*** [0.188]
$Controls\_in_{dt}$	0.161 [0.109]	0.814*** [0.252]	–0.56*** [0.184]
$Liquidity_{dt}$	0.463*** [0.077]	0.021*** [0.004]	0.001 [0.006]
Observations	3038	1523	1158
R-squared	0.37	0.46	0.31

Dependent variables are bilateral portfolio flows between source country *s* and destination country *d*. All explanatory variables except the dummy variables are logs. Robust standard errors of the estimated coefficients are reported in parentheses. Intercepts are included (not reported). ***, ** and * indicate that the estimated coefficients are statistically significant at the 1%, 5% and 10% levels, respectively.

[1] Results could not be reported due to lack of data.

Table 9

Subsample of developed countries

	Equity	Long-term debt	Short-term debt
$\ln(Trade_{sdt})$	0.432*** [0.059]	0.208** [0.098]	0.588*** [0.093]
$Sharpe_{dt}$	0.623*** [0.0538]	0.095 [0.095]	[1]
$Sharpe\_FX_{sdt}$	–0.156*** [0.049]	–0.470*** [0.097]	–0.265* [0.144]
Tax_{dt}	0.007 [0.011]	–0.021 [0.017]	0.01 [0.017]
$Controls\_out_{st}$	–2.61*** [0.153]	–1.24*** [0.237]	–0.78** [0.332]
$Controls\_in_{dt}$	0.213** [0.098]	0.304 [0.293]	–0.901*** [0.212]
$Liquidity_{dt}$	0.006** [0.004]	0.02*** [0.004]	0.006 [0.007]
Observations	1829	891	854
R-squared	0.45	0.56	0.36

Dependent variables are bilateral portfolio flows between source country *s* and destination country *d*. All explanatory variables except the dummy variables are logs. Robust standard errors of the estimated coefficients are reported in parentheses. Intercepts are included (not reported). ***, ** and * indicate that the estimated coefficients are statistically significant at the 1%, 5% and 10% levels, respectively.

[1] Results could not be reported due to lack of data.

Table 10

Subsample of developing economies

	Equity	Long-term debt	Short-term debt
$\ln(Trade_{sdt})$	0.147** [0.073]	0.216*** [0.067]	0.123 [0.093]
$Sharpe_{dt}$	0.654** [0.138]	0.017 [0.17]	[1]
$Sharpe\_FX_{sdt}$	0.059 [0.154]	0.074 [0.17]	0.478 [0.364]
Tax_{dt}	0.004 [0.014]	0.015 [0.016]	–0.0008 [0.018]
$Controls\_out_{st}$	–0.21 [0.164]	0.029 [0.16]	–0.015 [0.273]
$Controls\_in_{dt}$	–0.530** [0.24]	0.559 [0.731]	–0.421 [0.419]
$Liquidity_{dt}$	0.013 [0.008]	0.028*** [0.009]	–0.021 [0.014]
Observations	601	569	296
R-squared	0.17	0.34	0.18

Dependent variables are bilateral portfolio flows between source country *s* and destination country *d*. All explanatory variables except the dummy variables are logs. Robust standard errors of the estimated coefficients are reported in parentheses. Intercepts are included (not reported). ***, ** and * indicate that the estimated coefficients are statistically significant at the 1%, 5% and 10% levels, respectively.

[1] Results could not be reported due to lack of data.

Table 11

Subsample of western European economies

	Equity	Long-term debt	Short-term debt
$\ln(Trade_{sdt})$	0.896*** [0.076]	0.879*** [0.158]	0.610*** [0.152]
$Sharpe_{dt}$	0.581*** [0.061]	–0.021 [0.073]	–0.291* [0.161]
$Sharpe\_FX_{sdt}$	–0.115** [0.050]	–0.323*** [0.076]	[1]
Tax_{dt}	–0.012 [0.013]	–0.003 [0.026]	0.029 [0.027]
$Controls\_out_{st}$	[2]	[2]	[2]
$Controls\_in_{dt}$	–0.200* [0.108]	–1.41*** [0.541]	–0.939*** [0.293]
$Liquidity_{dt}$	0.0009 [0.003]	–0.026*** [0.006]	–0.012 [0.009]
Observations	1302	604	562
R-squared	0.52	0.59	0.32

Dependent variables are bilateral portfolio flows between source country *s* and destination country *d*. All explanatory variables except the dummy variables are logs. Robust standard errors of the estimated coefficients are reported in parentheses. Intercepts are included (not reported). ***, ** and * indicate that the estimated coefficients are statistically significant at the 1%, 5% and 10% levels, respectively.

[1] Results could not be reported due to lack of data. [2] There are no controls on capital outflows to other European countries.

Table 12

Subsample of Asian economies

	Equity	Long-term debt	Short-term debt
$\ln(Trade_{sdt})$	1.01***	1.411***	0.925***
	[0.147]	[0.222]	[0.223]
$Sharpe_{dt}$	0.221	–0.046	[1]
	[0.159]	[0.17]	
$Sharpe\_FX_{sdt}$	–0.367	–0.457**	–0.088
	[0.153]	[0.180]	[0.308]
Tax_{dt}	–0.008	–0.01	–0.041
	[0.018]	[0.056]	[0.031]
$Controls\_out_{st}$	–2.796***	–1.18***	–2.332***
	[0.283]	[0.290]	[0.437]
$Controls\_in_{dt}$	–0.496**	1.21**	–0.22
	[0.249]	[0.479]	[0.47]
$Liquidity_{dt}$	0.013***	0.027*	0.037**
	[0.001]	[0.017]	[0.019]
Observations	327	307	203
R-squared	0.73	0.58	0.48

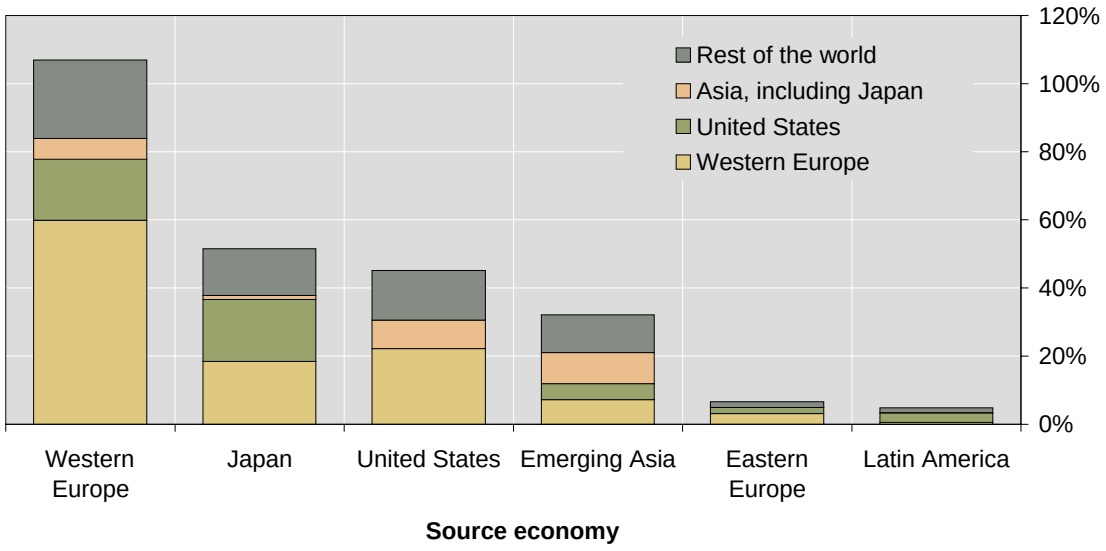
Dependent variables are bilateral portfolio flows between source country *s* and destination country *d*. All explanatory variables except the dummy variables are logs. Robust standard errors of the estimated coefficients are reported in parentheses. Intercepts are included (not reported). ***, ** and * indicate that the estimated coefficients are statistically significant at the 1%, 5% and 10% levels, respectively.

[1] Results could not be reported due to lack of data.

Graph 1

Foreign portfolio investment by destination economy

At end-2006, as percentage of source economies' GDP



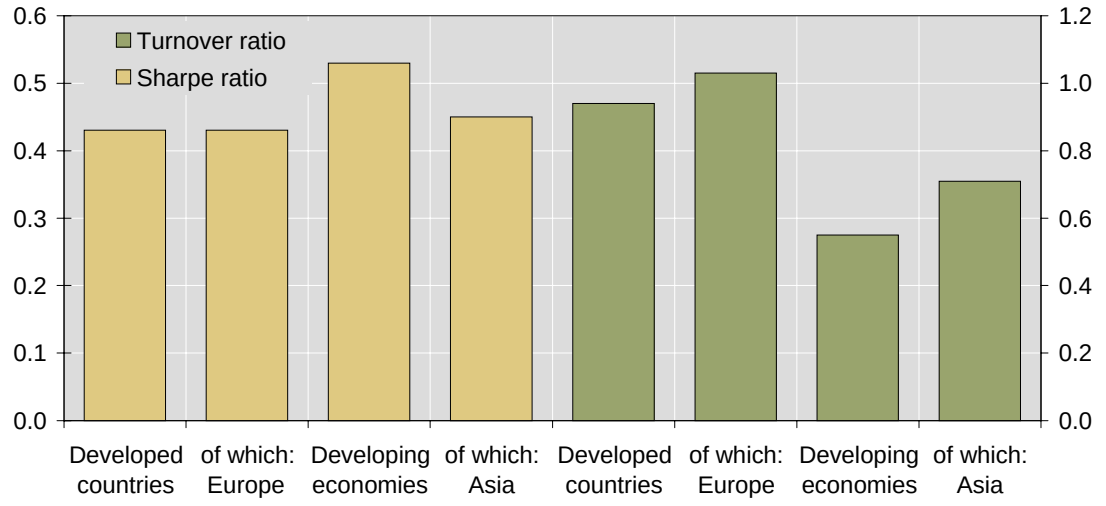
Based on preliminary CPIS data for 2006, excluding securities held as part of official reserves.

Sources: IMF; authors' calculations.

Graph 2

Performance and liquidity of equity markets

In per cent

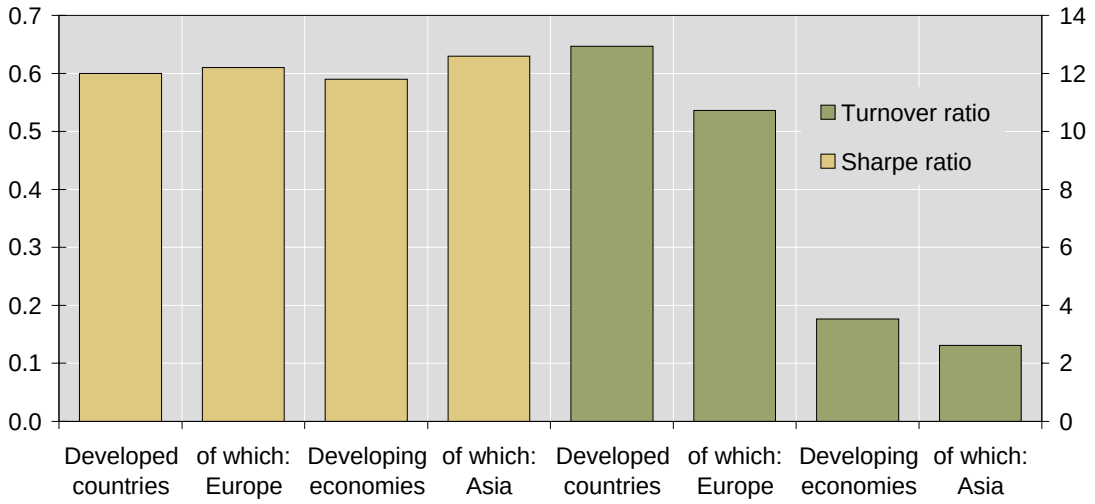


Turnover ratio is plotted on the right-hand scale; Sharpe ratio is plotted on the left-hand scale.

Graph 3

Performance and liquidity of bond markets

In per cent



Turnover ratio is plotted on the right-hand scale; Sharpe ratio is plotted on the left-hand scale.

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Dissecting regional integration in financial services from the competition policy and trade policy perspectives[1]

Masamichi Kono[2] and Mamiko Yokoi-Arai[3]

1. Introduction

It has been over a decade since there has been serious deliberation of Asia's regional integration, especially from the financial and monetary perspectives. Because of various domestic economic and financial issues, the progress of regional integration in financial services has been slow. However, with improved macroeconomic conditions and relatively stable markets, Asia is at an ideal juncture in which to revisit the subject and propose pragmatic avenues to follow if regional integration in financial services is to take place.[4]

The dynamism of regional integration is not globally uniform, and is strongly dependent on common philosophies being developed and various infrastructures being established within the region. The worldwide proliferation of customs unions, free trade areas and, eventually, common markets, indicates that regional integration efforts are being pursued widely to boost the economic capacity of the market and gain competitive advantage through close economic alliances.

For any of these efforts to bear fruit, however, there needs to be a presumption on the part of the participating states that competition policy will be applied actively and that the market is being used to determine the distribution of resources. Market enlargement is one of the major benefits of regional integration, enabling the region to capitalise on economies of scale and scope. Regional financial integration assumes that participating states will allow market forces to align demand for and supply of financial services in the region, creating a larger market that selects services and distributes capital according to efficiency and cost. In general, an integrated regional financial market should be better able to provide the necessary financial services and capital to those sectors and entities in need within the region, as compared to a smaller local market with a limited number of players, fewer investment opportunities and a meagre savings pool.

Thus, a precondition for regional integration in financial services is that financial markets are being gradually but steadily liberalised, both de jure and de facto, vis-à-vis other economies in the region. While the active engagement of economies in financial services trade is essential for meaningful integration, it is probably equally important to have economies liberalised within each jurisdiction, so as to maintain a competitive and innovative

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1 The views expressed herein are those of the authors and do not reflect the official views of the Financial Services Agency.

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3 At the time of writing, Dr Yokoi-Arai was with the FSA, Japan, but is currently with OECD.

4 We are aware that liberalisation of financial services is closely linked to or in some cases cannot be discussed separately from liberalisation of capital flows. However, to the extent that liberalisation of capital flows, and eventually monetary integration, cannot reasonably be attained until trade liberalisation succeeds in creating a single market in goods and services trade, and since there is still a long way to go before this happens in Asia, we focus in this paper on the liberalisation of financial services trade.

environment for financial services providers. The level of liberalisation in the financial sector will have a direct impact on the level of financial integration that can take place.

With this in mind, our paper analyses three dimensions of financial liberalisation. The fundamental dimension is the competition law environment. The competition regime demonstrates a country's overall commitment to a liberalised and market-oriented economic structure within the jurisdiction. The second dimension is the country's external commitment to liberalisation of financial services trade, which includes its schedule of commitments under the General Agreement on Trade in Services (GATS), and the commitments made in the framework of bilateral and regional free trade agreements (FTAs) or economic partnership agreements (EPAs). While there are certain exceptions, the commitments made under such agreements represent a minimum level of liberalisation in which a country is willing to engage vis-à-vis a foreign counterparty. The third dimension comprises the actual entry requirements imposed on foreign counterparties, including procedural and enforcement mechanisms. It is likely that there will be a positive or negative deviation from competition law, or from commitments to trade agreements.

Regional integration of financial markets requires harmonisation in all three dimensions.[5] After a brief analysis of the level of harmonisation in Asian countries in each of the dimensions cited above, it is argued that further progress in harmonisation efforts is necessary at all three levels, otherwise regional market integration will be surpassed by global market integration. To put it differently, global financial markets may become dominated by those countries which succeed in enhancing effective competition and innovation, perhaps even leading to disintegration of regional financial markets. In particular, we consider competition law and its aspects related to the financial sector to be a leitmotif for regional integration. In other words, without a robust competition policy, it is difficult for meaningful regional integration to take place and to benefit the regional economy.

In this sense, we consider implementation of the laws and regulations at each of the three levels of liberalisation to be as important as the rules themselves. As experience during the financial crises of 1997–98 indicates, there have been many cases in Asia where de jure and de facto rules have differed.[6] While the divergence has perhaps narrowed, it is still imperative that both the rules and their implementation be kept under scrutiny.

The examination carried out in this paper will be from two perspectives. On the one hand, a country's competition law environment, free trade commitments and actual entry requirements will be compared. On the other hand, this environment will be compared across countries to illustrate the relative level of liberalisation in the region. Owing to data and resource limitations, the research will focus on several Asian countries that represent typical milestones of financial market liberalisation, and will not draw up a comprehensive inventory for all countries.

The following section will examine various conceptual issues relating to financial liberalisation. The third section will investigate the competition policy environment of a number of Asian countries. The fourth section will look into the various commitments made under the GATS, FTAs and EPAs by a selection of Asian countries. The fifth section will scrutinise the actual entry requirements for foreign counterparties and compare this with the commitments made in regional agreements. On this basis, we hope to analyse in the sixth section the extent to

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[5] This is not to say that other dimensions are or may be unimportant. Labour market regulation (which may be exempt from commitments made under free trade agreements), environmental protection laws and even education policy may constitute barriers to regional integration. Our analysis focuses only on the dimensions within the reach of financial regulators and competition policymakers.

[6] See D Arner, M Yokoi-Arai and Z Zhou, *Financial crises in the 1990s*, British Institute of International and Comparative Law, 2002.

which the various levels of competition policy and trade agreements are being actively applied in the region, and the effect this may have on the progress of regional integration.

This paper seeks to demonstrate that financial services liberalisation and proactive competition policy implementation are key ingredients for regional integration in the financial services markets. Progress in this area needs to be carried out in stages, with overall implementation being sequential, but comprehensive. This represents a bottom-up approach to regional integration, in which all three dimensions possess similar importance and need for progress. We emphasise that financial liberalisation needs to be sequenced at each level, to allow the country to integrate the various measures taken and incorporate them into the market infrastructure. Safeguards must also be put in place to satisfy domestic concerns that will be a priority to any country. Such safeguards will include not only balance-of-payments or emergency protection measures to be invoked in the event of a financial crisis or threat thereof, but also domestic financial infrastructure, such as deposit insurance schemes.

2. Conceptual issues at stake

The extent to which foreign firms can operate in a certain sector affects the speed at which the financial sector develops. For both emerging and developing countries, opening their financial markets to foreign financial services providers raises the possibility of domestic financial institutions being taken over by foreign firms. This may lead eventually to the financial sector being monopolised by foreign interests. Hence, most countries do not agree to the complete opening of their financial markets, and usually place certain restrictions on their liberalisation.

The form in which the participation of foreign financial services providers is permitted will depend on the country's perception of the benefits it will derive from liberalisation. Also, the country will need to take into consideration the competitive effect that liberalisation will have. As the possible number of participants in the market increases, there will be greater competitive tension, which will equate to a more robust competition environment.

To step back slightly, the rationale for a country to restrict the financial system is twofold: developmental reasons, and rent-seeking. Rent-seeking often comes in the form of favourable interest rates and specialised financial institutions. It may also come with a high price attached, that of lax credit policies and mounting non-performing loans. Many developing countries also establish "strategic" industries to channel resources.[7] It is often taken for granted that the regulator will act in the best interest of the public.[8] However, regulators may lack appropriate and sufficient authority to enforce rules effectively.[9]

Such diverging views make it imperative that a lively discussion take place within the country to promote understanding of the rationale for financial liberalisation, its possible impact and the form in which the country wishes to achieve a liberalised market. Developed countries tend to demand the opening of markets based on mutual commitments. This is

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[7] See Sourafel Girma and Anja Shortland, "The political economy of financial liberalisation", University of Leicester, Department of Economics, working paper no 05/12, October 2005, pp 4–5.

[8] See James R Barth, Gerard Caprio and Ross Levine, *Rethinking bank regulation*, Cambridge University Press, 2006, pp 34–5.

[9] See Sebastien Miroudot, Enrico Pinali and Nicolas Sauter, "The impact of pro-competitive reforms on trade in developing countries", *OECD Trade Policy Working Papers*, no 54, 15 June 2007, p 52. However, such a requirement is part of the Basel Core Principles. See Basel Committee on Banking Supervision, *Core principles for effective banking supervision*, Basel, October 2006, Principle I.

advantageous to countries that already have a developed and liberalised market. Negotiations in financial services have reflected this tendency, with developed financial market countries making liberalisation demands on emerging market countries, and emerging market countries compromising to reach an agreement. This is usually the result of horse-trading, with developing countries and developed countries compromising in different markets to reach an overall agreement.

A. Benefits of financial liberalisation[10]

It is essential to understand the benefits of financial services trade liberalisation in order to comprehend the influence of competition policy and GATS negotiations. No member is being forced to make specific commitments, but commitments are made for the sake of the overall welfare that might be achieved through the World Trade Organization (WTO).[11] Competition policies will enable a competition regime to be established, thereby minimising the negative effects of competitive markets and laying down the rules for fair competition.

This section considers the general benefits of trade liberalisation and those attributable to financial services. The arguments for trade liberalisation are generally applicable to finance, although there are additional factors unique to finance as well.

(1) Economic benefits

In general economic theory, the participation of foreign firms in the financial market has multiple beneficial effects and some negative ones. There are a number of barriers and restrictions when a financial institution enters a foreign financial market. Management theory predicts that since foreign firms are not familiar with the customs, information and knowledge of the local market, there will be added information and transaction costs to overcome. This is disadvantageous to foreign firms, and is called the "liability of foreignness".[12] Thus, local firms initially have a natural advantage.

Despite the difficulties that foreign firms might have in entering a local market, there is potentially great merit in permitting their entry. This has been widely appreciated for goods,[13] but not so well for services.

Financial services liberalisation would allow foreign financial institutions to participate in the market, improving competition and market efficiency. Efficiency gains in financial services would be in terms of economies of scale and scope. Economies of scale can be gained by focusing on a specific area. Fixed costs would become lower per unit, and specialisation would be possible. Economies of scope can be gained when one institution provides cross-sectoral services that take advantage of its network and resources. Such an institution would be able to respond better to the needs of consumers. Competition from foreign financial institutions that are managed more cost-consciously would prompt local institutions to review

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[10] For a concise description of the benefits of financial services trade liberalisation, see Masamichi Kono et al, "Opening markets in financial services and the role of the GATS", *WTO Special Studies*, 1997.

[11] This follows David Ricardo's theory of comparative advantage.

[12] See Lilach Nachum, "Liability of foreignness in global competition? Financial services MNEs in the City of London", ESRC Centre for Business Research, University of Cambridge, *Working Papers*, no 229, June 2002.

[13] See Jeffrey D Sachs and Andrew Warner, "Economic reform and the process of global integration", *Brookings Papers on Economic Activity*, 1995.

their management and cost structure. This would result in lower prices and better services for consumers.[14]

Research suggests a correlation between market liberalisation and economic growth.[15] The improved efficiency of local financial institutions as a result of competition from foreign financial institutions would contribute to the development of the markets through better and cheaper financial intermediation. This, in turn, would enhance the profitability of local financial institutions and increase economic growth.

Furthermore, efficiency lowers financial institutions' lending cost, possibly leading to growth.[16] Often, when foreign firms enter the market, their entry induces foreign capital inflow as well. This adds to foreign investment, a prerequisite for economic growth in a country short on domestic savings.

Liberalisation is also said to have real economic benefits, although the data are not always clear-cut. The Organisation for Economic Co-operation and Development (OECD) has estimated that gains in potential GDP per capita from pro-competitive reforms may be substantial for developing countries. As Table 1 indicates, pro-competitive trade reforms have the potential to bring substantial economic benefits on an individual basis. The World Bank estimates that more globalised developing countries generate growth averaging 5% a year, as against –1% for less globalised countries and 2% a year in high-income countries.[17]

Table 1

Gains in potential GDP per capita from pro-competitive reforms

Country	% increase in GDP per capita
China	7.9
India	7.7
Indonesia	8.4
Korea	4.7
Malaysia	6.6
Philippines	6.8
Average	7.7

Source: Sebastien Miroudot, Enrico Pinali and Nicolas Sauter, "The impact of pro-competitive reforms on trade in developing countries", *OECD Trade Policy Working Papers*, no 54, 15 June 2007, p 26.

(2) Managerial expertise

Some of the greatest advantages of market liberalisation in services, however, come from transfers of soft elements, such as information, know-how and technology. In addition, the

[14] See Nihal Bayraktar and Yan Wang, "Banking sector openness and economic growth", *World Bank Policy Research Working Papers*, no 4019, October 2006, p 3.

[15] See Roberto Chang, Linda Kaltani and Norman Loayza, "Openness can be good for growth: the role of policy complementarities", *World Bank Policy Research Working Papers*, no 3763, November 2005.

[16] See Bayraktar and Wang, supra, footnote 14, p 21.

[17] See World Bank, *Globalization, growth and poverty*, 2001, p 5.

entry of foreign financial institutions brings potential improvements in general management, accounting, database processing, and corporate governance.[18] These would all be beneficial to the consumer.

Transfer of technology, know-how and personnel would take place, contributing to the formation of a basic market infrastructure. This enables (or forces) local firms to innovate in processes and services to cater for the local market, and to become competitive in their own right.

(3) Regulatory implications

Permitting foreign firms to enter the market is often accompanied by the lowering of entry requirements and clarification of their content, or vice versa. This is to ensure that all parties are on an equal footing and will be judged according to the same criteria. It also corresponds to the specific GATS commitment regarding national treatment.[19] This helps to rule out arbitrary decisions and encourages better drafting, disclosure and scrutiny of regulatory rules.

Foreign firms enter the market either by establishing a new commercial presence or by purchasing a local business. Either way, clear entry and/or takeover requirements must be disclosed, so that the appropriate form of market participation can be determined on an economically viable basis.

If financial market liberalisation takes place too rapidly, while prudential regulation and market infrastructure are weak, the financial market could be dominated by foreign firms seeking short-term profits in a predatory manner. Accompanied by short-term capital inflows and eventually by outflows, this can lead to wide fluctuations and turbulence in domestic financial markets, and does not bode well for national sentiment. The sudden outflow of capital in times of shock, in particular, has been condemned as the root cause of the Asian financial crisis of the late 1990s, and has given rise to harsh expressions of anti-foreign sentiment.

However, the threat from foreign firms needs to be viewed in the long run and placed within a larger picture. It can be argued that countries with smaller economies will benefit from open markets, as external forces will absorb any major disruption, limiting systemic risk to domestic markets.[20] When the host country economy is either stagnant or in a crisis situation, a foreign financial institution, which often has a more diversified portfolio, can provide stability to the financial system.[21]

This can be countered by arguing that when the market is opened and foreign personnel enter the market, the host country may become susceptible to economic difficulties affecting the home country or the wider international financial market.[22] Rapid opening of the financial

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[18] This, of course, assumes that foreign firms do not lower their management and internal control standards upon entry into a developing country market. This may not prove true in cases where regulatory arbitrage is the main motive for entering new markets.

[19] See infra, Section 3.B.

[20] See Morris Goldstein and Philip Turner, "Banking crises in emerging economies: origins and policy options", *BIS Economic Papers*, no 46, Basel, November 1996.

[21] See George Clarke, Robert Cull, Maria Soledad, Martinez Peria and Susana M Sanchez, "Foreign bank entry: experiences, implications for developing economies, and agenda for further research", *World Bank Research Observer*, spring 2003, 18 (1), p 43.

[22] See Joe Peek and Eric S Rosengren, "Collateral damage: effects of the Japanese bank crisis on real activity in the United States", *American Economic Review*, 2000, 90 (1), pp 30–45.

market may have certain repercussions, and therefore appropriate measures need to be considered to limit negative effects, particularly through prudential regulation. Also, some types of financial services liberalisation are more conducive to financial stability than are others.[23]

A society-wide discussion needs to take place to promote understanding of the possible negative and positive effects that liberalisation may have on the domestic economy. This is an essential prerequisite since the initial economic outcome may be positive or negative. The market opening also needs to be carried out in a sequenced manner so that the economy can adjust to changes and a consensus can emerge on the progress taking place. A country which, for whatever reason, is reluctant to liberalise all financial services trade and capital flows immediately should still consider liberalising those types of trade which promote stability and efficiency in the financial system. Such financial services trade liberalisation (i) promotes trade in a broad array of financial instruments; (ii) allows the commercial presence or local establishment of foreign financial institutions (Mode 3 trade in GATS terms); (iii) does not unduly restrict the business operations of similar local establishments; (iv) strengthens institutional capacity (such as transparency, regulation and supervision, etc.); and (v) improves financial sector efficiency.[24] Liberalisation of this nature is also likely to promote less distorted and volatile capital flows, both directly through the types of financial flows it encourages, and indirectly through its effect on institutional capacity.[25]

Often, the possible impact of liberalising a financial market is not well perceived by the domestic economy. Protectionism can be rife, and so-called "vultures" from abroad have been criticised for abusing and even destroying the local economy and reaping excessive profits.[26] However, financial services liberalisation is not a simple question of whether or not to open the market. Liberalisation is inevitable for any economy that has either an excess or a shortage of domestic savings. Furthermore, when economies are increasingly globalised, remaining oblivious to financial services trade liberalisation is not possible. In the case of trade in goods, it is difficult to remain isolated from trade with other countries when all countries depend on trade with others for economic development. This holds equally for financial market liberalisation, since financial services are a necessary component of a growing economy through their intermediation in the flow of savings to productive investment.[27]

That being the case, preparation and planning for a well coordinated and appropriately sequenced liberalisation are what is required. This would enable countries to reap the maximum benefits from liberalisation of financial services. If diplomatic negotiations lead to liberalisation of financial services under the pressure of market forces, a country should maximise the benefits by developing well coordinated policies and implementing them in a strategic manner. Global financial services liberalisation is an opportunity to be seized, not a disaster in which the only option is the insulation of domestic markets.

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[23] For further discussion of this topic, see Masamichi Kono and Ludger Schuknecht, "How does financial services trade affect capital flows and financial stability?", in Stijn Claessens and Marion Jansen (eds), *The internationalization of financial services*, World Bank and WTO, 2001.

[24] See id, pp 147–153.

[25] Id.

[26] A case in point is the attack on the pound sterling in 1992 by the fund led by George Soros, which resulted in the United Kingdom having to leave the European Exchange Rate Mechanism.

[27] Cf Chairman Alan Greenspan's remark on BBC Radio, "Greenspan on economics", 1 October 2007.

B. Patterns and path of liberalisation

As discussed above, the advantages of financial liberalisation, and its inevitability as a result of the globalisation of financial markets, indicate the fundamental need for liberalisation. Hence, while the necessity of financial liberalisation is not disputed, the path and method of liberalisation is an area in which there is wide debate. Financial liberalisation needs to be placed in the context of wider liberalisation efforts, since the sequencing of liberalisation has become an essential factor in its success.

The pattern of liberalisation has been studied in the context of post-crisis financial restructuring programmes. In the aftermath of a financial crisis, the limitations of a relatively closed financial system become apparent. Governments have often tried to control market forces directly by imposing capital controls at the onset of a crisis, only for their efforts to end in vain.[28] Given the power of the market, what is needed is not to resist it, but to establish a financial system that is robust and resilient in the face of sudden and strong market movements. Thus, financial liberalisation must progress in parallel with the strengthening of the financial system, and sequencing must take into account the need to establish certain institutions and infrastructure.

There are two aspects of sequencing which are relevant in this section. The first is the sequencing of financial system liberalisation in terms of domestic financial institutions and markets. This is the more closely felt aspect of liberalisation, in which domestic institutions will be strongly affected. The second aspect is the sequencing of financial services trade liberalisation, which will have an impact mainly on foreign counterparties. The two are closely intertwined, but in terms of policy formulation, the distinction is important, especially for developing countries.

(1) Trade liberalisation path

Diagram 1 illustrates the relation between trade liberalisation and domestic financial liberalisation. The two are closely related, and the liberalisation programme would not be complete without both sides being achieved.

When considering trade liberalisation independently, regional integration efforts need to be taken into account. As mentioned in the introduction above, regional integration often proceeds in the sequence of customs unions, free trade areas and finally common markets. If such regional integration creates barriers to extraregional trade,[29] participating in such regional frameworks can be an obstacle to further liberalisation.

On the other hand, joining the WTO prior to entering a customs union can induce competitive accession to the WTO in a region. This could be more advantageous for small and relatively open economies.[30] WTO members will be able to extract concessions from other members within the WTO framework, something that may be difficult to attain through a bilateral or regional arrangement.

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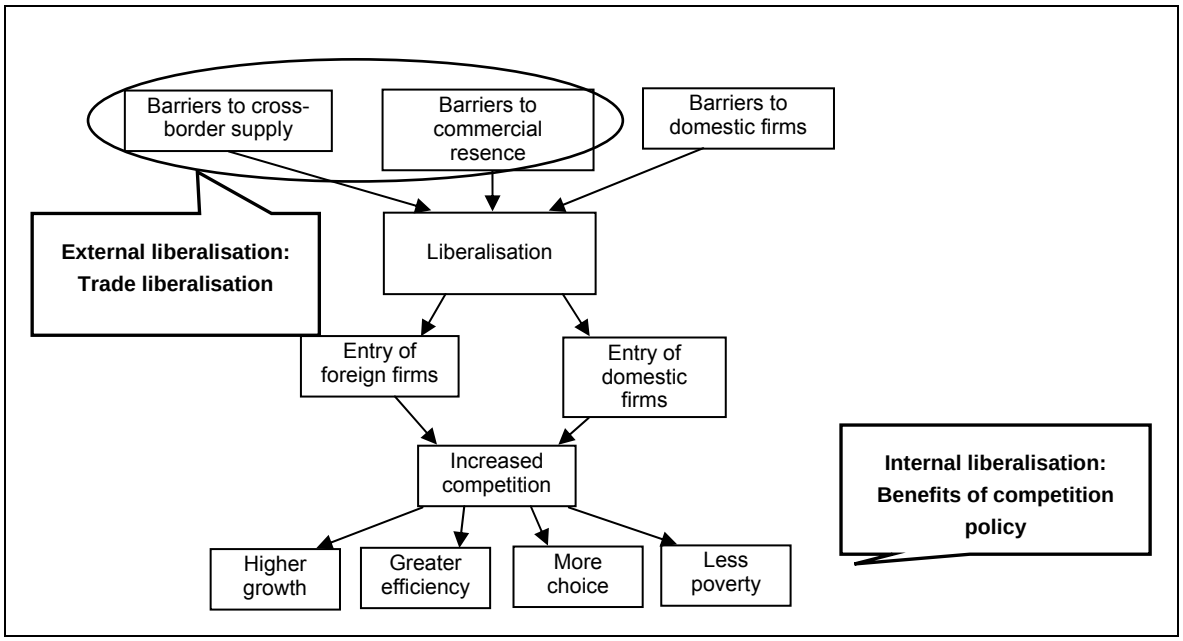
[28] See IMF, *Global financial stability report*, September 2007, p 89.

[29] Furthermore, the inclusion of most favoured nation clauses can cause trade negotiations to have a proliferating effect. See infra, Section 4. See also Patrizia Tumbarello, "Regional trade integration and WTO accession: which is the right sequencing? An application to the CIS", *IMF Working Papers*, no 05/94, May 2005, p 4.

[30] See id, p 5.

Diagram 1

Trade liberalisation process and competition policy



Source: International Financial Services, London, "Impact of liberalising financial services", January 2002, p 3.

Another aspect of trade in financial services is the issue of capital account liberalisation.[31] Current account liberalisation is a prerequisite of International Monetary Fund (IMF) membership,[32] and most countries in Asia are already members. Liberalisation of the capital account is related mainly to Article VI of the IMF's Articles of Agreement. Capital account liberalisation requires removal of controls on the movement of capital both in and out of a country, and of any restrictions on currency convertibility. Capital account liberalisation may result in a large surge of capital inflows as international investors react to the improved investment environment.[33] This often helps the balance of payments, smooths temporary shocks to income and consumption, reduces the cost of borrowing and supports more rapid economic growth.[34] The problem arises when this virtuous cycle is reversed and sudden outflows of capital cause the currency to fall, forcing the economy to shrink and bringing economic growth to an abrupt halt.

(2) Sequencing of financial liberalisation

There have been two approaches to financial liberalisation in the past: the use of sequencing discussed here, and shock or big bang therapy. The shock approach to financial liberalisation and regional integration is more or less applied within the European Union.[35]

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[31] For an account of the distinction between liberalisation of financial services trade and liberalisation of capital flows, see Kono and Schuknecht, supra, footnote 23.

[32] See IMF Articles of Agreement, Art VIII, para 2.

[33] See Barry Johnston, "Sequencing capital account liberalizations and financial sector reform", *IMF Papers on Policy Analysis and Assessment,* no 98/8, July 1998, p 1.

[34] See id, p 2.

[35] See Brigid Gavin, "The role of the European Union in global financial governance", *United Nations University – Comparative Regional Integration Studies Working Papers*, no O-2002/01, 2002, p 5.

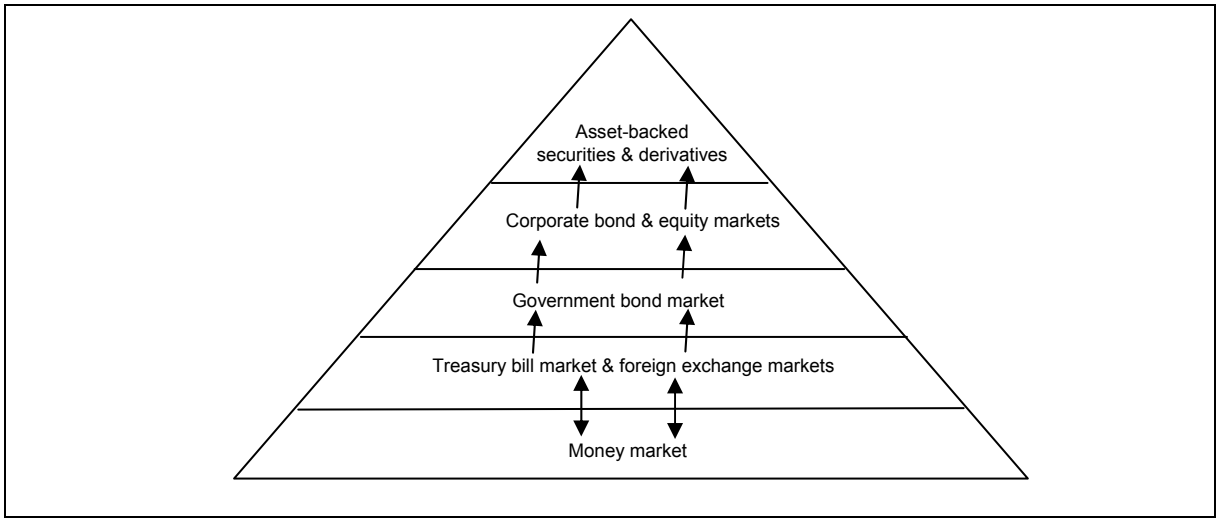
This approach has the advantage of speed, with possibly lower cumulative adjustment costs; another advantage is that full-scale reforms are not undermined by partial reforms.[36] Nevertheless, given the experience of a number of financial crises in which the total adjustment cost was considerably high with the shock approach, a global consensus has been emerging on the use of sequencing in financial liberalisation.

This is confirmed most clearly by the chapter on sequencing in the IMF/World Bank Handbook on the Financial Sector Assessment Program (FSAP). The goal of orderly sequencing is mainly to safeguard monetary and financial stability during financial liberalisation and financial sector development.[37] To comprehend the role of sequencing, we draw upon the paper from which the FSAP's Chapter 12 originated.[38]

Financial markets have a hierarchical order in their development, which is directly linked to the order of financial liberalisation (see Diagram 2). The money market precedes all other markets, with the foreign exchange market following as the point where non-resident capital enters local financial markets. The long-term government bond market is the initial benchmark for corporate and asset-backed securities markets to develop, and markets for more complex risks may follow. The market for short-term government paper should come before the development of the long-term government bond market, although the experience in Japan has been otherwise, perhaps as a result of fiscal and monetary conditions at the time. Derivatives markets require liquidity and efficiency in underlying fixed income or equity markets. Sequencing should assume such a developmental order.

Diagram 2

Hierarchical order of domestic financial markets



Source: Cem Karacadag, V Sundararajan and Jennifer Elliot, "Managing risks in financial market development: the role of sequencing", *IMF Working Papers*, no 03/116, June 2003, p 7.

[36] See Saleh M Nsouli, Mounir Rached and Norbert Funke, "The speed of adjustment and the sequencing of economic reforms: issues and guidelines for policymakers", *IMF Working Papers*, no 02/132, August 2002, p 5.

[37] See IMF and World Bank, *Financial sector assessment program – review, lessons, and issues going forward: a handbook*, 22 February 2005, Chapter 12, p 318.

[38] See, *inter alia*, Cem Karacadag, V Sundararajan and Jennifer Elliot, "Managing risks in financial market development: the role of sequencing", *IMF Working Papers*, no 03/116, June 2003.

Table 2

Financial development: stylised sequencing of reforms

Types of measures	Themes : Hierarchy of market and product development goals				
	Money and exchange market-related central bank reform	**Government bond market and public debt management**	**Banking and financial services to target groups**	**Corporate debt and equity markets**	**Derivatives and asset-backed securities**
Market and product development					
1. Entry, instrument design, primary issuance and access policies	→	→			
2. Trading and settlement infrastructure		→	→		
Risk mitigation					
3. Prudential supervision and market conduct oversight	→	⇢	⇢	⇢	⇢
4. Risk controls in the payment system		→	⇢	⇢	⇢
5. Macroprudential surveillance and macro policies to manage volatility and systemic risks		→	→	→	
Financial system infrastructure					
6. Accounting and disclosure standards	→	→	→	→	→
7. Insolvency regime and property rights	→	→	→	→	→
8. Internal information systems, transparency and governance		→	→	→	→
Financial institutions restructuring and recapitalisation	→	→			
Capital account liberalisation					
9. Capital inflows by instruments and sectors		→	→	→	
10. Capital outflows by instrument and sectors				→	→

Source: IMF and World Bank, *Financial sector assessment program – review, lessons, and issues going forward: a handbook*, 22 February 2005, p 319.

Moreover, sequencing needs to be accompanied by an institutional framework, and to be supported by sound financial institutions. Systemic weaknesses need to be addressed by the regulatory authority in close coordination with the central bank (or the monetary authority), and the regulatory authority needs to have appropriate powers to supervise the development of the financial markets. Sound financial institutions contribute through their roles as market intermediaries, providers of backup credit lines, and holders and managers of traded securities portfolios.

Imperative principles of sequencing include (Table 2):[39]

- Capital market development with financial stability hinges on establishing the institutional infrastructure for controlling both macroeconomic and financial risks.
- Market development policies should be comprehensive, and technically and operationally linked measures should be implemented together.
- Capital market development requires a careful sequencing of measures to mitigate risks in parallel with reforms to develop markets.
- Policies to develop markets should be accompanied by prudential and supervisory measures as well as macroprudential surveillance in order to contain risks introduced by new markets and instruments.
- The pace of reforms should take into account the initial financial condition and soundness of financial and non-financial firms, and the time needed to restructure them.
- Institutional development is a critical component of building capital markets and financial risk management capacity.

Recent developments in international financial markets, prompted by rising delinquencies in US mortgage markets, appear to have demonstrated that financial crises are even more contagious today, with the advent of securitisation and proliferation of investment vehicles and hedge funds. Risk contagion has become more rapid and complex, increasing the need to improve prudential measures and strengthen regulatory cooperation. It would be difficult for a country to develop its financial markets and maintain stability without taking into account technological innovations and capital movements. This backdrop of market turbulence reinforces the view that countries need to strengthen the robustness of their financial system with internationally recognised prudential rules and sequential liberalisation.

While the financial institutions of developed countries are generally suffering from sizeable (or, for some institutions, huge) losses from securitized products and/or from shortages of liquidity, the impact on Asian financial institutions appears to be limited. This can possibly be seen as an opportunity for the latter to increase their role and share in international financial markets.

3. Competition law environment in Asia

A. Placing competition law in context

Competition law is the first avenue to be pursued in discussing the existence of competition policy. It also indicates a country's attitude towards competition policy, with enactment of such law implying the relative importance to that country of a fair and balanced competition

[39] See id, p 30.

environment. When considering the competitive environment of a country, however, merely analysing competition law is perhaps insufficient.

Competition law is not the only law that dictates competition in the marketplace, or, more narrowly, regulates unfair transactions. However, competition law is the hallmark of a market economy.

It should be borne in mind that competition law which prohibits anticompetitive actions is meaningless in an environment where there is little or no real competition. Thus, a caveat must be entered: the fact that a competition law is established does not in itself ensure an effective competition policy. The wider system needs to support this philosophy, for example, through civil law and intellectual property laws, or privatisation of state-owned enterprises.

Another factor that should be taken into account is the uniqueness of the financial sector. Traditional public goods, such as a police force and national security, are often characterised by their exclusive provision by the state, and competition does not exist.[40] While competition policy in the financial sector per se is not necessarily within the scope of this paper, it should be noted that, while financial services are not normally considered to be public goods, they have often been excluded from the strict application of the competition law regime due to prudential and other public policy considerations.[41] Thus, when we consider this in the context of financial liberalisation, it is essential to bear in mind that competition law may not necessarily be reflected in the financial sector. The competition law regime may well present a more ambitious market-oriented perspective than is feasible in reality, or its non-existence may not preclude effective competition policy in the marketplace.

Generally speaking, competition law has three components. First, it prohibits anticompetitive practices or agreements (both horizontal and vertical) that restrict free trading and competition between firms.[42] Second, abuse of a dominant market position that is anticompetitive is restricted. Predatory pricing, imposing conditions on the sale of goods and services, controlling prices and refusal to deal are part of such behaviour. Third, large corporate mergers and acquisitions which might threaten competition are subject to decisions by the competition authority to prohibit the deal or to order remedies involving divestment of part of the business.

The rationale for competition law or policy is ultimately and essentially to improve consumer welfare. The objective of competition is to improve efficiency in production and supply and enable the provision of goods and services at lower prices and with wider choice.

When a country decides to enact a competition law, it makes a tacit commitment to adhere to competitive market principles, with a certain degree of government intervention to ensure the running of such markets.[43] If firms are left to compete freely, since they prefer to avoid competition, they will lean towards anticompetitive behaviour. In this case, competition will exist without a competition law or policy, but it will contribute less to economic efficiency.[44]

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[40] In recent years, public goods have not necessarily been provided exclusively by the state; certain services have been outsourced to the private sector. For example, prison services are being run by the private sector in some countries.

[41] See Mamiko Yokoi-Arai and Takeshi Kawana, "Competition policy in the financial sector of Asia", FSA-FRC discussion paper, December 2007.

[42] Horizontal agreements are agreements between firms in the same industry involving, for example, price fixing, market division and boycotts of third parties. Vertical agreements include agreements between suppliers and buyers of intermediate inputs or final goods, such as exclusive dealing or resale price controls.

[43] See Dennis Swann, *Competition and consumer protection*, Penguin, 1979, p 21.

[44] Id, p 22.

This section will provide an overview of the competition laws of Asian countries with a view to understanding the level of importance that competition law has been given in the region. The objective is not to delve into the detail of the provisions, but to grasp the commitment to a liberalised, market-oriented economy.

B. Competition laws

The enactment of competition law is a prerequisite for developing countries trying to establish a sound economic law infrastructure. However, developing countries may occasionally feel that competition law contradicts their development goals. This fear needs to be overcome and balanced in order for these countries to embrace the comprehensive benefits of well defined competition law and for greater economic growth to be achieved.

Competition law in Asia has often been brought about by external factors, such as membership of the WTO, or FTAs/EPAs that explicitly or implicitly require a competition law regime. Alternatively, countries may deem a competition law necessary as a result of such membership, in order to legitimately control the entry and activities of foreign firms.[45] If a firm with a dominant market position enters the country and behaves anticompetitively or abuses the market, it will become necessary to institute a competition law to manage such activities on the part of the firm. Furthermore, competition law is increasingly becoming a prerequisite for participation in the international economy.

(1) Enactment of competition laws

The landscape of competition laws in Asia is diverse. Since the objective of this paper is more to draw comparisons than to provide a detailed analysis of competition provisions, we draw upon a number of surveys covering the countries that we are investigating in this section in order to comprehend the overall competition policy of the region.

Most countries, with the exception of Korea and Japan, have only recently established their competition laws, or are still in the process of introducing such legislation, and lack substantial experience in the implementation of those laws (Table 3). China adopted its Anti-Monopoly Law in July 2007, to be enforced as from August 2008.[46] Malaysia and the Philippines have draft competition statutes, but their legislative timetables are unclear.

Thailand and India have relatively new competition laws, but they lack guidelines and cases for effective implementation. While a competition law is not necessarily required for a country to apply competition policy to the financial sector, the presence of a competition law generally bodes well for the effective implementation of such a policy.

The group of countries analysed in this section can be generally classified into three groups. The first group includes countries such as Japan and Korea, which have both developed various guidelines and evaluated many cases, and which have a well developed competition regime. The second group includes those countries which have established their competition laws relatively recently and which therefore lack the experience necessary to enhance their competition policy regime. This group covers a wide range of countries, but they have in common the ongoing process of establishing a meaningful competition regime and asserting the authority of the competition authority. India, Indonesia, Singapore and Thailand are the

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[45] See Makoto Kurita, "International rule-making in competition law and the effect on legal systems of developing countries", in Shinya Imaizumi, (ed), *International rule-making and developing countries*, Institute of Developing Economies (JETRO), 2007 (in Japanese), p 132.

[46] The Standing Committee of the National People's Congress adopted the Anti-Monopoly Law in July 2007. It will be enforced as from August 2008.

older members of this group, while China and Vietnam are very new members. The third group comprises those countries that have yet to enact a competition law. Countries such as Malaysia and the Philippines belong to this group; the level of discussion regarding competition law varies among such countries.

Table 3

Enactment of competition laws

State	Name of the law	Authority
Japan	Anti-Monopoly Act, 1947	Fair Trade Commission
China	Anti-Unfair Competition Law, 1993	National Industrial and Commercial Administrative Bureau
	Anti-Monopoly Law, 2007	
		Anti-Monopoly Commission
Korea	Monopoly Regulation and Fair Trade Act, 1980	Fair Trade Commission
Indonesia	Anti-Monopoly and Fair Competition Act, 1999	Business Competition Observation Commission
Malaysia	Under discussion	Ministry of Domestic Trade and Consumer Affairs
Philippines	Under discussion	Ministry of Trade and Industry
Singapore	Competition Act, 2004	Competition Commission
Thailand	Trade Competition Act, 1999	Trade Competition Commission
	(Price Control and Monopoly Prevention Act, 1979)	(Domestic Trade Bureau, Ministry of Commerce)
Vietnam	Competition Act, 2004	Competition Administration Agency
		Competition Council (Ministry of Commerce)
India	Competition Act, 2002 (Monopolistic and Restrictive Trade Practices Act, 1969)	Competition Commission of India

Source: M Kurita, "Establishment of international competition rules and their influence on enactment of competition law in developing countries", in S Imaizumi (ed), *Establishment of international rules and developing countries – globalised economic statutory reforms*, Institute of Developing Economies (JETRO), 2007 (in Japanese). Updates and revisions made by the authors.

To analyse the provisions of the competition laws, we cite two surveys that we have updated and revised. First, we draw upon the work of Urata,[47] which provides a snapshot of the competition law environment. Urata's index evaluates competition laws on the basis of whether they reflect the seven concepts identified by Bollard and Vautier:[48]

[47] See Shujiro Urata, "Competition policy and economic development in East Asia", *Washington University Global Law Review*, vol 1, 2002, p 19.

[48] See Alan Bollard and Kerrin Vautier, "The convergence of competition law within APEC and the CER agreement", in Rong-I Wu and Yun-Peng Chu (eds), *Business, markets and government in the Asia-Pacific competition policy, convergence and pluralism*, 1998, pp 126–134.

1. Merger regime
2. Abuse of dominant position
3. Horizontal agreements
4. Vertical restraints
5. Exceptions to jurisdiction
6. Unfair trade practices, and
7. Roles, enforcement and powers.

Table 4 corresponds generally to the stages of competition law in the region, but it defies certain expectations, as some newer legislation has resulted in well defined competition laws. This is illustrated most prominently in the case of China and Singapore, which have recently enacted competition laws and, as a result, have been able to learn from the experiences of other countries in compiling their legislation. The level of enforcement is also clearly demonstrated, as countries with a short record in enforcement have only scored lower on the index, or not at all. Countries which do not have competition laws, but which include relevant clauses in other legislation, are also clearly identified here.

Table 4

Competition law provisions index

	Merger regime	Dominant position	Horizontal agreements	Vertical agreements	Jurisdiction	Unfair practices	Enforcement	Total
China	5	10	5	5	5	10	–	40
Hong Kong SAR	10	–	–	–	–	–	–	10
Indonesia	5	5	5	5	0	5	5	30
Japan	10	10	10	5	0	10	10	55
Korea	10	10	5	5	0	10	5	45
Malaysia	–	–	–	–	–	5	–	5
Philippines	–	5	–	–	0	5	0	10
Singapore	10	10	5	10	0	5	5	45
Thailand	10	–	5	5	0	5	5	30
Vietnam	5	5	5	5	5	0	0	25
India	5	5	5	0	0	5	5	25

– A score of 10 indicates that there is an explicit statement concerning anticompetitive behaviour in this area.
– A score of 5 indicates that rules do exist, but they suffer from a lack of clarity.
– A score of 0 indicates that such a rule is not stipulated.

Source: Shujiro Urata, "Competition policy and economic development in East Asia", *Washington University Global Law Review*, vol 1, 2002, p 21. Revised and updated by the authors.

Table 5 is another antitrust index that corresponds to specific provisions. It is heavily reliant on merger notification and assessment, and the OECD[49] has added countries to the original study.[50] The antitrust index is obtained by adding scores for each criterion included in a list of items that are found in the relevant national laws of the country. The provisions are not examined in detail, but an explicit mention in a provision merits a score. The higher the score, the more specific the provisions of the competition law tend to be.

Considering that the higher-scoring countries have relatively recent legislation, it is to be expected that they would make better provision for the requisite criteria. Countries that have yet to enact competition laws are clearly identified.

As Nicholson admits, there is no guarantee that a competition law is more efficient or stronger simply because it includes a larger set of criteria. The implications of the antitrust law index are greater for the countries that score zero. These are unequivocally apparent in the index score.

Table 5

Antitrust law index

Country	Index
India	20
Vietnam	18
Singapore	14
Korea	14
Chinese Taipei	14
Thailand	13
Indonesia	13
Japan	9
China	6
Philippines	3
Hong Kong, SAR	0
Malaysia	0
United Kingdom	9
United States	21
Ukraine	20

Sources: M W Nicholson, "Quantifying antitrust regimes", *Federal Trade Commission Working Papers*, no 267, February 2004; Sebastien Miroudot, Enrico Pinali and Nicolas Sauter, "The impact of pro-competitive reforms on trade in developing countries", *OECD Trade Policy Working Papers*, no 54, 15 June 2007, pp 64–5. Revised and updated by the authors.

[49] See Miroudot, Pinali and Sauter, supra, footnote 9, pp 64–5.

[50] See M W Nicholson, "Quantifying antitrust regimes", *Federal Trade Commission Working Papers*, no 267, February 2004.

References for Table 5

List of antitrust law index criteria

Category	Criteria within national law	Score
Scope	Extraterritoriality	1
Remedies	Fines	1
	Prison sentences	1
	Divestitures	1
Private enforcement	Third-party initiation	1
	Remedies available to third party	1
	Third-party rights in proceedings	1
Merger notification	Voluntary	1
	Mandatory	1
	Pre-merger	2
	Post-merger	1
Merger assessment	Dominance	1
	Restriction of competition	1
	Public interest	1
	Other	1
	Efficiency	1
Dominance	Limits on access	1
	Abusive acts	1
	Price setting	1
	Discriminatory pricing	1
	Resale price maintenance	1
	Obstacles to entry	1
	Efficiency defence	1
Restrictive trade practices	Price fixing	1
	Tying	1
	Market division	1
	Output restraint	1
	Market sharing	1
	Eliminating competitors	1
	Collusive tendering/bid rigging	1

What the two surveys indicate is that those countries which do not have competition laws most probably lack the regime necessary for creating and maintaining a competitive environment for the economy in general, including the financial services sector. Some of the countries that have enacted competition laws recently have, in some cases, been able to score well with their carefully formulated legislative acts. It is interesting to refer to the position of developed countries such as the United Kingdom and the United States in the

index. The United States has a high score, but only slightly higher than that of India or Ukraine. The United Kingdom scores only nine, while having one of the most comprehensive competition policy regimes. Thus, the antitrust law index is probably only indicative of the strength of the regime, and should not be interpreted as a definitive score of the actual degree of competition for the market in question.

(2) Enforcement of competition laws

It is recognised that the text of the legislation will provide only a foundation for the regime. Enforcement and implementation of the law are significant and crucial for the competition law to be transformed into a competition policy regime. This was demonstrated in abundance during the Asian financial crises. Many of the crisis-affected countries had adequate legislation in terms of the letter of the law. However, it has been argued that the laws were not effectively applied and enforced, and that this may have undermined the spirit of the law, at least in part.[51]

Competition law reflects this recognition, requiring that a competition policy be developed subsequent to, or concurrently with, its enactment. The provisions of the competition law must not only be adequate, but must be supported by a strong and robust enforcement regime. The competition authority needs to be independent and able to provide guidelines to supplement the primary legislation.

As an indicator of enforcement, we use data on the number of investigations and the size of the competition authority (Table 6). For countries that have not enacted a competition law, it is not possible to make an evaluation. Hong Kong SAR, Malaysia and the Philippines fall into this category. For countries where anti-monopoly laws have been enacted recently or have just become effective, enforcement has yet to be carried out. China has just adopted its competition law, and the Anti-Monopoly Commission is yet to be established. Singapore's competition law came into effect in July 2007, and no infringement decisions have been made. However, the Competition Commission of Singapore does not publish the number of cases investigated, so data are unavailable.

At present, Vietnam does not appear to have investigated any cases or imposed any sanctions.[52] Guidelines for industry sectors are being discussed by the relevant ministries, and actual enforcement is about to commence.

India's regulations impose fees of 50,000 rupees (US$ 1,200) to file a complaint with the competition authority. This is very expensive, given the income standard of the country, and may work as a deterrent to filing a complaint. Hence, it may have acted as an impediment to collecting relevant information regarding suspected cartels. The few investigations that have been launched have been either stayed by the high courts or the Supreme Court, or dropped. There is legislation in India, but it may lack the means for effective implementation. At present, about 5,000 cases are said to be pending.[53]

Thailand's competition authority appears to have a management and control issue, with the number of commissioners being excessive, and arguably not all of them having the requisite

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[51] See Joseph Norton, *Emerging markets and financial sector reform,* British Institute of International and Comparative Law, 2000.

[52] See Yuka Kaneko, "Country study: Vietnam", in *Competition policy of the financial sector in Asia*, Financial Services Agency of Japan, 2007, p 349 (in Japanese).

[53] See Pradeep Srivastava, "Enforcement of competition policy and law in India", paper presented at a seminar on "Competition challenges in a globalising economy: issues before India", New Delhi, 4 October 2002.

expertise, thereby weakening the effective implementation of the competition regime. In addition, the authority is said to be affected by lobbyists and politics.[54]

Table 6

Competition law provisions index

	No of investigations			No of cases resulting in sanctions			Competition authority		
	Anti-competitive practices	M&As	Total	Anti-competitive practices	M&As	Total	No of employees	Total fines imposed	Total budget (in USD 000s)
China	Not enforced	–	–	–	–	–	500	–	–
Hong Kong SAR	No law	–	–	–	–	–	–	–	–
Indonesia (2005)	–	–	21	–	–	11	–	–	–
Japan (2006)	159	74	233	13	0	13	564	84,215	72,252
Korea	–	–	–	304	48	352	416	49,105	49,382
Malaysia	No law	–	–	–	–	–	–	–	–
Philippines	No law	–	–	–	–	88	–	–	–
Singapore (2005)	–	–	–	0	0	0	–	–	3,995
Thailand (2005)	–	–	9	–	–	3			
Vietnam (2006)	0	0	0	0	0	0	–	–	–
India	–	–	–	–	–	–	–	–	390,000–500,000
United Kingdom	11	315	326	0	8	8	170		23,388
United States	100	387	487	66	39	105	1075	442,421	135,486

Note: The dataset uses data from 2000 unless otherwise indicated.

Source: Hiau Looi Kee and Bernard Hoekman, "Imports, entry and competition law as market disciplines", *European Economic Review*, vol 51, 2007, p 835. Revised and updated by the authors.

Despite the relatively recent enactment of its competition law, Indonesia has been quite active in enforcing it. This is obvious in the number of cases that have been investigated by

[54] See Shinya Imaizumi, "Country study: Thailand", in *Competition policy of the financial sector in Asia*, Financial Services Agency of Japan, 2007, p 322 (in Japanese).

the authority. However, cases that have been appealed to the judiciary have often been overturned, which is said to be due to a lack of understanding of competition law concepts by the judges. Procedural inadequacies may have also led to the cases being overruled by the courts.[55]

Korea has been very active in its enforcement of cases and in the fines imposed. While the number of cases investigated is not disclosed, the number of infractions that are sanctioned and the amount of fines are high. This possibly reflects the pressure on the authority to control the dominance of the chaebol industrial groups.

Japan's enforcement record in recent years is outstanding within this group. The Anti-Monopoly Act has been implemented for a long period, but during the last decade, the experience and proceedings of the Fair Trade Commission have become abundant, as its organization as well as its enforcement powers and sanctions have been reinforced. The Fair Trade Commission of Japan has recently announced its intention to revise aspects of the Anti-Monopoly Act that relate to its investigative power and financial penalties, which are considered to be too low.[56] The revision is intended to improve the law's deterrent effect on anticompetitive behaviour.

The enforcement index illustrates well the real nature of competition policy regimes. This is true for the United States and the United Kingdom, which have strong regimes, and is reflected in the cases that have been investigated. It may also indicate that the competition authority can be managed by a relatively small number of employees, as in the United Kingdom.

C. Regional trends in Asia

The discussion in this section demonstrates that, as Asia experienced during the Asian financial crises, the issues surrounding competition law reside in its implementation. In addition, the amount of information available may correspond to the number of cases being investigated. This is probably indicative of the information disclosure policy of the country.

When provisions and enforcement indexes are compared, it is clear that enacting the law is the first crucial step in the implementation of a competition policy regime. Without a strong legal framework, a country will inevitably score low on the indexes. On the other hand, some countries have been able to establish a comprehensive law by learning from the experience of other countries. China and India have relatively high scores in the competition law provisions index and the antitrust law index, respectively, which might be a result of this. Vietnam also has a relatively high index score in this respect.

Once this stage is reached, the enforcement regime becomes critical. Countries such as Singapore, Vietnam and India have had their competition law regimes for some years, but implementation of the law has probably not been strong. Indonesia and Thailand have had some success with their implementation. Japan and Korea stand out in the region in their competition policy enforcement.

While data are limited, in comparing the United Kingdom with the United States, it seems that the competition authority can be managed with a relatively limited number of staff. Nevertheless, the governance structure of the authority and the decision-making bodies needs to be defined to ensure that decisions are made fairly and independently. This is likely

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[55] See Motoaki Tazawa, "Country study: Indonesia", in *Competition policy of the financial sector in Asia*, Financial Services Agency of Japan, 2007, p. 209 (in Japanese).

[56] Fair Trade Commission of Japan, "Basic considerations towards revising the Anti-Monopoly Law", report submitted to the Cabinet Office, 16 October 2007 (in Japanese).

to become a significant issue for countries in Asia, where the independence of competition policy authorities is still in the process of being developed.

4. Schedule of commitments under the GATS and FTAs/EPAs

Financial services commitments are the second most extensive category of commitments made by developing countries in the WTO services negotiations. Seventy-three per cent of developing and least developed countries have commitments in the financial sector.[57] The possibilities that a liberalised financial sector brings to an economy can be vast, as discussed in Section 2. However, due to domestic political considerations and protectionist or nationalist sentiments, engagement in financial liberalisation has not been straightforward for any country. In this respect, the high proportion of commitments made in the financial sector is a significant achievement.

This section seeks to investigate the financial sector commitments made by Asian countries in the GATS and FTA negotiations. Finance is a core element for running an economy, as efficient financial intermediation enables industries to be developed. Foreign capital can play an important role in this process, if countries are able to recognise this and apply financial liberalisation measures appropriately.[58]

A. Overview of the role of the schedule of commitments and its significance in the GATS

General obligations under the GATS[59] are basically non-negotiable, so they are not included in the schedule of commitments. However, specific obligations are subject to negotiation, and are then listed in each member's schedule.

Part III of the GATS[60] requires that specific commitments be made by members in relation to market access and national treatment. Specific commitments are subject to negotiation and then listed in the schedule of commitments, which states the specific conditions of market access and national treatment that members grant for each sector. Parts III and IV of the GATS need to be read together to understand the way in which a schedule of commitments is drafted,[61] its content,[62] and its modification.[63] The schedule of commitments is an important legal document in that it provides the particulars of market liberalisation commitments by each member and is the final product of negotiations between members.

Progressive liberalisation is an objective of the GATS, as set out in Part IV. This is achieved by amending and modifying the schedule to allow greater liberalisation in successive rounds.[64] These clauses prevent members from taking measures that are regressive or that

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[57] See J Marchetti, "Developing countries in the WTO services negotiations", WTO staff working paper, no ERSD-2004-06, 2004.

[58] See supra, Section 2.A.

[59] The general obligations under the GATS are the most favoured nation (MFN) clause and the transparency requirement. See GATS, Arts II and III.

[60] See GATS, Part III (Specific commitments), Arts XVI–XVIII.

[61] See GATS, Art XIX.

[62] See GATS, Art XX.

[63] See GATS, Art XXI.

[64] See GATS, Art XIX, para 1.

seek to maintain the status quo. Members must endeavour to improve commitments from the 1995 financial services agreement; this makes their 1995 schedules a minimum requirement for future negotiations.

The article on market access prevents members from making commitments that are based on an economic needs test.[65] This is a negative list, in that commitments for the service sectors inscribed in the schedule must be made in conformity with the requirements in Article XVI, unless limitations are explicitly entered in the schedule as a result of negotiations with trading partners in the WTO. Commitments that do not come within the ambit of market access and national treatment can also be negotiated and included in the schedule as additional commitments.[66]

The details of what should be specified in the schedule are laid out in Article XX. This sets out the commitments, together with Article XVI. Each schedule should state:[67]

- Terms, limitations and conditions on market access
- Conditions and qualifications on national treatment
- Undertakings relating to additional commitments
- Where appropriate, the time frame for implementation of such commitments, and
- The date of entry into force of such commitments.

These items are expected to be included in the schedule, along with further instructions on the structure of the schedule.[68] It is also noted that the schedule of commitments is an integral part of the GATS.[69]

B. The implications of members' schedules

The structure of members' schedules will be affected by the legal framework of the country. Owing to the US federal structure and its state laws, it became necessary for the United States to list the content of all the state laws that do not conform to the basic agreement negotiated. For example, insurance regulation in the United States is conducted by state insurance regulators, and there is no federal agency responsible for insurance regulation. Thus, in its additional commitments, the United States notes that the National Association of Insurance Commissioners is promoting harmonisation of state insurance regulation.[70] This is a result of negotiations with Japan, but if the United States were to harmonise insurance regulation, it would result in significant liberalisation measures in terms of the GATS. The current structure of insurance regulation in the United States is complex and vertically segregated by state. This does hamper foreign firms from entering the US market.

Part IV of the GATS requires liberalisation to be progressive, and this is to be achieved through agreement in successive rounds. However, the experience with respect to financial services has not been smooth, with the inability to reach an agreement at the end of the

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65 See GATS, Art XVI.

66 See GATS, Art XVIII.

67 See GATS, Art XX, para 1.

68 See GATS, Art XX, para 2.

69 See GATS, Art XX, para 3.

70 See United States of America, *Schedule of specific commitments, attachment to the United States schedule, additional commitments*, paper I.

Uruguay Round and the necessity of extending the deadline to enable an agreement in the form of the Fifth Protocol to the GATS.

The progress made to date in the Doha Round that started in November 2001 further indicates the difficulty of depending on negotiation rounds to move forward. In terms of financial services, some countries have yet to ratify the Fifth Protocol because of domestic constraints.[71] While much progress has been made with the accession of new members, there remain barriers to the speed of liberalisation of pre-existing members.[72]

On the other hand, some members have made extensive commitments in their schedule. Indonesia's schedule on financial services includes a commitment to extensive liberalisation by 2020.[73]

The European Union as a regional community also has a unique approach to the GATS. It negotiated as a single entity and listed the divergence of each member state in its schedule. Generally, GATS commitments list horizontal commitments in services, followed by sector-specific commitments. The European Union considers Mode 3, commercial presence, as the mode in which liberalisation must be given priority.[74] However, the European Union claims that limitations applied through horizontal commitments of members are being abused, affecting the financial services sector in particular, by:[75]

- Unspecified authorisation requirements
- Economic needs tests
- Certain limitations on the purchase or rental of real estate
- Restrictions on equity holdings
- Nationality requirements
- Certain tax and subsidy measures
- Etc.

The Uruguay Round resulted in progress on commitments in market access and national treatment in Mode 3 in particular. More specifically, Mode 3 was the mode in which the most advanced and comprehensive commitments to liberalisation were made in financial services.[76] Liberalisation of other modes was given lower priority due to lack of actual business engagement, or was subject to reservations from regulators.[77]

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[71] Brazil, Jamaica and the Philippines have yet to complete ratification of the Fifth Protocol. See WTO, Committee on Trade in Financial Services, "Report of the meeting held on 27 November 2006" (S/FIN/M/53), 30 November 2006.

[72] To mitigate the difficulty of reaching agreement in multilateral negotiations in the WTO, some members have been promoting the use of Economic Partnership Agreements (EPAs) that negotiate liberalisation and economic cooperation on a bilateral basis. Even Japan, which is a latecomer to regional economic agreements, has a stated policy to promote EPAs to complement current negotiations in the WTO. See Ministry of Foreign Affairs, http://www.mofa.go.jp/policy/economy/fta/index.html (last accessed on 8 June 2007).

[73] See infra, Section 4.C, for details of Indonesia's commitments.

[74] See WTO, Council for Trade in Services, special session, "Communication from the European Communities and their member states, *GATS 2000: financial services*" (S/CSS/W/39), 22 December 2000, para 10.

[75] Id, paras 8–10.

[76] Id, para 15.

[77] Financial regulators have expressed concerns over full liberalisation of Mode 1 and, to a lesser degree, Mode 2, since it is considered difficult to supervise or monitor foreign financial service providers and to protect domestic consumers with the currently available prudential supervisory tools.

Mode 3 becomes relevant when suppliers of services establish commercial presence for their businesses in the territory of another country. Commercial presence is defined in the GATS as "any type of business or professional establishment, including … juridical person, or … the creation or maintenance of a branch or a representative office".[78] The Understanding on Commitments in Financial Services (the Understanding) defines commercial presence as "wholly- or partly-owned subsidiaries, joint ventures, partnerships, sole proprietorships, franchising operations, branches, agencies, representative offices or other organizations".[79] The Understanding appears to be more comprehensive in its definition, making it clear that, if adopted by a WTO member, it allows foreign parties to enter a market in more diverse or capital-light forms.

The European Union insists that commercial presence should be permitted in the legal form of the member's choice.[80] Generally, establishment via local incorporation is more costly than branching. Local incorporation frequently requires higher minimum capital, and regulatory monitoring is stricter. Local incorporations need to meet the various regulatory requirements on a single-entity basis rather than on a group basis. In many Asian countries, foreign financial institutions are required to be licensed as local incorporations. Otherwise, their operational scope is limited and not subject to the local safety nets available.[81] The Understanding provides for full liberalisation of Mode 3 in this regard, but, in some cases, prudential regulation calls for certain limitations to be imposed under the so-called "prudential carve-out".[82] Some countries have inscribed this reservation explicitly in the head notes of their schedules of commitments; for example, Japan has listed in its head note that it "shall not be prevented from taking measures such as non-discriminatory limitations on juridical forms of a commercial presence".[83]

It is becoming increasingly difficult to distinguish between Modes 1 and 2 in financial services, as the internet and other forms of electronic trading networks enable cross-border trade to be arguably indistinguishable from consumption abroad. The Committee on Trade in Financial Services has been discussing this issue and will continue to do so.[84] The consumer protection framework may be different for the different modes. In many cases, consumer protection and safety net measures are not provided for cross-border transactions. While some WTO members request that the definition of Modes 1 and 2 be clarified, others consider the difference insignificant as liberalisation has taken place without such classification.[85] Mode 1 may cause greater concern to regulators, as the identification of the service provider is normally more difficult for cross-border trade than for Modes 2 or 3.[86]

The movement of natural persons, Mode 4, is sometimes limited in a member's schedule by listing the proportion/number of board members that need to have the member's nationality.

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78 See GATS, Art XXVIII, para (d).

79 See GATS, Understanding on commitments in financial services, Section D, para 1.

80 See supra, footnote 74, para 16.

81 See Hiroyuki Nakai, "The real objective: protectionism or supervisory requirement?", *Financial Business*, winter 2007, pp 95–7 (in Japanese).

82 See GATS, Annex on financial services, para 2.

83 See Japan, *Schedule of specific commitments*.

84 See WTO, Committee on Trade in Financial Services, "Report of the meeting held on 19 September 2005" (S/FIN/50), 23 September 2005, Section D (Technical issues), paras 65–76.

85 Some argue that the difference between Modes 1 and 2 should be discussed in the horizontal context, covering all service sectors. See WTO, Committee on Trade in Financial Services, "Report of the meeting held on 23 June 2005" (S/FIN/49), 24 August 2005, Section C (Technical issues).

86 Id, para 17.

If the local market lacks officials having the requisite qualifications or expertise in the respective sector, it may act as a de facto restriction to entry, since filling management positions and jobs requiring higher skills will be more difficult under such a limitation.

From the standpoint of facilitating the transfer of knowledge and know-how to developing countries, and to make the commitment acceptable nationally, it has however been necessary sometimes to accept some nationality requirements in the WTO negotiations.

C. GATS schedules of Asian countries

The schedule of commitments is a list of formal undertakings towards financial liberalisation by each WTO member. In order to make a useful comparison, we have compiled a table of commitments made by Asian countries in the Appendix. The table focuses on commitments in the area of banking (deposit-taking and lending) and other financial services (securities dealing, trading and underwriting), and does not include insurance services. Also, for the sake of simplicity, the mode of supply listed is mainly Mode 3. Practically all countries examined have unbound Modes 1, 2 and 4; in other words, they do not permit supply in this mode by a foreign supplier. Market access is where the bulk of commitments are made, and national treatment is either unbound, exclusive to banking, or for securities listed in the same way as banking.

We are aware of some studies that attempt to quantify the schedule of commitments in the GATS to compare financial liberalisation.[87] While these studies provide valuable input into the proliferation of liberalisation in financial services, we feel that the variety of commitments made implies that a qualitative analysis is more insightful than a quantitative investigation for the purposes of our paper.

Modes

The composition of the list makes it clear that Asian countries are reluctant to accept modes other than Mode 3, which the regulatory authority is generally able to monitor closely. Modes 1 and 2 are not permitted in principle in most countries, and for Mode 4, natural persons, commercial presence is required to accompany the supply mode.

Timing of Accession

One of the noticeable differences between the countries that negotiated their commitments during the Uruguay Round and those countries whose accession followed its conclusion (namely China and Vietnam) may be the specificity of their schedule. The relative intensity of the accession negotiations, and more sophisticated scheduling and drafting skills, may explain why China's and Vietnam's schedules are much more progressive in their approach. In those accession schedules, explicit time frames are given for commitments, making the road to liberalisation a much clearer path for foreign counterparties and hence for foreign financial services providers.

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[87] Eg, Ying Qian, "Financial services liberalisation and GATS", in Stijn Claessens and Marion Jansen (eds), *The internationalisation of financial services*, Kluwer, 2000, pp 63–101; Ying Qian, "Financial services liberalisation and GATS – analysis of the commitments under the General Agreement on Trade in Services (GATS) at the World Trade Organization (WTO)", background paper presented at the PECC Trade Policy Forum Meeting "Options for the WTO 2000 negotiations", 8–9 July 2003; Patricio Contreras and Soonhwa Yi, "Internationalisation of financial Services in Asia-Pacific and the western hemisphere", PECC, December 2003; and Piritta Sorsa, "The GATS agreement on financial services – a modest start to multilateral liberalisation", *IMF Working Papers*, no 97/55, May 1997.

The relative intensity of the accession negotiations can be at least partly attributed to the negotiation mechanism in the WTO, whereby countries conduct a series of bilateral and plurilateral negotiations before finally arriving at a multilateral deal. Countries with later accession were subject to concentrated pressure from other member countries, while pressure during the Uruguay Round negotiations was more widely dispersed among countries and more reciprocal. This was due to the strong attraction of the previously closed markets being opened to foreign providers. While China and Vietnam have been gradually liberalising their economies, previously, the possibility of a foreign financial institution taking part in the financial market as a meaningful player had long been a remote notion. At the same time, the closed financial system presented great business opportunities for foreign players since the saving rates of these countries were very high, while before liberalisation, the needs of consumers for diverse financial products had not been realised.

Geographical limitations

Countries such as China and Indonesia have geographical restrictions for foreign entry, with different rationales. China initially allowed entry into Shanghai and Shenzhen, which were already designated as a financial district and a special economic zone, respectively, and therefore already had foreign parties operating in those areas. Special economic zones were gradually enlarged and then phased out. The rationale seems to lie in initially limiting the number of markets that can be accessed, and gradually increasing the presence of foreign parties in order to avoid drastic effects on the domestic suppliers/markets, and to enable a smooth transition to a more competitive market environment.

Indonesia has a more country-specific issue, in that, together with its archipelago geography, rural areas of the country have very limited financial infrastructure that requires government intervention to be sustainable. This seems to be the reason for Indonesia limiting liberalisation only to the more populated areas of the country.

Social interests

Many Asian countries have scheduled the need for social, public and developmental interests to be a consideration or, in some cases, a precondition for a foreign financial institution to be authorised to operate. Malaysia and India have included language issues related to such interests in their horizontal commitments. Malaysia has a unique *Bumiputra* policy which favours Malays' interests in economic activities, and this is inscribed in its schedule of commitments.[88] Malaysia also includes the need for foreign banks to facilitate trade and economic development. The Philippines considers economic conditions and public interest when deciding whether to grant authorisation. Korea requires mandatory lending to small and medium-sized enterprises (SMEs) as part of its limitations on market access by foreign banks.

Numerical restrictions and economic needs tests

Although numerical restrictions, such as the number of suppliers, or market share and economic needs tests, are in principle to be eliminated under the GATS[89] unless specified in their schedule, many countries have in practice opted to schedule various reservations. India limits the number of bank licences to 12 per year for both existing and new banks. Malaysia limits the number of wholly foreign-owned commercial banks to the existing 13. The Philippines requires that 70% of the resources or assets of the banking system be owned by

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[88] See Malaysia, *Schedule of specific commitments*.

[89] See GATS, Art XVI (Market access).

domestic banks, and it has committed to 10 new licences for the period 1995–2000. Singapore does not bind itself to allowing any new full or restricted bank licences, committing to allow only offshore bank branches or representative offices.

On the other hand, China clearly states that an economic needs test will *not* be applied, and that only prudential considerations will enter into the licensing of foreign banks.

Type of legal entity and participation of foreign capital

Many countries restrict the type of legal entity allowed to foreign entrants, and the level of capital participation and investment by foreign banks. Joint ventures with domestic financial services providers are often required (Table 7).

Table 7

Capital participation by foreign financial institutions

	Banking	Securities business
China	Subsidiary: assets more than USD 10bn Branch: assets more than USD 20bn Joint bank: assets more than USD 10bn	Foreign investment increased to 49%
Vietnam	Representative office, branch or 50% foreign capital joint venture bank Parent bank has total assets of more than USD 20bn	Foreign participation limited to 49%
India	Only through branches of foreign banks licensed and supervised in home country	Foreign equity limited to 49%
Indonesia	Locally incorporated, joint venture bank only Acquisition of local bank up to 49%	Listed non-bank up to 100% Through establishment of broker/dealer
Japan	–	Investment trust must be juridical person established in Japan
Korea	A person may own up to 4% of bank stock and 15% of provincial bank stock without authorisation Only branches of foreign banks which rank among world's top 500	Only representative office, branches or joint venture permitted. Joint venture foreign participation minimum is 50% Equity participation in existing securities firm is limited to less than 50%
Malaysia	Equity participation limited to 30%	Locally incorporated, joint venture company only, with less than 30% shareholding
Philippines	Not exceeding 30% of voting stock or 40% upon approval by the President of the Philippines	Foreign equity limitation of 51%
Singapore	Single group of foreign shareholders can only hold up to 5% of a local bank's share. A local bank's share held by foreigners is limited to 40% in aggregate	–
Thailand	Maximum foreign equity participation limited to 25% of paid-up registered capital	Maximum foreign equity participation is 49%

The schedules show clearly that many countries continue to limit foreign capital participation at 30% or 49% thresholds, which is often the benchmark for significant shareholdings. Korea and Singapore appear to have strict regimes in their schedules for banks, with a maximum of only 4% and 5% bank shares respectively permitted for a single entity. For Malaysia, the Philippines and Thailand, such limitations vary between 25% and 40%. Vietnam and Indonesia commit to allow 50% and 49% respectively, but Vietnam will be easing this restriction to permit 100% foreign-owned banks in 2008. Japan and India do not specify any such restrictions upon banks in their schedules.

As for securities firms, many countries limit foreign participation to 49–51%, such as China (49%), Vietnam (49%), India (49%), Korea (50%), the Philippines (51%) and Thailand (49%). Malaysia limits this to 30%. In general, one would normally expect that from the standpoint of the authorities, foreign participation would be more permissible for securities firms than for banks, given the relative importance of banks to a country's financial system. However, it is noted that many countries actually restrict foreign ownership in securities businesses, while other, often stricter forms of market access limitations are applied to banks.

As mentioned above, many countries also require financial institutions to be locally incorporated and/or take the form of joint ventures, thereby excluding direct branches of overseas headquarters. Local incorporation is often required to ensure that the bank's local assets are segregated from the assets of the headquarters and operations in other countries. The use of joint ventures may be expected to encourage the transfer of expertise and know-how to the local institutions and markets, as well as to ensure that at least a part of the ownership of domestic businesses remains with local interests.

Apart from limitations on legal form, China requires that the bank maintain a minimum amount of assets, varying according to the legal form assumed by the commercial presence. Vietnam requires a certain level of assets to be held by the parent bank. Indonesia insists on a locally incorporated joint venture for new entrants. Vietnam, India and Korea do not permit local incorporation of foreign banks, committing to allow only representative offices, branches or joint ventures.

Such restrictions are not as prominent or restrictive in securities businesses, although Korea requires that any foreign commercial presence take the form of a representative office, a branch or a joint venture, excluding wholly owned subsidiaries. Malaysia commits to allow only minority-held joint ventures in securities.

Branching restrictions

If foreign banks are considering tapping into the capital accumulated by the high saving rates of Asian countries, they will need to be able to establish branches and ATM networks to provide financial services at the retail level. Branching is often regulated in Asian countries, perhaps not just for prudential reasons but also because of other policy considerations.

Geographical restrictions may have effects similar to branching restrictions on foreign financial services providers, since the size of the market in the region may be limited (Table 8). Singapore appears to have a strict regime, allowing premises at only one location for foreign banks, but its uniqueness as an island nation may mitigate the effect on foreign providers in terms of restricting market access.

Table 8

Branching restrictions and ATM network participation

	Banking	Securities business
China	Geographical restriction on business	–
Indonesia	Geographical limitation	1 sub-branch and 1 auxiliary office
Philippines	Maximum of 6 branches, with 3 at locations of its choice and 3 at designated locations	
Singapore	Operate from only 1 office Cannot establish off-premise ATMs	Operate from only 1 office
Thailand	Existing banks to be permitted 2 further branches Participation in local ATM network is permitted	

Local expertise requirement

Some countries have included requirements to employ local personnel in their schedules (Table 9). Korea and Malaysia have kept themselves unbound in this respect, permitting all types of reservations on market access. Thailand requires a high proportion of locals to be employed as directors in banking and securities. The local employment requirement may be based on a desire to limit the number of foreigners operating in the market, and hence limit their influence, but it can also be viewed as a desire to elevate the level of expertise of local personnel in senior positions.

Table 9

Local expertise requirement

	Banking	Securities business
India	Local advisory board with SME expertise to be established with Indian nationals	
Indonesia	Branch: 1 executive position by expatriate Joint venture: for director positions, in proportion to shareholding	
Korea	Unbound	
Malaysia	Unbound	
Thailand	At least three quarters of directors must be of Thai nationality	At least half of directors must be of Thai nationality

Progressive liberalisation and other entries

On the other hand, some members have made extensive liberalisation commitments in their schedules. Indonesia's schedule on financial services states that "[a]ll Market Access and

National Treatment limitation specified in the banking subsector will be eliminated by the year 2020 subject to similar commitment by other members".[90] This commitment may not have been given great significance in the context of the Uruguay Round negotiations, as the timing given was a far-off date, and the commitment was very general. However, it expresses Indonesia's clear commitment to complete financial liberalisation through future negotiations. This commitment was related to ASEAN's 30th anniversary, when ASEAN Vision 2020[91] was declared. This initiative lays down the marker for ASEAN members to further integrate and achieve developed-nation status in a cooperative manner through economic development. As part of this endeavour, Indonesia has committed itself to possible full liberalisation by 2020. However, this is not an ASEAN-wide commitment, as no other ASEAN member has included this commitment in its schedule.

Some countries have incorporated restrictions on local currency businesses. China had restricted local currency business until five years after accession, so the present situation will have to be assessed to see whether all of its commitments have been honoured in full. Vietnam also limits local currency business. Malaysia limits foreign currency deposits for residents. Korea maintains a unique position on the choice of currencies. Foreign banks with a commercial presence may handle transactions only in Korean won, and assets must be kept within the country. Furthermore, foreign currency loans are restricted. The schedule was agreed in the midst of the financial crisis in 1997, and the intention of restricting disorderly capital movement can be seen from the provisions.

D. Selected RTAs/FTAs

To facilitate the analysis in this section, we consider the following regional trade agreements (RTAs) and FTAs which appear to be important for regional integration in financial services: the ASEAN Framework Agreement on Services (AFAS), the United States-Singapore FTA, and the Japan-Singapore EPA. The FTAs that Singapore has entered into may be particularly interesting in the sense that Singapore has been strategic in its approach to FTAs and liberalisation of its financial sector. The AFAS is an Asian-driven RTA which, if made effective, could signal the active engagement of Asian countries in financial liberalisation. This would mark a positive approach towards regional integration as well.

(1) AFAS

The AFAS is a regional trade agreement in services among ASEAN member states.[92] It was originally concluded in 1995, and has since completed its third round of negotiations, with its Third Package of Commitments having been agreed in April 2005. Negotiations have been held since the Uruguay Round was concluded in 1997, so it is to be expected that further liberalisation commitments have been made beyond those in the GATS.

The AFAS has adopted a positive list approach, similar to the GATS. The commitments made in the latest negotiation rounds for Mode 3 are summarised in Table 10. Commitments in banking are limited mainly to deposit-taking and lending, and those for securities to trading, dealing and underwriting of securities.

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[90] See Indonesia, *Schedule of specific commitments*. In the schedule, Indonesia declares, for both banking and non-banking financial services, that markets will be liberalised if the commitment is mutual.

[91] See ASEAN, "ASEAN Vision 2020", Kuala Lumpur, 15 December 1997, http://www.aseansec.org/1814.htm.

[92] The ASEAN member states are Brunei, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam.

The clarity of the drafting seems to have improved compared to the GATS schedules, in which the intentions of the member countries were not always clear. However, whether there has been a significant improvement compared to the GATS in terms of actual commitments is not obvious, and in some cases it appears that, due to the clearer language, the number or content of limitations may have increased.

When compared to the GATS commitments, while there has been some progress in non-banking services, the overall situation does not appear to be very different. Rajan and Sen (2002) have looked into how far the AFAS has achieved GATS "plus", and it was their view that while some progress had been made, it was considered to be "weak".[93]

Table 10

Summary of AFAS commitments

	Banking	**Securities business**
Indonesia	2 sub-branches and 2 auxiliary offices Executive position can be assumed by expatriates only if at least one Indonesian national also holds such position	
Malaysia	Jointly with commercial or merchant banks in Malaysia	Locally incorporated joint venture companies licensed by Securities Commission with aggregate foreign shareholding under 70% will be permitted to offer corporate financial advice
Philippines		Limited to 2 branches. A resident agent needs to be appointed as condition for licence
Singapore	In accordance with GATS	SGX will admit new trading members who will be able to trade directly in local currency securities
Thailand	Removal of quantitative quota on number of foreign personnel permitted	
Vietnam	Foreign bank permitted to carry out specific operation only in accordance with licence issued by the central bank ATMs not permitted outside its branch office	

[93] See, *inter alia*, Ramkishen S Rajan and Rahul Sen, "Liberalisation of financial services in Southeast Asia under the ASEAN Framework Agreement on Services", Centre for International Economic Studies, University of Adelaide, *Discussion Papers*, no 0226, October 2002.

(2) United States-Singapore FTA

The impact that the United States-Singapore FTA has had on the Singapore banking sector is remarkable. According to interviews, opinion leaders in Singapore seem to agree that the FTA signed in May 2003 has had a significant effect on liberalisation of the banking sector.[94] Singapore pursued this FTA with priority over other FTAs, since the United States is one of the largest sources of foreign direct investment for Singapore.[95] As Singapore does not have a large export industry for goods, the main area in which commitments were requested was services.[96] The United States-Singapore FTA goes beyond the bilateral FTAs that Singapore has concluded with New Zealand, Japan, and Australia.

One of the most significant moves by Singapore was the partial opening of its retail banking sector to US banks. Foreign banks were to be given access to Qualifying Full Bank (QFB) licences and Wholesale Bank licences. Foreign banks are granted three types of banking licences: QFB, restricted or offshore. The ban on QFBs was lifted, and branching location restrictions were to be gradually lifted.[97] Furthermore, although foreign banks are not permitted to join the local ATM network, QFBs would be exempt from this limitation.[98]

The United States-Singapore FTA includes a most favoured nation (MFN) clause,[99] which enables MFNs to capitalise on any agreement reached between different counterparties which is more favourable than the United States-Singapore FTA.

(3) Japan-Singapore Economic Partnership Agreement (EPA)

The FTA agreed between Japan and Singapore comprises an FTA and a partnership/cooperation component. It was signed in January 2002, and lists Singapore's Chapter 7 on trade in services, Chapter 13 on financial services cooperation, Annex IVA on financial services, and Annex IVC on Singapore's schedule of specific commitments.

For banking, Japanese banks are allowed only offshore bank branches or representative offices. Merchant banks can establish merchant bank subsidiaries or branches. No new finance companies are permitted. Japanese banks can operate from only one location, and cannot establish off-premise ATMs.

This appears to be very similar to the commitments under the GATS, and significantly less open when compared to the United States-Singapore FTA. As mentioned above, while the United States-Singapore FTA includes an MFN clause, the Japan-Singapore EPA does not require this explicitly.[100] Therefore, while US banks may be able to take advantage of any liberalisation measures, the Japan-Singapore EPA does not automatically grant the same advantage.

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[94] Interviews conducted by the author with Singapore government officials, bankers and banking lawyers in January 2007 for a separate research project.

[95] See Chia Siow Yue, "Provisions and commitments on trade in financial services in trade agreements in East Asia – notes on Singapore's commitments", paper presented at the 2nd Annual Conference of the PECC Finance Forum, 8–9 July, 2003, p 10.

[96] Id.

[97] United States-Singapore FTA, Annex 10B, schedule of Singapore, Section B.

[98] Id.

[99] Id, art 8(4).

[100] The Japan-Singapore EPA, Art 63(4), requires a party to "favourably consider" MFN treatment when either party enters into such an agreement with a third country.

Subsequently, the Japan-Singapore EPA was reviewed and amended in March 2007, and a Japanese bank has been granted a full banking licence accordingly.[101]

5. Actual entry requirements for foreign financial services providers

Given the above examination of the competition law environment, and the GATS and FTA commitments in financial services, we will now proceed to look into the actual entry requirements of selected Asian countries. Analysis will focus on the banking sector.

The objective of this section is to ascertain the effect on actual market liberalisation of commitments made in the GATS and other FTAs. In addition, reference to the level of liberalisation in each country will enable an analysis of the level of convergence of regulatory standards. An effort is also made to confirm whether trade agreements have been implemented through real measures.

Some time has passed since these trade agreements were signed, and some of the FTAs have been revised since. Considering the objective of progressive liberalisation under the GATS and FTAs, the assumption would be that actual entry requirements for foreign banks and securities firms would be more or less the same as or less restrictive than the specific commitments made in the schedules. To make for a meaningful analysis, and due to the limited availability of the requisite information, we have investigated the actual entry requirements for foreign financial institutions in China, Indonesia, Japan, Singapore, and Thailand.[102]

A. Significance of entry requirements for foreign financial institutions

Financial services, especially banks, have been heavily regulated compared to other industrial sectors because of financial stability and other prudential policy concerns. Entry requirements are an important part of this regulatory consideration. Only entities which have fulfilled specific minimum prudential requirements to operate in the financial sector, and which are likely to be able to satisfy the mandate of maintaining a sound and stable financial system, are allowed to enter.[103]

However, entry requirements are not necessarily imposed solely for the purpose of maintaining the soundness and/or stability of the financial system. Some entry requirements have the effect of limiting competition, leading to efficiency losses and underdevelopment of financial markets.[104] This may be the case especially with restrictions on the entry of foreign banks, which may be superior in their financial technology and expertise. While many studies

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[101] Other revisions include the elimination by Singapore of a numerical quota on granting of wholesale banking licences, further liberalisation by Japan of insurance brokerage services and further liberalisation of cross-border securities services by both parties.

[102] *Inter alia,* the data used in this section were collected for a research project sponsored by the Financial Services Agency of Japan, "Competition policy of financial services in Asia", 2007 (in Japanese).

[103] There are various theories on the rationale for entry requirements, but we consider only the main objective of financial stability. For other theories on entry requirements, see Barth, Caprio and Levine, supra, footnote 8, pp 49–52.

[104] Id, p 50.

have shown that easier foreign bank entry improves bank performance,[105] the inclination of countries to restrict market entry is strong, even taking into account the possibility of sequenced liberalisation. Most countries are not against financial liberalisation per se, particularly when they wish to make use of foreign capital and expertise for economic development and growth. However, the policy that emerges from an overview of their financial roadmaps is to concentrate first on increasing the competitiveness of their financial markets, mainly through consolidation and encouragement of joint ventures, before allowing greater financial liberalisation and introducing foreign competition in full force.[106]

Applications for bank entry in most countries are said to require the submission or fulfilment of the following requirements:[107]

1. Draft by-laws
2. Organisational chart
3. Financial projections for the first three business years
4. Financial information on the main potential shareholders
5. Background/experience of future directors
6. Background/experience of future managers
7. Sources of funds to be used to capitalise the new bank, and
8. Market differentiation intended for the new bank.

When an economic needs test is not applied, and entry is allowed on a purely prudential basis, a bank licence will normally be granted upon the fulfilment of prudential criteria, such as having (1) a sound capital base and adequate financial resources, (2) fit and proper management, and (3) a viable business plan. Nevertheless, three issues may need to be raised when considering the entry of foreign banks. The first is whether entry requirements are effectively non-discriminatory or provide full and effective national treatment to foreign applicants. The second is what juridical forms of entry are permitted for foreign banks. The third is whether foreign share ownership of domestic banks is restricted.

On the one hand, countries may provide preferential treatment to foreign banks. This may be in the form of easing entry requirements, by replacing the entry requirements with those already fulfilled by the home supervisor. This is based on the notion that the home regulator is conducting consolidated supervision, and only limited prudential requirements may be necessary. Needless to say, this will be possible only when the home supervisor's regulatory standards and enforcement are considered sufficient and effective.

On the other hand, foreign banks may be discriminated against, either explicitly or implicitly. Some countries clearly state that only a limited number of licences will be granted to foreign banks. Implicit entry barriers may sometimes take the form of requesting more information upon application, albeit on an informal basis, or slower processing of licence applications.

Some countries will require a foreign bank to enter in a particular juridical form of commercial presence. For example, there is an important distinction between a branch and a subsidiary. A subsidiary is a separate legal entity from the main bank, whereas a branch is not. The

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[105] See Asli Demirgüç-Kunt, Ross Levine and Hong-Ghi Min, "Opening to foreign banks: issues of stability, efficiency and growth", in Seongtae Lee (ed), *The implications of globalization of world financial markets,* Bank of Korea, 1998.

[106] See supra, footnote 41, p 17.

[107] Id, pp 110–11. More than 80% of countries are said to require these eight items, although there are those that require them fully and those that are more flexible or selective.

distinction becomes significant when a foreign bank becomes insolvent. Because a branch is part of the legal entity established in the home country, its assets will be directly subject to claims by the creditors of the entire bank. In contrast, a subsidiary is an independent legal entity, and therefore it will normally be legally shielded from liquidation procedures abroad.

This will also have direct implications for regulatory capital, and it is the primary reason why, as witnessed in the GATS commitments of countries such as Vietnam and Korea, some countries have imposed requirements in regard to the assets of the parent bank when authorising the opening of a branch. Another approach is to require a certain level of branch capital to be set aside for protecting domestic depositors, as in China.

Acquisition of local banks may be limited, narrowing the possible routes for foreign banks to enter the market. Many countries have limits on foreign shareholding of local banks. The level of foreign shareholding permitted varies widely, and majority shareholdings are often authorised only on a restricted basis, or not at all.

B. Country studies[108]

In this section, we will examine three aspects of entry requirements in China, Indonesia, Japan, Singapore and Thailand. The choice of countries in our study has been based on the availability of information and the significance that entry requirements have had for liberalisation.[109] While the main source of information will be the laws and regulations that the regulatory authorities have published, we will also use information obtained through interviews with various experts in each market.

(1) China

Domestic commercial banks are subject to a relatively strict authorisation regime for permitted activities and branches. Each activity requires authorisation from the China Banking Regulatory Commission (CBRC).[110] Interest rates are restricted for deposit rates and lending rates (both ceiling and floor rates), in accordance with the People's Bank of China Law.[111] The fees for services that commercial banks provide are also regulated by the government.[112] Promissory notes, checks, remittances and payment collection services that are settled in the local currency are subject to price controls determined by the CBRC and the Ministry in Charge of National Development and Reform Commission. Branching is restricted to only one branch and three ATMs in any one city.[113]

(a) Distinct rules for foreign financial institutions

China has distinct rules for foreign banks, although they have been eased considerably since December 2006, as a result of GATS commitments to liberalise local currency business.[114] Geographical restrictions on local currency business have been abolished, and foreign

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[108] See, *inter alia*, Michael Gruson and Ralph Reisner, *Regulation of foreign banks: banking laws of major countries and the European Union, vols I, II and III,* Lexis-Nexis, 4th ed, 2005.

[109] In securities, China recently (11 December 2007) announced the lifting of a temporary freeze on new licences and new joint ventures.

[110] See Commercial Banking Law of China, Chapter 3.

[111] See People's Bank of China Law, Art 28.

[112] See Provisional Rules Governing the Pricing of Commercial Bank Services, Arts 6 and 7.

[113] See CBRC, Reform Law on Commercial Bank Permitted Activities, Arts 46 and 52.

[114] See Regulations of the People's Republic of China on Administration of Foreign-funded Banks, November 2006.

financial institutions are able to supply local currency business to firms and individuals upon fulfilment of certain requirements. However, for the purpose of depositor protection, foreign bank branches can only accept local currency deposits from Chinese nationals in the form of time deposits greater than one million renminbi.

Foreign banks are defined as joint capital banks, joint venture banks, and branches and representatives of foreign banks. To apply for local currency business, such banks and branches must have been operating in China for the previous three years, have been profitable for the last two years, and fulfil the prudential requirements of the CBRC.

Detailed capital and asset criteria have been defined. A foreign financial institution is required to hold a minimum of one billion renminbi or equivalent of registered capital, and to allocate a minimum of 100 million renminbi operating capital for each branch opened in China.

There are separate requirements for each type of legal form, as discussed below. Other requirements are as follows: the institution must have been continuously profitable, have experience in international finance, have measures to combat money laundering, be subject to effective regulatory oversight in the home country, and be able to clear other prudential requirements.

The approval process for setting up a foreign bank appears to take considerable time. The preparatory approval is said to take up to nine months. This is followed by a final approval process which can take up to two months. The applicant is also required to obtain a business licence from the local industry and commerce bureau before opening business.

(b) Legal forms

There are separate requirements for each type of legal form that a foreign financial institution takes upon entering the Chinese banking market. While foreign bank branches are limited in their local currency services, such as the acceptance of local currency deposits, other significant obstacles have been removed, resulting in a near national treatment of foreign financial institutions.

Capital investment from a solo foreign financial institution or joint foreign financial institutions

Holders of capital (or shareholders) in a bank must be financial institutions. Majority shareholders must be commercial banks that have had a representative office in China for more than two years. The majority shareholder must also have assets greater than US$ 10 billion and fulfil the capital adequacy requirements of the CBRC.

Joint ventures

Joint ventures are required to be owned by foreign financial institutions and Chinese financial institutions. The majority foreign shareholder must be a commercial bank with an established representative office, have more than US$ 10 billion in assets, and fulfil the capital adequacy requirement of the CBRC.

Branches of foreign financial institutions

To establish a branch, the following additional requirements must be satisfied. The parent bank must have a minimum of US$ 20 billion in assets, fulfil the prudential requirements of the CBRC, and have had a representative office for more than two years. Foreign bank branches are limited in their local currency deposit-taking business to time deposits larger than one million renminbi.

Branching restrictions are not limited to foreign banks, but also apply to domestic banks. Priority in branching is given to areas where banking facilities are inadequate.

(c) Acquisition of local banks

Acquisition of commercial banks needs to be carried out in accordance with the articles of the Company Law and requires the approval of the CBRC. While there are no specific regulations on bank mergers, the CBRC is likely to play a central role in allowing an acquisition. Mergers of domestic banks are subject to a standard applied to companies of all industries, except that the CBRC participates in the process when banks are concerned.

As for foreign financial institutions, they may acquire the equity of a domestic bank directly or indirectly. There is no statutory limitation on the acquisition of listed domestic banks. However, the CBRC does not allow foreign financial institutions to acquire more than a 25% ownership of unlisted domestic banks. As a result, Chinese bank shares have been heavily purchased by foreign financial institutions. By July 2006, 26 foreign financial institutions had purchased equity of 18 domestic banks totalling US$ 17.9 billion.

Foreign banks are now permitted to own 100% of their subsidiary. Ownership of Chinese banks by foreigners is limited to 25%, and approval is needed for foreign banks to own more than 5% of securities. Ownership of securities houses by foreigners is limited to 25% of capital.

(2) Indonesia

Indonesia has relaxed its entry barriers to foreign financial institutions considerably since the Asian financial crisis in 1998.

(a) Distinct rules for foreign financial institutions

The Banking Law of 1998 permitted the establishment of branches by foreign banks. The Banking Law states that non-Indonesian persons or entities cannot establish a commercial bank in Indonesia.[115] However, the regulation on commercial banks permits joint ventures to be established as commercial banks.[116]

The requirements for a foreign bank opening a branch are similar to those for domestic banks, but there are additional requirements for the parent bank.[117] It must:

- Have a minimum “A” rating issued by a leading international rating agency
- Rank among the 200 largest banks in the world
- Have a minimum of 3 trillion rupiah equivalent in paid-up operating funds
- Provide a statement from the banking authorities in the country of origin of the bank’s head office, stating no objection to the opening of a branch office in Indonesia.

There are no restrictions on the branching of foreign banks, although a licence needs to be acquired from Bank Indonesia.[118] There is no discrimination against foreign banks when branching in Indonesia.

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[115] See Banking Law of 1998 (Indonesia), Art 22(b).

[116] See Bank Indonesia, Regulation no 2/27/2000 concerning commercial banks, 2000, Art 5(1)b.

[117] See Bank Indonesia, *Indonesian Banking Booklet 2007*, p 77.

[118] See Banking Law, supra, footnote 115, Art 20, and Bank Indonesia regulation, supra, footnote 112, Art 27(1).

(b) Legal forms

A commercial bank is required to be opened as one of the following: a state-owned enterprise of limited liability, a regional government enterprise, a cooperative or a limited liability company.[119] A foreign bank can establish a commercial presence in the form of a branch or a joint venture with a local partner. The legal form of a foreign bank branch must correspond to the legal form of the respective head office.[120]

(c) Acquisition of local banks

Through numerous relaxations of rules, foreign financial institutions can acquire local banks either by purchasing shares in the stock exchange, if they are listed, or through bilateral purchase agreements with the domestic bank itself.[121] While the articles of the banking law seem to suggest that foreign banks can acquire 100% of the shares of domestic banks,[122] they are in fact able to acquire 99%.[123] This is said to be an anomaly resulting from consideration for national sentiment.

Controlling shareholders are defined as entities holding more than 25% of voting shares.[124] This would include holdings within a group structure. Foreigners are permitted to own up to 99% without the participation of an Indonesian entity.[125]

Those intending to become controlling shareholders are subject to evaluation and interviews by the central bank.[126] Controlling shareholders are required to submit a statement of their intention to resolve any capital or liquidity problems that the bank faces.[127]

Foreigners are not permitted to acquire rural banks.[128]

(3) Japan

Japan's regulation regarding the entry of foreign financial institutions is non-discriminatory. There are very few requirements that are specific to foreign banks, other than expecting the home regulator to be competent and able to exchange information.

(a) Distinct rules for foreign financial institutions

A foreign bank is defined as any entity authorised to engage in banking under the legislation of its home country.[129] In other words, the entity making an application must be a bank in its home country. The Banking Law requires foreign banks to obtain a licence from the Prime

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[119] See supra, footnote 115, Art 21.

[120] Id, Art 21(3).

[121] Id, Art 26(2).

[122] Id, Art 26(2).

[123] See supra, footnote 116, Art 5(2).

[124] Id, Art 1(13).

[125] Id, Art 5(2).

[126] Id, Art 15.

[127] Id, Art 6(2)a.2.

[128] See supra, footnote 115, Art 23.

[129] See Japan Banking Law (Law no 59), 1981, Art 47(1).

Minister of Japan to establish a branch, which is delegated to the Commissioner of the Financial Services Agency (FSA), except upon initial entry.[130]

Foreign banks must satisfy specific requirements that are also applicable to domestic banks. In addition, it must be ascertained that the legal requirements in the foreign bank's home country are similar to those of the Japan Banking Law.[131]

(b) Legal forms

In Japan, banks are required to establish themselves as limited liability stock companies under the Commercial Code.[132] However, foreign banks are exempted from this requirement and do not have to be incorporated in Japan to establish a branch.[133]

(c) Acquisition of local banks

Any entity may acquire shares in an existing Japanese bank. However, there are requirements imposed on the acquisition of a certain proportion of shares of a local bank. When acquiring more than 5% of a bank or a bank holding company's voting shares, the shareholder must file with the FSA.[134]

A person acquiring more than 20% of a local bank's voting shares becomes a bank major shareholder,[135] for which prior approval from the FSA is required.[136] A bank's major shareholding can also occur as a result of joint holdings by two or more separate entities. Bank primary shareholders are subject to reporting requirements[137] and on-site inspections[138] to ensure the soundness and financial independence of the financial institution.

An entity becomes the controlling shareholder when acquiring 50% of a bank's voting shares.[139] The FSA is given greater authority to intervene in the business of controlling shareholders. The FSA can request the submission of business improvement plans or issue business improvement orders to controlling shareholders.

When the bank's major shareholder is a foreigner or a foreign corporate (including banks), the same requirements apply as to domestic shareholders.

(4) Singapore

The Singapore government has intentionally segregated the domestic and offshore banking sectors, resulting in domestic retail banks being fairly sheltered from international competition.

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[130] See id, Arts 47(1) and 4(1).

[131] Id, Art 4(3).

[132] Id, Art 4(2).

[133] Id, Art 47(3) and Cabinet Order on the Implementation of the Banking Law, Art 10.

[134] Id, Art 52(2).

[135] Id, Arts 2(10) and 2(9).

[136] Id, Art 52(9).

[137] Id, Art 52(11).

[138] Id, Art 52(12).

[139] In the Banking Law, there is no mention of the controlling shareholder. Instead, the bank's primary shareholder with more than 50% of voting shares becomes subject to specific requirements. See id, Art 52(14).

(a) Distinct rules for foreign financial institutions

Banks are licensed as full banks, wholesale banks or offshore banks. Full banks are able to carry out the full range of banking business, while wholesale banks are able to perform all banking activities except Singapore dollar retail banking services. Offshore banks can carry out the full range of banking operations through Asian currency units (ACUs).

Of the full banks in Singapore, five are local banking groups and one is a local incorporation of a foreign bank. Twenty-three are branches of foreign financial institutions.[140] Foreign full banks are restricted in the number of branches, relocation of existing branches and setting up of off-premise ATMs. They cannot share ATMs with other banks, or offer Electronic Funds Transfer at Point-of-Sale (EFTPOS) services.

Singapore created a subcategory of the full bank, ie the qualifying full bank (QFB), in 1999 to grant foreign branches greater privileges as a result of its bank liberalisation package.[141] The Monetary Authority of Singapore (MAS) grants the QFB licences and so far six QFBs have been awarded.[142] QFBs are allowed to open up to 15 sub-branches and/or off-premise ATMs, of which 10 can be sub-branches. QFBs may share ATMs among themselves and relocate their sub-branches freely. Since 2002, QFBs have been allowed to provide debit services through EFTPOS that access social pension investment accounts and other investment accounts.

Since 2005, QFBs have been allowed to establish up to 25 sub-branches, which may be either physical locations or off-site ATMs. The MAS also announced that QFBs will be allowed to negotiate with local banks to let their credit card holders obtain cash advances through the local banks' ATM network.

Foreign bank branches are placed under the same conditions as local banks, but in addition are required to hold paid-up share capital of no less than 200 million Singapore dollars, which is less than the requirement of 1,500 million Singapore dollars for locally incorporated banks. Foreign branches are also required to hold at least 10 million Singapore dollars in a head office fund, of which at least five million Singapore dollars must be held in Singapore, in assets the MAS deems appropriate.

(b) Legal forms

In Singapore, a bank is defined as any company that carries on banking business under a valid licence.[143] The Banking Act does not define a foreign bank, but any bank incorporated outside Singapore and holding a valid banking licence under the Banking Act is considered to be a foreign bank.[144] Subsidiaries of foreign banks and foreign bank branches are treated in the same manner as local banks for regulatory purposes, and as a result, none of the foreign financial institutions operating in Singapore is incorporated in Singapore.

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[140] See MAS website for information on the number of regulated banks: http://www.mas.gov.sg/fin_development/Types_and_Number_of_Institutions.html (accessed on 3 December 2007).

[141] See MAS website for information on the liberalisation package: http://www.mas.gov.sg/news_room/statements/1999/MAS_Statement_on_Measures_to_Liberalise_Commercial_Banking_and_Upgrade_Local_Banks__17_May_1999.html (accessed on 7 December 2007).

[142] MAS website, supra, footnote 140.

[143] See Singapore Banking Act, Chapter 19, 2003 revised edition, paras 7 and 79.

[144] Id, paras 7 and 79.

(c) Acquisition of local banks

Substantial shareholding of a bank requires the prior approval of the MAS.[145] A substantial shareholding is defined as an interest of 5% or more of voting shares.[146] Furthermore, prior approval is required when intending to acquire more than 12% and 20% of voting shares, including indirect control of a bank.[147] The 12% and 20% thresholds may be attained by the aggregate of shares held in a group structure.[148] An indirect controlling person is any person who is able to determine the policy of a financial institution without necessarily holding shares or controlling the voting power of the institution. The approval for substantial shareholding is based on fit and proper criteria of the shareholder and the likely influence the bank might receive in conducting prudent business.[149] Furthermore, the Minister of Finance can object to existing substantial shareholding if it is not in the national interest.[150]

The MAS has discretion under the Banking Act to deny a bank licence if it establishes either that 50% or more of the bank's issued and paid-up capital is owned by a foreign government, or that a majority of persons with control of the bank are appointed by a foreign government.[151]

The acquisition of any foreign or local bank in Singapore requires the prior approval of the MAS, which has indicated that it would not allow a local bank to be acquired by a foreign party.[152]

(5) Thailand

Foreign banks are subject to restrictions that are primarily a result of the reform of the financial sector. Domestic banks are also subject to restrictions as a result of the reform programme, although foreign banks face restrictions on their branching.

(a) Distinct rules for foreign financial institutions

Thais opening a commercial bank and foreign banks establishing a branch both require the permission of the Minister of Finance.[153] Commercial banks are required to be listed stock companies with more than 250 shareholders holding more than 50% of the stock.[154]

As part of the financial system reform, the 2004 Master Plan for the Financial Sector outlines the entry methods for foreign banks. First, no new commercial banking licences are to be issued. However, existing entities can be upgraded to a commercial bank, ie by upgrading from a *crédit foncier* (mortgage bank) that provides mortgage loans, or through local incorporation by a foreign bank branch or a bank with an offshore licence.

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[145] See id, para 15A.

[146] Singapore Companies Act, Chapter 50, 2006 revised edition, para 81.

[147] See supra, footnote 143, para 15B.

[148] Id, para 15B.

[149] Id, para 15C.

[150] Id, para 15E.

[151] Id, para 11.

[152] See supra, footnote 108, vol III, p 765.

[153] See Thailand Commercial Banking Law, B.E. 2505 (1962), Arts 5 and 6.

[154] Id, Art 5(4).

Foreign branches require the permission of the Bank of Thailand for branching, product approval, and promotion activities. These activities do not require authorisation in the case of Thai commercial banks. Foreign branches are permitted to establish ATMs only in their branches. An ATM is counted as one branch, and since only one branch is permitted at a time, the result is that foreign banks have few outlets.

(b) Legal forms

A locally incorporated foreign bank is allowed to conduct the same activities as domestic commercial banks, but may open only a limited number of branches.

Foreign bank branches are also allowed the same range of activities as commercial banks. However, they are unable to open sub-branches. Once local incorporation is permitted, the bank name is expected to be used when acquiring other domestic banks. Locally incorporated foreign banks are expected to merge domestic banks and submit a merger plan to assist in the reform of the financial sector.

(c) Acquisition of local banks

No person is allowed to hold more than 5% of a commercial bank's shares. However, to enable resolution of problem banks, exemptions were made to this restriction for administrative agencies, state-owned enterprises, the Financial Institution Development Fund (the de facto deposit insurance fund at the Bank of Thailand), and cases where the Minister of Finance gives permission to improve the solvency of a commercial bank.[155]

In principle, more than three quarters of the shares of Thai banks must be held by Thai nationals. Further, more than three quarters of the board of directors of commercial banks must be Thai nationals. The Minister of Finance may permit exemptions upon the advice of the Bank of Thailand.

Acquisition of commercial banks requires the permission of the Minister of Finance.

6. Concluding remarks

The investigation into competition law, trade commitments, and entry requirements demonstrates clearly that there still is a gap between the commitments made and the actual environment in which financial institutions operate. It is important to recognise that these differences are not in themselves a hindrance to greater regional financial integration, but a lack of progress can become a significant impediment.

Importance of effectively implementing competition laws

While it is still probably too early to make a definitive assessment of many of the competition regimes in Asia, it is clear that further progress in enforcement and compliance will be a necessary and important element in realising the spirit of the competition laws being implemented in the economies. It is heartening to see that many countries have enacted competition laws in recent years; this reflects a deepening recognition of the importance of having a statutory mechanism to ensure fair competition, eliminate monopolies and suppress anticompetitive practices.

[155] See id, Art 5(2).

Effective enforcement of and compliance with competition law are largely dependent on the dissemination of detailed guidelines, on the competence and independence of the competition authorities, and on strong and timely administrative and judicial actions against serious infractions. It remains to be seen how far the competition regime will be made effective as part of the basic infrastructure of a well functioning market economy.

Indonesia represents the positive effect that the competition policy regime can have on the overall liberalisation path and on trade commitments. Indonesia has been actively enforcing its competition law regime in a relatively high number of cases. It has been taking steps to approach liberalisation in a progressive manner, which reflects its approach to competition law. Thus, it provides an insight into the possibilities that a proactive competition policy might achieve.

Narrowing the gap

While the GATS is seen to have had a great impact on furthering the liberalisation of the financial sector, an analysis of subsequent regional trade agreements and a comparison with actual entry requirements identifies the gap that remains between them (Table 11). Of the countries studied, Indonesia has made marked progress in the liberalisation of its financial sector, going well beyond the commitments made under the GATS. On the other hand, many other countries have maintained the status quo of the Uruguay Round, or have not narrowed significantly the gap between their commitments and the actual requirements currently applied.

Table 11

Competition law, GATS commitments and actual requirements

	Competition law		
	Provisions	**Index**	**Enforcement cases**
	GATS and actual		
	Discriminatory	**Legal form**	**Acquisition**
China			
Competition Law	40	6	None
GATS	Geographical restrictions Local currency business restrictions.	Asset requirement for each legal form.	–
Actual	High capital requirement, continuous profitable operations in China.	Asset requirement for each legal form, as well as interest holder requirement to be commercial bank. Branches only permitted high net-worth time deposits.	Approval of CBRC, social interest for acquisition. Shareholding above 25% not permitted for foreigners.
Indonesia			
Competition Law	30	13	21
GATS	Branching and geographical limitations.	Joint ventures. Local incorporations are considered local banks.	Acquisition of up to 49% of bank shares to be permitted.

Table 11 (cont)

Competition law, GATS commitments and actual requirements

	Competition law		
	Provisions	**Index**	**Enforcement cases**
	GATS and actual		
	Discriminatory	**Legal form**	**Acquisition**
Indonesia (cont)			
Actual	Parent bank's asset requirement, high ranking and capital requirement.	Approval for branch establishment. Otherwise joint venture. No specific differentiation.	Acquisition of controlling shareholding subject to BI approval. Acquisition of bank shares permitted up to 99%.
Japan			
Competition Law	55	9	233
GATS	Understanding	Understanding	–
Actual	Home country regulation is essential.	Do not need to incorporate.	Five per cent shareholding must file. Twenty per cent shareholding requires approval.
Singapore			
Competition Law	45	14	None
GATS	Foreign banks can operate from only one office. Cannot establish off-premise ATMs and new sub-branches.	No new full banks. Foreign banks only as offshore banks.	A foreign shareholder can only hold up to 5% of bank shares. Aggregate foreign shareholding of a bank is limited to 40%.
Actual	Foreign banks limited in their branching, ATMs and subsequent services. Asset requirement for HQ and branch.	No need to incorporate.	Five per cent, 12%, 20% shareholding of banks requires approval. Policy not to permit acquisition of local banks by foreign parties.
Thailand			
Competition Law	30	13	9
GATS	New establishment subject to approval. Branching of existing banks limited to two additional ones.	Branches and incorporate banks permitted different shareholding levels by foreign capital.	Foreign equity participation limited to 25% of paid-up capital for incorporated foreign banks.
Actual	No new banking licences to be issued to foreign banks. Branching requires approval and ATM limited to in-branch.	Incorporation required for commercial banking. Branches are not permitted sub-branches.	No one is allowed to hold more than 5% of bank shares. More than ¾ of shares must be held by Thais.

Since the basic spirit of the GATS is for all members to work continuously for progressive liberalisation, greater progress needs to take place both in the commitments made and in the actual rules imposed, narrowing the gap between the two levels. Progress in competition policy will support the underlying foundation of liberalisation.

It is also noted that regional trade agreements, while increasingly prevalent and preferred by countries seeking reciprocal treatment upon liberalisation, do not appear to have made noticeable headway compared to the GATS, so far as liberalisation of the financial services sector is concerned. One exception may be the United States-Singapore FTA, under which Singapore made much deeper commitments towards the United States than in the GATS or other FTAs, apparently balanced by the business opportunities provided in other sectors under the bilateral agreement. However, even this agreement may be modest in its elimination of market access limitations in financial services in the context of the liberalisation necessary for greater integration. As for the AFAS and Japan-Singapore EPA, the commitments appear to be largely the same as the GATS commitments in financial services.

Making further progress in future negotiations

Prudential considerations call for a cautious approach to commitments in trade agreements for the liberalisation of financial services. The financial crises that inflicted serious damage on the economies of the region seem to justify the caution, even well after the recovery.

An important issue that needs to be addressed is how to facilitate and encourage the willingness to come forward with commitments in financial liberalisation through trade negotiations. Trade negotiations typically involve a certain degree of horse-trading in which liberalisation offers are made across sectors. The GATS was one of the first opportunities for many Asian countries to be involved in financial services trade negotiations, since no regional or bilateral framework for such negotiation existed in the region in the early 1990s. Strong requests from developed countries in the Uruguay Round negotiations resulted in a wide range of financial services liberalisation commitments under the GATS, but these may also have made it difficult for Asian countries to come forward independently with further liberalisation commitments. The mindset of negotiators may have tilted towards making commitments only when and where strong requests were made from their counterparts, not necessarily or always on the basis of economic rationale or according to a carefully considered strategy. It now appears that the Doha Round negotiations are facing serious difficulties as developing countries find it hard to obtain tangible benefits from liberalisation, particularly from the developed member countries.

There is a fundamental need to recognise that the rapidly changing financial market environment requires financial markets to function more efficiently, and effective competition is necessary for the benefit of consumers of financial services and for economic growth. Excessive regulatory control of financial services and markets may succeed in isolating a country's financial sector from global financial crises, but would also inflict heavy efficiency losses and considerable costs on the economy.

Moreover, economic development, particularly for emerging market countries, would be difficult without further liberalisation and effective competition in the financial sector. Instead of making incremental liberalisation commitments which are realised over as long a period as permissible, it would be better for national authorities to develop a properly sequenced liberalisation strategy. This would enable further development of the country's economy based on a clearly defined strategy.

To take an example, Indonesia's entry requirements for foreign banks have gone well beyond the commitments made in trade negotiations. This can be viewed as recognition of the country's need for foreign capital and expertise in developing its financial services sector, and as determination to advance the country's integration into the world economy for further development.

Drawing up an inventory of prudential measures

At a more technical level, the proliferation of prudential measures exempt from commitments under the GATS has made it difficult for countries to move forward to further liberalise their financial services sectors, not just under the GATS, but also in FTAs and other liberalisation processes. While there are genuine prudential concerns and justifiable measures for prudential purposes that should not be eliminated upon liberalising a country's financial services sector, a lack of common understanding and the generally low transparency of the measures taken for this purpose may be behind the slow progress in negotiations. Many regulations applied in the name of prudential measures may have had the effect of inflicting considerable costs and effectively working as barriers to entry into the markets.

To overcome the weaknesses of the GATS and other FTAs in identifying prudential measures and reducing those which may become unnecessary or overly burdensome over time, and to assist in the coherent implementation of prudential regulations across countries, developing country-by-country inventories of prudential regulations could be an effective first step. The difficulty of monitoring developments in member countries after the conclusion of negotiations in the WTO is apparent, as reports to the WTO Financial Services Committee have been largely anecdotal and not made on a regular and consistent basis across countries. The IMF has developed the Special Data Dissemination Standard (SDDS) to encourage countries to develop standard statistics and publish them on their websites. A mechanism like the SDDS could be created to take stock of prudential measures and further promote transparency of the financial system.

The IMF also carries out the Financial Services Assessment Program (FSAP),[156] in which member countries are examined by officials of other countries and by IMF staff, to evaluate the condition of their financial sector, their observation of international standards and their understanding of financial sector regulation. The FSAP has not resulted in an easily accessible and up-to-date inventory of prudential regulation for financial services providers wishing to enter a country's market, as many countries do not agree to the publication of FSAP reports. The FSAP is also analytical in nature and not descriptive of the entire regulatory system, which makes it difficult to use as a database of prudential measures.

Asia would benefit from the compilation of such an inventory, as regional financial integration requires a better understanding of each country's financial sector regulations. With a common format and regular updating, it would also cater for internationally active financial services providers in the region. This would greatly improve the transparency of the region's financial systems, and facilitate the negotiation of future liberalisation agreements.

An inventory would also assist in grasping the level of convergence of regulatory directives in the region. The European experience presents a template which could be referred to in this respect.[157] The European Directives are in themselves a set of comprehensive directories of prudential regulations for each financial services sector or market. A significant level of convergence and minimum levels of harmonisation of prudential regulations may be necessary in laying the groundwork for true financial integration in the region in practical terms. Lack of transparency and of mutual understanding would likely benefit only a handful of countries with strong financial services players. If the inventory were based on international standards, such as the Basel Core Principles or International Organization of

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[156] See *FSAP Handbook*, supra, footnote 37.

[157] The European Union's market integration in financial services is based on principles of essential harmonisation, mutual recognition, home country control of supervision and consolidated supervision. Licensing of banks, securities firms, and collective investment schemes is based on a single passport in which firms need licensing from only one member state. However, this is possible only with effective implementation of the above principles.

Securities Commissions (IOSCO) and International Association of Insurance Supervisors (IAIS) standards, this would not only encourage countries to improve their regulatory standards, but would also achieve greater regulatory convergence in the region and contribute to regional economic development. Through regulatory convergence, the region's supervisory authorities could develop an Asian prudential regulation handbook, not only describing the prudential rules of all countries in the region, but also setting out standard interpretations of the rules and related regulatory principles for the financial services sector. Such a handbook could be useful both for technical training of officials in the region and for enhancing pre-emptive risk management and compliance at financial institutions.

Mutual recognition and regional integration

Mutual recognition of regulatory standards is currently being considered among G7 countries. This would enable relaxation of, or partial exemption from, regulations for financial institutions that have been licensed in a country which has accepted such an agreement. Mutual recognition is based on the general compatibility of the countries' regulatory standards, and can be made effective when countries share common goals in regulatory policy. Thus, licensing of a financial institution in one country would enable it to provide services in another participating country that shares common or similar prudential standards. Mutual recognition is the foundation of financial market integration in the European Union and is made possible by assurances that certain rules are commonly applied in all member states. A prudential regulation inventory would provide an initial step to such progress in Asia as well, by clarifying current regulatory measures.

High convergence of prudential regulation for regional financial integration may be difficult without the conclusion of a formal treaty or agreement among Asian countries. However, sequential liberalisation of the financial markets based on a broad understanding of prudential regulations across countries would facilitate progress towards regulatory convergence in this very diverse Asian region. The compilation of a prudential regulatory inventory of the region may prove to be an initial but significant first step towards true regional financial integration.[158]

Modalities of future negotiations and the development agenda

A useful by-product of compiling a prudential inventory could be the identification of non-prudential or semi-prudential measures that do not belong or do not fit well in a prudential inventory. Those measures are likely to be "genuine" market access and national treatment limitations that should be phased out in stages, in line with the development of the real economy. Although there may be no universal formula for phasing out such measures, future negotiations could focus better on those measures that constitute "genuine" limitations, without possibly entering into a long and difficult debate on what constitutes a prudential measure and which measures must be listed as limitations to market access or national treatment under the GATS or FTAs. Staging the phase-out properly would be essential, and a common understanding on such a strategy could be a useful step towards general regulatory convergence and harmonisation in the region.

[158] The European Union has been experiencing difficulties in handling emergency situations from a financial supervisory perspective. Further sharing of information and common analysis of financial conditions are considered to be imperative for the region to further integrate its common market. A common rulebook is being proposed by a prominent ex-central banker and current Italian economic and finance minister. See Tommaso Padoa-Schioppa, "Europe needs a single financial rulebook", *Financial Times*, 11 December 2007, p 13.

The difficulties faced by the WTO Doha Round negotiations may be arguably, at least in part, due to the fact that public opinion has not so far fully embraced the liberalisation process in emerging market economies. Suggesting an optimal regulatory framework in competition policy, and prudential regulation in financial services, both of which are conducive to development and coherent with a country's development strategy, could be viewed as a small but important step towards making progress and establishing a development strategy for Asia as a region.

Appendix:
Abridged schedule of commitments in financial services (banking and other financial services) of Asian countries under the GATS

General		Mode 3 market access (banking related)			Mode 3 national treatment (banking)	Mode 3 market access (securities)
		Capital participation/licensing	Local currency	Local clients		Capital participation/licensing
China (accession 2001)	Geographical coverage Foreign exchange, no restrictions	Solely prudential, with no economic needs test Within 5 yrs: any existing non-prudential measures on ownership, operation, and juridical form shall be eliminated Subsidiary: Total assets > USD 10bn Branch: Total assets > USD 20bn Chinese foreign-joint bank: Total assets > USD 10bn	Geographical coverage Upon accession: Shanghai, Shenzhen + 2 cities Within 2 yrs accession: Guangzhou + 4 cities Within 3 yrs: Kunming, Beijing + 1 city Within 4 yrs: Shantou + 3 cities Within 5 yrs: no restrictions Local currency business: 3 yrs business operation in China and 2 yrs profitable business	Foreign exchange business, no restrictions Local currency: Within 2 yrs, to Chinese enterprises Within 5 yrs, to all Chinese clients		Solely prudential, with no economic needs test Upon accession Joint ventures with up to 33% foreign investment to conduct domestic securities investment fund management Within 3 yrs: foreign investment increased to 49% Within 3 yrs: foreign joint ventures (⅓ minority ownership) to engage in underwriting and trading of B and H shares

General		Mode 3 market access (banking related)			Mode 3 national treatment (banking)	Mode 3 market access (securities)
		Capital participation/licensing	Local currency	Local clients		Capital participation/licensing
Vietnam (accession January 2007)	Upon accession: capital contribution limited to 30% One year after accession: foreign equity limitation to be eliminated	Upon accession: representative office, branch of foreign bank, 50% foreign capital commercial joint venture bank April 2007: 100% foreign-owned banks	Five years from accession: limit local currency deposits from Vietnamese with no credit relationship to branch's paid-in capital: 2007: 650% 2008: 800% 2009: 900% 2010: 1000% 2011: full national treatment		Deposit-taking: Parent bank has total assets of more than USD 20bn Lending: parent bank has assets of more than USD 10bn	Upon accession: representative office, joint venture with foreign participation of 49% Five years from accession: 100% foreign capital securities company

General		Mode 3 market access (banking related)			Mode 3 national treatment (banking)	Mode 3 market access (securities)
		Capital participation/licensing	Local currency	Local clients		Capital participation/licensing
India		Only through branch operations of a foreign bank licensed and supervised in home country Not more than five licences a year for both new entrants and existing banks Investments in other financial services companies not to exceed 10% of own funds, or 30% of invested company's funds			Local advisory board with SME expertise to be established with Indian nationals as members, except CEO. Members must be approved by Reserve Bank Public sector enterprises allowed to invest only surplus funds with commercial bank incorporated in India	Branches: allow with Indian bank licence Financial services company: foreign equity not exceeding 51%

General		Mode 3 market access (banking related)			Mode 3 national treatment (banking)	Mode 3 market access (securities)
		Capital participation/licensing	Local currency	Local clients		Capital participation/licensing
Indonesia	All limitations to be eliminated by 2020 subject to similar commitments by other members	Newly established foreign service provider shall be joint venture bank, locally incorporated and a banking institution, which will be unbound Acquisition of locally incorporated banks listed is permitted up to 49% of shares deposit-taking and lending: 1 sub-branch and 1 auxiliary office permitted	Geographical coverage: Foreign bank and joint venture open branches in Jakarta, Surabaya + 7 cities		Foreign bank branch: only 1 executive position can be taken by expatriate Joint venture: only for director position, in proportion to ownership sharing	Foreign ownership bound by laws and regulations. Share of listed non-bank may be 100% foreign owned Through establishment of a securities broker/dealer 1 sub-branch and 1 auxiliary office permitted
Japan	Application of Understanding of Financial Services				Deposit insurance does not cover deposits taken by branches of foreign banks	Commercial presence for investment trust management services must be juridical person established in Japan

General		Mode 3 market access (banking related)			Mode 3 national treatment (banking)	Mode 3 market access (securities)
		Capital participation/licensing	Local currency	Local clients		Capital participation/licensing
Korea	Acquisition of stock of domestic companies by natural persons or juridical persons of another member is restricted. Foreign portfolio investment in Korean stocks is permitted only for listings in Korean Stock Exchange, and individual foreign investors can own up to 6% of each company's total stock Amount of foreign direct investment must be at least KRW 50m	After establishment of commercial presence, financial institutions may only handle transactions denominated and settled in won Assets owned by branches must be kept within territory of Korea. Capital of HQ not recognised as basis for determining the extent of funding and lending Only branches of foreign banks which rank among world's top 500 banks are permitted A person may own up to 4% of bank stock and 15% of provincial bank stock without special authorisation	Foreign currency loans are restricted with respect to ceiling and uses	Mandatory lending to SME companies	Unbound	Only representative office, branches or joint venture companies are permitted Joint venture's foreign equity participation must be at least 50% Equity participation in existing domestic securities is limited to less than 50% in aggregate

General		Mode 3 market access (banking related)			Mode 3 national treatment (banking)	Mode 3 market access (securities)
		Capital participation/licensing	Local currency	Local clients		Capital participation/licensing
Malaysia	Acquisition by a foreign bank of an aggregate of 5% or more of share-holding in Malaysian-owned or -controlled commercial bank must meet following criteria: Foreign bank has ability to facilitate trade and contribute to financial and economic development; Country of foreign bank has significant trade and investment interests in Malaysia; Country of foreign bank does not have a significant presence in Malaysia	Thirteen wholly foreign-owned commercial banks are permitted to remain Entry is limited to equity participation by foreign banks in Malaysian-owned or -controlled commercial bank or a merchant bank not exceeding 30% Commercial bank is not allowed to acquire any share in another commercial bank, but may acquire shares in one merchant bank Merchant bank is not allowed to acquire shares in a commercial bank Other persons are not allowed to own more than 5% shareholding of a commercial bank Deposit-taking only allowed through commercial banks, in Labuan	Foreign commercial banks are permitted to accept foreign currency deposits from residents subject to conditions imposed on designated bank		Unbound	Trading, dealing and underwriting in securities require establishment of a locally incorporated joint venture company and aggregate shareholding must not exceed 30%

	General	Mode 3 market access (banking related)			Mode 3 national treatment (banking)	Mode 3 market access (securities)
		Capital participation/licensing	Local currency	Local clients		Capital participation/licensing
Philippines	Appropriate regulatory authority shall determine whether public interest and economic conditions justify authorisation for establishment Demonstrated capacity to contribute to attainment of Philippine development objective required	Monetary Board shall ensure that, at all times, 70% of all resources and assets of the banking system is held by the domestic banks which are at least majority owned by Filipinos Foreign banks must be widely owned, publicly listed. However, this does not preclude secondary investment in the equity of a locally incorporated bank not exceeding 30% of voting stock or 40% upon approval by President of the Philippines Bound for 10 new licences for full banking authority to new and existing foreign bank branches for the period 1995–2000		Each foreign bank shall be allowed to establish a maximum of 6 branches, with the first 3 at locations of its choice and the remaining 3 branches at designated locations		Must be organised as a stock corporation Subject to foreign equity limitation of 51% Majority of members of Board shall be citizens of the Philippines An investment house is not allowed to engage in banking operations

General		Mode 3 market access (banking related)			Mode 3 national treatment (banking)	Mode 3 market access (securities)
		Capital participation/licensing	Local currency	Local clients		Capital participation/licensing
Singapore		No new full and restricted banks. New foreign banks may establish only as offshore bank branches or representative offices A single/related group of foreign shareholders can hold only up to 5% of a local bank's shares. The limit on aggregate foreign ownership of each domestic bank's shares has been increased from 20% to 40%		Banks with the MAS' approval can operate foreign currency savings account only for non-residents	Foreign banks can operate from only 1 office. They cannot establish off-premise ATMs, ATM networking or new sub-branches	Merchant banks can operate from only 1 office

General		Mode 3 market access (banking related)			Mode 3 national treatment (banking)	Mode 3 market access (securities)
		Capital participation/licensing	Local currency	Local clients		Capital participation/licensing
Thailand		Not bound for existing foreign bank branches under present shareholding structure. New establishment is subject to licence approved by the Ministry of Finance with consent of Cabinet Existing foreign banks which already had their first branch prior to July 1995 will each be permitted to open no more than 2 additional branches Locally incorporated banks are limited with respect to acquisition of shares. Maximum foreign equity participation limited to 25% of paid-up registered capital ATM operations permitted by joining ATM pools operated by Thai banks or operation within own premises, or sharing facilities with other commercial banks in Thailand			At least ¾ of directors must be of Thai nationality	Market access is limited to acquisition of shares of existing companies only. Unbound for new licences Maximum foreign equity participation limited to 49% At least half of directors of locally incorporated securities firms must be Thai nationals

Regional financial cooperation in Asia: challenges and path to development

Jee-young Jung[1]

I. Introduction

Since the late 1990s, when the financial and foreign exchange crisis broke out, financial cooperation within the Asian region has centred on regional financial forums. These endeavours have achieved considerable results, although somewhat slowly. These results include the setting up of regional liquidity support arrangements through the Chiang Mai Initiative (CMI), the establishment of the Asian Bond Fund (ABF), and the progress of the Asian Bond Market Initiative (ABMI). These accomplishments have been largely the work of various regional financial forums, especially the Association of Southeast Asian Nations Plus Three (ASEAN + 3) and the Executive Meeting of East Asia-Pacific Central Banks (EMEAP). Moreover, all initiatives for financial cooperation are being undertaken at a time when Asian countries, especially China, Japan and Korea, have already accumulated experience in regional financial cooperation. Therefore, to some extent the foundation needed to continue these cooperation efforts is already in place.

Meanwhile, there has been an increasing number of financial forums on regional financial cooperation, and the range of their discussions has also been broadened. Selection and concentration of topics related to cooperation is therefore required. A gap has also been exposed between the expectations and the reality of regional financial cooperation, as well as the expectations of growing visible accomplishments. Using our empirical knowledge, therefore, we need to examine what challenges must be overcome in order to achieve efficient regional financial cooperation. It is also important that we determine the direction we should take in improving our regional financial cooperative system.

II. Progress of Asian regional financial cooperation

1. Background of Asian regional financial cooperation

The Asian financial crisis in 1997 provided a direct impetus for countries to recognise the need for regional financial cooperation. Having experienced the financial crisis, Asian countries reached a consensus on the need to enhance their own risk management abilities in order to prevent and resolve any future financial crises. They needed to do so by strengthening regional financial cooperation, instead of depending merely upon support from international financial organisations, including the International Monetary Fund (IMF), and from advanced countries. The strengthening of regionalism around the world, with the launch of the European Economic and Monetary Union (EMU) (and the euro) in 1999, and the advancement of economic integration in the Americas, has also led Asian countries to participate actively in regional financial cooperation with a view to protecting the region's interests and boosting its status in the international community.

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As a result, Asian countries have, since the 1997 crisis, started to engage in active discussions of regional financial cooperation. In their efforts to come up with means of preventing and effectively coping with financial crises in the region, the countries have achieved visible results, including the setting up of a regional emergency liquidity provision regime. The financial crisis was attributable mainly to regional countries' increasing dependence upon foreign capital and bank loans, owing to their relatively underdeveloped financial markets. It was due as well to the maturity mismatches in overseas markets, such as long-term lending and short-term borrowing. In recognition of this fact, countries have focused on ways of developing regional financial markets, for example, by fostering regional bond markets.

2. Outline of regional financial cooperation bodies

Financial cooperation in the Asian region is currently being led by ASEAN + 3 and the EMEAP, in addition to many other cooperation bodies and organisations, including ASEAN, Asia-Pacific Economic Cooperation (APEC), the Asia-Europe Meeting (ASEM), the South East Asian Central Banks (SEACEN) Research and Training Centre, and the SEANZA (Southeast Asia, New Zealand and Australia) countries (Table 1).

First of all, ASEAN + 3 and the EMEAP play central roles in the current regional financial cooperation projects. In ASEAN + 3, countries have established a regime of regional emergency liquidity provision through bilateral swap arrangements (BSAs) under the CMI. They have also sought to develop regional bond markets through the ABMI. In ASEAN, which comprises the 10 Southeast Asian countries, coordination of views and agreement among members based upon close cooperation since the 1960s have also contributed to the smooth promotion of the ASEAN + 3 financial cooperation projects. In the EMEAP, the cooperative organisation of regional central banks, members have set up and operated the ABF as a way of fostering regional bond markets. They recently also established a Monetary Financial Stability Committee (MFSC) to strengthen financial and economic monitoring and risk management in the region.

Unlike ASEAN + 3 and the EMEAP, the region's other cooperation bodies have not engaged in concrete cooperation projects. Rather, they have carried out limited research on regional cooperation-related themes and have shared information through annual meetings and irregularly scheduled workshops. The East Asia Summit (EAS), comprising the ASEAN + 3 members, Australia, India and New Zealand, has been seeking ways of strengthening regional economic cooperation among its members, with the help of the ASEAN Secretariat. SEANZA and SEACEN, regional financial cooperation organisations of central banks, have focused on training and research activities to enhance member central bankers' capacities.

APEC and the ASEM, in which countries from the Americas and Europe also participate, have pursued financial cooperation in a limited range. The APEC Finance Ministers' Meeting has been working on projects to strengthen regional financial cooperation, increase provision of technical support, and develop a regional bond market. In particular, the Asia-Pacific Finance and Development Centre in China has led the APEC Finance and Development Program. The ASEM, whose objective is to strengthen economic cooperation between Asia and Europe, has also established the ASEM Trust Fund in its Finance Ministers' Meeting. Recent financial cooperation projects include the operation of systems of cooperation among member countries in times of economic and environmental emergencies, such as financial crises or, for example, tsunamis.

Table 1

Regional monetary and financial forums

Forum[1]	No of members	Member countries
Central bank cooperation		
EMEAP (1991)	11	Australia, China, Hong Kong SAR, Indonesia, Japan, Korea, Malaysia, New Zealand, the Philippines, Singapore, Thailand
SEACEN (1966)	16	Brunei, Cambodia, Fiji, Indonesia, Korea, Malaysia, Mongolia, Myanmar, Nepal, Papua New Guinea, the Philippines, Singapore, Sri Lanka, Taiwan, Thailand, Vietnam
SEANZA (1956)	20	Australia, Bangladesh, China, Hong Kong SAR, India, Indonesia, Iran, Japan, Korea, Macau, Malaysia, Mongolia, Nepal, New Zealand, Pakistan, Papua New Guinea, the Philippines, Singapore, Sri Lanka, Thailand
Finance ministry-led		
ASEAN (1967)[2]	10	Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, Vietnam
ASEAN + 3 (1999)	13	10 ASEAN countries, China, Japan, Korea
APEC (1994)	21	Australia, Brunei, Canada, Chile, China, Hong Kong SAR, Indonesia, Japan, Korea, Malaysia, Mexico, New Zealand, Papua New Guinea, Peru, the Philippines, Russia, Singapore, Taiwan, Thailand, the United States, Vietnam
ASEM (1997)	43	27 EU countries, ASEAN + 3, India, Mongolia, Pakistan
Others		
EAS (2005)	16	ASEAN + 3, Australia, India, New Zealand
ACD (2002)	30	ASEAN + 3, Bahrain, Bangladesh, Bhutan, India, Iran, Kazakhstan, Kuwait, Mongolia, Oman, Pakistan, Qatar, Russia, Saudi Arabia, Sri Lanka, Tajikistan, United Arab Emirates, Uzbekistan

[1] Figures in parentheses are years of foundation. [2] AFMM and ACBF started after 1997.

3. Regional financial cooperation agenda

Regional financial cooperation can be subdivided into three categories. These are strengthening crisis management regimes, developing a regional bond market, and studying regional exchange rate cooperation and monetary integration.

A. Strengthening crisis management regimes

Since the financial crisis in the late 1990s, Asian countries have made joint efforts to create cooperative schemes for resolving and preventing any future crises. They have focused on two pillars – establishing a regional financing arrangement, and strengthening the surveillance and monitoring framework. Measures to establish a regional financing arrangement include the conclusion of bilateral swap arrangements (BSAs) under the ASEAN + 3 CMI. As the financing network of BSAs among regional countries has been successfully established, members are discussing multilateralisation of the CMI to set up a more advanced regional liquidity provision framework based upon it. The strengthening of

regional surveillance and monitoring regimes has been dealt with as a major challenge in both ASEAN + 3 and the EMEAP.

(Establishment of a regional financing arrangement)

The CMI, adopted at the ASEAN + 3 Finance Ministers' Meeting in May 2000, established a network of BSAs under which, in times of financial crisis, member central banks provide liquidity to their counterparts up to certain agreed-upon amounts. Under the CMI, China, Japan and Korea have concluded BSAs with one another, and also with five ASEAN countries. The ASEAN countries have expanded the volumes of the existing swap arrangements, which had been maintained since 1977, instead of concluding separate bilateral arrangements with one another.[2] As of December 2007, the number of BSAs reached 17, with the total funding volume amounting to $84 billion.

The ASEAN + 3 countries have made great efforts to develop the BSAs of the CMI into a more efficient regional financing framework (Table 2). Members agreed to double the amounts of their BSA funding support in 2005. In 2006, they increased the effectiveness of the financing framework by introducing a collective decision-making process, in which financing countries are called upon within two days after the outbreak of a crisis, and fully provide the support required after deciding upon financing within one week.

Table 2

Schedule and major agenda items for CMI multilateralisation discussion

	Schedule	**Major items**
Stage 1	Completed (~ 2007.5.5)	Basic items for CMI multilateralisation: ① Means of participation ② Legal forms ③ Surveillance framework
Stage 2	2007.5.6 ~ Ministers' Meeting in 2008	Core items for CMI multilateralisation: ① Size of funds and additional financing ② Quotas for borrowing and lending (borrowing) conditions ③ Financing mechanism
Stage 3	Ministers' Meeting in 2008 ~	Detailed implementation plan

Most notably, in the May 2006 ASEAN + 3 Finance Ministers' Meeting, member countries agreed to initiate discussions on developing the framework into a more advanced one (in a process designated as CMI multilateralisation or post-CMI). Members subsequently completed the first stage of discussions in May 2007, by deciding to pool their reserves

[2] ASEAN adopted a $200 million ASEAN Swap Arrangement (ASA) in August 1977 to promote regional monetary cooperation among the central banks of five ASEAN members: Indonesia, Malaysia, the Philippines, Singapore and Thailand. In May 2000, it expanded the number of ASA participants from five to 10 countries, and the amount from $200 million to $1 billion. The amount was further expanded to $2 billion in April 2005.

through a self-managed reserve pooling arrangement under a contractual agreement, and to strengthen their surveillance of financial and economic trends through the ASEAN + 3 Economic Review and Policy Dialogue (ERPD). In the second half of 2007, countries held working-level discussions on concrete plans for multilateralisation of the current BSAs, including financing methods. In particular, at the ASEAN + 3 Finance and Central Bank Deputies' Meeting held in Lijiang, China, in late November 2007, members discussed the volume of the multilateralised CMI fund, borrowing quotas by groups, and details including payment methods and borrowing conditions.

Other regional financing frameworks established after the 1997 crisis include the New Miyazawa Initiative (NMI), proposed by Japan in 1998, the ASEM Trust Fund (ATF, or Asian Financial Crisis Response Fund) established by the ASEM based upon a proposal by the United Kingdom, and a system of US Treasury bond repo agreements among EMEAP countries. Japan concluded several individual financing arrangements with regional countries based upon the NMI. Only a $2.5 billion swap arrangement with Malaysia remains in place currently, as the other arrangements have either reached maturity or been cancelled prior to maturity. The ATF was designed to provide technical assistance related to financial restructuring in countries hit by the Asian financial crisis. The fund amounts to a total of $800 million, and has been provided to regional countries.[3] The system of US Treasury bond repo agreements among EMEAP members was started in November 1995 to establish a framework for cooperation among central banks and ensure regional foreign exchange market stability. The amount of the agreement was expanded after the 1997 financial crisis, but it has never been implemented so far.[4]

(Reinforcement of surveillance and monitoring system)

For independent and efficient operation of the regional funding system in times of financial crisis, it is essential that conference bodies build their own surveillance and monitoring systems so they can observe financial and economic developments in each regional member country. In the current CMI-BSA system, 80% of the amount agreed for funding is linked to the IMF's decision, which greatly limits the independence of the funding operation.[5] This is because, unlike the IMF, the CMI lacks independent and credible surveillance and monitoring.

Accordingly, countries in the region have made efforts to build systems for surveillance and monitoring of regional financial and economic developments and to strengthen their policy cooperation through these systems. The Manila Framework was launched in 1998, in the aftermath of the 1997 financial and foreign exchange crisis, with the goal of strengthening financial stability in the Asian region. As one of its major projects, it began building a surveillance mechanism in the region to complement the IMF's global surveillance. Although it had lasted for six years, the Manila Framework was terminated at its 12th meeting in November 2003, without having achieved any concrete results.

Since April 2002, ASEAN + 3 has examined regional economic and financial developments through its ERPD and sought means of policy cooperation. However, the ERPD, which

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[3] Nine European countries and China raised $45 million to form ATF I (1998–2002) and supported seven Asian countries. ATF II was created by eight European countries, China and Korea. It totalled $35 million, and was provided to five Asian countries.

[4] Under the repo agreements, countries have been able to provide financial support in US dollars, with US Treasury bonds as collateral, during a very short period. Therefore, the agreements have not been so useful as a crisis resolution measure.

[5] Funding through the CMI-BSA is mostly limited to cases where IMF programmes/funding have already been executed or will soon be executed. However, for up to 20% of the contracted amount, funding can be provided at the donor's discretion, without linkage to an IMF programme.

remains merely a means of examining country-specific macroeconomic indicators, has no surveillance functions and cannot demand any actions from member countries. The ERPD is thus inadequate as a regional economic surveillance system. In May 2006, therefore, the Technical Working Group on Economic and Financial Monitoring (ETWG) and the Group of Experts (GOE) were created. These groups support member countries in building policy collaboration through regular monitoring of economic and financial developments, and at the same time enhance their crisis management capabilities by facilitating early detection of crisis symptoms. During the Finance Ministers' Meeting in May 2007 in Kyoto, Japan, the ministers agreed to tighten the connections among the ERPD, ETWG and GOE, to further promote their functions of surveillance of regional economic and financial developments.

The EMEAP is also working on building a system for regional monetary and financial monitoring. In April 2007, the Monetary and Financial Stability Committee (MFSC), composed of deputy governor-level staff of member central banks, was launched. This committee handles regional monetary and financial monitoring, and also performs such activities as risk and crisis management and resolution. In May 2007, the MFSC decided to launch a regional monetary and financial monitoring system.[6] Then, in November 2007, its members agreed to build a regional crisis management and resolution network.[7]

After the financial crisis, ASEAN members designed the ASEAN Surveillance Process (ASP), and have drawn up monitoring reports on members' and regional economic developments with help from the ASEAN Finance and Central Bank Deputies' Meeting, the surveillance and coordination body of the ASEAN Secretariat, the Asian Development Bank (ADB), etc. This ASEAN surveillance report includes policy recommendations concerning regional financial and economic developments. The finance ministers of the ASEAN member countries exchange opinions and information through peer reviews, and discuss measures needed to cope with potential risk factors in order to enable members to be prepared for emergencies.

B. Development of regional bond markets

Since the Asian financial crisis, there have been active discussions in most regional financial forums regarding the development of Asia's financial markets, which had been relatively backward. There has been remarkable progress, especially in discussions concerning the development of regional bond markets, particularly during EMEAP and ASEAN + 3 meetings, aimed at lessening dependence on funding from outside the region and cultivation of funding from within the region.

The EMEAP has created the ABF, a fund comprising foreign exchange reserves held by regional member central banks. Its investment in regional bonds is contributing to the development of regional bond markets. ASEAN + 3 is seeking ways to spur issuance of bonds within the region and member countries through the ABMI, and to build a common substructure (a credit guarantee, credit rating and settlement system) that can foster regional bond market development. APEC is also searching for ways to strengthen member countries' capacities to develop their regional financial markets, including bond markets, through discussions on how to promote securitisation and credit guarantee markets.

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[6] This monitoring system comprises the following: macro-monitoring done by dedicated resources from each member central bank; monitoring performed by the three working groups in their respective fields; and the Dealing Room Network, connecting the network of the IFIs (eg, the IMF and the BIS) and the EMEAP member central banks.

[7] The crisis management network is composed of the High-level Team and the Technical-level Crisis Management Team (CTM). The High-level Team advises members on policy alternatives in dealing with crises, and also provides them with a point of contact with the IFIs. The CTM supports the High-level Team through data collection and execution of business continuity plans (BCPs) in times of crisis.

(Creation of the Asian Bond Fund)

The EMEAP has created bond-type funds, invested in jointly by member countries, to boost regional bond markets and diversify the investment targets of members' foreign exchange reserves. As a result, the ABF-1 and ABF-2 were launched in July 2003 and April 2005, respectively, and have been in operation ever since.

The ABF-1 is a bond-type fund with a total size of $1 billion. Its investments are limited to US dollar-denominated bonds issued by EMEAP member governments (except Japan, Australia and New Zealand) and governmental institutions.

The ABF-2 is composed of the Pan-Asian Bond Index Fund (PAIF) and the eight Single-market Funds. Its investment targets are bonds issued by the governments and government institutions of eight EMEAP member countries (China, Hong Kong SAR, Indonesia, Korea, Malaysia, the Philippines, Singapore and Thailand) and denominated in their local currencies.[8] Australia, Japan and New Zealand, whose bond markets are already advanced, are excluded. The ABF-2 started out as a $2 billion bond-type fund created with foreign exchange reserves of EMEAP members. However, through listing and public offerings, it now also attracts private funds.

(Discussions regarding regional bond market development)

Remarkable progress has been made in discussions of ways to foster regional bond markets. The ASEAN + 3 ABMI has organised working groups dedicated to work in various relevant fields (Table 3).

Table 3

Activities of ABMI working groups

Working groups	Activities
New Securitised Debt Instruments	Finding ways to provide tax incentives for regional currency-denominated bond transactions to promote efficient supply of these bonds, ways to issue ABSs, and ways of coordinating a response to withholding taxation
Credit Guarantee and Investment Mechanisms	Discussing ways to establish a single credit guarantee and investment institution to facilitate more active issuance of regional bonds
Foreign Exchange Transactions and Settlement Issues	Studying ways to improve the regional payment/settlement system; organising a group of experts to study establishment of a regional depository organisation
Rating Systems and Information Dissemination on Asian Bond Markets	Studying ways to improve the regional credit rating system and reinforce the credit information dissemination system
Technical Assistance (TA) Coordination Team for the Focal Group	TA for globalisation of members' bond markets and for improvement of human resource quality in these markets

[8] The PAIF is a unified fund that invests in local currency-denominated sovereign and quasi-sovereign bonds of eight EMEAP bond markets. The eight Single-market Funds are country funds that invest in the same bonds of the respective markets.

The Working Group on New Securitised Debt Instruments is devoted to finding ways for issuance of bonds to finance infrastructure, for securitisation of loans and charge sales bonds, and for issuance of regional medium-term notes (MTNs). The Working Group on Credit Guarantee and Investment Mechanisms has confirmed (November 2007) that a regional credit guarantee and investment organisation will be established, in the form of a fund operated under the ADB, and it is now working on detailed plans for its implementation. The Working Group on Foreign Exchange Transactions and Settlement Issues has discussed how regional foreign exchange settlement risks can be minimised, although not much progress has been achieved due to conflicts of interest among members. Finally, the Working Group on Rating Systems plans to come up with ways to improve the comparability and level of standardisation of regional credit rating agencies, and boost their functions by May 2008. Its aim is to enhance the credibility and transparency of regional credit rating agencies.

APEC members have continued discussing the cultivation of regional bond markets for the past 10 years. They have launched several initiatives, namely: the Initiative on Securitisation Promotion (1997–98), launched in April 1997; the Initiative on Regional Bond Market Development (1998–99), launched in May 1998; and the Initiative on Development of Securitisation and Credit Guarantee Markets (2002–04), launched in September 2002. It has been recognised that one of the elements undermining the development of regional bond markets is the credit quality gap – ie, regional issuers' credit rating levels do not meet investors' expectations. In line with this awareness, APEC has tried to find ways of encouraging more active credit guarantees and securitisation. Even until recently, APEC has tried to strengthen regional members' capabilities in developing their financial markets, through initiatives such as the AFDP (APEC Financial Development Program), the APEC Public-Private Dialogue on Bond Market Development, and the Initiative on Strengthening Capital Markets in the APEC Region.

C. Studies on regional foreign exchange cooperation and regional monetary integration

The basic goal of regional financial cooperation since the financial crisis has been to build an emergency funding system in preparation for possible future financial crises. At the same time, however, studies have also been done continually on how major regional countries can cooperate in their foreign exchange-related policies and unify their currencies. These studies have been conducted based on a mid- to long-term perspective, with the aim of, eg, preventing competitive devaluations of currencies in times of foreign exchange crisis.

Recently, systematic studies have been conducted by regional development financial organisations (eg, the ADB) and conference bodies (eg, ASEAN + 3), based on academic studies carried out by major research institutes. The ADB has been conducting research on development of an Asian Currency Unit (ACU) since 2005.[9] During the China-Japan-Korea Finance Ministers' Meeting in May 2006, the participants agreed that the three governments together would initiate research on an Asian common currency basket. ASEAN + 3 has been studying the development of a single regional monetary unit since 2006. In the ASEAN + 3 Research Group, led by a private research institute, Japanese researchers have since 2006

[9] The ACU would be a weighted average index of an Asian regional monetary basket. It would be an indicator used to monitor the movements of regional currencies as a whole against currencies outside the region (eg, the US dollar and the euro) and against the currencies of individual regional countries.

been studying the adoption of a regional monetary unit (RMU) in Asia, by considering the European Union's adoption of the EMU.[10]

The ASEAN Central Bank Forum (ACBF) has also, since 2000, been studying the prospects for adopting a single monetary and foreign exchange system for the ASEAN region. In 2000, the Forum organised a task force team to conduct research on the feasibility of a single monetary and foreign exchange system in the ASEAN region. In 2007, it set up a new task force team to conduct research on the foreign exchange system in the ASEAN region.[11]

III. Challenges to the strengthening of regional financial cooperation

The foundation for setting up a regional financial cooperation framework seems to have been laid, as Asian countries have pursued financial cooperation for a decade since the 1997 financial crisis. In order for this framework to develop more and produce substantial results in the future, however, the following challenges must be overcome.

1. Creating synergy through division of work among major regional financial forums

(Problems resulting from diverse cooperation channels and leading institutions)

The channels of regional financial cooperation have become very diverse, as Asian financial cooperation has been conducted through a variety of forums that are different from one another in terms of their structures and the natures of the institutions leading them. Concerning the structures of these forums, ASEAN has 10 Southeast Asian countries as its members, while APEC and the ASEM have 21 and 43 members, respectively, including countries from outside the Asian region. ASEAN + 3, APEC and the ASEM are government-led (central banks might participate depending upon the areas of cooperation), while the EMEAP, SEACEN and SEANZA are forums of central banks. SEACEN and SEANZA focus mainly on providing training programmes to enhance the capacities of member central bankers.

As multiple forums conduct discussions on similar themes in similar areas due to the existence of such diverse channels, human and physical inefficiencies might arise (Table 4). In particular, as the EMEAP has focused more on regional financial cooperation since 2007, its agenda overlaps greatly with that of the government-led ASEAN + 3.[12]

(Creating synergy by enhancing connections between consultative channels)

Tasks should be reorganised in consideration of the expertise and driving forces of the different regional forums, while the connections between the forums should be increased, so that they can refer to and utilise the results of each other's discussions for each task. More specifically, for example, synergy can be created if the government-led ASEAN + 3 establishes a financing regime for coping with a regional financial crisis, while the central bank-led EMEAP strengthens its surveillance and monitoring functions. It has also been argued that some of the

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[10] Japan has categorised its research in line with four objectives: first, a currency composition plan for the RMU, in accordance with the purposes of its adoption; second, a plan for using the RMU to stabilise regional foreign exchange rates; third, a plan for encouraging use of the RMU in regional financial markets; and fourth, a roadmap for RMU adoption.

[11] The task force team has concluded in its research that it is still premature to adopt a single monetary and foreign exchange system in the region, since it remains difficult for the macroeconomies of all ASEAN countries to converge under such a system.

[12] For example, both ASEAN + 3 and EMEAP have promoted stronger surveillance and monitoring in the region.

forums need to be developed into permanent organisations, or even further into international financial institutions that wield political and economic binding force supranationally.

Table 4

Financial cooperation agenda of regional forums

	APEC	ASEAN	ASEAN + 3	ASEM	EMEAP	SEACEN	SEANZA
Liquidity support		√	√				
Surveillance/ monitoring		√	√		√		
Financial market development	√	√	√	√	√		
Monetary integration		√	√				
Capacity building	√	√	√	√	√	√	√

Most forums other than ASEAN and SEACEN, which have their own secretariats or permanent administrative offices, lack permanent organisations in charge of implementing and coordinating their cooperative projects and contacting their members (Table 5). They therefore depend upon the experiences of certain member countries (or the rotating chair countries) or other international organisations such as the ADB and the BIS. If they continue to depend upon certain specific members or international financial organisations, they will face limitations in achieving regional cooperation results and developing their own capacities through establishment of regional financial cooperation regimes.

It is not easy in reality for member countries to reach consensus on resolving this problem, owing to various factors including the additional expense of establishing secretariats, and possible conflicts of interest among members. In the medium and long run, however, they need to come up with practical measures to increase their activities and the effectiveness of their functions in the region, including planning to set up permanent offices.

Table 5

Organisations supporting regional financial forums

Forum	Organisations
SEACEN	Enhance capacity of central banks in the region through the SEACEN CENTRE
EMEAP	No secretariat. Depends upon capacities of the BIS and individual members, including Hong Kong SAR and Singapore, for its major initiatives such as the ABF
ASEAN	ASEAN Secretariat
APEC, ASEM, ACD, EAS, SEANZA	No secretariat. Depend upon other international organisations, including the World Bank (ASEM Trust Fund), ASEAN Secretariat (EAS), and ADB
ASEAN + 3	No secretariat. Depends upon indirect assistance from other international organisations, including the ASEAN Secretariat and ADB for the CMI and ABMI

2. Establishing surveillance and monitoring frameworks

Some regional forums, including ASEAN + 3 and the EMEAP, have worked on establishing regional surveillance and monitoring frameworks, but the current monitoring has not developed beyond an initial stage of peer review of economic conditions of member countries and their major statistical indices. Owing to its underdeveloped monitoring function, financing through the BSAs under the CMI of ASEAN + 3 has relied greatly upon surveillance and monitoring by the IMF, with 80% of its financing linked to the IMF's financing decisions. The increasing dependence of regional forums upon international organisations outside the region for their surveillance and policymaking decisions may undermine their abilities to respond rapidly and effectively to financial crises in the region.[13]

To increase the effectiveness of the multilateralised financing framework of the ASEAN + 3 CMI and prevent moral hazard in recipient countries in times of crisis, regional forums need to set up their own surveillance and monitoring frameworks that are more systematic and binding. The EMEAP's Monetary and Financial Stability Committee is working to ensure more rapid information exchanges and decision-making by establishing a working-level risk management system. In view of this, ASEAN + 3 also needs to increase the linkages between surveillance activities and financing in its CMI multilateralisation efforts, so that it can provide actual financing in times of crisis.

3. Strengthening cooperation with major international financial organisations

Regional cooperative forums need to strengthen their cooperative relationship with major international financial organisations. This will help to ensure that the region's common interest is reflected properly in the international community and enable the promotion of regional financial cooperation to proceed more smoothly. For example, when Japan proposed establishing an Asian Monetary Fund (AMF) in the wake of the 1997 Asian financial crisis, this could not be realised owing to opposition from the United States, which was concerned about weakening the IMF's role. The current financing system of the CMI-BSA is also in a complementary relationship to the existing international financial organisations, such as the IMF.

If the current CMI multilateralisation discussion on setting up a regional financing framework develops further, so as to deal also with the possible establishment of a regional financial organisation, support from the existing international financial organisations, including the IMF and the ADB, is essential. In this case, the cooperative relationships between regional forums and international organisations would become closer, and regional forums would also build a more cooperative relationship with one another, with each forum specialising in different areas, for example.

In promoting their cooperative projects, these regional forums also need to utilise the knowledge and experience of the existing international financial organisations, including the IMF, the BIS, and the ADB. For instance, the EMEAP, which has already successfully established the ABF in cooperation with the BIS, can fully utilise the experiences of the BIS when developing measures to foster regional bond markets. Technical advice from the IMF, based upon its diverse experience and expertise in the area of international cooperation, is essential for resolving conflicts of interest and differences of views on countries' shares of funds and reaching consensus among ASEAN + 3 members in the CMI multilateralisation process. With regard to the review and adjustment of international standards, including payment and settlement criteria and capital adequacy ratios, regional countries can maintain

[13] Considering that the IMF conducts its surveillance of member countries only once or twice every year, for about two weeks, surveillance of regional countries is not adequate in terms of its intensity and frequency.

close relationships with the BIS. They can then utilise the major meetings and expert committees of the BIS to advance their interests by, for example, asking that greater consideration be given to the uniqueness of regional economic conditions.

4. Establishing a long-term vision

Asian countries have promoted a variety of cooperative projects, in recognition of the importance of regional financial cooperation in an era in which both globalisation and regionalism are deepening. However, there has been no clear consensus, either within a single regional forum or among them all, on a common goal or vision that they should pursue in the long term through regional financial cooperation. Having a properly set long-term goal would enable them to formulate strategies to achieve that goal effectively and with the minimum political and economic costs.

If there is a lack of consensus on a long-term goal or direction among member countries, the driving force to achieve that goal might be weakened, or the process might result in considerable trial and error. This lack of a long-term vision seems to be one of the reasons that the cooperation pursued recently by major forums in the region has failed to take off, despite their experiences accumulated during the past decade.

Of course, it is not easy for countries to form a consensus on long-term visions requiring common understanding and efforts, such as AMF establishment and regional monetary integration. This is because Asian countries differ in their development levels, their cultures and their languages, and there are various historical and political conflicts among them. For example, countries have tended to avoid officially discussing the issue of regional monetary integration, as they might incur huge political and economic costs in the short term during such discussions, while their benefits would be uncertain and could be realised only over a long period of time.

At the current stage, therefore, member countries need to engage more actively in research and discussions, in order to arrive at a long-term vision of regional financial cooperation that they can share, and to increase their understanding of that vision. The topics for such research and discussions can include the establishment of a regional foreign exchange cooperation system, regional monetary integration and the scope of the participants to be involved in regional financial cooperation.

IV. Conclusion

The progress of regional financial cooperation since the Asian financial crisis has been slow, but there have been visible outcomes, although on a limited scale. In this process, Asian countries have also been able to accumulate experience related to regional financial cooperation. In particular, the efforts of ASEAN + 3 to set up a financing framework based on the CMI-BSA, and its multilateralisation of that framework, are expected to serve as a cornerstone to the strengthening of a regional risk management system. Efforts in the EMEAP to create the ABF, and endeavours by ASEAN + 3 to foster a regional bond market including the ABMI, will contribute greatly to improving the region's financial markets and enabling smoother financing and management of funds.

Obstacles to long-term cooperation processes have, however, recently emerged in various regional forums. Countries therefore need to strengthen their capacities to operate and develop the already established regional financial cooperation frameworks more effectively, rather than trying to find new areas for cooperation. To reduce inefficiencies, including the overlapping of agendas due to the diversification of regional cooperative forums, the forums need to readjust their projects and focus more on key projects in consideration of their own areas of expertise and their driving forces.

For instance, the establishment of regional surveillance and monitoring frameworks has been pursued by both ASEAN + 3 and the EMEAP. ASEAN + 3 could focus on its financing function and strengthening of bilateral surveillance (between ASEAN + 3 and its individual members), in cooperation with the IMF. The EMEAP, meanwhile, needs to learn from the surveillance activities of the BIS as a role model, and focus on information exchange and monitoring of areas in which central banks have expertise, including the financial markets, payment and settlement, and banking supervision, to promote greater regional monetary and financial stability. If the connections between the various regional forums increase, regional financial cooperation can be promoted more effectively through synergy effects. Therefore, the forums need to engage more actively in official information exchanges. In addition, they would be able to expand the basis for cooperation in the long run by utilising regional central bank training organisations such as the SEACEN Centre, and thus increasing countries' understanding of and interest in the overall financial cooperation projects being carried out currently.

Just as Germany and France played leading roles during the European Union's long economic integration process, major countries in the Asian region need to show their strong leadership and gather the political willpower to make regional financial cooperation successful in the future. The leading countries in terms of economic size and level of economic and financial development should show their leadership. At the same time, they need to be careful not to undermine regional financial cooperation by harmonising all the cooperation processes.

Asian countries can be expected to develop their relationships for regional financial cooperation further in the near future. However, there has been no clear agreement on the ultimate goal of regional financial cooperation, even among the countries participating in it. This is because there are many constraints that cannot be resolved in the short term through the capacities of cooperative forums alone. Financial cooperation in the Asian region so far has not been conducted step by step, in accordance with any long-term plan. Instead, for a decade since the Asian financial crisis, it has centred on projects in which countries can actually cooperate with each other, by reflecting and adjusting the interests of many countries. Therefore, countries need to start with tasks that realistically can be agreed upon, instead of rushing to set up an ultimate goal for regional financial cooperation.

Considering that it took more than four decades for the European Union to complete its economic integration, and that Asia's environment for integration is more heterogeneous than that of the European Union, it will not be easy to reach agreement on the ultimate goal of regional financial cooperation. If countries hurry to try to specify such an ultimate goal, conflicts of interest among them could arise, and this might hamper many of the monetary and financial cooperation projects currently under way. If there is no ultimate goal for regional financial cooperation, however, this could lead to negative side effects, including weakening our driving force and ineffective management of human and physical resources. Efforts to minimise these effects are therefore needed.

In selecting and promoting individual financial cooperation projects, consistency with an ultimate goal must be considered from the mid- and long-term perspectives. To this end, countries need to continue research and discussion on mid- and long-term challenges, including the establishment of a regional foreign exchange cooperation framework and regional monetary integration, even if it takes considerable time to reach a conclusion.

Member governments can face many constraints in actively promoting tasks that require political judgment or on which regional countries have differing opinions. In contrast, central banks can advance the related discussions relatively freely, through objective research and review. In this regard, central banks in the region have many contributions to make to regional monetary and financial cooperation.

Appendix: Key reforms to foster regional financial integration in Asia

1. Current state of regional financial integration

Asia's real sector integration is remarkably advanced, with intraregional trade accounting for about 50% of total trade. Asia's financial integration with the world is also well advanced by some measures, including net private capital flows, foreign participation in some markets, and stock market correlations. Meanwhile, Asia's intraregional financial integration – measured by, for example, cross-border capital flows, or cross-border correlation of consumption growth[14] – has been more limited than elsewhere. The volume of intraregional cross-border portfolio investment in Asia is relatively small compared with that of either North America or the European Union.[15]

Although cross-border interest rate and bond yield differentials have narrowed in recent years, they remain substantial. Co-movements in Asian interest rates and bond yields have increased, but this could also reflect increasing integration with the global market and/or improving fundamentals. Empirical studies (Mercereau, 2005) find that consumption growth in most Asian countries has a low or negative correlation with that in other Asian countries. This is in contrast to a correlation of about 0.6 among euro area countries.[16]

2. Key reforms to foster regional financial integration

Financial services are conditioned by a host of factors such as cost and availability of funds, transparency, well developed infrastructure, prudential regulation, and market openness. Considering this, key reforms to foster regional financial integration are as follows:

- Strengthen capital markets to increase investor sophistication and improve the investment climate
  - Strengthen the investor base by increasing the role of institutional investors such as pension funds
  - Strengthen corporate governance for an attractive investment climate
- Build regional infrastructure to facilitate trading
  - Link clearing and settlement systems
  - Ensure standardised ratings and a more complete coverage
- Minimise risks associated with greater integration
  - Move towards risk-based supervision
  - Address cross-sectoral and cross-border issues and coordinating crisis management

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[14] Increasing financial integration should reduce the volatility of consumption growth relative to income, through diversified asset holdings and source of income. In this way, consumption patterns will be better correlated across countries.

[15] For example, Asia's intraregional cross-border portfolio liabilities amounted to only 2.25% of its GDP in 2004, less than one third of its liabilities to either North America or the European Union.

[16] Cowen et al (2006), p 8.

- Remove impediments to cross-border activities
  - Further capital account liberalisation
  - Further financial services sector liberalisation
- Harmonise rules and practices across the region
  - Address differences in laws, regulations, and tax treatments that deter investors
  - Implement global standards and best practices

Table A.1

Key reforms to foster regional financial integration

Greater financial market integration				
Deeper and more resilient capital and financial markets				
International and regional cooperation				
Strengthening capital markets	**Building infrastructure**	**Minimising risks**	**Removing impediments**	**Harmonising rules and practices**
– Pension sector reforms – Strengthening corporate governance	– Clearing and payment systems – Credit rating agencies	– Moving toward risk-based supervision – Addressing cross-sectoral & cross-border issues – Safeguarding market integrity	– Capital account liberalisation – Liberalising trade in services	– Implementing global standards and best practices
Preconditions (eg, sound economic, legal and judicial, accounting, and auditing frameworks)				

Source: Cowen et al (2006).

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Measuring economic integration: the case of Asian economies[1]

Yin-Wong Cheung,[2] Matthew S Yiu[3] and Kenneth K Chow[3]

Introduction

Since the 1997 Asian financial crisis, both intra-Asia trade and Asian financial markets have experienced considerable growth. Anecdotal evidence indicates that the economic integration of the Asian economies has been steadily progressing. The degree of economic integration is of substantial interest to both academics and policymakers because of its implications for economic efficiency, risk-sharing and the feasibility of forming a currency union.

How integrated are the Asian economies? This is not an easy question to answer. Roughly speaking, economic integration refers to increased interactions and strengthened links between economies. Eatwell, Milgate and Newman (1987, p 43), for example, define economic integration as "a process and as a state of affairs. Considered as a process, it encompasses measures designed to eliminate discrimination between economic units that belong to different national states; viewed as a state of affairs, it represents the absence of various forms of discrimination between national economies". Translating economic concepts into real-world measures may not be straightforward. Assessing the extent of economic integration is no exception.

In the literature, a number of criteria have been developed to evaluate the degree of economic integration. The criteria can be broadly classified in two categories, namely quantity- and price-based measures. The quantity-based category includes measurements of openness and restrictiveness in trade and financial transactions, capital flows, output correlation, savings-investment correlation and consumption correlation.[4] A greater degree of openness (or a lesser degree of restrictiveness) is associated with greater economic integration. The price-based category consists of tests derived from price differentials in goods and financial markets. A greater degree of economic integration is implied by a smaller price differential. Variables including interest rates, price indices and asset prices have been used to assess integration. The use of macro variables such as output, saving, investment and consumption to assess integration is sometimes labelled the macroeconomic approach, while the microeconomic approach refers to the use of financial and goods prices.[5]

It is not an exaggeration to say that we have an embarrassment of riches. There is no consensus on which of these different measures is the most appropriate one to use. We

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[1] The views expressed in the paper are solely those of the authors and do not necessarily reflect those of the Hong Kong Institute for Monetary Research (HKIMR), or of the HKIMR's Council of Advisers or Board of Directors. Contact information: Matthew S Yiu, HKIMR, 55/F, Two International Finance Centre, 8 Finance Street, Central, Hong Kong, e-mail: matthew_sf_yiu@hkma.gov.hk.

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[4] Sometimes, the regulatory and institutional measures are included.

[5] See Bayoumi (1997).

anticipate that the multitude of measures, with different implementation methods, will yield different inferences about the degree of integration. For instance, using different approaches, Yu, Fung and Tam (2007) and McCauley, Fung and Gadanecz (2002) offer different assessments of the integration of bond markets in Asia. Indeed, it is reasonable to ask which of the available measures should be used in assessing the degree of integration among the Asian economies.

Instead of arguing in favour of one measure over another, we propose an alternative framework. The economic intuition is that, in general, individual measures focus on different aspects and implications of economic integration, and, therefore, no one by itself gives a complete picture. Thus, it is useful to combine information from individual measures to form an overall assessment of the degree of integration.

The proposed framework is based on the premise that integration is driven by common factors that affect all economies, that some factors affect a group of economies with common characteristics and that there are also economy-specific, idiosyncratic factors. Suppose we have a measure of trade integration and a measure of financial integration. To combine information from these two measures, we assume there is an overall common factor driving both trade and financial integration. Further, some common and group factors are specific to trade, others to financial integration. Thus, a given economy's observed degree of integration is decomposed into several components – an overall common factor that drives both trade and financial integration, one common factor that drives trade (or financial) integration, one factor that drives a group of economies that share some common characteristics and an idiosyncratic component.

The common factors required for the analysis can be constructed using two approaches. One approach is to assume that the common factors are represented by a set of observed economic variables. With this approach, it is desirable to have a theory that relates integration to these variables. The same applies to the use of common elements of these economic variables as proxies of common factors. The second approach is to assume that the common factors are unobservable. We can extract the latent common factors directly from the measures of integration. This approach implicitly assumes that the observed measures of integration contain information on the common force that drives integration. Although the approach is atheoretical, it is quite intuitive and can be implemented easily. Indeed, the technical aspect is drawn mainly from factor models, which have been used to analyse various economic issues. In the current exercise, we will follow the latent common factor approach.

In the next section, we describe the basic econometric framework and its variants. The third section illustrates the practical relevance of the proposed framework. Specifically, the proposed framework is used to examine data on two measures of integration. Some concluding remarks are provided in the final section.

Econometric framework

To simplify the presentation, we first consider the case of one common and one group factor. Then we discuss the variants of the basic setup. The basic specification is given by

$$X_{ij,t} = \gamma_{ij} F_t + \nu_{ij,t}; \qquad i, j = 1, 2, \ldots, \text{N and } i < j,\ t = 1, \ldots, \text{T}, \tag{1}$$

$$X_{ij,t} = \gamma_{ij} F_t + \delta_{ij} Q_{ij,t} + \nu_{ij,t}; \qquad i, j = 1, 2, \ldots, \text{N and } i < j,\ t = 1, \ldots, \text{T}, \tag{2}$$

where $X_{ij,t}$ is a measure of integration between economies i and j at time t, F_t is the common factor that affects the level of integration among all the economies, $Q_{ij,t}$ is the group factor defined by some common characteristics of economies in the sample, $\nu_{ij,t}$ is the regression

error term that captures the idiosyncratic component of integration, N is the number of economies under consideration and T gives the time dimension of the sample.

To fix the idea, we can interpret $X_{ij,t}$ as the measure of trade integration between economies i and j at time t, F_t as a latent variable that summarises the effects of, say, common economic growth and institutional changes on trade and $Q_{ij,t}$ as a group variable that captures the trade effect of, say, the two economies sharing a similar culture.

In the literature, equation (1) is known as a factor model. The specification has been adapted in finance to investigate asset pricing, in macroeconomics to study business cycles and generate economic forecasts; see, for example, Chamberlain and Rothschild (1983), Forni and Reichlin (1998), Giannone, Reichlin and Small (2005) and Stock and Watson (1989, 2002a,b). In the current context, it is implicitly assumed that the effects of economic variables on the evolution of global trade integration can be represented by a few latent common factors. Alternatively, one can view F_t as the common component of $X_{ij,t}$ in the analysis. One advantage of the data-driven approach is that we do not have to commit to a specific theory on the determinants of global trade integration and the specific (dynamic) channels through which these determinants affect integration.

We deem equation (2), which includes the group factor, to be a relevant specification for data analysis. For instance, in the trade literature some attributes such as culture and participation in a trade agreement have implications for trade intensity. In the current exercise, we appeal to some observable economic characteristics to define the group factor.

The coefficient γ_{ij} pertaining to the common factor effect is allowed to vary across economies. We consider that cross-economy heterogeneity is a real phenomenon and, hence, that a homogeneous restriction on the global factor coefficients is undesirable. For the same reason, the coefficient δ_{ij} of the group effect is also economy-specific.

Two remarks are in order. First, the model can be easily modified to accommodate a case in which there is more than one measure of integration, as illustrated below. Further, the model can be extended to include more than one factor in F_t and $Q_{ij,t}$ and the lags of these factors.

Second, the principal component approach can be used to estimate the latent factor F_t. Forni et al (2000) and Stock and Watson (2002a,b), for example, show that under some regularity conditions and for large N and T, the principal component of $X_{ij,t}$ is a consistent estimator of the common factor that drives $X_{ij,t}$. By the same token, the latent factor $Q_{ij,t}$ can be estimated by the principal component derived from the subset of $X_{ij,t}$ determined by the common economic characteristic defining the group factor.

Now, suppose $Y_{ij,t}$ is a measure of financial integration. Its common-group-factors specification is given by

$$Y_{ij,t} = \gamma_{ij} G_t + \delta_{ij} R_{ij,t} + \varepsilon_{ij,t}\,, \tag{3}$$

where G_t, $R_{ij,t}$ and $\varepsilon_{ij,t}$ are the common, group and idiosyncratic components, respectively, of the integration measure $Y_{ij,t}$.

For the sake of argument, we assume that the two measures of integration, $X_{ij,t}$ and $Y_{ij,t}$, represent different aspects of integration and that individually neither gives a complete picture of the degree of integration of the two economies. An analysis that combines information from these two measures can be expressed as follows:

$$X_{ij,t} = \beta_{ij,x} W_t + \gamma_{ij,x} F_t + \delta_{ij,x} Q_{ij,t} + \nu_{ij,t} \tag{4}$$

and

$$Y_{ij,t} = \beta_{ij,y} W_t + \gamma_{ij,y} G_t + \delta_{ij,y} R_{ij,t} + \varepsilon_{ij,t} \tag{5}$$

The system (4) and (5) is a combination of (2) and (3) with an added variable, W_t, which represents the overall common factor that affects, in the current example, both trade and financial integration. The subscripts of ß indicate the effect of the overall common factor on trade and financial channels, respectively. Thus, the setup allows us to infer latent common factors that affect the overall (or, to be more precise in the current example, combined) level of integration, trade (financial) integration and group-specific trade (financial) integration.

We apologise for the imprecise use of language. The meaning of the "common" factor is situation-dependent. For instance, F_t is the common factor when only $X_{ij,t}$ is under consideration. When both $X_{ij,t}$ and $Y_{ij,t}$ are considered, W_t is the overall common factor and, strictly speaking, F_t becomes the trade integration-specific factor. Of course, when we change the sample of economies and the measures of integration, the interpretation of these latent common factors will be altered accordingly. Similarly, the meaning of group factor can be situation-specific. We will make the interpretations of these factors appropriate to the content of the discussion.

Empirical results

In the aftermath of the 1997 Asian financial crisis, there was an intense interest in assessing the integration of Asian economies, not only because of the contribution of integration to economic efficiency but also because integration is believed to promote policy coordination and to be capable of deterring future crises in the region. Further, the level of integration is usually deemed to be one of the preconditions for forming an economic or currency union. Indeed, in the post-crisis period, there has been a substantial increase in intraregional trade, and various initiatives, including the development of local bond markets, have been taken to foster integration. To shed some light on integration, we consider 14 economies in Asia: Australia, China, Hong Kong SAR (hereinafter referred to as Hong Kong), India, Indonesia, Japan, Korea, Malaysia, New Zealand, the Philippines, Singapore, Taiwan (China) (hereinafter referred to as Taiwan), Thailand and Vietnam.

It is quite common to discuss economic integration in terms of trade and financial integration. It has been found that both trade and financial integration increase over time and, typically, go hand in hand, at least in the postwar period.[6] Thus, in our exercise, we consider one measure each of trade and financial integration.

For simplicity, we retain $X_{ij,t}$ as our notation of the measure of trade integration. It is given by:

$$X_{ij,t} = (Ex_{ij,t} + Ex_{ji,t}) / (GDP_{i,t} + GDP_{j,t}), \quad (6)$$

where $Ex_{ij,t}$ denotes the exports of economy i to economy j, $Ex_{ji,t}$ denotes the exports of economy j to economy i, and $GDP_{i,t}$ and $GDP_{j,t}$ are the output of economy i and economy j, respectively, at time t. The variable $X_{ij,t}$ is also known as the trade intensity between the two economies and is customarily scaled by 100 to make it a percentage of the sum of the two GDPs.

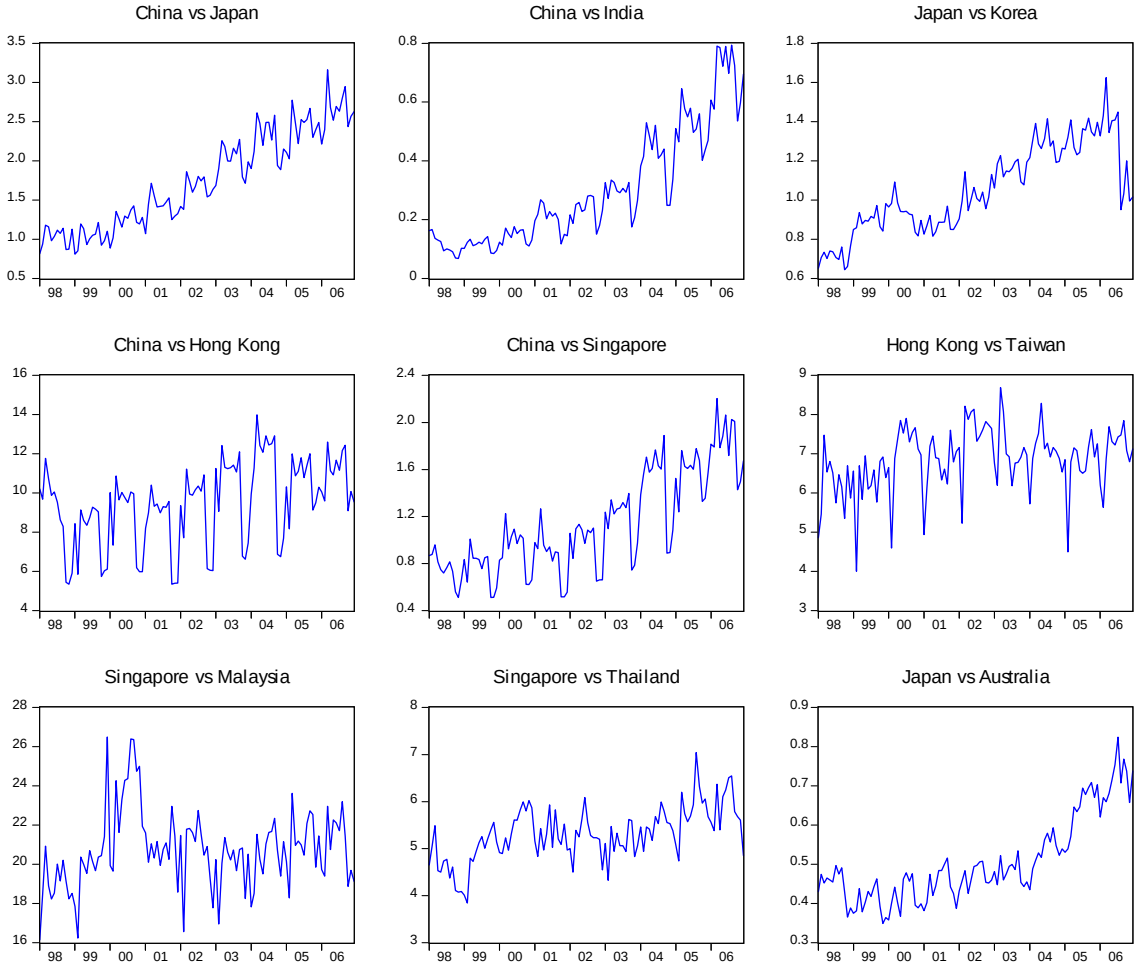
Figure 1 shows nine selected trade intensity series from our sample of 14 economies for the period January 1998 to December 2006. It is clear that China's trade with its partners grew significantly during the sample period.

[6] See IMF (2002). Obstfeld and Taylor (2004) observe that the degree of international integration was greater, by some measures, at the end of the 1800s.

Figure 1

Selected trade intensity series

1998M1 to 2006M12



We use interest rate co-movement to assess the degree of financial integration. Specifically, our measure of financial integration is defined by $Y_{ij,t} = corr(IR_{i,t}, IR_{j,t})$, the correlation of interest rates of economies *i* and *j* over a moving window of 12 months.[7] Because of the lack of data, Vietnam is not included in the sample for financial integration analysis and the sample period is restricted to January 2000–December 2006. Figure 2 depicts nine selected interest rate correlation series.

As discussed in the previous section, the principal component approach is used to extract from the trade intensity series the common factors that drive the evolution of bilateral trade among the sample economies. Table 1 shows the five largest principal components, which explain 70% of the total variation. The largest principal component accounts for around 44% of the total variation. The presence of a strong common component suggests that trade among the 14 sample economies is driven by an influential common latent factor.

[7] There are other measures of financial integration, such as interest rate parity conditions and financial openness. See, for example, Cheung, Chinn and Fujii (2007).

Figure 2

Selected interest rate correlation series

2000M1 to 2006M12

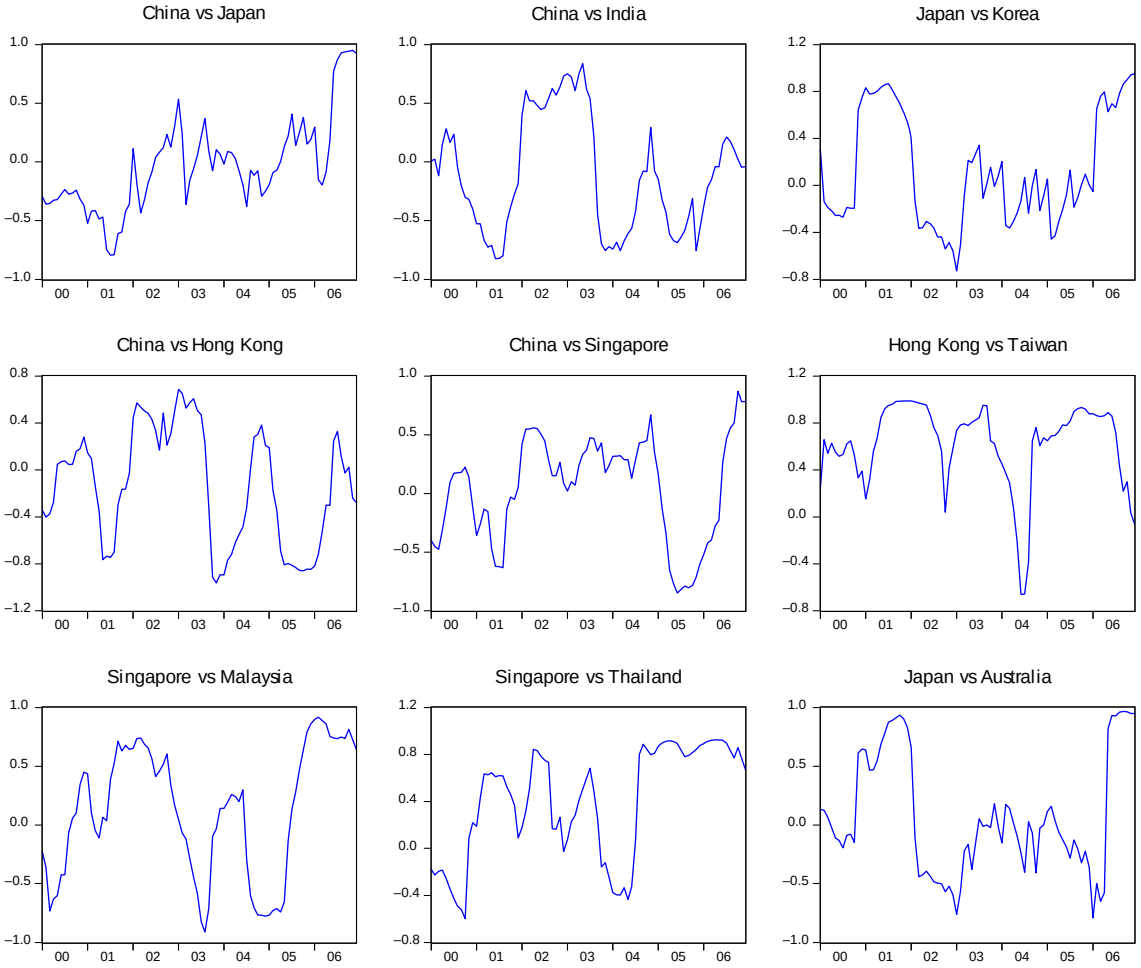


Table 2 describes the five largest principal components derived from the interest rate correlation series. Unlike the trade intensity series, the interest rate correlation series do not display a dominant principal component. The largest principal component accounts for only 16% of the total variation, whereas each of the next three largest principal components accounts for more than 10% of the total variation. The evidence indicates that, compared with the trade intensity series, the interest rate correlation series have relatively weak common components. The result should not be too surprising because the interest rate is an instrument of the monetary policy pursued by these economies to manage diverse economic conditions.[8] Further, most of these economies do not have full capital account convertibility.

To investigate the relevance of the largest principal component, we estimate equation (1) and calculate the proportion of trade intensity variation explained by the common factor F_t. The results are presented in Table 3. The common factor plays a significant role in explaining the bilateral trade of China, Japan and India, the three largest economies in the region. The average of the explained variability for each economy is shown in the last row of the table.

[8] Hong Kong may be the only exception in the group, given its currency board arrangement, which pegs the Hong Kong dollar to the US dollar.

These averages range from 24% (New Zealand) to 77% (China), indicating a diverse common factor effect.

Table 1

Principal component analysis of trade intensity series

1998M1 to 2006M12

	First principal component	Second principal component	Third principal component	Fourth principal component	Fifth principal component
Eigenvalue	43.88	7.72	5.12	4.65	2.55
Cumulative value	43.88	51.59	56.71	61.36	63.91
Variance proportion	0.48	0.08	0.06	0.05	0.03
Cumulative proportion	0.48	0.57	0.62	0.67	0.70

Table 2

Principal component analysis of interest rate correlation series

2000M1 to 2006M12

	First principal component	Second principal component	Third principal component	Fourth principal component	Fifth principal component
Eigenvalue	15.72	11.00	8.87	7.52	6.18
Cumulative value	15.72	26.72	35.59	43.10	49.29
Variance proportion	0.20	0.14	0.11	0.10	0.08
Cumulative proportion	0.20	0.34	0.46	0.55	0.63

Table 4 reports the same results from the interest rate correlation series – each interest rate correlation series is regressed on the largest principal component. Contrary to the results in Table 4, the proportion of variability in interest rate correlation explained by the largest component is quite small. Specifically, average explained variability ranges from 2.19% (China) to 31% (Malaysia). The relatively low explanatory power reflects the absence of a dominating interest rate correlation principal component.

Next, we investigate the role of group factors. Table 5 reports the regression results of equation (2), with Chinese culture as the group factor. The Chinese culture group comprises China, Hong Kong, Singapore and Taiwan. We first estimate the principal components from these economies' trade intensity series. To capture the marginal Chinese culture effect, the Chinese culture principal component is regressed on the common factor F_t, and the resulting residuals, labelled U_t, are used to define the group factor $Q_{ij,t}$ in the regression exercise. Hong Kong and Singapore give the only insignificant estimate of the latent group factor. In general, the results indicate that the Chinese culture factor offers a significant marginal explanation of bilateral trade between these economies. Except in the case of Hong Kong and Taiwan, adjusted R^2 is quite high. Indeed, in three of the six cases adjusted R^2 equals nearly 90%.

Table 6 considers the ASEAN trade agreement group effect. The members of ASEAN included in our sample are Indonesia, Malaysia, the Philippines, Singapore and Thailand (ASEAN 5). The ASEAN trade agreement group factor is constructed using the procedure for estimating the Chinese culture group factor. Only two of the coefficient estimates in Table 6 are insignificant – that is, a portion of bilateral trade between these economies is attributable to the ASEAN trade agreement. A comparison of adjusted R^2 in Tables 5 and 6 suggests that the Chinese culture group factor has a stronger influence on bilateral trade.

Estimates of bilateral interest rate correlation (equation (3)) are given in Tables 7 and 8. As shown in these tables, the latent factors are insignificant more often in the bilateral interest rate correlation series than in the trade intensity series and are less able to explain bilateral interest rate correlation, as indicated by the adjusted R^2 estimates.

Next, we consider an overall common factor that affects both the trade intensity and the interest rate correlation series. The availability of interest rate data dictates the size of the combined dataset; specifically, Vietnam is not included because of the lack of interest rate data, and the sample period is limited to January 2000–December 2006. Table 9 describes the first five principal components. The first principal component accounts for 26% of the total variation in the dataset, and the second principal component explains another 13%.

Table 10 shows that the first principal component (ie W_t in equations (4) and (5)) explains a large proportion of the variation in the trade intensity series, while the same overall common factor accounts for only a small fraction of interest rate correlation variability (Table 11). These observations reinforce the results shown in Tables 3 and 4 – trade intensity has a more dominant common factor than interest rate correlation.

The estimates derived from equation (4), which distinguishes between the effects of the overall common factor, the trade-specific common factor and the group-specific factor, are presented in Tables 12 and 13. The Chinese culture effect is the group factor in Table 12, while the ASEAN trade agreement is the group factor in Table 13. To assess the marginal effect of the trade-specific common factor, we regress F_t on the overall common factor, W_t, and use the resulting residuals, labelled ξ_t , as the trade-specific common factor in the regression. For the group-specific factor, we regress the group-specific principal component on W_t and F_t and use the resulting residuals, labelled U_t, as the group factor in the regression.

The results in Tables 12 and 13 are comparable to those in Tables 5 and 6. The trade intensity data are well explained by equation (4), as exemplified by the adjusted R^2 estimates. In general, the results support the notion that trade integration among these economies is driven by the three latent factors. Again, Chinese culture seems to have a stronger effect on trade intensity than the ASEAN trade agreement.

Tables 14 and 15 present the estimation results of equation (5). Table 14 shows the effect of the Chinese culture factor, Table 15 of the ASEAN trade agreement factor. Again, these results confirm that the latent factor model does not explain interest rate correlation as well as it explains trade intensity. Nonetheless, the results lend support to our findings about the effect of the three latent factors on interest rate correlation.

Conclusion

We propose a latent factor structure as an empirical device for studying the degree of integration. Data on selected Asian economies are used to illustrate the relevance of the proposed model in studying trade and financial integration. There is strong evidence that the integration of these economies is affected by an overall latent common factor that drives both trade and financial integration, a trade-specific integration factor, a financial-specific integration factor, a Chinese culture factor and an ASEAN trade agreement factor. These

results are indicative in general of the usefulness of the proposed model in analysing the integration of economies.

We recognise that the current exercise is an exploratory one and that the empirical strategy is not closely linked to any theory of integration. Indeed, in the paper we focus on fitting the data and are sketchy on the related economic interpretation. Currently, we are extending the exercise in several directions. First, we are considering dynamic factor models that allow the latent factors to have time-varying effects on the degree of integration. Obviously, a time-varying latent factor effect offers a means of capturing the possible temporal variation of the link between the latent factor and the degree of integration. Second, the choice of interest rate correlation as a proxy for financial integration may be controversial. We are examining alternative measures of financial integration, including price and interest rate parity conditions. Third, while the proposed factor approach offers a flexible way to study integration, the current framework does not provide much economic interpretation. It is our plan in the next stage to shed some light on the economic intuitions of the exercise by relating the latent common factors to observable economic variables.

Table 3

The proportion of trade intensity variability explained by the overall common factor F_t

1998M1 to 2006M12

	China	India	Japan	Korea	Singapore	Malaysia	Thailand	Indonesia	Philip-pines	Taiwan (China)	Hong Kong SAR	Viet-nam	Australia	New Zealand
China		13.12	6.48	15.30	15.43	24.45	14.62	27.82	24.55	11.62	57.79	31.42	11.47	45.27
India	86.88		56.93	28.66	20.13	69.14	27.95	8.75	92.78	35.57	56.48	8.92	33.63	86.47
Japan	93.52	43.07		26.71	44.18	53.15	7.52	15.93	40.75	26.39	15.01	12.89	24.41	25.85
Korea	84.70	71.34	73.29		99.54	90.98	91.81	100.00	63.61	32.07	72.56	57.64	97.00	94.25
Singapore	84.57	79.87	55.82	0.46		90.87	49.67	24.56	95.70	34.56	9.31	32.80	76.86	47.17
Malaysia	75.55	30.86	46.85	9.02	9.13		11.23	53.91	89.52	72.70	29.92	32.22	89.00	99.70
Thailand	85.38	72.05	92.48	8.19	50.33	88.77		47.48	75.12	44.16	11.26	17.30	31.89	50.70
Indonesia	72.18	91.25	84.07	0.00	75.44	46.09	52.52		99.29	58.52	82.26	89.45	97.49	88.91
Philippines	75.45	7.22	59.25	36.39	4.30	10.48	24.88	0.71		69.02	38.64	86.99	74.09	85.28
Taiwan (China)	88.38	64.43	73.61	67.93	65.44	27.30	55.84	41.48	30.98		84.30	18.91	99.87	68.44
Hong Kong SAR	42.21	43.52	84.99	27.44	90.69	70.08	88.74	17.74	61.36	15.70		20.40	70.38	92.48
Vietnam	68.58	91.08	87.11	42.36	67.20	67.78	82.70	10.55	13.01	81.09	79.60		54.31	99.59
Australia	88.53	66.37	75.59	3.00	23.14	11.00	68.11	2.51	25.91	0.13	29.62	45.69		99.07
New Zealand	54.73	13.53	74.15	5.75	52.83	0.30	49.30	11.09	14.72	31.56	7.52	0.41	0.93	
Mean	76.97	58.57	72.60	33.07	50.71	37.94	63.02	38.89	28.05	49.53	50.71	56.71	33.89	24.37

Model for each trading pair:

$$TI_t = C + \hat{\gamma}\hat{F}_t + \hat{\varepsilon}_t$$

Above the diagonal:

$$\frac{\text{var}(\hat{\varepsilon}_t)}{\text{var}(TI_t)} * 100$$

Below the diagonal:

$$\frac{\text{var}(\hat{\gamma}\hat{F}_t)}{\text{var}(TI_t)} * 100$$

Var is the sample variance.

Table 4

The proportion of interest rate correlation variability explained by the common factor F_t

2000M1 to 2006M12

	China	India	Japan	Korea	Singapore	Malaysia	Thailand	Indonesia	Philip-pines	Taiwan (China)	Hong Kong SAR	Australia	New Zealand
China		97.02	98.61	95.89	99.74	90.15	99.99	98.14	99.93	99.99	99.49	98.40	96.43
India	2.98		91.40	70.98	83.12	48.49	80.89	32.21	95.34	99.92	99.91	62.35	86.44
Japan	1.39	8.60		50.52	86.61	68.78	78.56	61.82	84.91	63.44	86.91	52.59	57.35
Korea	4.11	29.02	49.48		45.35	77.26	78.80	91.58	97.50	54.26	70.68	89.13	85.23
Singapore	0.26	16.88	13.39	54.65		59.76	96.01	83.45	69.71	75.93	98.01	78.05	80.58
Malaysia	9.85	51.51	31.22	22.74	40.24		54.57	99.20	99.89	36.22	55.36	80.80	57.35
Thailand	0.01	19.11	21.44	21.20	3.99	45.43		52.92	87.03	94.59	94.74	81.56	99.63
Indonesia	1.86	67.79	38.18	8.42	16.55	0.80	47.08		99.24	51.80	63.27	94.64	91.87
Philippines	0.07	4.66	15.09	2.50	30.29	0.11	12.97	0.76		79.07	71.03	84.72	78.72
Taiwan (China)	0.01	0.08	36.56	45.74	24.07	63.78	5.41	48.20	20.93		94.70	64.99	78.83
Hong Kong SAR	0.51	0.09	13.09	29.32	1.99	44.64	5.26	36.73	28.97	5.30		73.19	75.47
Australia	1.60	37.65	47.41	10.87	21.95	19.20	18.44	5.36	15.28	35.01	26.81		84.69
New Zealand	3.57	13.56	42.65	14.77	19.42	42.65	0.37	8.13	21.28	21.17	24.53	15.31	
Mean	2.19	21.00	26.54	24.40	20.31	31.01	16.73	23.32	12.74	25.52	18.10	21.24	18.95

Model for each interest rate correlation pair:

$$IR_t = C + \hat{\gamma}\hat{G}_t + \hat{\varepsilon}_t$$

Above the diagonal:

$$\frac{\text{var}(\hat{\varepsilon}_t)}{\text{var}(IR_t)} * 100$$

Below the diagonal:

$$\frac{\text{var}(\hat{\gamma}\hat{G}_t)}{\text{var}(IR_t)} * 100$$

Var is the sample variance.

Table 5

Results of regressing trade intensity series on their first principal component and the Chinese culture factor

1998M1 to 2006M12

	China vs Singapore	China vs Taiwan (China)	China vs Hong Kong SAR	Singapore vs Taiwan (China)	Singapore vs Hong Kong SAR	Taiwan (China) vs Hong Kong SAR
Constant	1.14 (0.00)	1.37 (0.00)	9.48 (0.00)	2.22 (0.00)	7.15 (0.00)	6.84 (0.00)
First principal component (F_t)	0.06 (0.00)	0.13 (0.00)	0.21 (0.00)	0.06 (0.00)	0.27 (0.00)	0.05 (0.00)
U_t	0.18 (0.00)	0.21 (0.00)	2.26 (0.00)	0.14 (0.01)	–0.01 (0.93)	0.56 (0.00)
R^2	0.89	0.90	0.71	0.68	0.91	0.27
Adj. R^2	0.89	0.90	0.70	0.67	0.91	0.26

U_t is the residual series obtained from regressing the first Chinese culture principal component on the first principal component of the trading intensity series. ( ) contains the p-value of parameter estimate.

Table 6

Results of regressing trade intensity series on their first principal component and the ASEAN 5 factor

1998M1 to 2006M12

	Singapore vs Malaysia	Singapore vs Thailand	Singapore vs Indonesia	Singapore vs Philippines	Malaysia vs Thailand	Malaysia vs Indonesia	Malaysia vs Philippines	Thailand vs Indonesia	Thailand vs Philippines	Indonesia vs Philippines
Constant	20.73 (0.00)	5.31 (0.00)	5.16 (0.00)	3.35 (0.00)	3.30 (0.00)	1.42 (0.00)	1.82 (0.00)	0.98 (0.00)	1.13 (0.00)	0.41 (0.00)
First principal component (F_t)	0.09 (0.00)	0.06 (0.00)	0.25 (0.00)	0.01 (0.01)	0.11 (0.00)	0.02 (0.00)	0.01 (0.00)	0.03 (0.00)	0.02 (0.00)	–0.001 (0.34)
U_t	1.45 (0.00)	0.29 (0.00)	0.02 (0.82)	0.23 (0.00)	0.12 (0.00)	0.09 (0.00)	0.08 (0.00)	0.06 (0.00)	0.08 (0.00)	0.04 (0.00)
R^2	0.58	0.73	0.75	0.27	0.91	0.61	0.18	0.57	0.37	0.17
Adj. R^2	0.57	0.73	0.75	0.26	0.91	0.60	0.16	0.56	0.36	0.16

U_t is the residual series obtained from regressing the first ASEAN trade agreement principal component on the first principal component of the trading intensity series. ( ) contains the p-value of parameter estimate.

Table 7

Results of regressing interest rate correlation series on their first principal component and the Chinese culture factor

2000M1 to 2006M12

	China vs Singapore	China vs Taiwan (China)	China vs Hong Kong SAR	Singapore vs Taiwan (China)	Singapore vs Hong Kong SAR	Taiwan (China) vs Hong Kong SAR
Constant	0.04 (0.16)	–0.02 (0.65)	–0.14 (0.00)	0.54 (0.00)	0.56 (0.00)	0.62 (0.00)
First principal component (G_t)	–0.01 (0.40)	–0.001 (0.87)	–0.01 (0.46)	0.05 (0.00)	0.01 (0.11)	0.02 (0.01)
U_t	0.23 (0.00)	0.26 (0.00)	0.16 (0.00)	–0.13 (0.00)	–0.12 (0.00)	–0.14 (0.00)
R^2	0.70	0.59	0.27	0.52	0.39	0.44
Adj. R^2	0.70	0.58	0.25	0.51	0.37	0.43

U_t is the residual series obtained from regressing the first Chinese culture principal component on the first principal component of the interest rate correlation series. ( ) contains the p-value of parameter estimate.

Table 8

Results of regressing interest rate correlation series on their first principal component and the ASEAN 5 factor

2000M1 to 2006M12

	Singapore vs Malaysia	**Singapore vs Thailand**	**Singapore vs Indonesia**	**Singapore vs Philippines**	**Malaysia vs Thailand**	**Malaysia vs Indonesia**	**Malaysia vs Philippines**	**Thailand vs Indonesia**	**Thailand vs Philippines**	**Indonesia vs Philippines**
Constant	0.12 (0.00)	0.40 (0.00)	–0.004 (0.92)	–0.08 (0.02)	0.11 (0.00)	0.04 (0.46)	0.39 (0.00)	0.32 (0.00)	0.19 (0.00)	0.14 (0.00)
First principal component (G_t)	0.09 (0.00)	0.02 (0.07)	–0.04 (0.00)	0.07 (0.00)	0.10 (0.00)	–0.01 (0.28)	–0.003 (0.77)	–0.08 (0.00)	0.05 (0.00)	–0.01 (0.14)
U_t	0.17 (0.00)	–0.01 (0.67)	0.06 (0.03)	0.18 (0.00)	0.23 (0.00)	0.26 (0.00)	0.04 (0.15)	0.06 (0.01)	0.25 (0.00)	0.23 (0.00)
R^2	0.63	0.04	0.21	0.64	0.82	0.46	0.03	0.51	0.75	0.73
Adj. R^2	0.62	0.02	0.19	0.63	0.82	0.44	0.002	0.50	0.75	0.72

U_t is the residual series obtained from regressing the first ASEAN trade agreement principal component on the principal component of the interest rate correlation series. ( ) contains the p-value of parameter estimate.

Table 9

Principal component analysis of trade intensity and interest rate correlation series

2000M1 to 2006M12

	First principal component	Second principal component	Third principal component	Fourth principal component	Fifth principal component
Eigenvalue	40.02	20.05	12.70	10.79	9.51
Cumulative value	40.02	60.07	72.77	83.56	93.06
Variance proportion	0.26	0.13	0.08	0.07	0.06
Cumulative proportion	0.26	0.39	0.47	0.54	0.60

The table presents eigenvalues of and proportions of variability explained by individual principal components.

Table 10

The proportion of trade intensity variability explained by the overall common factor W_t

1998M1 to 2006M12

	China	India	Japan	Korea	Singapore	Malaysia	Thailand	Indonesia	Philip-pines	Taiwan (China)	Hong Kong SAR	Australia	New Zealand
China		15.92	7.73	19.87	18.22	35.85	20.45	41.37	22.05	9.31	60.13	17.47	57.56
India	84.08		47.99	14.03	21.48	41.93	43.64	9.09	99.99	42.55	64.94	25.64	72.20
Japan	92.27	52.01		28.44	60.44	87.82	10.35	31.40	62.31	38.43	18.31	26.09	20.04
Korea	80.13	85.97	71.56		92.73	99.72	97.87	95.74	69.91	48.49	73.18	94.26	98.20
Singapore	81.78	78.52	39.56	7.27		99.97	74.61	12.25	99.50	57.75	11.20	91.40	42.84
Malaysia	64.15	58.07	12.18	0.28	0.03		17.08	57.60	86.97	93.63	39.97	97.86	98.37
Thailand	79.55	56.36	89.65	2.13	25.39	82.92		41.34	99.98	58.27	19.14	53.63	71.65
Indonesia	58.63	90.91	68.60	4.26	87.75	42.40	58.66		99.79	71.58	90.55	87.69	98.67
Philippines	77.95	0.01	37.69	30.09	0.50	13.03	0.02	0.21		97.52	47.77	60.08	99.57
Taiwan (China)	90.69	57.45	61.57	51.51	42.25	6.37	41.73	28.42	2.48		99.52	99.97	69.83
Hong Kong SAR	39.87	35.06	81.69	26.82	88.80	60.03	80.86	9.45	52.23	0.48		62.13	95.69
Australia	82.53	74.36	73.91	5.74	8.60	2.14	46.37	12.31	39.92	0.03	37.87		95.94
New Zealand	42.44	27.80	79.96	1.80	57.16	1.63	28.35	1.33	0.43	30.17	4.31	4.06	
Mean	72.84	58.38	63.39	30.63	43.13	28.60	49.33	38.58	21.21	34.43	43.12	32.32	23.29

Model for each trading pair:

$$TI_t = C + \hat{\beta}\hat{W}_t + \hat{v}_t$$

Above the diagonal:

$$\frac{\text{var}(\hat{v}_t)}{\text{var}(TI_t)} * 100$$

Below the diagonal:

$$\frac{\text{var}(\hat{\beta}\hat{W}_t)}{\text{var}(TI_t)} * 100$$

Var is the sample variance.

Table 11

The proportion of interest rate correlation variability explained by the overall common factor W_t

2000M1 to 2006M12

	China	India	Japan	Korea	Singapore	Malaysia	Thailand	Indonesia	Philip-pines	Taiwan (China)	Hong Kong SAR	Australia	New Zealand
China		96.45	62.91	81.68	99.92	98.50	93.21	55.47	94.17	99.72	89.69	83.84	90.31
India	3.55		96.91	99.79	88.93	97.49	71.62	87.29	79.06	98.68	99.55	92.95	95.37
Japan	37.09	3.09		99.96	90.07	99.99	99.08	99.98	76.90	99.77	99.41	98.97	99.99
Korea	18.32	0.21	0.04		87.69	98.77	99.79	90.63	99.33	94.74	92.87	63.49	83.64
Singapore	0.08	11.07	9.93	12.31		99.98	77.67	78.96	75.92	98.47	98.29	85.90	98.80
Malaysia	1.50	2.51	0.01	1.23	0.02		99.34	99.95	89.15	99.62	97.99	99.26	99.54
Thailand	6.79	28.38	0.92	0.21	22.33	0.66		96.04	84.88	59.79	64.91	99.27	53.83
Indonesia	44.53	12.71	0.02	9.37	21.04	0.05	3.96		100.00	88.21	57.69	99.68	76.48
Philippines	5.83	20.94	23.10	0.67	24.08	10.85	15.12	0.00		92.87	99.75	88.54	98.92
Taiwan (China)	0.28	1.32	0.23	5.26	1.53	0.38	40.21	11.79	7.13		98.51	97.81	94.72
Hong Kong SAR	10.31	0.45	0.59	7.13	1.71	2.01	35.09	42.31	0.25	1.49		91.58	100.00
Australia	16.16	7.05	1.03	36.51	14.10	0.74	0.73	0.32	11.46	2.19	8.42		63.05
New Zealand	9.69	4.63	0.01	16.36	1.20	0.46	46.17	23.52	1.08	5.28	0.00	36.95	
Mean	12.84	7.99	6.34	8.97	9.95	1.70	16.71	14.14	10.04	6.42	9.15	11.30	12.11

Model for each interest rate correlation pair:

$$IR_t = C + \hat{\beta}\hat{W}_t + \hat{\varepsilon}_t$$

Above the diagonal:

$$\frac{\text{var}(\hat{\varepsilon}_t)}{\text{var}(IR_t)} * 100$$

Below the diagonal:

$$\frac{\text{var}(\hat{\beta}\hat{W}_t)}{\text{var}(IR_t)} * 100$$

Var is the sample variance.

Table 12

Results of regressing trade intensity series on W_t, their first principal component and the Chinese culture factor

2000M1 to 2006M12

	China vs Singapore	China vs Taiwan (China)	China vs Hong Kong SAR	Singapore vs Taiwan (China)	Singapore vs Hong Kong SAR	Taiwan (China) vs Hong Kong SAR
Constant	1.24 (0.00)	1.64 (0.00)	9.81 (0.00)	2.37 (0.00)	7.68 (0.00)	7.03 (0.00)
Overall common factor (W_t)	0.06 (0.00)	0.12 (0.00)	0.21 (0.00)	0.04 (0.00)	0.27 (0.00)	0.01 (0.48)
ξ_t	0.08 (0.00)	–0.07 (0.00)	0.58 (0.00)	0.15 (0.00)	0.21 (0.00)	0.34 (0.00)
U_t	0.21 (0.00)	0.35 (0.00)	2.21 (0.00)	0.12 (0.07)	–0.17 (0.22)	0.37 (0.02)
R^2	0.91	0.95	0.74	0.56	0.90	0.26
Adj. R^2	0.91	0.95	0.73	0.55	0.90	0.23

ξ_t is the residual series obtained from regression F_t on W_t. U_t is the residual series obtained from regressing the first Chinese culture principal component on W_t and F_t. ( ) contains the p-value of the parameter estimate.

Table 13

Results of regressing trade intensity series on W_t, their first principal component and the ASEAN 5 factor

2000M1 to 2006M12

	Singapore vs Malaysia	Singapore vs Thailand	Singapore vs Indonesia	Singapore vs Philippines	Malaysia vs Thailand	Malaysia vs Indonesia	Malaysia vs Philippines	Thailand vs Indonesia	Thailand vs Philippines	Indonesia vs Philippines
Constant	21.06 (0.00)	5.47 (0.00)	5.53 (0.00)	3.42 (0.00)	3.58 (0.00)	1.46 (0.00)	1.84 (0.00)	1.04 (0.00)	1.22 (0.00)	0.40 (0.00)
Overall common factor (W_t)	–0.00 (0.78)	0.04 (0.00)	0.29 (0.00)	–0.01 (0.48)	0.09 (0.00)	0.02 (0.00)	0.02 (0.00)	0.03 (0.00)	0.00 (0.89)	0.00 (0.62)
ξ_t	1.23 (0.00)	0.24 (0.00)	–0.14 (0.06)	0.18 (0.00)	0.02 (0.40)	0.08 (0.00)	–0.02 (0.59)	–0.02 (0.26)	0.04 (0.01)	–0.00 (0.90)
U_t	1.02 (0.00)	0.23 (0.00)	0.25 (0.00)	0.12 (0.02)	0.17 (0.00)	0.09 (0.00)	0.08 (0.00)	0.09 (0.00)	0.03 (0.05)	0.05 (0.00)
R^2	0.72	0.69	0.90	0.20	0.91	0.72	0.22	0.72	0.11	0.33
Adj. R^2	0.71	0.68	0.89	0.17	0.90	0.71	0.19	0.71	0.08	0.30

ξ_t is the residual series obtained from regression F_t on W_t . U_t is the residual series obtained from regressing the first ASEAN trade agreement principal component on W_t and F_t. ( ) contains the p-value of the parameter estimate.

Table 14

Results of regressing interest rate correlation series on W_t, their first principal component and the Chinese culture factor

2000M1 to 2006M12

	China vs Singapore	China vs Taiwan (China)	China vs Hong Kong SAR	Singapore vs Taiwan (China)	Singapore vs Hong Kong SAR	Taiwan (China) vs Hong Kong SAR
Constant	0.04 (0.16)	–0.02 (0.66)	–0.14 (0.00)	0.54 (0.00)	0.56 (0.00)	0.62 (0.00)
Overall common factor (W_t)	–0.00 (0.65)	–0.00 (0.46)	–0.02 (0.00)	0.01 (0.10)	–0.01 (0.13)	–0.01 (0.14)
U_t	–0.01 (0.32)	–0.00 (0.71)	–0.02 (0.08)	0.06 (0.00)	0.01 (0.20)	0.02 (0.01)
ξ_t	0.23 (0.00)	0.27 (0.00)	0.15 (0.00)	–0.13 (0.00)	–0.13 (0.00)	–0.14 (0.00)
R^2	0.71	0.59	0.35	0.56	0.41	0.46
Adj. R^2	0.70	0.58	0.33	0.54	0.39	0.44

ξ_t is the residual series obtained from regression G_t on W_t. U_t is the residual series obtained from regressing the first Chinese culture principal component on W_t and G_t. ( ) contains the p-value of the parameter estimate.

Table 15

Results of regressing interest rate correlation series on W_t, their first principal component and the ASEAN 5 factor

2000M1 to 2006M12

	Singapore vs Malaysia	Singapore vs Thailand	Singapore vs Indonesia	Singapore vs Philippines	Malaysia vs Thailand	Malaysia vs Indonesia	Malaysia vs Philippines	Thailand vs Indonesia	Thailand vs Philippines	Indonesia vs Philippines
Constant	0.12 (0.00)	0.40 (0.00)	–0.00 (0.92)	–0.08 (0.01)	0.11 (0.00)	0.04 (0.46)	0.39 (0.00)	0.32 (0.00)	0.19 (0.00)	0.14 (0.00)
Overall common factor (W_t)	0.00 (0.82)	0.04 (0.00)	0.03 (0.00)	–0.04 (0.00)	0.01 (0.01)	0.00 (0.79)	–0.02 (0.00)	0.01 (0.01)	–0.03 (0.00)	0.00 (0.94)
U_t	0.09 (0.00)	0.04 (0.00)	–0.03 (0.00)	0.06 (0.00)	0.11 (0.00)	–0.01 (0.30)	–0.01 (0.25)	–0.08 (0.00)	0.04 (0.00)	–0.01 (0.13)
ξ_t	0.17 (0.00)	–0.00 (0.95)	0.07 (0.01)	0.17 (0.00)	0.24 (0.00)	0.26 (0.00)	0.03 (0.20)	0.06 (0.01)	0.25 (0.00)	0.23 (0.00)
R^2	0.68	0.33	0.34	0.74	0.92	0.46	0.14	0.51	0.81	0.73
Adj. R^2	0.66	0.31	0.34	0.73	0.91	0.44	0.11	0.49	0.81	0.72

ξ_t is the residual series obtained from regression G_t on W_t . U_t is the residual series obtained from regressing the first ASEAN trade agreement principal component on W_t and G_t. ( ) contains the p-value of the parameter estimate.

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Volatility and persistence of capital flows

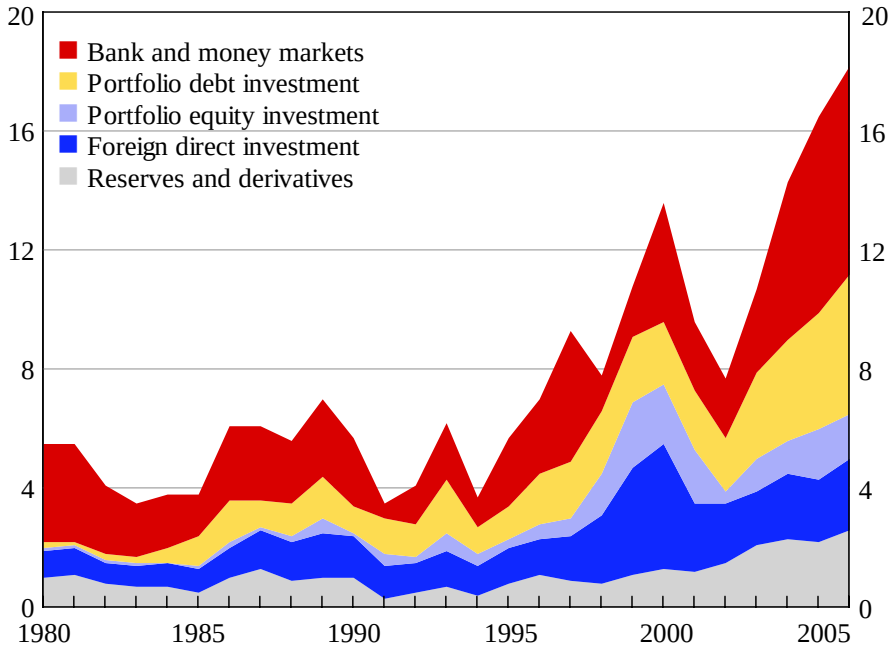
Chris Becker and Clare Noone[1]

Introduction

Over the past decade or so, financial globalisation has accelerated as domestic financial markets have grown rapidly and a greater proportion of financial capital has come to be traded across international borders. Following a period of relatively steady expansion in line with world output growth in the 1980s and early 1990s, gross international capital flows began to grow more rapidly in the mid-1990s (Graph 1). It is also evident that there have been major fluctuations around the uptrend in gross capital flows and occasions when the composition of capital flows changed noticeably, with shifts in the importance of various types of flows.[2]

Graph 1

Gross international capital flows[1]



[1] Ratio to world GDP; in per cent.

Sources: IMF; RBA estimates.

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[1] International Department of the Reserve Bank of Australia (RBA), contact email: beckerc@rba.gov.au and noonec@rba.gov.au. We thank Cameron Deans for research assistance and are grateful to Guy Debelle, Keith Hall, Christopher Kent and participants in an internal seminar for their helpful comments on earlier drafts of this paper. The paper also benefited from comments at the inaugural workshop of the Asian Research Network for Financial Markets and Institutions, "Regional Financial Integration in Asia: Present and Future", jointly organised by the BIS and the Hong Kong Institute for Monetary Research and held in January 2008. Any remaining errors are our own. The views expressed in this paper are those of the authors and not necessarily those of the RBA.

[2] For a more detailed exposition of these trends, refer to Battellino (2006).

While these trends have generally been viewed as a sign of economic development, the merits of financial globalisation and integration have attracted an increasing amount of critical scrutiny. The proliferation of financial crises in the 1990s has given rise to a body of literature that calls into question the unqualified benefits of international integration (Krugman (2000), Calvo and Reinhart (2000), Kose et al (2006)). In particular, the literature has focused on the possible disadvantages faced by emerging economies that open up to global capital markets prematurely. Key characteristics identified in the literature as determinants of successful financial integration include macroeconomic policies, development of domestic financial markets, quality of domestic institutions and corporate governance.[3]

In emerging economies, crises have focused attention on the potentially destabilising aspects of capital flows over which the domestic authorities have little or no influence.[4] With some types of flows typically seen to be inherently more susceptible to sudden reversals, one dimension of financial integration that has attracted interest is the composition of the overall capital account. The conventional wisdom is that certain types of capital flows are more volatile and destabilising than others (Claessens et al (1995)). As a result, flows such as foreign direct investment, which are seen to engender a longer-term commitment determined by a country's fundamentals, have come to be viewed as being relatively stable and unlikely to reverse without good reason. Because of this perceived lack of skittishness, such flows are said to be "cold". In contrast, flows such as portfolio or bank and money market flows are often seen as a form of speculation by investors seeking short-term gains and therefore volatile and subject to sharp reversals, exposing recipient countries to the whims of international financiers. These flows are correspondingly often described as "hot".

This view appeared to be reinforced by the Asian financial crisis, which first erupted in Thailand. The characteristics of the capital flows involved in the crisis in Thailand are compared in Graph 2 with the types of capital flows received by the United States. The United States provides a useful benchmark when considering the scale of the flows involved. Thailand and other East Asian economies had current account deficits, as might be expected for emerging economies (Lipsey (1999)). Capital was imported through a number of channels, with bank lending the predominant source of inflows prior to the crisis. During the crisis, it was this short-term foreign currency denominated borrowing that suddenly reversed, putting downward pressure on the exchange rate and prompting large-scale foreign exchange intervention; it eventually came to be seen as the cause of the deep recession that followed (see also Grenville (1998) and Radelet and Sachs (2000)). Direct investment flows remained stable during this time, and private sector portfolio flows also showed relatively few signs of volatility. This seemed to support the view that bank and money market flows are inherently speculative and destabilising, and that they should be discouraged in favour of sources of finance, such as direct investment, driven by fundamentals.

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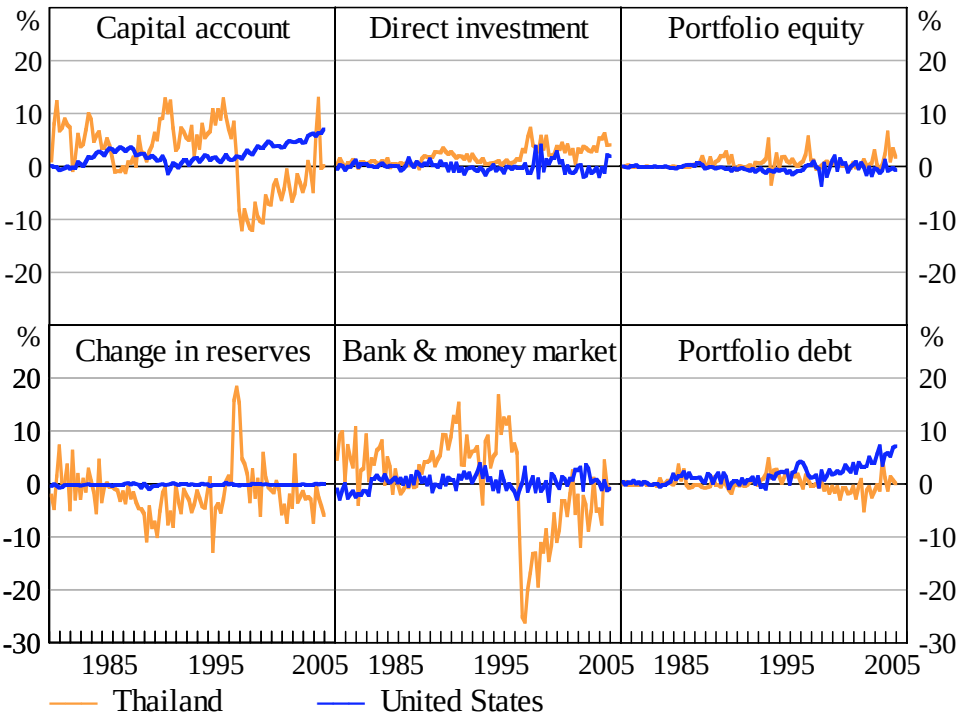
[3] For a literature survey, see Obstfeld and Taylor (2002). For related discussions on the disadvantages faced by emerging economies, possible transitional arrangements and conditions that must exist for countries to gain from trade in capital, see Nakagawa and Psalida (2007) and Kose et al (2006).

[4] If capital flows were completely determined by domestic variables such as economic growth and expected returns on assets, they would be of little direct policy interest. Instead, the underlying reasons for variations in flows would attract the attention of policymakers. On the other hand, if capital flows are not uniquely determined (that is, subject to crises of confidence) and are influenced by variables in international capital markets that lie beyond the control of domestic policymakers, they may warrant more direct scrutiny (see also Krugman (2000), and Radelet and Sachs (2000)).

Graph 2

Net international capital flows[1]



[1] Ratio to national GDP; in per cent.

Sources: IMF; Thomson Financial.

In this paper, we investigate whether different types of capital flows have inherent attributes that make them more likely to be associated with variability in the overall capital account. We undertake this investigation as it is not immediately obvious why this would be the case over time for a diverse group of countries. For example, debt instruments can be structured to take on the characteristics of an equity investment, while beyond a certain threshold portfolio equity is reclassified as direct investment. Short-term loans that are continually rolled over may have characteristics similar to those of longer-term investments, while lumpy cross-border mergers and acquisitions can cause considerable fluctuations in foreign direct investment. Additionally, when domestic markets are deep, liquid and well developed, there is no a priori reason to expect that capital entering the host country will necessarily leave it in the same form. With financial innovation and a greater degree of financial integration, the original source of capital is becoming increasingly remote from the capital's ultimate destination – for example, the financing of an investment project.

We investigate the statistical properties of the flows to judge whether they are regularly "hot" or "cold". For the purpose of this paper, we put aside the question of whether different forms of capital confer desirable economic benefits on the recipient country, such as the transfer of technological and managerial know-how often associated with direct investment. Since we are interested in assessing the overall volatility of the capital account, we focus largely on net flows while acknowledging that gross flows play a crucial role in understanding the

underlying sources of variability.[5] Throughout we compare the experiences of six advanced industrial economies with those of six emerging market economies.

The remainder of the paper is structured as follows. In the next section, we define our concept of variability and apply a number of measures to test the validity of commonly held priors. In the third section, we provide several insights into how capital flows interact within a country's capital account and how they interact with the flows of other countries. The fourth section provides empirical estimates of possible explanations for capital account volatility that may be the subject of future research. The final section provides some concluding remarks, while the appendix applies a series of simple econometric techniques to the question at hand.

Variability of the capital account

There are several methods for measuring the variability of the capital account and its components. We take our lead from Claessens et al (1995), but our approach differs from theirs in a number of ways.

Throughout the paper we use standard balance of payments data sourced from the International Monetary Fund's International Financial Statistics, on a quarterly basis, with the US dollar serving as the numeraire. The balance of payments identity imposes the constraint that the current account balance (*CAB*) is equal to the capital account balance (*KAB*), and the two concepts can be used more or less interchangeably. The capital account refers to what has become more conventionally termed the financial account and consists of foreign direct investment (*FDI*), portfolio equity (*PFE*), portfolio debt (*PFD*), bank and money market flows (*BMM*)[6] and official reserves (*RES*). We use this disaggregation of the data for the remainder of the paper, and while the error term is at times large, we ignore the implications of this. Our sample of six advanced industrial economies comprises Australia, Germany, Japan, Sweden, the United Kingdom and the United States. The six emerging market economies are chosen based largely on data availability. The three East Asian economies are Korea, the Philippines and Thailand. The three Latin American countries are Argentina, Brazil and Mexico. In the interest of brevity we present most results in terms of the simple unweighted average for industrial and emerging economies. Interesting results apparent on a country-by-country basis are discussed in their own right. The sample period runs from the first quarter of 1980 through the fourth quarter of 2005.

Composition of cross-border finance

If a particular type of capital flow reliably exhibits certain characteristics, one could expect to find these reflected in the overall capital account. More specifically, as a flow assumes a more prominent position in the overall capital account, it may be possible to discern a systematic relationship between its volatility and that of the total capital account. This would

[5] Debelle and Galati (2005) point out that it is useful to know whether foreigners or domestic residents are driving the flows. In preliminary work on gross flows (not shown), we found that net capital flows in emerging economies, unlike those in industrial economies, are usually driven entirely by non-residents. This may expose emerging economies to sudden changes in the sentiment of foreign investors (see also Calvo (2000)).

[6] In the balance of payments, these flows fall in the category of "other". As bank loans and money market transactions are the main components of this category, we use the more meaningful label "bank and money market flows" in referring to them.

be self-evident in the extreme case where the capital account is restricted to just one type of flow.

To test whether such statistical regularities are observable, we disaggregate quarterly country data by type of flow, as defined above. We then calculate the average importance of each type of capital flow in the overall capital account of every country.[7] This is done over five-year blocks in our 25-year sample period. The changing importance of each flow for every country is measured as the difference in the flow's share of total flows from one five-year block to the next. A positive number indicates that a flow has become more important in the overall capital account of the country in question.

To measure the variability of total net capital flows, we first scale the quarterly capital account balance for each country by GDP and then calculate the standard deviation of the data over the same five-year blocks. Our gauge of how the variability of the capital account has changed is then given by the difference in the standard deviations from one five-year block to the next. A positive number indicates that the standard deviation has risen and that the capital account of the country in question has become more volatile.

Graph 3 plots the relationship between the importance of different flows and capital account volatility for industrial and emerging economies. The changing importance of the flows is plotted on the vertical axis, the changing volatility in the capital account on the horizontal axis. Given that we have 12 countries, five types of capital flows and the change over five subsamples, the figure plots 240 observations.

A positive relationship in the scatter plots could signify a systematic relationship between more volatile flows becoming more important, thereby raising the average volatility of the capital account. Conversely, a negative relationship could be expected if less volatile flows were to become more important and capital account volatility could be expected to decline eventually. When we fitted regression lines through the data (not shown), no statistically significant evidence was found of such relationships.

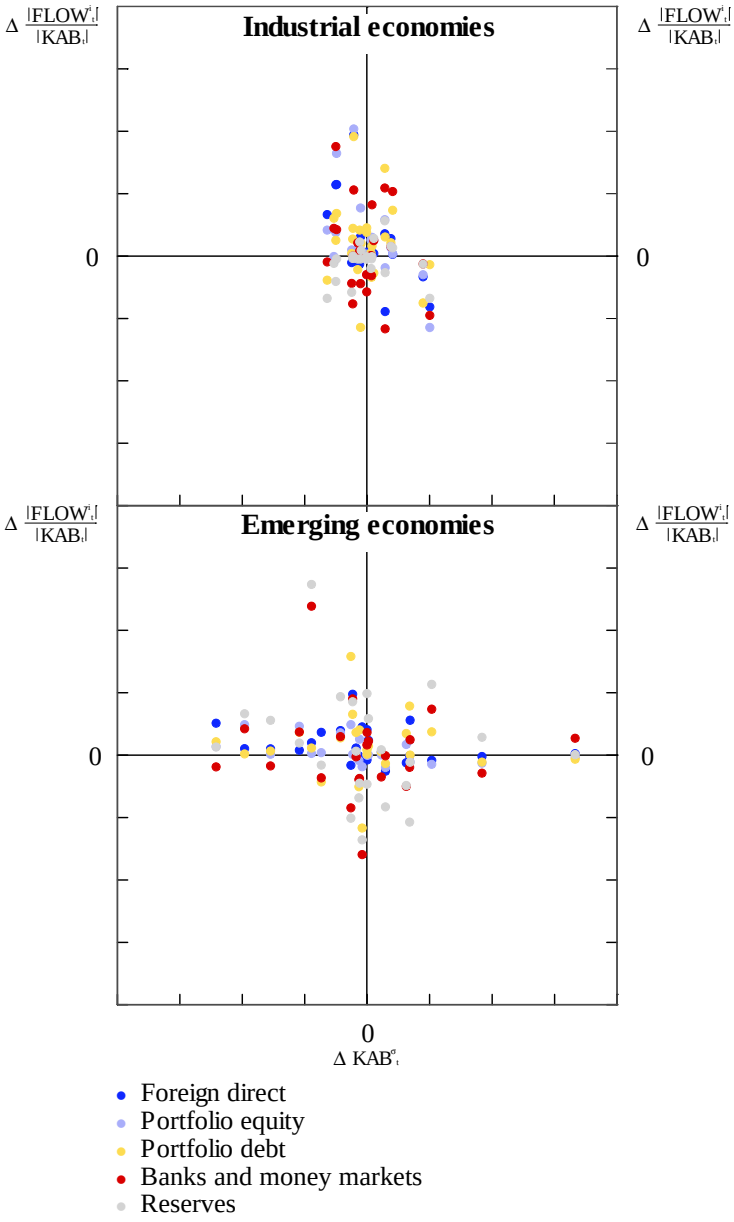
For example, Australia saw a rise in the importance of direct investment and a decline in the importance of bank and money market flows in the 1990s, relative to the 1980s. While preconceived ideas about the rising importance of cold flows and the decline in hot flows could lead us to expect lower variability in overall capital inflows, at the margin the opposite occurred. Similarly, during the same time the United States experienced a decline in direct investment relative to bank and money market flows, but the volatility of overall flows declined.

What is evident, however, is that for industrial economies the observations lie clustered in an ellipse around the vertical axis. This means that the composition of finance changes noticeably over time between the flows but that this has little consequence for the evolving variability in the capital account, which remains relatively stable. The observations for emerging economies are more randomly dispersed but show some tendency to lie around the horizontal axis. We interpret this as showing that while changes in the composition of capital flows are less significant, overall capital account volatility changes noticeably over time. These results suggest that evolution in the volatility of the capital account may not be systematically related to the capital account's composition.

[7] We take the absolute value of the quarterly flows and the capital account to avoid the problems of interpretation associated with a change in sign for either the numerator or the denominator.

Graph 3

Composition of finance and volatility[1]



[1] Standard deviation of capital account as ratio to GDP.

Source: RBA estimates.

Volatility of capital flows

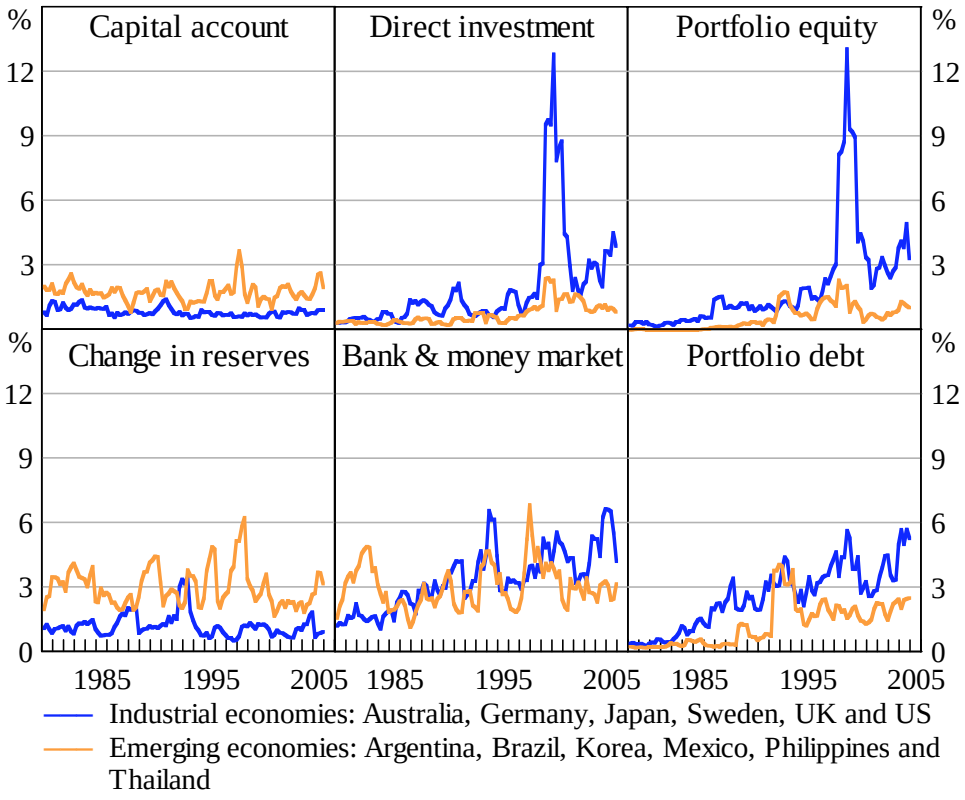
A more direct measure of flow variability is the standard deviation in the ratio of the flows to GDP. Scaling by GDP is important because we are most interested in large swings in total flows from each country's perspective and their possible implications for variables such as the exchange rate.[8] To capture how flow volatility has evolved over time we calculate the

[8] As all flows are expressed in US dollars. GDP is also in nominal US dollars, at current exchange rates. However, this measure of output is subject to three different sources of potential variability – prices, real

standard deviations in the quarterly data over a one-year rolling window for each country. For expositional reasons, we average the results for industrial economies and emerging economies as depicted in Graph 4.

Graph 4

Volatility of capital flows[1]



[1] Simple average of standard deviation in the ratio of capital flows to GDP. Quarterly one-year rolling window.

Source: RBA estimates.

Emerging economies have always experienced around twice as much overall volatility in their capital accounts as industrial economies. Furthermore, emerging economies have more discrete episodes when volatility rises markedly, indicating that they have more frequent crises. These outcomes are in line with what we know about emerging economies. Developments in the volatility of different flows, comparison with the overall capital account and the contrast between the experiences of emerging market and industrial economies yield additional insights.

One of the most noteworthy findings is that while there has been little change in the average volatility of total flows, the pattern of volatility has evolved very differently for the various flows that make up the capital account. In industrial economies, individual flows are always

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output and the exchange rate. Since we wish to avoid attributing the volatility inherent in these variables to our measure of capital flow variability, we use the trend of nominal US dollar GDP in the denominator. This normally makes very little difference to the measurement of volatility, except in periods when financial crises lead to a subsequent collapse in output, which would unnecessarily inflate the measure of capital flow volatility for the purpose at hand.

more volatile than total flows, and all flows except for reserves have exhibited a trend rise. Given that there is no such time trend in the evolution of the capital account's volatility, it implies a degree of negative correlation between flows, which ensures that aggregate net flows are less volatile than their parts. This is an important attribute in that it suggests a degree of substitutability between different forms of capital, which allows industrial economies to accommodate variability without significant adverse consequences, such as frequent crises.[9]

For example, the trend increase in the standard deviation of portfolio debt flows for industrial economies is closely aligned with that observed for bank and money market flows. This raises the question of whether these flows are complements or substitutes. We found a strong negative correlation over time between portfolio debt and bank and money market flows, suggesting that the industrial economies are able to substitute different forms of debt finance for each other. As a result, the rise in volatility of both types of flows has few implications for the overall capital account's variability.

Among emerging economies there is no similar generalised trend rise in the standard deviation of the flows, and the constituent flows of the capital account are typically less volatile than the total. The volatility of bank and money market flows is high but bears little resemblance to that of portfolio debt over time. The reliance of some emerging economies on bank-intermediated finance while local currency debt markets remain relatively underdeveloped may provide a partial explanation for this finding.

Another interesting feature of the data for industrial economies is the sharp movement in foreign direct investment and portfolio equity investment earlier this decade. This was due primarily to the increase in mergers and acquisitions in European countries, which was financed through stock swaps. In these kinds of deals, direct investment is financed by an exchange of stock between companies, resulting in a portfolio equity flow that is opposite to, and that often fully offsets, the foreign direct investment flow.[10] Once again, because the flows move in opposite directions, the effect of rising volatility on the overall capital account is fully offset.

The behaviour of reserve flows is also quite different for the two groups of countries. Not surprisingly, reserves are considerably more volatile in emerging economies, where monetary authorities are typically more active in foreign exchange markets. It would appear that attempts to offset the effects of private flows have been mostly unsuccessful in emerging economies, given that the overall capital account remains highly variable at all times.[11] With the exceptions of the Plaza Accord in 1985 and the European Exchange Rate Mechanism crisis of 1992–93, central banks in the advanced industrial economies, which typically have floating exchange rates, play a less activist role in foreign exchange markets; their reserves

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[9] Levchenko and Mauro (2007) also find that while the overall capital account of emerging economies is more volatile than that of industrial economies, portfolio flows in industrial economies are two to five times more volatile than those in emerging economies.

[10] The merger of Vodafone Plc in the United Kingdom with Mannesmann AG in Germany is one of the most prominent examples of this phenomenon. For more details, see Becker (2003).

[11] The results could be criticised as unfair to emerging economies because the latter experienced a higher incidence of crises during the sample period. We argue that the reason we are interested in this topic in the first place is because of these crises and that they should be included. However, we recalibrate our results for the post-crisis sample period 2000–05. While the smaller sample results are less robust, they lead to the same conclusions we present in the main part of the paper. So even under relatively favourable macroeconomic conditions without major shocks, emerging economies experience a relatively variable capital account with individual flows that are less volatile than the total. Broner and Rigobon (2006) also find that removing outliers (ie crises) does not account for the higher volatility of capital flows to emerging economies.

are therefore only around half as volatile as reserves in emerging market economies. Japan is an obvious exception and is responsible for the blip in volatility in 2003–04.

Persistence of capital flows

A complementary measure of variability is the degree to which capital flows persist over time. Cold flows that are perceived to be relatively stable should also display evidence of a strong positive correlation with their own past values. The absence of such a correlation would suggest that a flow switches sign and is relatively unpredictable. To assess persistence we calculate autocorrelation coefficients for each flow in each country over the sample period. The data are quarterly ratios of capital flows to GDP, and the correlations are calculated for 16 lags (Graphs 5 and 6).

Consistent with the volatility results discussed earlier, total capital flows are found to exhibit a high degree of persistence in industrial economies. The autocorrelation coefficients are typically large and positive, and they gradually decay as the lags increase. This suggests that there is a high degree of persistence in the overall balance of payments for at least one to two years. Again we attribute this lack of deviation from a slow-moving trend to the smaller number of shocks that affect the current and capital accounts of industrial economies.[12] In contrast, there is typically less autocorrelation in the capital accounts of emerging economies. Most striking is the result for the Philippines, where there is the least evidence of a systematic relationship between the capital account and its own lags.

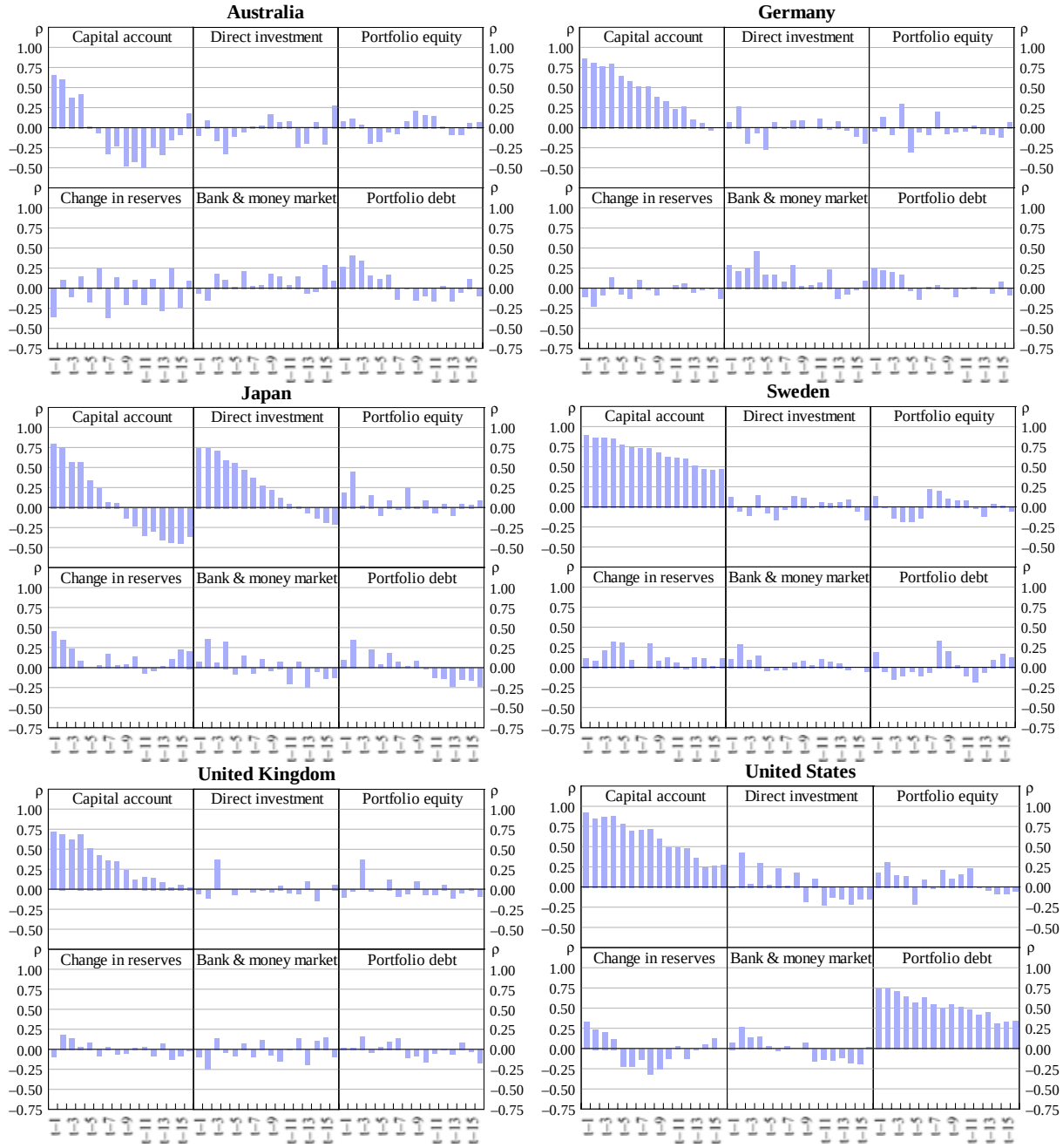
Looking at the individual components of the capital account, there is virtually no evidence in the autocorrelation coefficients to suggest that the flows systematically exhibit any signs of persistence for industrial economies. The coefficients are small and change sign frequently. There are, however, a number of notable exceptions. We find that in the United States portfolio debt flows are highly persistent. Given that the United States is home to the largest debt markets and the US dollar is the world's reserve currency, this should not come as too much of a surprise. Japanese foreign direct investment is also shown to be highly persistent. This may reflect the structural "hollowing out" of Japanese manufacturing, as companies set up plants in other Asian countries where labour costs are more advantageous. There is also persistence in the reserves component of the Japanese capital account, which is probably related to the monetary authorities' presence in the foreign exchange market.

[12] We find further evidence of this persistence when we investigate the forecastability of the flows, as shown in the appendix. There is some evidence to suggest that the current account of industrial countries is endogenous to domestic economic fundamentals such as growth, saving and investment and does not in itself precipitate sudden stops that cause adjustment in other variables (Debelle and Galati (2005)).

Graph 5

Industrial economies' autocorrelation coefficients

Sample, 1980–2005

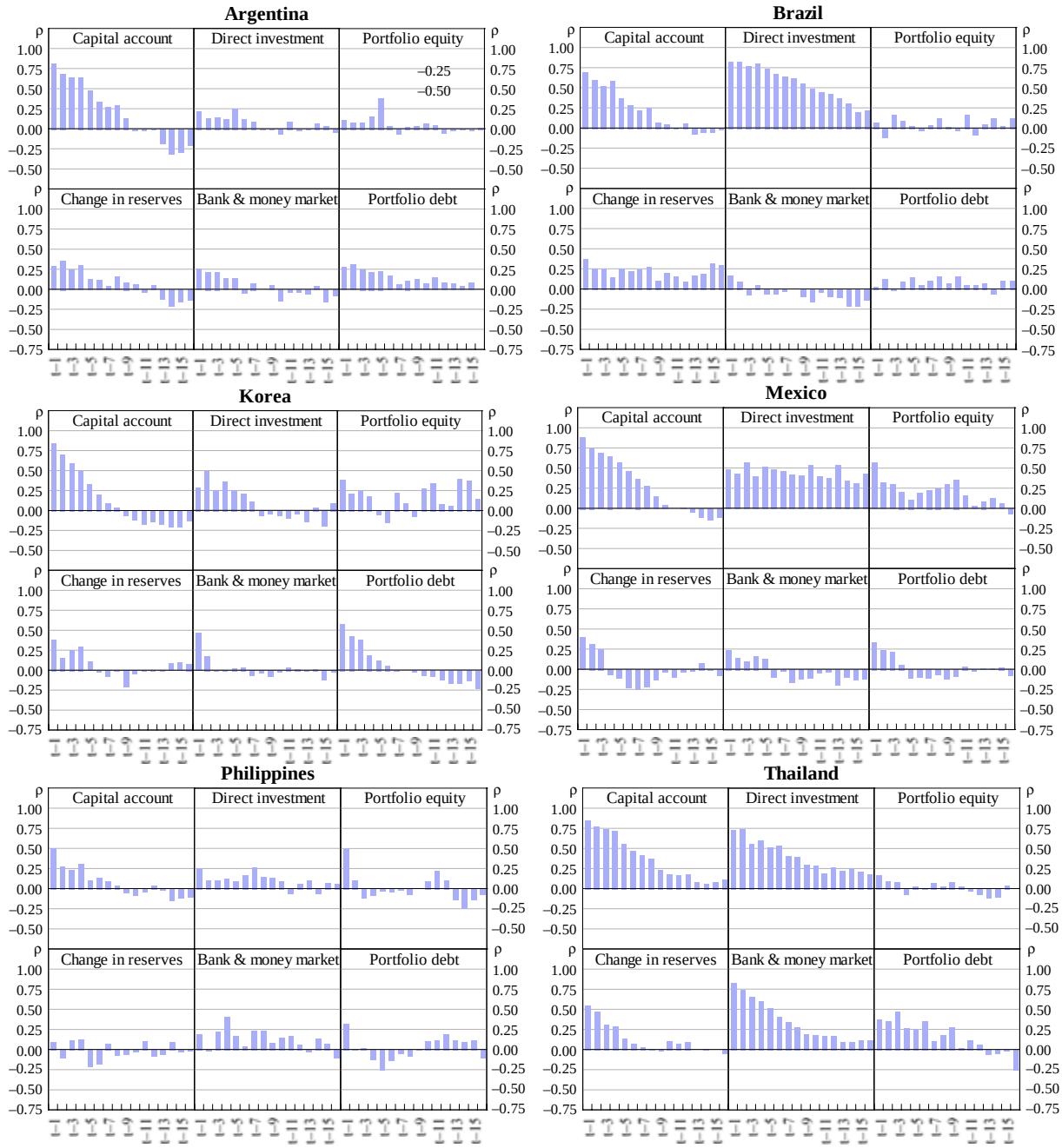


Source: RBA calculations.

Graph 6

Emerging economies' autocorrelation coefficients

Sample, 1980–2005



Source: RBA calculations.

There is little evidence from the advanced industrial economies to support the claim that some types of capital flows are inherently more stable than others. Foreign direct investment is typically not as stable as what some priors may suggest and can hardly be distinguished from the bank and money market and portfolio flows that are often blamed for causing instability.

In emerging economies the evidence is somewhat different. Foreign direct investment is often persistent. This can probably be attributed to the fact that these countries are natural destinations for foreign direct investment, with inflows typically exceeding outflows. In

contrast, for industrial economies gross direct investment typically flows in both directions as companies merge and are taken over. There are also several other examples of persistence in emerging economies, but we suggest that this is unlikely to be an inherent property of the flows themselves.

Interactions between flows

The results in the preceding sections demonstrate the importance of studying the interactions between capital flows, as the co-movement of the flows seems to be central to understanding the overall variability of the capital account. What this section further highlights is that the analysis of a given type of capital flow in isolation could yield misleading results. Instead, the whole of the capital account should be drawn into the analysis, even when we are investigating the behaviour of individual components.

To provide a comprehensive view of the data and how the flows interact, we estimate correlation coefficients for each of the flows over the entire period of the sample. The quarterly data are summed to annual totals for this purpose. The correlations are estimated for each individual flow with every other type of flow within a country's capital account, as well as with each type of flow for all other countries. We are thus able to assess the degree of correlation within the capital account as well as across countries. Since we are now comparing the flows of capital between countries, we use US dollar amounts and no longer scale the flows by the source country's size. The results refer to the average degree of correlation over the sample period, and we acknowledge that there are subperiods within the sample period when the correlations rise and fall sharply, which is not fully reflected in this section.

Correlations within a capital account

We find that correlations between various types of flows within each country's capital account are mainly negative, providing further support for the argument that there may be a degree of substitutability between flows. We note that around 70% of industrial economies' flows are negatively correlated within the capital account but that the degree of negative correlation is smaller for emerging economies, at 60%. The implication would seem to be that emerging economies are less able to substitute between different types of international capital flows.

Table 1 summarises our general findings on correlation between flows within a given capital account. In the interest of brevity we show only the average correlation coefficients for industrial economies and emerging economies.

It is generally difficult to detect any regular correlation patterns for industrial economies. The negative correlation between foreign direct investment and portfolio equity flows for countries such as the United Kingdom, discussed earlier in this paper, are an exception. Bank and money market and portfolio debt flows among industrial economies are also negatively correlated. Overall, however, capital appears to come and go irregularly and in different forms with no strong link to a particular form of finance and without causing undue disturbances in the overall capital account of industrial economies.

An interesting finding is that the capital account and bank and money market flows are always positively correlated for emerging economies and, typically, significantly more so than for industrial economies. This strong link may indicate the greater dependence of emerging economies on banks, which may also explain why these economies are more vulnerable to sudden stops and reversals of flows and why such changes in flows can become full-blown crises (see also Calvo (2000) and Radelet and Sachs (2000)).

Table 1

Correlation within a capital account, by country

Sample, 1980–2005

	Foreign direct invest-ment	Portfolio equity invest-ment	Portfolio debt invest-ment	Bank and money market flows	Reserves	Capital account
Industrial economies						
Foreign direct investment	1.0					
Portfolio equity investment	–0.4	1.0				
Portfolio debt investment	0.1	–0.3	1.0			
Bank and money market flows	–0.2	–0.1	–0.3	1.0		
Reserves	0.1	–0.2	0.0	–0.2	1.0	
Capital account	0.2	–0.2	0.6	0.2	0.1	1.0
Emerging economies						
Foreign direct investment	1.0					
Portfolio equity investment	0.1	1.0				
Portfolio debt investment	0.0	0.4	1.0			
Bank and money market flows	–0.2	–0.1	0.0	1.0		
Reserves	–0.3	–0.3	–0.3	–0.3	1.0	
Capital account	0.1	0.0	0.5	0.5	0.1	1.0

Coefficients are calculated on annual values in US dollars and are the simple average of coefficients calculated for individual countries.

Source: RBA calculations.

For emerging economies, there also appears to be a pattern of negative correlation between reserves and private flows. In particular, bank and money market flows stand out in the country data as always being negatively correlated with official reserve flows. There are two possible explanations for this outcome. First, domestic monetary authorities may be aiming to offset the effects of bank and money market flows on the overall capital account and the ensuing consequences for the exchange rate. Indeed, intervention during the Asian financial crisis was squarely aimed at mitigating the sudden reversal of bank and money market flows. Nonetheless, it is also feasible that since the capital account must balance with the current account, actions to maintain a given exchange rate through variations in reserves will cause disturbances in the capital account and expectations, thereby inducing a change in private flows. Such disturbances may manifest themselves in such a way that it is typically the bank and money market component of the capital account that is most accommodating.[13]

[13] See also further evidence of this in the appendix, where we investigate the marginal source of finance for the current account.

Cross-country correlations

The correlation in capital flows between countries may also be useful in understanding volatility. Identification of regular relationships may be informative as to why such correlation is observable and thus shed some light on the underlying sources of variability. Several interesting capital flow linkages across countries are evident and worth highlighting, but once again there is no overwhelmingly clear or regular pattern (results not shown).

While the capital account balance of the United States is significantly correlated with that of other industrial economies, there is less evidence of its correlation with the capital accounts of emerging economies. Also of note, Japan's net creditor status is borne out in the negative correlation between its total flows and those of other industrial economies that are net capital importers, such as the United States and Australia. We take these results to be indicative of a relatively high degree of financial integration among industrial economies, while emerging economies are less integrated into global financial markets. It is possible that the degree of financial market development and integration allows industrial economies to accommodate the volatility of individual flows by substituting different types of financing for each other, thereby leaving the overall capital account balance relatively stable.

The capital accounts of emerging markets tend to be positively correlated. Given that these balances are also relatively volatile, we suggest that this result may be interpreted as evidence that these countries are subject to similar balance of payments shocks – that is, they experience crises at the same time, which also reflects a degree of contagion (see also Broner and Rigobon (2006)).

Another interesting aspect of the flows is that they reflect correlations with foreign exchange interventions by economies with exchange rate regimes that, to varying degrees, attempt to limit currency variations. One would expect that the accumulation of reserves and their investment in fixed income assets in an attempt to stem the appreciation of the exchange rate (ie a capital outflow) would lead to a negative correlation between reserves in the intervening country and portfolio debt flows to the recipient country. We find evidence that the reserves of both Japan and Korea are significantly negatively correlated with portfolio debt flows to the United States, the United Kingdom and Australia. Most central banks hold reserves in US dollars and invest the proceeds in US Treasuries. The demand for holding reserve assets in pound sterling is probably somewhat smaller, but the correlations probably reflect that London is a major financial centre through which intervening countries churn their investments with an indeterminate eventual destination. The relationship with Australian debt may be due to the yield advantages and the liquidity of the Australian dollar, as well as a number of other benefits not directly relevant in the context of this paper. While we learn little that is new from these findings, we note that the emerging economies' actions on reserves have not subdued the relatively high volatility of their capital accounts.

Sources of capital account volatility

In this section we make a first pass at explaining the underlying sources of capital account variability. In our study, we discovered certain characteristics that we attempt to condense into explanatory variables. The panel data regression that we run is not meant to be an exhaustive attempt at modelling capital flows. Rather, it is aimed at testing whether some of our broad insights have explanatory power and should be the subject of further research. Central to our approach is the generalised finding that industrial economies appear to have a greater ability than emerging market economies to substitute different forms of capital for each other. As argued earlier, substitutability seems to allow the industrial economies to accommodate volatile flows in a manner that leaves the overall capital account relatively stable.

Selection of explanatory variables and the model

The first two variables we consider correspond to those calculated in the section on the composition of cross-border finance, above. They reflect the importance of foreign direct investment (*FDIshare*) and bank and money market flows (*BMMshare*) in the capital account. We measure the importance of a flow as the ratio of its absolute value to the sum of the absolute value of all flows. Given the work presented in earlier sections, we expect to confirm that these variables are not significant in explaining overall capital account variability.

Another factor potentially relevant to explaining the ability of a country's capital account to absorb the volatility of individual net capital flows appears to be the volume of gross flows. Gross capital movements probably reflect three important differences between industrial and emerging market economies. The first is that sizeable two-way flows signal not only that capital flows are diversified among different types of capital but also that investors are diversified and include both resident and foreign entities. Such diversification may limit volatility when foreigners sell off their investment because resident investors may fill the void. Emerging economies are somewhat dependent on bank financing, and foreign investors typically dominate gross flows to these economies. In contrast, industrial economies appear to be better placed to reap the benefits from universally large gross flows. Second, limited gross flows may reflect the degree of market development. For example, it would be unrealistic to expect portfolio debt flows to play a major part in smoothing capital flows in economies that do not have well-developed bond markets. Finally, the scope of gross capital flows reflects the degree of capital account openness. The less open the capital account, the less scope there is for volatility to be absorbed by offsetting flows.

To gauge the importance of these factors we construct a summary measure based on gross flows (*FlowOpenness*). We create an index that captures the relationship of the absolute value of the gross flows to the absolute value of the sum of gross and net flows (see equation (1)). When capital flows freely in both directions, we expect the sum of absolute gross flows to be large relative to net flows. When this is the case, the index tends towards 100. When capital flows are not large or are very one-sided, we expect gross flows to be small relative to net flows. The most extreme case would be where gross flows are the same size as net flows. This would occur if resident or non-resident flows were completely restricted. In this case, the index would register zero.[14]

$$FlowOpenness_{it} = \left[\frac{\left|resident\ \ flows_{it}\right| + \left|nonresident\ \ flows_{it}\right|}{\left|resident\ \ flows_{it}\right| + \left|nonresident\ \ flows_{it}\right| + \left|net\ \ flows_{it}\right|} - \frac{1}{2} \right] \cdot 200 \qquad (1)$$

A further difference between advanced industrial and emerging market economies is the degree of development of their domestic financial markets. We suggest that highly developed financial markets are probably an important prerequisite for the substitutability of different forms of finance. We therefore test whether market development can be linked to capital account volatility using the ratio of equity market turnover to market capitalisation as a proxy for financial market development (*MarketDevelopment*).

We also control for the exchange rate regime under the presumption that if the exchange rate is fixed or pegged, more of the burden of external adjustment is borne by quantities than

[14] The United Kingdom provides a useful illustration of the index. Despite having an average annual capital account surplus of just 2% of GDP over 2000 to 2005, the United Kingdom records an average openness index of 96, the highest for any economy in our sample. The high score reflects London's role as a global financial centre.

by prices.[15] Limiting the nominal variability of the exchange rate may result in more adjustment taking place in capital flows, which introduces greater volatility into the capital account. To test for the significance of the exchange rate regime we include a dummy variable that is zero when the exchange rate regime is a free or managed float, and one if the exchange rate regime is less flexible (*FXregime*). The classification of each country's exchange rate is taken from the International Monetary Fund's *Annual Report on Exchange Arrangements and Exchange Rate Restrictions.*

In addition to these explicit variables, by using a fixed-effects estimator we allow for unobserved time-invariant factors to influence the volatility of each economy's capital account.

In summary, the regressions we estimate are of the form:

$$\left(\frac{KAB_{it}}{GDP_{it}}\right)^{\sigma} = \eta_i + \beta_1 FDIshare_{it} + \beta_2 BMMshare_{it} + \beta_3 FlowOpenness_{it} + \beta_4 MarketDevelopment_{it} + \beta_5 FXregime_{it} + \varepsilon_{it}$$

where $\left(\frac{KAB_{it}}{GDP_{it}}\right)^{\sigma}$ represents the volatility of the capital account as a ratio to GDP for country i, η_i is the fixed effect for country i, ε_{it} is the error term and β_j denotes the parameters.[16]

We use a balanced panel of annual data over 1991–2005 for the 12 countries examined in this paper.

Regression results

The preliminary results shown in Table 2 broadly support the view that while the composition of the capital account is not a significant determinant of its volatility, market development and a general openness to capital foster substitutability between different forms of capital, which helps smooth total capital movements. We also find a statistically significant relationship between the exchange rate regime and capital account variability.

As suggested in previous sections, we find no statistically significant relationship between the importance of foreign direct investment or bank and money market flows and the volatility of the total capital account. Both variables have *p* values beyond any reasonable threshold for significance.

The two factors we put forward as potential drivers of substitutability – the development of domestic financial markets and the freedom of capital flows – do have a statistically significant relationship with the volatility of the capital account. Moreover, the signs of their coefficients are consistent with our priors. We find that as the ratio of equity market turnover to market capitalisation increases, the volatility of the capital account decreases. Economies that experience large two-way gross capital flows also tend to have less volatile capital accounts.

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[15] When the price of one currency vis-a-vis another changes, it imparts valuation changes on the existing stock of foreign currency denominated assets and liabilities. These international wealth transfers can be an important adjustment mechanism but do not involve the transaction in any quantity of financial assets.

[16] In this model, the assumption that the slope parameters are the same across all countries is implicit.

Table 2

Panel data estimation results

	Coefficient value	*p* value
Constant	2.0403	0.0000
FDIshare	–0.2267	0.8139
BMMshare	–0.7936	0.1934
FlowOpenness	–0.0070	0.0834
MarketDevelopment	–0.4223	0.0335
FXregime	0.3530	0.0496
R^2	0.6452	
Number of observations	180	

Wooldridge test for autocorrelation: 0.0000. Dependent variable is the volatility of the capital account.

Source: RBA calculations.

The exchange rate regime dummy was also found to be significant. When a country maintains a fixed rate or a crawling peg, its capital account typically also exhibits higher volatility than the capital accounts of countries that allow more flexibility. We caution against interpreting this as evidence that fixing the exchange rate causes capital account volatility. Rather, the results indicate that the two appear to be related, but further work is necessary to address whether they reflect common factors not explicitly considered here or whether the relationship is indeed causal.

Conclusion

Capital has become increasingly mobile as global financial integration has accelerated. Interestingly, while industrial economies have experienced more volatility in individual capital flows as financial globalisation has progressed, there is no evidence to suggest that the overall capital account has exhibited a trend rise in variability. Indeed, greater financial integration may have fostered the substitutability between different forms of international finance that helps economies cope with variability. A direct link between financial integration and the increased incidence of financial crises in the 1990s appears tenuous.

We suggest that there are few regular and systematic relationships to be found in the statistical properties of capital flows and reject the view that some flows are inherently more conducive to stability than others. We also reject the view that the combination of different types of capital flows is relevant to the overall stability of the external accounts.

Given that the substitutability between different forms of capital is stronger for industrial economies than for emerging market economies, we suggest that openness to capital flows and financial market development may be positively related to overall stability in the capital and current accounts. However, we think it unlikely that the stability of the overall capital account in advanced industrial economies is attributable to inherent properties of the capital flows. Rather, these countries probably meet certain preconditions that allow them to integrate into global markets more smoothly, which in turn is reflected in their external accounts.[17]

[17] See Broner and Rigobon (2006), Daude and Fratzscher (2008), Grenville (1998) and Nakagawa and Psalida (2007).

Appendix: predictability of capital flows

In this appendix we maintain as simple and transparent an approach as feasible but employ basic econometric techniques to investigate whether the findings discussed in the main part of the paper are consistent with results obtained under more intense statistical scrutiny.

Forecasting ability

One way of ascertaining whether knowledge of a particular flow conveys information useful in making inferences about the total capital account is to test how well it can explain contemporaneous capital account developments. In other words, we ask if knowledge of the composition of the capital account conveys useful information about the total. For this purpose we conduct a simple modelling exercise.

A naïve model is set up where the capital account (*KAB*) is modelled by its own first lag and a constant. That is, the first two terms on the right-hand side of equation (*A*1) below. Given the degree of autocorrelation discussed earlier, we expect to find that the coefficients are highly significant. Next we add the contemporaneous value of the *i*th capital flow (*Flow*) to the equation to test whether the fit of the model increases with its inclusion. One would expect that if this additional variable were an important determinant of the total its inclusion would significantly improve the predictive ability over and above the naïve model.

$$KAB_t = \alpha_0 + \alpha_1 KAB_{t-1} + \alpha_2 Flow_t^i \qquad \text{(A1)}$$

Table A1 reports the main results of these regressions for industrial and emerging economies. The rows refer to each of the models run – first the naïve model, then the naïve model augmented for foreign direct investment and so on. The root mean squared error (RMSE) for each model serves as a measure of the model's predictive accuracy. For expositional purposes, we express the RMSE of the *i*th model as a ratio to the RMSE of the naïve model. As forecasting ability improves and the RMSE declines, this ratio tends towards zero. A value of one signifies no improvement over the naïve model; a value greater than one, a deterioration in the ability to predict the capital account. In the interest of brevity we do not report the ratio for every flow and every country. Instead we distinguish between industrial and emerging economies and average the ratios for the six countries in each sample to report a summary ratio for each type of flow. The second column lists the countries for which we find that the coefficient on the variable of interest is statistically significant.

The ratio of the errors in the first column indicates that the addition of information about individual flows to the forecast of overall capital movements improves the fit by around 5%, at best. However, in most cases the additional information adds less than 2% to explanatory power, and in some cases there is an outright deterioration.

As expected, all industrial and emerging economies have highly significant coefficients on the lag of the capital account in the naïve model. However, because there is typically less persistence in the emerging economies due to the higher incidence of crises, their RMSE for the naïve model is around twice as large (not shown).

None of the individual flows can be shown to systematically add statistically significant explanatory power over and above the naïve benchmark for a majority of the industrial countries. Portfolio debt flows are statistically significant only for the United States and Japan, but not enough to noticeably outperform the naïve model.

Table A1

Ability to predict the capital account

Sample, 1980–2005, quarterly

Model	$RMSE_i$/ $RMSE_{Naïve}$	Countries for which *p* value indicates significance at 5% level
Industrial economies		
Naïve with lag	1.000	Australia, Germany, Japan, Sweden, United Kingdom, United States
Foreign direct investment	1.003	
Portfolio equity investment	1.000	
Portfolio debt investment	0.989	Japan, United States
Bank and money market flows	0.998	
Reserves	0.994	Australia , Japan
Emerging economies		
Naïve with lag	1.000	Argentina, Brazil, Korea, Mexico, Philippines, Thailand
Foreign direct investment	1.000	
Portfolio equity investment	1.001	
Portfolio debt investment	0.989	
Bank and money market flows	0.949	Argentina, Korea, Mexico, Thailand
Reserves	0.988	Brazil, Korea, Philippines, Thailand

Source: RBA calculations.

In contrast, the relationship between bank and money market flows and the capital account appears to be more robust in the emerging economies. For Argentina, Korea, Mexico and Thailand, the significance of these flows may reflect a degree of bank dependence, as discussed in the paper. Reserve flows are also more typically related to the overall capital account in emerging economies than they are in industrial economies. Once again, however, the improvement from adding this information to the regression is at best marginal, suggesting that there is little to be gained by adding information about individual flows when trying to understand capital account developments.

Marginal source of finance

In this section we run a set of simple regressions, with the total capital account on the right-hand side and, separately in turn, each of its components on the left. All variables are in US dollars, and we take account of the semiannual change in each over the full sample period. The coefficients are constrained to sum to one and may be interpreted in a number of ways. If the change in the current account on the right side is interpreted as the financing requirement, then the coefficients can be viewed as the responsiveness of each flow to a US$1 increase in that funding requirement. The value of the slope coefficients and their statistical significance are shown in Table A2.

One of the first things to note is that many of the estimated coefficients are not statistically significant. This may well be because, as we suggest earlier in this paper, there is no

statistically reliable relationship over time between the current account and the different types of capital used to finance it. This is particularly evident for portfolio equity flows, given that almost no country has a highly significant coefficient.

Table A2

Marginal source for financing the current account

Slope coefficients[1, 2], sample 1980–2005[3]

	Foreign direct investment	Portfolio equity investment	Portfolio debt investment	Bank and money market flows	Change in reserves
Industrial economies					
Australia	0.52	–0.82	1.01**	0.07	0.22
Japan	–0.05	–0.12	–0.44	1.29**	0.32
Germany	0.63**	–0.35*	–0.27*	0.92**	0.07
Sweden	–0.17	0.00	0.70**	0.49**	–0.02
United Kingdom	0.93**	0.04	0.51	–0.52	0.03
United States	0.43**	0.07	0.07	0.42**	0.01
Emerging economies					
Argentina	0.15	0.30*	–0.30	0.94**	–0.08
Brazil	0.06	–0.37**	–0.47	0.54	1.23**
Korea	–0.07**	–0.11	0.04	0.25	0.89**
Mexico	0.11**	0.05	0.02	0.55**	0.27**
Philippines	–0.09*	0.06	0.27**	0.90**	–0.15
Thailand	0.01	0.03	–0.05	0.90**	0.11

[1] ** Significance at the 5% level or better. [2] * Significance between the 5% and 10% levels. [3] Semiannual observations. Due to data availability, the portfolio debt slope coefficients for Korea, the Philippines, Mexico and Argentina are calculated on samples starting in the first quarters of 1988, 1996, 1989 and 1992, respectively. All samples end in 2005Q4.

Source: RBA calculations.

Portfolio debt flows are also found to have a relatively low significance for most countries. In the medium-sized economies of Australia and Sweden, international transactions in debt are found to be highly significant and have a large positive coefficient. With the exception of the Philippines, none of the emerging economies are found to have significant debt market relationships with the overall flow of capital. We suggest that this is not coincidental. The Philippines has had a relatively well-developed government bond market for some time due to a history of fiscal deficits, whereas the domestic bond markets of many other emerging economies remained underdeveloped for a longer time. As a result, we would not expect portfolio debt flows to play a major role in the determination of the overall capital account for these economies.

Foreign direct investment appears to be an important source of finance for a number of countries. For emerging economies this is to be expected, in part because these types of flows are generally encouraged and the host countries are a natural destination for such flows.

However, bank and money market flows are found to be the most responsive to financing requirements. The flows are most often found to be statistically significant and have large coefficients. Our interpretation of this finding is relatively simple. Banks perform an important intermediation function in both industrial and emerging economies. They are typically also active in international debt and foreign exchange markets. Furthermore, since banks are routinely found on both sides of most of these markets, they act not only as intermediaries but also as an important source of arbitrage. Perhaps this function is what makes these flows the most flexible and readily adjustable. Banks are most likely to be involved in such equilibrating transactions in industrial economies that have large two-way gross banking flows. In emerging economies, the importance of bank-related flows, with highly significant and large positive coefficients, may reflect a degree of dependence on banks in the absence of ready access to non-intermediated debt markets. The claim appears to be supported by net banking-related flows being dominated by gross foreign flows in emerging economies.

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India's financial openness and integration with Southeast Asian countries: an analytical perspective

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I. Introduction

At present, most developed economies have open capital accounts coupled with liberalised domestic financial sectors. Following the trend, developing and transition economies have opened up mostly between the late 1980s and the mid-1990s. *The Economist* recently carried an article proclaiming that emerging economies are driving global growth and making a big impact on developed countries as these newcomers integrate with the global economy. In several Indian cities, one can come across stores sporting the name China Bazaar, which essentially sell "made in China" goods for price-conscious Indian consumers. This is the effect of globalisation, which opens up the Indian economy to a world of opportunities for ordinary people to reap benefits. Nobel laureate Joseph Stiglitz, in his book *Making Globalization Work* (2006), pointed out that China and India are growing at historically unprecedented rates, largely because of globalisation, new technologies, and financial integration.

In a way, the trade openness and financial integration between developed and developing countries have become much stronger in recent years. A number of developing economies have been transformed into emerging economies by growing at an extraordinary pace while rapidly integrating into the regional and global economies. Moreover, some of these developing economies have become increasingly important players in the global economy, as they have begun to account for a substantial share of world output (Akin and Kose, 2007). While there are divided opinions on the advantages and disadvantages of global financial market integration, most would agree that globalisation has been positive, at least to the extent of imposing market discipline on policymakers.

The conceptual analytics behind the trade openness and financial integration of an economy relate to cross-border movement of goods, services and factors of production. Historically, the approach towards openness has varied widely in different economies, as well as under separate regimes within the same country. Since 1950, there has been a gradual liberalisation of world trade under the banner of the General Agreement on Tariffs and Trade (GATT) and, since 1995, under the aegis of the World Trade Organisation (WTO). A slow but definite break from inward-looking approaches started during the late 1970s when some of the East Asian economies embarked on the path of export-led growth and succeeded in attaining higher economic growth. As a consequence, while world output has expanded

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fivefold since 1950, the volume of world trade has grown 16 times, that is, at an annual compound growth rate of about 7 per cent. It has been documented that exports have tended to grow steadily in countries with more liberal trade regimes and these countries have experienced faster growth of output and living standards (Thirlwall, 2002). The emerging market and developing countries weathered the recent financial storm and are providing the basis for strong global growth in 2008. For the first time, China and India are making the largest country-level contributions to world growth. These two countries together now account for one fifth of world purchasing power parity-adjusted GDP, up from 10 per cent in 1990 (IMF, 2007). The output paths of China and India have broadly followed the output paths of other economies that experienced rapid expansions earlier.

Against this backdrop, several issues have come into sharp focus: Where does India stand in the evolving global trade pattern? Does global experience suggest that trade liberalisation/openness move in tandem with financial integration as well as higher growth? What is the link between international trade and financial openness? Other aspects that are relevant to India's trade openness and financial integration with Southeast Asian countries are discussed with analytical rigour in the following sections. Schematically, Section II deals with the recent trend in world trade, followed by that in finance, in the context of the financial turmoil that shook the world economy, and with the consequent growth prospects. Section III delves into the analytics of openness as a prelude to reviewing the literature in order to analyse various indicators of trade openness and financial integration. Section IV analyses India's domestic, regional and global openness with a special focus on Southeast Asian economies, including China. Section V concludes with some observations from the ensuing analysis and random thoughts on the future deeper economic integration of India with the East Asian region.

II. Recent trends in world trade vis-à-vis Asia's trade and finance

World trade in recent years was buoyant despite the lack-lustre economic performance of several industrialised countries, especially those of the European Union and Japan. Although the Southeast Asian crisis did cause a major disruption in international trade in 1997, the crisis-affected countries have recovered in recent years, and have growing trade volumes. According to the WTO's *World trade report 2007 and prospects for 2008*, real merchandise export growth slide to 5.5 per cent in 2007 from 8.5 per cent in 2006, and may grow even more slowly in 2008 – at about 4.5 per cent – as sharp economic deceleration in key developed countries is only partially offset by continuing strong growth in emerging economies. World commercial services exports also rose by 18 per cent to USD 3.3 trillion in 2007.

The recent financial market turbulence, which has considerably reduced economic growth projections for some major developed markets, has clouded the prospects for world trade in 2008. Real merchandise export growth in 2007, while nearly 3 percentage points lower than in 2006, according to provisional estimates, was still close to the average rate of trade expansion over the past decade (1997–2007). Exports from Asia rose by 11.5 per cent in real terms, again exceeding significantly the region's import growth (8.5 per cent). Within the Asian region, very large variations could be observed on the import side. While China and India recorded double digit import growth, the comparable figure for Japan was practically stagnant (1 per cent). The trade performance of the four newly industrialised economies (Hong Kong SAR, Korea, Singapore and Taiwan, China) continued to be less dynamic than that of the region as a whole, but still recorded an excess of export growth over import growth (8.5 per cent and 7.0 per cent, respectively), indicating the importance of the Asian region in the world trade picture (Table 1).

The most important phenomenon to emerge from the recent trade and finance scenario is the increased interdependency among the economies of Southeast Asia and specifically in the trade between China and the rest of the region. This intraregional trade is spurred by the

integration of the regional production network and supply chain. Financial integration in the form of cross-border investment flows, such as foreign direct investment (FDI), portfolio investment and bank lending, is also on the rise. The Asian Bond Market Initiative under ASEAN + 3 (China, Japan and Korea), the launching of the Asian Bond Funds, I and II, under the EMEAP,[2] and the road map for monetary and financial integration undertaken by ASEAN[3] are important government policy measures behind the recent expansion in trade and financial flows in the region.

Table 1

Growth in world GDP and merchandise trade by region

Annual percentage change at constant prices

Region	GDP			Exports			Imports		
	2005	2006	2007	2005	2006	2007	2005	2006	2007
World	3.3	3.7	3.4	6.5	8.5	5.5	6.5	8.0	5.5
Asia	4.2	4.7	4.7	11.0	13.0	11.5	8.0	8.5	8.5
China	10.4	11.1	11.4	25.0	22.0	19.5	11.5	16.5	13.5
Japan	1.9	2.4	2.1	5.0	10.0	9.0	2.5	2.5	1.0
India	9.0	9.7	9.1	21.5	11.0	10.5	28.5	9.5	13.0
USA	3.1	2.9	2.2	7.0	10.5	7.0	5.5	5.5	1.0
Europe	1.9	2.9	2.8	4.0	7.5	3.5	4.5	7.5	3.5
EU (27)	1.8	3.0	2.7	4.5	7.5	3.0	4.0	7.0	3.0
S&CA	5.6	6.0	6.3	8.0	4.0	5.0	14.0	15.0	20.0
CIS	6.7	7.5	8.4	3.5	6.5	6.0	18.0	21.5	18.0
AME	5.6	5.5	5.5	4.5	1.5	0.5	14.5	6.5	12.5

Note: EU (27) stands for the 27 European Union economies; S&CA for South and Central America, including the Caribbean; CIS for the Commonwealth of Independent States; and AME for Africa and the Middle East.

Source: WTO, *World trade report 2007 and prospects for 2008*.

According to the UNCTAD[4] *World investment report 2007*, FDI inflows to southern, East and Southeast Asia maintained their upward trend in 2006, rising by about 19 per cent to reach a new high of USD 200 billion. At the subregional level, southern and Southeast Asia saw a sustained increase in flows, while their growth in East Asia was slower. However, FDI in the latter subregion is shifting towards more knowledge-intensive and high value-added activities. China and Hong Kong retained their positions as the largest FDI recipients in the region, followed by Singapore and India. Resource-seeking FDI from China and India continued to increase. The emergence of China and India as important sources of FDI, coupled with active mergers and acquisitions (M & A) by investors based in the Asian NIEs[5] (particularly Singapore), has led to increased FDI flows from Asia to developed countries.

[2] Executive Meeting of East Asia-Pacific Central Banks.

[3] Association of Southeast Asian Nations.

[4] United Nations Conference on Trade and Development.

[5] Newly industrialised economies – Hong Kong SAR, Korea, Singapore and Taiwan, China.

Resource-seeking FDI from southern, East and Southeast Asia rose again in 2006, driven by large M & A involving oil and gas companies from China and India. With strengthening relationships between countries within the same region, and the emergence of many developing countries as sizeable investor economies, geographical proximity is becoming increasingly important in bilateral FDI relations.

III. Analytics of openness

A. Indicators of trade openness

The proportion of a country's gross domestic product (GDP) involved in international trade (exports and imports) has been recognised in the literature as a good indicator for levels of trade openness. Academics and policymakers have devoted enormous energy to the question of whether openness is good for growth. Most of the evidence is based either on case studies or on regression analysis. The main objections to such studies are that the case studies are always hard to replicate and are affected heavily by country idiosyncrasies, while regression analysis is plagued with endogeneity issues (Lee et al, 2004).

The trade openness of an economy has two distinct dimensions – ex ante and ex post openness. While these dimensions are separate, they are often interrelated. The ex ante trade openness of an economy relates to the permissiveness of its policy positions on exports and imports. The levels of tariff and non-tariff measures (such as quantitative restrictions) applied by the country to cross-border trade flows are the most important indicator of the ex ante trade openness of the economy. The ex post trade openness of an economy, on the other hand, refers to the actual outflow of exports and inflow of imports. Despite low levels of ex ante openness, the ex post openness of the country may be high owing to its large dependence on certain crucial and high-value imported products. The relative "size of the domestic economy" is another crucial factor, owing to which, even with similar ex ante openness, the ex post openness generally becomes higher for smaller economies (for example, the ratio of exports to GDP of Hong Kong and Singapore is more than 200 per cent). Thus, the major problem in the analysis of trade openness is that openness is neither directly observable, nor does it have an accepted definition derived from theory.

As a result, a large body of literature proposing and evaluating alternative measures of trade openness has grown up. The *World development report 1987* constructed an "outward orientation" index for 41 countries in accordance with their trade policies. The distinction between an inward-oriented and an outward-oriented strategy is made on the basis of: (1) effective rate of protection; (2) use of direct controls, such as quotas and import licensing schemes; (3) use of export incentives; and (4) degree of exchange rate overvaluation. On the basis of these data for 41 countries at two points in time, the countries were divided into four broad categories, viz, "strongly outward-oriented", "moderately outward-oriented", "strongly inward-oriented" and "moderately inward-oriented" economies.

Sachs and Warner (1995) used a series of trade-related indicators – tariffs, quota coverage, black market premia, social organisation and the existence of export marketing boards – to construct a composite openness index. These indicators provide only a binary classification – a country is either open or closed. As a result, countries with different degrees of trade intervention are equally classified as open. Also, many of the underlying data used by Sachs and Warner to construct their index are only available at one point in time. Most researchers have examined the relationship between economic growth and trade volumes, not policies, because of the difficulties in measuring policy. Second, it is sometimes difficult to interpret the observed correlation between trade policies and growth. Third, most of the literature uses cross-sectional averages or starting values for time-series data (Edwards, 1997).

The indicators of trade openness used by researchers in many cases are problematic as the trade barriers are highly correlated with other sources of poor economic performance. In other cases, the empirical techniques used to ascertain the link between trade policy and growth suffers from serious shortcomings, the removal of which weakens the findings significantly (Rodriguez and Rodrik, 1999). To sum up, the nature of the relationship between trade openness and economic growth remains an open question and the issue is far from having been settled on empirical grounds.

At present, a key aspect of the global economy is the mushrooming of regional trade agreements (RTAs), as multilateral efforts have faced not only economic bottlenecks but also political obstacles. The difficulties encountered in reaching agreement on sensitive issues like agriculture and services (more specifically, on Singapore issues) under the Doha Development Agenda, and the complex and slow negotiation process, have stalled the process of globalisation and paved the way for open regionalism. In this context, RTAs hold advantages for the global trading system. A pertinent issue arising from the current trend in regionalism is how it can be reconciled with increasing globalisation. The debate over whether RTAs are building blocks or stumbling blocks is characterised by two schools of thought. One provides a pessimistic prognosis of the effects of regionalism on multilateral liberalisation, while the other predicts benign effects. Systematic and anecdotal evidence can be found to support both views. Recent work has stressed that the network of overlapping RTAs, including trade-diverting RTAs, may act as a positive force for the multilateral trading system by generating a need to rationalise the system.

B. Indicators of financial integration

Apart from trade, the openness of an economy can have other dimensions as well, most notably, openness in allowing cross-border capital flows (Virmani, 2001). In economics literature, "financial integration" and "financial openness" have often been used interchangeably. The problems associated with capital mobility or financial openness are ascribed to the "costs" of financial integration. If the costs are too high in net terms, financial integration would induce welfare reduction. An economy pursuing capital account liberalisation is said to be seeking financial integration with the international financial markets through financial openness. In this sense, financial openness is the means, while financial integration is the goal. Although financial openness is a necessary condition for financial integration, it is not a sufficient condition.

The growth of international financial flows in recent years has overshadowed that of trade resulting from the rapid liberalisation of capital account regimes. In addition, several pull[6] and push[7] factors have changed the composition of financial linkages between developed and developing countries during the process of globalisation. Regional financial integration occurs due to ties between a given region and the major financial centres serving that region. It has been widely believed that economic integration might be easier to achieve at a regional level due to network externalities and the tendency of market-makers to concentrate in a certain geographical proximity to one another.

The gravity models that take into account the economic size and the distance between two countries explain bilateral trade and investment flows. Furthermore, regional financial integration can be an important means of developing local financial markets, for instance,

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[6] Privatisation of state-owned enterprises, removal of restrictions on the acquisition of assets by foreigners, liberalisation of domestic banking systems and stock markets, and gradual establishment of liberal capital account regimes have attracted international capital flows towards the developing countries.

[7] Demographic changes in the developed economies have resulted in a search for higher returns from emerging markets.

through peer pressure to strengthen institutions and upgrade local practices (BIS, 2006). As a consequence, the composition of capital flows, in particular to emerging economies, has rapidly changed, and portfolio equity and foreign direct investment inflows have become more prominent. Accumulation of official international reserves has recently accounted for a significant portion of the increase in the gross foreign assets of emerging and developing economies (Kose et al, 2006).

In practice, financial openness is a situation in which existing administrative and market-based restrictions on capital movement across borders have been removed. In some countries it also includes the introduction of measures to attract foreign capital and reduce discrimination against foreign financial institutions operating in domestic markets. When a country implements capital account liberalisation, it should first ensure openness, and then financial integration will be achieved gradually. Ideally, that country will eventually have a financial market structure and products similar to those of overseas markets. Domestic financial markets effectively become part of the world market, synchronising interest rate movements, saving and investment activities, and the accumulation of physical capital stocks.

Since the 1997 financial crisis in East Asia, the economics literature has sought to explain why financial integration has sometimes caused harm instead of providing the benefits predicted in theory. Among researchers, the answers to this question range from asymmetrical information problems, such as moral hazard and adverse selection (Eichengreen and Mussa, 1998; Roubini, 1998), to flawed financial fundamentals (Moreno et al, 1998). Certainly, all these issues are relevant and important, although they overlook the eventual and aggregate cause of these problems for the economy – the low level of financial integration. Instead of trying to identify all the inherited problems in the financial system, it is much simpler to look at the gap between openness and integration to appreciate the costs and benefits of the capital account liberalisation process.

The financial markets are, firstly, a market for channelling savings to investment; secondly, a market for risk; thirdly, a market for corporate control; and, finally, they provide an infrastructure for making payments. The market for savings is analysed by macroeconomics; the market for risk is analysed using the theory of finance; and the market for corporate control is analysed using the theory of industrial organisation. Finally, the intermediation of payments is usually analysed in the context of monetary theory. In many financial relationships, these different functions of financial markets appear intertwined, but nevertheless they are conceptually separate and their purposes and impact on financial integration are also different.

Furthermore, the issue of sequencing the process of capital account liberalisation has been widely addressed as a policy response to the ostensible costs or risks of financial openness (Eichengreen and Mussa, 1998). Although financial integration is not directly mentioned, what the sequencing in fact does is to harmonise openness and integration in an attempt to prevent a situation in which a country completely opens its capital account while its level of financial integration is still very low. There is, however, a shortcoming in sequencing studies – the lack of a simple timing index or indicator which would allow policymakers to decide when it is appropriate to move to the next step.

The classical view may, however, be too simplistic. As a result of the emergence of the so-called “new economic geography” advocated by Paul Krugman, the classical view is no longer seen as the whole story. New economic geography emphasises the importance of economies of scale in many industries. In those industries, the rate of return on capital is not necessarily a declining function of previous investment, but may well be an increasing function of the amount of capital. For these kinds of industries, market integration can lead to agglomeration and concentration in centres where the economies of large-scale operation can best be achieved.

The degree of financial openness can influence the extent of international trade in goods and services through two main channels. The first operates through risk-sharing and product

specialisation. Open and well integrated financial markets facilitate diversification of ownership. This, in turn, has two effects. First, if economic agents in one country hold debt and equity claims on the output of the other country, then the dividend, interest and rental income derived from these holdings contributes to smoothing shocks across countries. This is thus a form of ex ante international insurance. Second, to achieve consumption smoothing, households in each country will undertake ex post adjustment of their asset portfolios following the occurrence of shocks in the region. Again, this will lead to smoothing the income of all countries. Once insurance is available through international trade in financial assets, each country will have a stronger incentive to specialise in one form of production (or technology) in order to fully exploit economies of scale or technological competitive advantage. The specialisation in production will then create greater scope for international trade in goods and services, as predicted by standard neoclassical trade theory.

The second channel relies on the ability of the financial sector to divert savings to the private sector. When domestic financial intermediation is weak and inefficient, firms in export-oriented sectors are burdened by significant liquidity constraints; hence, they trade less. Financial openness can help to overcome those constraints by making more external finance available to domestic firms. An implication of this model is that international trade will tend to increase particularly in those sectors that are heavily reliant on external finance, such as projects in the manufacturing sector. A related argument is that financial openness, by eventually facilitating the development of financial intermediation and hence contributing to the establishment of efficient international payment systems, can work as a trade facilitation factor.

IV. Openness of the Indian economy

Specifically in the Indian context, the paradigm shift towards liberalisation started in 1991 following the balance-of-payments crisis, and was carried forward by several policy measures undertaken in response to the crisis (Box 1 and Annex 1). The broad approach to external sector reform was laid out in the report of the High-level Committee on Balance of Payments, headed by C. Rangarajan, in 1993. The devaluation of the rupee in July 1991 and the subsequent transition to the market-based exchange rate regime constituted an important aspect of the open trade policy regime. The reform also sought the elimination of quantitative restrictions on imports (barring a few sensitive items) and a drastic reduction in customs duties. With a distinct change in the overall policy stance, the reform marked a shift in emphasis from import substitution to export promotion, moving away from direct subsidies to indirect promotional measures. Apart from deregulation of the domestic economy, the objective was to increasingly integrate the Indian economy with the world economy, that is, to globalise the Indian economy (Nayar, 2001).

The setting up of a road map for capital account liberalisation in India (RBI, 2006), sequenced with other institutional policy measures, resulted in significant trade and financial flows in conjunction with other emerging market economies of Southeast Asia (Tables 2 and 3). India's economic performance has continued to be impressive since 2001–02[8] and real GDP growth has been particularly rapid since 2003–04, averaging 7.2 per cent during 2000–08, with 9.6 per cent and 8.7 per cent growth in 2006–07 and 2007–08, respectively. This performance is largely due to unilateral trade and structural reforms, in particular in services, according to a WTO Secretariat report on Indian trade policies and practices. Rapid economic growth has also resulted in an improvement in social indicators such as poverty and infant mortality (WTO, 2007a). It has been observed that trade openness is correlated with financial market

[8] The financial year runs from 1 April to 31 March.

development, especially when cross-border capital flows are free and changes in openness are correlated with changes in the size of financial markets (Rajan and Zingales, 1998).

Box 1

Liberalisation of the external sector in India since 1991

The external payment crisis that India witnessed in 1991 called for management of the external sector reforms. These included a market-based exchange rate system, introduction of convertibility of the rupee for external transactions on the current account, and a compositional shift in cross-border capital inflows from debt-creating to non-debt-creating flows. A cautious approach was followed in respect of debt-creating external capital inflows, especially those with short-term maturity, in addition to reducing the volatile component of non-resident Indian (NRI) deposits and the flow of external assistance. In the 1990s, for the first time, a strategic external debt management policy was put in place, emphasising compositional aspects, cost, maturity, end use, transparency and risk management. The overall prudential approach was integrated into the process of growing openness and financial liberalisation, which were basic elements of the package of structural reforms. Quantitative annual ceilings on external commercial borrowing (ECB), along with maturity and end-use restrictions, broadly shaped the ECB policy. FDI is encouraged through a very liberal but dual route: a progressively expanding automatic route and a case-by-case route. Portfolio investments are restricted to selected players, particularly approved institutional investors and NRIs. Indian companies are also permitted to access international markets through Global Depository Receipts/American Depository Receipts (GDRs/ADRs) under an automatic route, subject to specified guidelines. Foreign investment in the form of Indian joint ventures abroad is also permitted.

Restrictions on outflows involving Indian corporates, banks and those who earn foreign exchange (like exporters) have also been liberalised over time, subject to certain prudential guidelines. As a result of pursuing the above approach, India has attracted considerable private flows, primarily in the form of FDI, portfolio investment, ECB and NRI deposits. Consequently, managing the surplus also became a challenge in the management of the capital account. The policy for reserve management is built upon a host of identifiable factors and other contingencies. Similarly, the Indian securities market is increasingly integrated with the rest of the world. Indian companies have been permitted to raise resources from abroad through the issue of ADRs, GDRs, Foreign Currency Convertible Bonds (FCCBs) and ECBs. Foreign companies are also allowed to tap the domestic stock markets. FIIs have been permitted to invest in all types of securities including government securities. The Indian stock exchanges have been allowed to set up trading terminals abroad. The trading platforms of Indian exchanges are now accessed through the internet from anywhere in the world. The Reserve Bank of India (RBI) permitted two-way fungibility for ADRs/GDRs, which meant that investors (foreign institutional or domestic) who hold ADRs/GDRs can cancel them with the depository and sell the underlying shares in the market.

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Source: RBI, Report on currency and finance.

Table 2
India's trade and financial openness

In per cent

Year	Trade		Invisibles			Current account			Capital account		Import cover of reserves (number of months)
	Exports/GDP	Imports/GDP	Receipts/GDP	Payments/GDP	Net/GDP	Current receipts/GDP	Current receipts/ current payments	CAD/GDP	Foreign investment/GDP	Foreign investment/exports	
1992–93	7.3	9.6	3.6	3.0	0.6	10.8	87.7	–1.7	0.2	3.0	4.9
1993–94	8.3	9.8	4.1	3.1	1.0	12.3	95.6	–0.4	1.5	18.7	8.6
1994–95	8.3	11.1	4.8	3.1	1.8	13.0	91.7	–1.0	1.5	18.3	8.4
1995–96	9.1	12.3	5.0	3.5	1.6	14.0	88.8	–1.7	1.4	14.9	6.0
1996–97	8.9	12.7	5.6	2.9	2.7	14.3	91.6	–1.2	1.6	18.0	6.5
1997–98	8.7	12.5	5.7	3.2	2.4	14.3	90.9	–1.4	1.3	15.1	6.9
1998–99	8.3	11.5	6.2	4.0	2.2	14.5	93.2	–1.0	0.6	7.0	8.2
1999–2000	8.3	12.3	6.7	3.8	2.9	14.9	93.0	–1.0	1.2	13.8	8.2
2000–01	9.9	12.6	7.0	4.9	2.1	16.8	96.4	–0.6	1.5	14.9	8.8
2001–02	9.4	11.8	7.7	4.5	3.1	16.9	103.8	0.7	1.7	18.2	11.5
2002–03	10.6	12.7	8.3	4.9	3.4	18.8	106.6	1.3	1.2	11.2	14.2
2003–04	11.0	13.3	8.9	4.3	4.6	19.8	112.8	2.3	2.6	23.7	16.9
2004–05	12.2	17.1	10.3	5.5	4.5	22.1	98.0	–0.4	2.2	18.0	14.3
2005–06	13.1	19.5	11.5	6.2	5.3	24.4	95.2	–1.1	2.5	19.2	11.6
2006–07	13.9	21.1	13.0	7.0	6.0	26.9	96.0	–1.1	2.9	20.8	12.4

Source: RBI, *Handbook of statistics on the Indian economy 2006–07*.

Table 3

Exports to GDP and FDI to GDP of selected SEA economies

In per cent

Economy	Indicator	2001	2002	2003	2004	2005	2006
China	Export/GDP	22.6	25.1	29.6	34.0	37.3	36.8
	FDI/GDP	3.3	3.4	2.9	2.8	3.5	…
Hong Kong SAR	Export/GDP	138.7	149.6	171.1	190.2	198.7	205.7
	FDI/GDP	14.3	5.9	8.6	20.5	20.2	…
India	Export/GDP	12.7	14.5	14.7	18.2	20.3	…
	FDI/GDP	1.1	1.1	0.8	0.8	0.8	…
Indonesia	Export/GDP	39.0	32.7	30.5	31.8	32.9	30.2
	FDI/GDP	–1.9	0.1	–0.3	0.7	1.8	…
Japan	Export/GDP	10.6	11.4	12.0	13.4	…	…
	FDI/GDP	0.2	0.2	0.1	0.2	0.1	…
Korea	Export/GDP	37.8	35.3	37.9	44.0	42.3	43.2
	FDI/GDP	0.7	0.4	0.6	1.4	0.5	…
Malaysia	Export/GDP	116.4	114.8	113.3	121.1	123.4	117.1
	FDI/GDP	0.6	3.4	2.4	3.9	3.0	…
Philippines	Export/GDP	49.2	50.2	49.6	50.8	47.3	43.1
	FDI/GDP	0.3	2.0	0.6	0.8	1.2	…
Singapore	Export/GDP	191.8	193.2	214.3	230.6	244.3	252.6
	FDI/GDP	18.3	8.2	11.2	13.8	17.2	…
Thailand	Export/GDP	65.9	64.2	65.7	70.7	73.8	71.4
	FDI/GDP	3.4	0.8	1.4	1.1	2.6	…
Vietnam	Export/GDP	54.6	56.0	59.2	67.5	70.0	…
	FDI/GDP	4.0	4.0	3.7	3.6	3.7	…

Note: Exports: both goods and services in current US dollars; FDI: net inflows basis; …: not available.

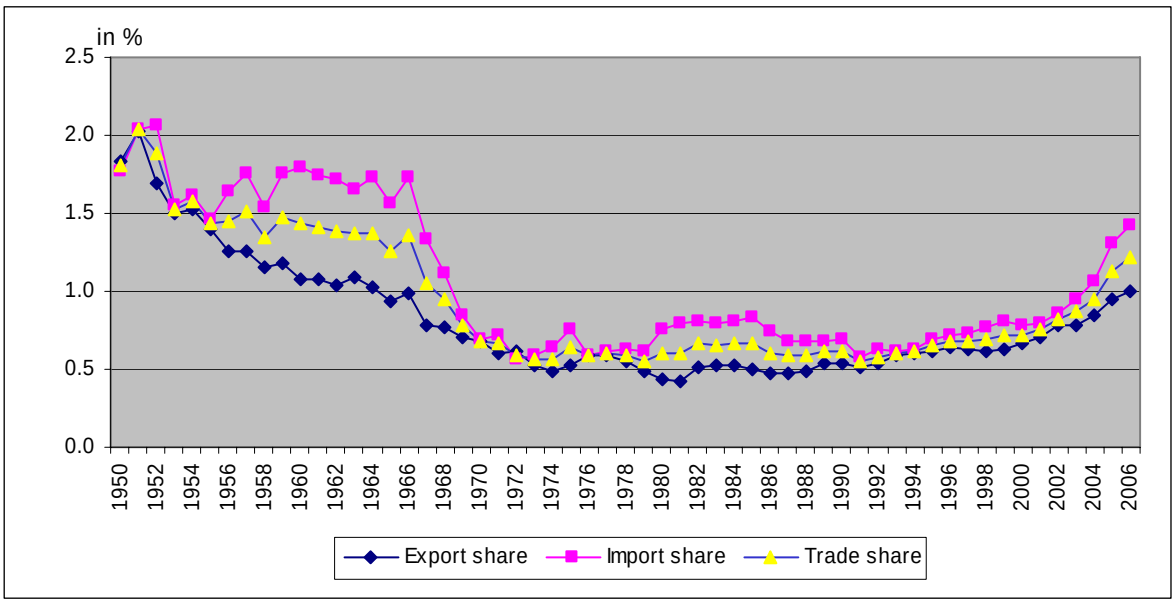
Source: World Bank online database.

A. Perspective on current account openness

From the beginning of the planning process in the 1950s, India adopted an inward-looking development strategy. The essence of this strategy lies in production for the domestic market behind higher tariff barriers, and a higher degree of effective protection for domestic industry. Besides tariffs, quantitative restrictions were used to provide automatic as well as custom-made protection to almost all domestic import substitution activities. It has been argued by many analysts that inward-looking policies and import-substituting industrialisation, coupled with the system of controls, led to inefficiencies in resource allocation and landed the economy in a high-cost industrial structure with "technology lag" (Chopra et al, 1995; Joshi and Little, 1996; Nayar, 2001; Virmani, 2001). Trade performance was also hampered by restrictive industrial and foreign investment policies. This can be ascertained from India's share of world merchandise exports, which declined from about 2 per cent in 1951 to less than 1 per cent in 1965, and hovered around 0.5 per cent in the 1980s, reaching 1 per cent only in 2006 (Graph 1).

Graph 1

India's share of world exports and imports



B. India's trade with East Asia and China

Under India's "focus area" approach (as a part of its overall trade strategy), trade with East Asian countries focused specifically on catering to the rising demand from this region. As a result, during the 1990s, the average growth of India's exports to Asian countries, and especially China, Singapore, Korea and Thailand, far exceeded its overall export growth (Table 4). Since 2004–05, China has emerged as the third major export destination for India after the United States and the United Arab Emirates. However, its share of exports to the Asian region as a whole remains sluggish and below the expected level (Table 5).

Table 4

Growth in India's exports to selected Asian economies

In per cent

Region/economy	1993–97	1998–2002	2003	2004	2005	2006
Asia	**20.2**	**10.8**	**34.0**	**27.6**	**33.7**	**27.6**
China	66.0	27.6	57.6	54.2	54.2	47.7
Hong Kong SAR	23.4	7.3	21.5	14.7	20.0	1.1
Indonesia	32.2	17.4	39.7	18.8	8.8	23.5
Japan	5.2	–1.1	–1.6	9.3	24.4	57.5
Korea	20.6	16.4	22.2	24.3	77.9	81.2
Malaysia	18.5	11.0	13.4	13.3	16.9	6.8
Philippines	32.1	19.9	–13.7	4.6	25.2	–22.6
Singapore	11.4	12.2	48.9	73.3	53.3	–14.3
Thailand	10.3	14.3	15.9	6.0	20.2	44.6
India's exports growth	12.7	8.1	21.0	23.3	29.9	25.4

Source: Calculated from IMF, *Direction of trade statistics*.

Table 5

Share of India's exports with selected Asian economies

In per cent

Region/economy	1993–97	1998–2002	2003	2004	2005	2006
Asia	**21.7**	**21.7**	**27.1**	**28.0**	**28.9**	**28.5**
China	1.4	2.3	4.4	5.5	6.6	7.8
Hong Kong SAR	5.6	5.6	5.1	4.7	4.4	3.5
Indonesia	1.4	1.0	1.7	1.7	1.4	1.4
Japan	7.0	4.4	2.9	2.5	2.4	3.0
Korea	1.3	1.3	1.2	1.2	1.7	2.4
Malaysia	1.2	1.3	1.4	1.3	1.2	1.0
Philippines	0.4	0.5	0.6	0.5	0.5	0.3
Singapore	2.9	2.1	3.2	4.5	5.3	3.6
Thailand	1.4	1.2	1.3	1.1	1.0	1.2
India	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source**:** Calculated from IMF, *Direction of trade statistics*.

A similar trend was noticeable vis-à-vis the ASEAN 5 (Indonesia, Malaysia, the Philippines, Singapore and Thailand). The surge in India's trade with East Asian countries has emanated mainly from product specialisation and the natural comparative advantage of the respective countries. Engineering goods, chemicals and related products, crude petroleum and related products, gems and jewellery, and iron ore are India's major exports to East Asian countries.

China is the major source of India's imports, comprising about 9 per cent of total imports during 2006–07 (Table 6). Major imports from this region are electronic goods and edible oil. It may be pertinent to mention that the increase in India's degree of openness compared to that of Asian countries is the result of aggressive industrialisation policies based on export-driven growth strategies. These developments have been accompanied by a substantial reallocation of resources from agriculture to industry and services. These two sectors have been the driving forces of the growth in the emerging South. The share of manufacturing imports has also expanded simultaneously with the growth of manufacturing exports. One of the factors underlying this trend has been the rising intra-industry trade between India and Asian countries during the process of achieving openness and integration. In recognition of the growing importance of Asian countries to India's foreign trade, a series of nominal and real effective exchange rate indices released by the RBI were revised recently to include the renminbi and the Hong Kong dollar in the weighting scheme. With Japan already a part of the indices, the representation of Asian economies has increased to three in the six-country real effective exchange rate index.

The modalities of a free trade agreement (FTA) between India and China are on the way, against the backdrop of a report by the joint task force entrusted with studying the pros and cons and making recommendations. Considering the larger perspective of India's "look east" policy on free trade, an agreement with ASEAN would in the long run lead to a reduction in costs, resulting in a better standard of living for the people of Asian countries. There would also be a rational allocation of resources between the economies concerned, leading to higher productivity and efficiency. An FTA with China would enhance India's business interests in the region, despite the apprehension that the unregulated opening up of the Indian market will lead to a flood of low-priced Chinese products. The fear is understandable, given the prowess of Chinese manufacturers in churning out low-priced manufactured goods which have had a "tsunami effect" on markets the world over. There is also the issue of

granting “market economy” status to China, a step that will make way for the establishment of anti-dumping charges under the WTO rules.

Table 6

Share of India’s imports from Asian economies

In per cent

	1993–97	1998–2002	2003	2004	2005	2006
Asia	**13.8**	**19.1**	**21.5**	**21.3**	**21.5**	**26.5**
China	2.1	3.2	5.0	6.1	7.3	8.7
Hong Kong SAR	0.8	1.6	1.8	1.7	1.5	1.8
Indonesia	1.2	2.0	2.6	2.4	2.1	1.9
Japan	6.3	4.4	3.3	2.9	2.6	2.7
Korea	2.2	2.6	3.4	3.1	3.1	3.0
Malaysia	2.1	3.1	2.6	2.2	1.8	3.0
Philippines	0.0	0.1	0.2	0.2	0.1	0.1
Singapore	2.8	3.3	2.6	2.5	2.3	4.6
Thailand	0.5	0.7	0.7	0.8	0.8	1.1
India	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: Calculated from IMF, *Direction of trade statistics*.

C. Perspective on capital account openness

As a result of calibrated and gradual capital account openness, the financial markets in India have also become increasingly integrated with the global network. In horizontal integration, interlinkages occur among domestic financial market segments, while vertical integration occurs between domestic markets and international/regional financial markets. Global integration refers to the opening up of domestic markets and institutions to the free cross-border flow of capital and financial services by removing barriers, such as capital controls and withholding taxes. A deeper dimension of global integration entails removing obstacles to the movement of people, technology and market participants across borders (BIS, 2006). Regional financial integration occurs through ties between a given region and the major financial centre serving that region. It is perceived that economic integration might be easier to achieve at a regional level due to network externalities and the tendency of market-makers to concentrate in certain geographical centres. Furthermore, regional financial integration can be an important means of developing local financial markets, for instance, through peer pressure to strengthen institutions and upgrade local practices.

The number of international investment agreements (IIAs) has continued to grow, reaching a total of almost 5,500 at the end of 2006, of which 2,573 are bilateral investment treaties, 2,651 are double taxation treaties and 241 are free trade agreements and economic cooperation arrangements containing investment provisions. The number of preferential trade agreements with investment provisions has almost doubled in the past five years. Developing countries are becoming increasingly important participants in international investment rulemaking, partly reflecting growing South-South FDI (UNCTAD, 2007). Rapid economic growth in southern, East and Southeast Asia should continue to fuel growing market-seeking FDI to the region. The region will also become more attractive to efficiency-seeking FDI, as countries such as China, India, Indonesia and Vietnam plan to significantly improve their infrastructure.

(i) India's domestic financial integration

Until the early 1990s, India's financial sector was tightly controlled. Interest rates in all market segments were administered. The flow of funds between various market segments was restricted by extensive regulations. There were also restrictions on participants operating in different market segments. Banks remained captive subscribers to government securities under statutory arrangements. The secondary market of government securities was dormant. In the equity market, new equity issues were governed by several complex regulations and restrictions. The secondary market trading of such equities lacked transparency and depth. The foreign exchange market remained extremely shallow as most transactions were governed by inflexible and low limits under exchange regulation and prior approval requirements. The exchange rate was linked to a basket of currencies. In this environment, the financial sector grew at a lower level of efficiency. Financial market reforms initiated in the early 1990s focused on removal of structural bottlenecks, introduction of new players/instruments, free pricing of financial assets, relaxation of quantitative restrictions, improvement in trading, clearing and settlement practices and greater transparency (Mohan, 2004).

Other policy initiatives in the money, foreign exchange, government securities and equity markets were aimed at strengthening institutions, fostering greater transparency, encouraging good market practices, establishing effective payment and settlement mechanisms, rationalising tax structures and enabling legislative frameworks. Dismantling of various price and non-price controls in the financial system has facilitated the integration of financial markets. The 2006 report of the Committee on Fuller Capital Account Convertibility observed that in order to make a move towards fuller capital account convertibility, it must be ensured that different market segments are not only well developed, but also well integrated. In the sphere of finance, the traditional postulate that capital flows from the capital-surplus developed countries to the capital-scarce developing countries seems to have been disproved in recent years (Reddy, 2006).

(ii) India's regional financial integration

With growing financial globalisation, an emerging market economy (EME) like India also needs to develop its financial markets to manage the risks associated with large capital flows. In a globalised world, the importance of a strong and well regulated financial sector, in order to deal with capital flows that can be very large and might reverse quickly, can hardly be overemphasised. The East and Southeast Asian economies, in particular, have achieved significant integration due to liberalisation of foreign direct investment (FDI) regimes. The resulting expansion of trade and FDI has become the engine of economic growth and development in the region. The underlying surge in capital flows to developing and emerging market economies in recent years is led by the strong demand for emerging market debt and equities, supported by sharp improvement in fundamentals in many EMEs and investors' search for higher yields in an environment where long-term interest rates remain low in major industrial countries (World Bank, 2006).

India's capital account has witnessed a structural transformation, with a shift in the composition from official flows to market-oriented private sector flows. Following the shift in emphasis from debt to non-debt flows in the reform period, foreign investment comprising direct investment and portfolio flows emerged as the main capital account component (Box 2).

Box 2

Framework for regional economic integration in Asia

The East Asian economies have embarked upon various initiatives for regional monetary and financial cooperation. The major initiatives for regional cooperation in Asia include ASEAN + 3, the Chiang Mai Initiative, the Executive Meeting of East Asia-Pacific Central Banks (EMEAP), the Asian Bond Market Initiative and the Asian Bond Fund (ABF). The countries of ASEAN (Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam) and India have entered into a framework agreement on comprehensive economic cooperation. ASEAN has embarked on a process to expand economic cooperation with its neighbours to the north, namely China, Japan and Korea (ASEAN + 3). As far as India's association with the ASEAN community is concerned, India currently is not a full-fledged member of the ASEAN network, but holds a regular summit with ASEAN. However, in the years ahead, it is envisaged that the ASEAN + 3 + 3 (India, Australia and New Zealand) network would help India to share and cooperate on various financial issues, in the same way as the present network of ASEAN + 3 has consistently engaged in an economic policy dialogue of unprecedented scope and depth.

Another instance of central banking cooperation in Asia consists of reciprocal currency or swap arrangements under the Chiang Mai Initiative. The ASEAN Swap Arrangement (ASA) was created primarily to provide liquidity support to countries experiencing balance-of-payments difficulties. The Finance Ministers of ASEAN + 3 announced this initiative in May 2000 with the intention of cooperating in four major areas, viz, monitoring capital flows, regional surveillance, swap networks and personnel training. The informal meeting organised by the Asia Cooperation Dialogue (ACD) is, however, attended by participant central banks, including that of India, to discuss promotion of the supply of Asian Bonds. The government of India has given a commitment on participation in the ABF-2 to the tune of USD 1 billion. SEANZA (Southeast Asia, Australia and New Zealand) and SEACEN (Southeast Asian Central Banks Research and Training Centre) are the oldest initiatives in central bank cooperation in Asia. SEANZA, formed in 1956, promotes cooperation among central banks by conducting intensive training courses for higher central banking executive positions with the objective of building up knowledge of central banking and fostering technical cooperation among central banks in the SEANZA region. The SEACEN provides a forum for member central bank governors to become acquainted with one another and to gain a deeper understanding of the economic conditions of the individual SEACEN countries. It initiates and facilitates cooperation in research and training relating to the policy and operational aspects of central banking, ie, monetary policy, banking supervision and payments and settlement systems. The Asian Clearing Union (ACU), an arrangement for central banking cooperation, has functioned successfully since 1974, providing multilateral settlement of payments to promote trade and monetary cooperation among the member countries. Since 1989, the ACU has also included a currency swap arrangement among its operational objectives. The SAARCFINANCE, established in September 1998, is a regional network of the South Asian Association for Regional Cooperation (SAARC) Central Bank Governors and Finance Secretaries, which aims to strengthen the SAARC with specific emphasis on international finance and monetary issues. India has participated very actively in SAARCFINANCE activities. The clearest evidence of Asian countries' desire to forge closer economic relationships is the proliferation of free trade agreements (FTAs). By 2006, there were more than 30 FTAs under negotiation in East Asia alone. Increasingly, these agreements are also deepening, extending to areas beyond mere tariff reduction. One example is the recently signed India-Singapore comprehensive economic cooperation agreement, which covers not only trade in goods, but also trade in services, investments and cooperation in technology, education, air services and human resources.

Source: RBI, Report on currency and finance.

India's FDI openness, as measured by the FDI stock-to-GDP ratio, increased from 3.8 per cent in 2000 to 5.8 per cent in 2006. However, this is still much lower than in other emerging countries in Asia, including China (Table 7). India has emerged as a major destination for global portfolio equity flows since the late 1990s. On average, India's share was 24 per cent of total portfolio flows to all developing countries during the period 1999–2006. The geographical sources of portfolio investment inflows show a country's global and regional

financial linkages. Singapore appears among one of the top sources of India's portfolio stock investment.

Table 7

Indicators of FDI openness in selected Asian economies

As a percentage of GDP

Economy	2000	2001	2002	2003	2004	2005	2006
China	16.1	15.3	14.9	13.9	12.7	12.1	11.1
Hong Kong SAR	269.9	251.8	205.4	240.6	273.2	294.3	405.2
Korea	7.4	8.8	8.3	8.2	8.7	8.3	8.0
Taiwan, China	5.5	13.0	9.5	11.8	12.0	12.1	13.8
India	3.8	4.3	5.1	5.4	5.8	5.7	5.8
Indonesia	15.0	9.5	3.6	4.4	6.2	4.7	5.2
Malaysia	58.4	38.6	39.4	39.6	36.8	36.3	36.0
Philippines	16.9	15.0	15.7	14.8	14.9	15.0	14.6
Singapore	121.5	140.5	153.7	160.2	159.6	159.3	159.0
Thailand	24.4	28.8	30.3	34.3	33.0	33.1	33.0

Source: UNCTAD online statistics.

According to the Indian Ministry of Commerce and Industry, Mauritius accounts for the largest share of cumulative FDI inflows to India from 1991 to 2006 – nearly 40 per cent. Given the size of an economy like Mauritius, this is simply implausible. The companies operating outside India utilise Mauritian holding companies to take advantage of the India-Mauritius Double Taxation Avoidance Agreement (DTAA). The DTAA allows foreign firms to bypass Indian capital gains taxes and may allow some India-based firms to avoid paying certain taxes through a process known as round-tripping. In round-tripping, a company operating in India registers a subsidiary in Mauritius and then routes profits through the subsidiary in order to avoid paying capital gains taxes on its profits in India. Although it is a matter of tax concern to the government of India, the extent of round-tripping by Indian companies through Mauritius is not yet known.

Financial market integration has assumed added significance in the recent period as capital has become more mobile across countries with the reduction in capital controls and improvement in technological infrastructure. This is reflected in increasing co-movements in interest rates, bond yields and stock indices. The bond yield differential in Asia has narrowed in an environment of improved macroeconomic fundamentals and lower inflation in these economies. Evidence from price-based measures of financial integration suggests increasing financial market integration in Asia. In general, money and bond market segments in Asia showed a lower degree of correlation as compared with stock markets. Within countries, bond and money market correlation was negative in many countries, implying that these markets remain segmented in the region (RBI, 2007).

(iii) Trade in services

According to the World Bank publication *Handbook of international trade in services*, India's services exports rose 15 times, from around USD 5 billion in 1990 to nearly USD 74 billion in 2006. Over the past decade, India's exports of business services have grown at a rate of

25 per cent per annum, which is faster than that of any other country in the world, barring Ireland. More than a third of India's aggregate exports are services, a proportion unmatched by any developing country and by only a handful of advanced countries. As a result, India today is confronted with contrasting challenges abroad: uncertainty of access for cross-border exports of services, and barriers to exports through the movement of people. Advances in information and telecommunication technologies have expanded the scope of services that can be traded across borders.

Many countries now allow foreign investment in newly privatised and competitive markets for key infrastructure services, such as energy, telecommunications and transport. More and more people are travelling abroad to consume tourism, education and medical services, and to supply services ranging from construction to software development. In fact, services are the fastest-growing components of the global economy, and trade and FDI have grown faster in services than in goods over the past decade and a half. International transactions, however, continue to be impeded by policy barriers, especially to foreign investment and the movement of service-providing individuals. Developing countries in particular are likely to benefit significantly from further domestic liberalisation and the elimination of barriers to their exports. In many instances, income gains from a reduction in protection of services may be far greater than from trade liberalisation in goods. The openness to trade could not be taken for granted because, as services outsourcing grows, adjustment costs in importing countries could unleash protectionist pressures. Now the political climate in many advanced countries has become more resistant to external service providers. But India has much to gain, probably more than any other country in the world, by bringing services to centre stage.

V. Concluding observations

India has undertaken important growth-enhancing reforms over the past 15 years, placing considerable emphasis on achieving macroeconomic stability, liberalising trade, strengthening the financial sector and improving the business climate. Over the years, this has resulted in higher trade and investment growth, especially to and from the Asian countries. The growth impulse has emanated from product specialisation and natural comparative advantages arising from various geographical factors. Overall, China has emerged as India's major trading partner.

However, India's share of exports to the Asian region remained sluggish and below the expected level. India's FDI openness, despite an increase, is much lower than that of other Asian emerging economies. As India's services exports are increasing at a rapid pace, the country is confronting challenges emanating from the uncertainty of access to cross-border exports of services and barriers to the movement of people. The role of the private sector is crucial for raising investment and productivity in the economy. Higher private investment, including foreign direct investment, can contribute to higher productivity through learning by doing and technology transfer. Public-private partnership is a key factor for boosting investment. The coming together of public and private sector representatives can be a catalyst for developing new regional initiatives in Asia aimed at expanding the private sector and thereby strengthening its positive impact on economic growth. The new sources of competitive advantage will be in technology and human skills, not necessarily in low wages.

Recognising their complementary strengths, India is becoming increasingly linked to East Asian production networks. East Asian companies have begun to exploit India's strengths in research and development (R & D), software and design by locating their global R & D centres in India. Several Indian companies have also begun to take advantage of cheaper manufacturing costs for hardware in China and other East Asian countries by rationalising their production. This trend is likely to become more entrenched as the emerging free trade arrangements between India and Southeast Asian countries come into effect. It is important for India to forge a closer relationship for mutual trade and investment within the Asian region

and also to adopt a proactive role vis-à-vis the ASEAN economies. India has already demonstrated its strength in the services sector, especially software. If complemented by the hardware and manufacturing base of East Asia, India and the region can prosper together in the new global scenario. The rapid change that has taken place in Asia provides new opportunities that must be seized by each side.

After the Southeast Asian crisis in 1997, there has been increasing recognition in Asia of the importance of regional economic integration for generating growth impulses from within the region. Substantial complementarities exist among Asian economies that remain to be exploited for their mutual common benefit. For instance, while the region has economies that have surplus capital resources, there are also economies which have inadequate domestic savings for rapid development. The region is similarly characterised by complementarities in the demand and supply of other resources, such as technology and skilled manpower. By generating intraregional demand, regional cooperation could supplement external demand and reduce the region's vulnerability owing to overdependence on outside regions. Regional cooperation could also help in exploiting the existing regional capacities fully.

Trade and investment promotion within Asia will also be accelerated by a conscious move towards the adoption of common standards in both goods and delivery of services. The massive increase in infrastructure investment in areas such as power, telecommunications, airports, highways and so on all require a corresponding expansion in manufacturing of the equipment that will be required in these projects. Other similar ideas can be explored so that the Asian region can move towards the formation of a larger common market.

The lessons learned from European experience have three components. First, in the European trade and financial integration process, there has been macroeconomic and monetary instability in the context of a global downturn. Second, the disturbances appearing in these economies have had internal causes rather than being the result of contagion. Third, at times of crisis, the European economic authorities have established a common platform, provided unconditional credit to their partners and pursued policies based on prudence. Taking its cue from this experience, Asia's economic outlook has improved since the financial crisis a decade ago. But underlying financial policies and institutions in the region remain underdeveloped and untested. The emphasis on regional solutions to perceived challenges has contributed to a profound ambivalence about financial openness in the region.

Annex 1:
Chronology of India's financial liberalisation since 1991

July 1991	The government abolished the industrial licensing system, with a few exceptions, and approval for the expansion of large firms, including foreign firms, was no longer necessary. Foreign firms were allowed major shareholding in joint ventures, and foreign investment up to 51 per cent of equity in 35 priority industries received automatic approval. The new investment policy also spelled more incentives to attract FDI from non-resident Indians, including 100 per cent ownership shares in many sectors and full repatriation of profits.
1992	The Security and Exchange Board of India (SEBI) Act was passed, and the SEBI has since been an independent regulator.
September 1992	Foreign institutional investors (FIIs) were given permission to participate in the Indian market. One FII could own up to 5 per cent of a firm and all FIIs combined could own 24 per cent. FIIs had to have at least 50 investors.
1994	The National Stock Exchange (NSE) began trading bonds in June and equity in November. Different features of the NSE include: equal access for all traders in a vast geographical area, a competitive market in security intermediation, electronic matching of trades, anonymous trading followed by guaranteed settlement, and a more independent corporate governance structure.
November 1996	"100 per cent debt FIIs" were permitted. These were allowed to buy corporate bonds, but not government bonds.
April 1997	The ceiling upon total ownership by all FIIs of a firm was raised from 24 per cent to 30 per cent. A shareholder resolution was required.
April 1998	FIIs were permitted to invest in government bonds, with a ceiling of USD 1 billion on all FIIs in aggregate.
June 1998	The ceiling on ownership by one FII in one firm was raised from 5 per cent to 10 per cent. FIIs were permitted to partially hedge currency exposure risk using the forward market. FIIs were permitted to trade equity derivatives in a limited way.
August 1999	The requirement that FIIs must have at least 50 investors was eased to 20.
February 2000	Foreign firms and individuals were allowed to access the Indian market through FIIs as "subaccounts". Local fund managers were also permitted to manage funds for foreign firms and individuals through subaccounts. The requirement that no investor be allowed to own more than 5 per cent of an FII was eased to 10 per cent.
March 2000	The ceiling on total ownership by all FIIs of a firm was raised from 30 per cent to 40 per cent. A shareholder resolution was required.
March 2001	The ceiling on total ownership by all FIIs of a firm was raised from 40 per cent to 49 per cent. A shareholder resolution was required.
September 2001	The ceiling on total ownership by all FIIs of a firm was raised from 49 per cent to "the sectoral cap for the industry". A shareholder resolution was required.
January 2003	Limitations on FII hedging using the forward currency market were removed.
December 2003	Approvals for FIIs at both the SEBI and the RBI were replaced by single approval at the SEBI.
November 2004	A new ceiling on total ownership by all FIIs of corporate bonds was placed at USD 0.5 billion.
February 2006	The ceiling on ownership of government bonds by all FIIs was raised to USD 2 billion. The ceiling on ownership of corporate bonds by all FIIs was raised to USD 1.5 billion.

Source: Lane and Schmukler (2007).

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Integration of India's stock market with global and major regional markets

Janak Raj and Sarat Dhal[1]

1. Introduction

National stock markets have emerged as the major channel for financial integration of emerging market economies amid globalisation, deregulation and advances in information technology. Among the factors contributing to growing financial integration are a rapid increase in the cross-border mobility of private capital inflows due to investors seeking portfolio diversification and better yields, a growing reliance of nations on the savings of other nations, and a shift in the leverage preference of companies from debt to equity finance. It is generally perceived that financial integration can be associated with several benefits, including development of markets and institutions and effective price discovery, leading to higher savings, investment and economic progress. At the same time, linkages among financial markets can pose various risks, such as the contagion and associated disruption of economic activities that were evident during the crisis in Asia in the late 1990s. More recently, in January 2008, national stock markets declined sharply in the wake of credit market developments in the United States. Economists have thus realised that it is useful for countries to monitor the progress of interdependence among financial markets for the sake of policy as well as market participants.

Recognising the critical importance of financial assets to economic agents and policy, numerous studies in the applied finance literature have concentrated on measuring the international integration of national stock markets across several developed and emerging market economies. In the copious literature, however, studies focused on India's stock market are rather scarce,[2] despite various stylised facts suggesting, prima facie, the growing linkage of the Indian market with global and major regional markets in Asia during the reform period beginning in the early 1990s.[3] Illustratively, the Bombay Stock Exchange (BSE) of India has emerged as the largest stock exchange in the world in terms of the number of listed companies, comprising many large, medium-sized and small firms. With a market capitalisation of US$ 1.8 trillion in 2007, the BSE has become the tenth largest stock

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[2] It is of particular interest that several studies on emerging markets, with a few exceptions, have not considered India. Studies that have included India are available for the period before 2003. However, as we see in this paper, India's financial market has witnessed rapid progress since 2003.

[3] Major reforms undertaken in the Indian capital market have included free pricing of equity issues in the primary market, introduction of the book-building process, screen-based trading in stock exchanges, allowing foreign institutional investors (FIIs) to operate in the Indian capital market and Indian companies to raise capital from international capital markets, dematerialisation of securities, rolling settlement ($t + 2$), setting up of the National Stock Exchange to create competitive pressures, corporatisation of major stock exchanges such as the BSE, strengthening of corporate governance practices and enhanced transparency and disclosure standards. For a comprehensive review of financial sector reform and perspectives on India, see the various articles by R Mohan and Y V Reddy referred to in this study.

exchange globally and come closer to advanced economies in terms of the ratio of market capitalisation to gross domestic product. As regards transaction cost, the Indian stock market compares with some of the developed and regional economies. With the objective of internationalisation, several Indian companies have opted for listing on the stock exchanges of other countries, especially the United States and the United Kingdom. Ten major Indian companies listed on the New York Stock Exchange (NYSE) account for a 19 per cent weight in the benchmark 30-scrip stock price index of the BSE. Fifty Indian companies are listed on the London Stock Exchange. Foreign capital flows have made a crucial contribution to the growth of India's stock market. India has become a major destination, representing about a fourth of total portfolio capital inflows to the emerging market economies (EMEs) group. There are 1,247 foreign institutional investors participating in India's stock market. The purchase and sales activities of such investors account for three fourths of the average daily turnover in India's stock market.[4] Since foreign investors operate in a number of countries at the same time, their operations can be expected to have contributed to the integration of the Indian stock market with other markets. Moreover, India has engaged in various bilateral trade and economic cooperation agreements with several countries and regional groups across Asia, Europe and the western hemisphere.

In this context, several issues arise. Is the Indian stock market integrated with global and regional markets? What is the extent of such market integration? Which regional and global markets have dominant influence on India's stock market? While seeking answers to these questions is the major objective, we also have the motivation of contributing to the literature the experience of a leading emerging market economy like India. Following the dominant perspective in the applied finance literature, we use correlation and the vector error correction and cointegration model (VECM) to gauge the integration of India's stock market with global markets such as the United States, the United Kingdom and Japan, and with major regional markets such as Singapore and Hong Kong, which are key financial centres in Asia. At the same time, the study demonstrates the critical role of data mining relating to frequency of data, sample periods and currency denomination of stock prices in the analysis of financial market integration. The study that follows comprises five sections, including a brief review of theoretical and applied finance perspectives relating to stock market integration, stock price variables and data used in the study, stylised facts, empirical analysis and summary findings.

2. Stock market integration hypothesis

In the theoretical literature, financial market integration derives from various postulates such as the law of one price (Cournot (1927), Marshall (1930)), portfolio diversification with risky assets (Markowitz (1952)), capital asset price models (Sharpe (1964), Lintner (1965)) and arbitrage price theory (Ross (1976)). Despite distinguishing features, these postulates share a common perspective: if risks command the same price, then the correlation of financial asset prices and the linkage among markets comes from the movement in the price of risks due to investors' risk aversion. Based on these theoretical postulates, financial integration at the empirical level is studied using several de jure and de facto measures, although the latter, reflecting the actual degree of market linkages, have been more popular (Prasad et al (2006), Yu et al (2007)). Following the seminal works of Engle and Granger (1987), Johansen (1988) and Johansen and Juselius (1990), numerous studies beginning with Taylor and Tonks (1989), Kasa (1992) and, subsequently, Masih and Masih (2005),

[4] Average daily turnover in the stock market is available for one-leg transactions, while turnover by the FIIs includes two-way transactions (purchase and sales).

Chowdhry (1997) and Chowdhry et al (2007), among several others in the applied finance literature, have used the cointegration hypothesis to assess the international integration of financial markets. Until Taylor and Tonks (1989) and Kasa (1992), studies relied on correlation and regression analyses to gauge the nature of price convergence and international portfolio diversification across markets (Levy and Sarnat (1970), Agmon (1972), Solnik (1974) and Panton et al (1976)). Taylor and Tonks (1989) showed that the cointegration technique is useful from the perspective of the international capital asset price model. Kasa (1992) suggested that the short-term return correlation between stock markets is not appropriate from the perspective of long-horizon investors driven by common stochastic trends. A cointegration model is useful since it not only distinguishes between the nature of long-run and of short-run linkages among financial markets, but captures the interaction between them as well. Given the wide popularity of the cointegration hypothesis, we refrain from rehashing the algebra of this methodology. What is striking about the empirical literature is that studies on the subject have brought to the fore various useful perspectives relating to price equalisation, market equilibrium, market efficiency and portfolio diversification (Chowdhry et al (2007)). In order to facilitate our empirical analysis, a brief discussion on these perspectives follows.

2.1 The cointegration hypothesis

The cointegration hypothesis has a generalised and statistical perspective on equilibrium dynamics among economic and financial variables. It begins with non-stationary variables with time-varying mean and variance properties. If the non-stationary variables are integrated within the same order – typically, the random walk or first-order integrated processes – then they may follow the path of equilibrium in the long run or share a cointegration relation, ie, a linear combination of them could be a stationary process. Within the multivariate vector error correction (VECM) framework of Johansen and Juselius (1990), the cointegration space may not be unique; there can be r cointegrating relationships among n non-stationary variables. In the extreme case, if $r = 0$, then the variables are not cointegrated and they do not follow a long-run equilibrium path. Similarly, if $r = n$, then the cointegration and error correction dynamics are redundant for the system of variables. In practice, there can be a single or multiple but less than n number of cointegration relations. According to Gonzalo and Granger (1995), the evidence of cointegration among national stock indices implies equilibrium constraints, which preclude the cointegrated indices from diverging too much in the long run. Such constraints emerge because these indices share common stochastic trends or driving forces underlying their mutual growth over extended time horizons. In contrast, a lack of cointegration suggests that stock markets have no long-run link and stock prices in different markets can diverge without constraint or without a trend. Stock market integration implies that the markets are exposed to similar risk factors and thus a common risk premium (Ahlgren and Antell (2002)). The existence of single long-run cointegration among stock market prices would imply that the unique long-run equilibrium path constrains markets. The cointegration test results are stronger, stable and more robust when there is more than one significant long-run vector (Johansen and Juselius (1990), Dickey et al (1991)). This is because for r cointegrating vectors, there are (n – r) common stochastic trends or factors underlying the dynamic linkages among the variables. The existence of multiple cointegrating vectors is consistent with the multifactor international capital asset pricing model (Bachman et al (1996)).

In some quarters it is postulated that cointegration of stock markets contradicts the efficient market hypothesis. According to this school of thought, in an efficient market, changes in asset prices cannot be predicted. In cointegration models, however, deviations of prices from a long-run relationship indicate predictable future price changes (Granger (1992), Baillie and Bollerslev (1989) and Hakkio and Rush (1989)). Diverging from this viewpoint, Dwyer and Wallace (1992), Crowder and Wohar (1998) and Masih and Masih (1997, 2002) argue that there is no general equivalence between market efficiency and lack of a long-run relationship

between assets. Dwyer and Wallace (1992) define market efficiency as the lack of arbitrage opportunities. Hassan and Naka (1996) suggest that in cointegrated markets, price movements in one market immediately influence other markets, consistent with efficient information sharing and free access to markets by domestic and foreign investors. Harvey (1995) and Korajczyk (1996) suggest that the improvement in market efficiency is consistent with increasing integration with world markets. If markets are predictable and foreign investors are sophisticated, then investors are likely to profit from the predictability of returns. As foreign investors take advantage of market inefficiencies, those market inefficiencies will decrease and prices will react more quickly to new information (Kim and Singhal (2000)). Another viewpoint is that national stock markets are different since they operate in the economic and social environments of different countries. Accordingly, a country's financial market is efficient when prices reflect the fundamentals and risks of that country, rather than the fundamentals and risks of other countries. Several studies have, however, argued that financial integration could occur due to real economic interdependence or linkages among economic fundamentals across nations. For instance, the profit and loss account and the balance sheet of a domestic company relying on a large volume of exports and imports can be affected by the macroeconomic fundamentals of other countries.

From the perspective of portfolio diversification, economists have differing views. Integrated markets may or may not facilitate portfolio diversification. One view is that cointegrated stock markets weaken the benefits of international portfolio diversification in the long run (Chowdhry et al (2007), Kearney and Lucey (2004)). This is because the existence of common factors limits the amount of independent variation in stock prices (Chen et al (2002)). Another view is that portfolio diversification benefits would continue to accrue in the short run (Hassan and Naka (1996)), although not in the long run. Byers and Peel (1993) argue that cointegration among stock prices does not preclude the benefits of diversification, since these follow from the covariance of stock returns rather than from the covariance of prices. Similarly, Hakkio and Rush (1991) and Sephton and Larsen (1991) have questioned the reliability of using the cointegration hypothesis to test market efficiency and portfolio diversification. The extent of portfolio diversification in cointegrated markets would hinge on the size of the coefficients of the long-run cointegrating vector relating to various stock price indices (Verchenko (2000)). In our view, the cointegration vector can be consistent with the standard asset demand function, such that the price of one asset (domestic) depends on other assets (regional and global), some of which may serve as substitutes or complements to domestic assets. Therefore, portfolio diversification in the long run would depend on the size and the sign condition of the coefficients of the cointegration vector relating to various stock prices.

3. Data mining issues

Empirical finance studies have also brought to the fore various useful insights about the role of data mining for stock market integration analysis. Three important issues in this regard are the frequency of data, the currency denomination of stock prices and the sample period. Firstly, in some quarters it is felt that high-frequency daily data are preferred to weekly and monthly data in an environment of advanced information technology-enabled online trading platform and payment and settlement systems. Daily data capture speedy transmission of information, as both short- and long-run dynamic linkages matter for market integration (Voronkova (2004), Hassan and Naka (1996)). Others, however, argue that weekly stock returns are useful to avoid the problem of non-synchronous trading in some thinly traded stock markets (Cha and Oh (2000)). Several other studies use monthly and quarterly data, since economic fundamentals such as output, inflation and dividends, which are considered to be the key drivers of stock prices, are mostly available in these frequencies (Blackman et al (1994), Masih and Masih (2002)). For robustness of empirical analysis and serial

correlation, and to avoid common lag length problems in the cointegration model, it is useful to rely on a comparative analysis of daily and weekly data. Secondly, keeping in view the portfolio diversification and arbitrage activities of dominant market participants such as foreign investors, most of the studies use stock prices measured in a common reference currency, typically, the US dollar, which serves as the major invoicing currency for trade and investment activities (Bachman et al (1996), Christian and Renatas (2007), Hilliard (1979), Meric and Meric (1989), Philippatos et al (1983)). Studies using stock prices in domestic currency units argue that indices in national currencies restrict their change to movements in security prices and avoid distorting the empirical results with sharp devaluation of the exchange rates, especially during periods of crisis (Chowdhry et al (2007)). Thirdly, there is a view that in analysing the long-run integration of markets, it is appropriate to use a long sample period consisting of several years, rather than large sample observations with high-frequency daily or weekly data for a few years (Hakkio and Rush (1991)). However, over a very long horizon such as a decade, an empirical study has to contend with long-run integration being affected by structural shifts emanating from changes in the policy regime and the general economic environment.

With the above issues as the backdrop, we use six stock price indices: the 200-scrip index of the BSE of India pertaining to the domestic market, two stock price indices relating to regional markets such as Singapore and Hong Kong, and three stock price indices relating to global markets in the United States, the United Kingdom and Japan, as defined in Annex Table 1. We use stock price indices measured in local currency as well as the US dollar. As regards frequency of data, we use daily as well as weekly stock prices. The sample period covers end-March 1993 to end-January 2008.[5] Our choice of stock markets is guided by the consideration that India has significant trade and financial relations with these countries. Illustratively, global markets such as the United States continue to be India's single largest trade and investment partner. India has had long-standing trade and financial relations with the United Kingdom since the era of British colonial rule. As regards regional markets, India has concluded a comprehensive economic cooperation agreement with Singapore. Hong Kong has significant trade and investment relations with India. Anecdotal evidence shows that about 1,500 Indian companies and seven Indian banks have a business presence in Hong Kong. The Hong Kong market is also the major financial centre in China and Asia, with which India has witnessed the rapid growth of trade in recent years. Recently, efforts have been initiated for free trade and double taxation avoidance agreements between India and Hong Kong.

4. Stylised facts

Chart 1 shows the co-movement of India's stock market prices with those of global and regional markets.[6] The financial integration process can be visualised in two phases: (i) the period from the 1990s to the first two years of the current decade, associated with various crises in emerging market economies, including the Asian crisis in 1997–98, and (ii) the post-crisis period since 2003, characterised by the revival of private foreign capital flows to emerging market economies in an environment of liberalisation, flexible exchange rates and strong economic growth. A notable point here is the crossover of the Indian market with

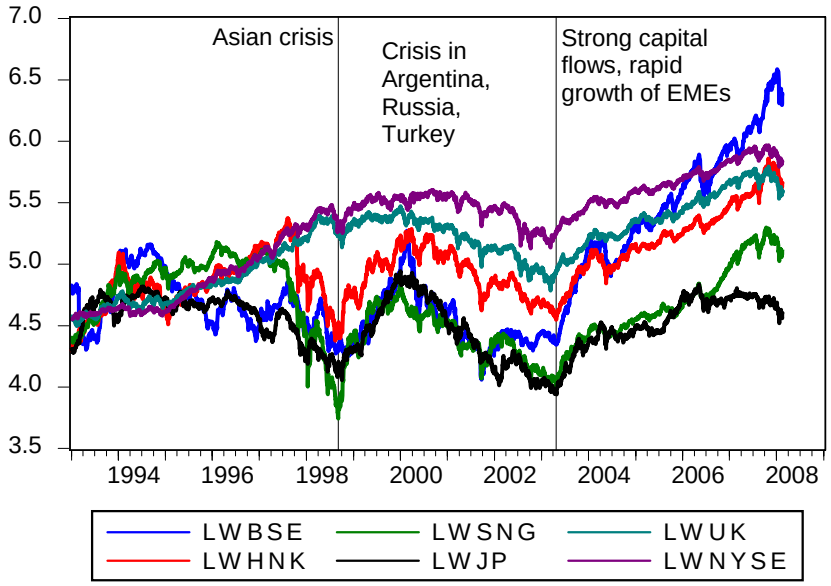
[5] The choice of the beginning date for the sample, ie March 1993, is guided by the consideration that the exchange rate was allowed to be market determined from this date. Thus, in terms of the first difference, the sample begins with the financial accounting year in India (April–March).

[6] For the purposes of illustration, stock price indices in Chart 1 refer to price indices with a common base (1993–94).

reference to the US market since September 2006. Until the January 2008 crisis, this development was construed by market participants as a "decoupling" phenomenon, despite the co-movement of stock indices in general and at turning points in particular. At this juncture, it is to be noted that our analysis is based on a sample period up to 18 January 2008 for daily and weekly data; the role of the crisis since 21 January 2008 in fostering market integration is addressed in a separate section.

Chart 1

Co-movement of global and regional stock markets



4.1 Correlation of stock prices and returns

It is evident that during the first period, especially until the Asian crisis, India's stock market showed inverse co-movement with the global stock markets of the United States and the United Kingdom, but some positive price correlation with regional exchanges, such as those of Hong Kong, Singapore and Japan in the Asian region (Table 1). In the second phase, however, India's stock market exhibited strong positive co-movement, or perfect price correlation, with global as well as regional stock markets.

An analysis of stock return correlation is important since correlation of stock price indices could be elevated owing to the presence of an underlying time trend and the persistence of prices in level form. The pairwise correlations of daily stock returns (defined as the first difference of logarithm-transformed stock prices in the six markets) in Table 2 show that the correlation of the Indian market with other markets has strengthened in the more recent period since 2003 as compared with the earlier period (April 1993–December 2002). A strikingly important result is that the Indian market has an edge over the major Asian markets such as Singapore, Hong Kong and Japan in terms of the sharp increase in return correlation between the two periods, 1993–2002 and 2003–07. Illustratively, it is evident that the increase in correlation between stock returns in the Indian market (DLBSE) and in the US market (DLNYSE) during the second period as compared to the earlier period was 301 per cent, the highest among other pairings of regional markets with the US market. Nevertheless, the stock return correlation of the Indian market with global markets is lower than that of other regional markets with global markets.

Table 1

Correlation of stock price indices

Sample: April 1993 to January 2008

	LBSE	LHNK	LSNG	LJP	LUK	LNYSE
LBSE	1.00	0.82	0.55	0.49	0.60	0.50
LHNK	0.82	1.00	0.57	0.46	0.75	0.68
LSNG	0.55	0.57	1.00	0.77	0.03	–0.14
LJP	0.49	0.46	0.77	1.00	0.07	–0.11
LUK	0.60	0.75	0.03	0.07	1.00	0.96
LNYSE	0.50	0.68	–0.14	–0.11	0.96	1.00

Sample: April 1993 to March 2003

	LBSE	LHNK	LSNG	LJP	LUK	LNYSE
LBSE	1.00	0.33	0.63	0.73	–0.26	–0.42
LHNK	0.33	1.00	0.42	0.37	0.46	0.40
LSNG	0.63	0.42	1.00	0.75	–0.44	–0.57
LJP	0.73	0.37	0.75	1.00	–0.25	–0.40
LUK	–0.26	0.46	–0.44	–0.25	1.00	0.95
LNYSE	–0.42	0.40	–0.57	–0.40	0.95	1.00

Sample: April 2003 to January 2008

	LBSE	LHNK	LSNG	LJP	LUK	LNYSE
LBSE	1.00	0.99	0.97	0.87	0.96	0.97
LHNK	0.99	1.00	0.98	0.86	0.97	0.98
LSNG	0.97	0.98	1.00	0.84	0.97	0.98
LJP	0.87	0.86	0.84	1.00	0.91	0.91
LUK	0.96	0.97	0.97	0.91	1.00	1.00
LNYSE	0.97	0.98	0.98	0.91	1.00	1.00

Note: The pairwise correlation measure is computed using natural logarithm-transformed stock price indices in US dollars.

Table 2

Correlation of daily stock market returns

Sample: April 1993 to 2008 (up to 18 January)

	DLBSE	DLHK	DLSNG	DLJP	DLUK	DLNYSE
DLBSE	1.00	0.26	0.24	0.18	0.16	0.07
DLHK	0.26	1.00	0.62	0.36	0.29	0.14
DLSNG	0.24	0.62	1.00	0.37	0.30	0.19
DLJP	0.18	0.36	0.37	1.00	0.18	0.08
DLUK	0.16	0.29	0.30	0.18	1.00	0.43
DLNYSE	0.07	0.14	0.19	0.08	0.43	1.00

Phase I: April 1993 to March 2003

	LBSE	LHNK	LSNG	LJP	LUK	LNYSE
DLBSE	1.00	0.17	0.16	0.11	0.09	0.04
DLHK	0.17	1.00	0.61	0.32	0.27	0.13
DLSNG	0.16	0.61	1.00	0.33	0.25	0.17
DLJP	0.11	0.32	0.33	1.00	0.15	0.06
DLUK	0.09	0.27	0.25	0.15	1.00	0.39
DLNYSE	0.04	0.13	0.17	0.06	0.39	1.00

Phase II: April 2003 to 2008 (up to 18 January)

	LBSE	LHNK	LSNG	LJP	LUK	LNYSE
DLBSE	1.00	0.50	0.49	0.32	0.30	0.15
DLHK	0.50	1.00	0.71	0.51	0.34	0.17
DLSNG	0.49	0.71	1.00	0.49	0.48	0.29
DLJP	0.32	0.51	0.49	1.00	0.24	0.12
DLUK	0.30	0.34	0.48	0.24	1.00	0.52
DLNYSE	0.15	0.17	0.29	0.12	0.52	1.00

Percentage increase in return correlation during phase II over phase I

	LBSE	LHNK	LSNG	LJP	LUK	LNYSE
DLBSE	0.0	187.2	204.9	205.1	245.6	301.2
DLHK	187.2	0.0	17.4	62.8	24.4	26.9
DLSNG	204.9	17.4	0.0	47.3	91.1	73.0
DLJP	205.1	62.8	47.3	0.0	58.2	100.1
DLUK	245.6	24.4	91.1	58.2	0.0	31.5
DLNYSE	301.2	26.9	73.0	100.1	31.5	0.0

Table 3

Statistical moments of stock returns

Full sample: April 1993 to January 2008						
Statistics	**BSE**	**HK**	**SNG**	**JP**	**UK**	**NYSE**
Mean	16.0	10.7	7.5	3.0	8.2	9.2
Std. Dev.	420.0	400.9	388.2	361.4	263.7	242.4
Skewness	–0.3	0.2	0.6	0.2	–0.1	–0.2
Kurtosis	7.7	13.8	17.6	6.5	5.8	7.0
Jarque-Bera	3,674.2	18,992.1	35,176.2	2,013.5	1,312.0	2,655.0
Phase I (April 1993 to March 2003)						
Mean	3.3	5.1	–0.4	–2.7	4.3	7.1
Std. Dev.	408.3	443.4	432.5	375.0	265.0	253.6
Skewness	0.0	0.2	0.8	0.4	–0.1	–0.2
Kurtosis	6.1	13.1	16.7	6.8	5.4	7.3
Jarque-Bera	1,029.9	11,066.0	20,665.9	1,629.1	619.9	2,065.4
Phase II (April 2003 to January 2008)						
	LBSE	**LHNK**	**LSNG**	**LJP**	**LUK**	**LNYSE**
Mean	41.3	21.9	23.1	14.5	16.0	13.5
Std. Dev.	441.6	298.2	278.9	332.3	261.0	218.2
Skewness	–0.8	–0.2	–0.4	–0.4	–0.2	–0.3
Kurtosis	10.2	7.5	6.2	5.3	6.8	5.2
Jarque-Bera	2,990.7	1,094.0	593.3	326.9	787.6	287.7
Risk-adjusted return (mean/standard deviation, in per cent)						
Full sample	3.8	2.7	1.9	0.8	3.1	3.8
Phase I	0.8	1.2	–0.1	–0.7	1.6	2.8
Phase II	9.4	7.3	8.3	4.4	6.1	6.2

4.2 Descriptive statistics

Table 3 shows statistical moments of daily stock returns, annualised over 252 trading days in percentage terms.[7] For the whole sample period, the Indian stock market provides the highest average return, while the Japanese stock market provides the lowest return. During this period, the US, UK and Hong Kong markets show more or less similar returns. The Singapore market showed a modest return, lower than that of India and other markets,

[7] The stock return for a market is defined as Rj = (Pj,t / Pj,t –1 –1) * 100 * 250, where Pj,t is the stock price index for the jth market in period t.

excluding the Japanese market. For the period April 1993–March 2003, the average stock return was marginally positive in India and Hong Kong, and insignificant and negative in Singapore and Japan, respectively, while global markets in the United States and the United Kingdom showed a modest positive return, higher than those in India and Hong Kong. In the post-Asian crisis phase, the Indian market outperforms all other markets, and regional markets in general outperform global markets. Also, in terms of risk-adjusted return (average stock return adjusted to standard deviation), the Indian stock market provides the highest return during the post-Asian crisis period.

Skewness and kurtosis measures provide insights about the underlying statistical distribution of stock returns. It is evident that skewness is negative and kurtosis is positive for all six markets during the period April 2003–January 2008. However, both the skewness and the kurtosis measures pertaining to the Indian stock market are significantly different from those of other regional and global markets. On the other hand, regional markets in Singapore and Hong Kong and global markets including the United States, the United Kingdom and Japan exhibit more or less a similar pattern of statistical distribution. The Jarque-Bera statistic, defined over skewness and kurtosis measures, is very high for all six stock markets, implying that stock returns differ significantly from the normal distribution. Alternatively, this implies that in each stock market there exist opportunities for investors to benefit from abnormal returns.

5. Empirical cointegration analysis

5.1 Unit root test

The results of the Augmented Dickey-Fuller (ADF) unit root test in Table 4 suggest that all the representative stock price indices in their natural logarithm level are non-stationary series, with the deterministic trend including both the intercept and the time trend. In first-difference form, however, these stock price indices are stationary, plausibly with an intercept-only trend component. Thus, the chosen stock price indicators are first-order integrated series, or I(1) processes.

Table 4

Augmented Dickey-Fuller (ADF) unit root test of stock price indices in US dollars

	In level form (with intercept and trend)		First difference (with intercept)	
	ADF statistic (daily)	ADF statistic (weekly)	ADF statistic (daily)	ADF statistic (weekly)
LNYSE	–1.72	–1.55	–60.05	–24.80
LUK	–1.81	–1.60	–62.68	–24.29
LJP	–1.99	–2.00	–60.71	–23.06
LSNG	–1.42	–1.49	–54.47	–22.21
LHK	–2.35	–2.41	–33.45	–22.22
LBSE	–0.75	–1.05	–54.88	–20.63

Note: MacKinnon critical values are 3.4 and 3.1 for 5 per cent and 10 per cent level of significance, respectively.

5.2 Lag length of VECM

The estimation of the Johansen and Juselius (1991) VECM requires the specification of a common lag length. In practice, the unrestricted VAR model is estimated first, and the lag length is ascertained from Swartz-Bayes information criteria (SBC), Hannan and Quinn criteria (HQC), the final prediction error criteria (FPE), the Akaike information criteria (AIC) and the sequential modified likelihood ratio test (LR). In this regard, the SBC and HQC showed a lower-order lag length of two days for the VAR model involving daily stock price data. On the other hand, the FPE and AIC determine a somewhat higher six- to eight-day lag length. Interestingly, for weekly data as well, the FPE and AIC suggested a three- to four-week lag length, while the SBC and HQC suggested a two-week lag length in line with the six- to eight-day lag length determined by the AIC and FPE for daily data. For high-frequency time series, empirical studies generally prefer lower-order lags, bearing in mind the informational efficiency of stock markets (Schollhamer and Sand (1987), Eun and Shim (1989), Hassan and Naka (1996)). Thus, our subsequent empirical analyses are based on lower-order lag lengths of two days and two weeks for daily and weekly stock prices, respectively.

5.3 Cointegration rank test

Empirical results of the cointegration rank test derived from Johansen's multivariate VECM involving the six stock prices chosen in the study are summarised in Annex Tables 2–5. The tests were conducted for natural logarithm-transformed stock price indices measured in both US dollars and local currency over sample periods pertaining to the long sample (31 March 1993 to 18 January 2008 and two phases from 1 April 1993 to 31 March 2003) and the more recent period from April 2003 to 18 January 2008, using daily and weekly data and allowing two alternative types of linear deterministic trends, referring to the intercept only (Trend 1) and to the intercept as well as the time trend (Trend 2) stock index component. There are two broad findings on the evidence of stock market integration. First, the cointegration test is sensitive to the underlying trend assumption. For stock price indices measured in US dollars for the long sample 1993–2008 and two alternative phases of the sample involving daily and weekly data, both the trace and the maximum Eigen value tests of Johansen's VECM support the evidence of a single cointegration relation with the linear trend component that includes the intercept as well as the time trend in stock market indices. Second, the currency denomination of stock prices plays an important role. Cointegration among stock markets could be supported for stock prices in US dollars for both weekly and daily data. However, for stock price indices measured in local currency, the evidence of cointegration among stock prices is not robust. Daily data could not support cointegration among stock prices in local currency for the whole sample, but could for two subsamples. On the other hand, weekly data on stock prices in local currency do not support cointegration of stock markets.

The existence of a single cointegration relation among stock price indices in US dollars gives rise to a concern that any particular stock price indicator pertaining to a global or a regional market could be critical for the integration of stock markets. Accordingly, in the first instance, we investigated the cointegration relation among five stock price indices, excluding the US stock index. Both the trace and the Eigen value tests for the VECM involving daily and weekly data on stock prices in US dollars ruled out any cointegration among five stock indices. Similarly, the exclusion of the UK index did not support cointegration among the remaining five stock indices, including the US index. However, exclusion of the Japanese, Singapore and Hong Kong indices one by one did not eliminate the evidence of a single cointegration relation. At the same time, excluding these three markets together did not eliminate the cointegration relation, implying that the cointegration space could be attributable to India's integration with two global markets, including the United States and the United Kingdom. This finding was reinforced inasmuch as five stock markets excluding the Indian market, ie, two Asian regional markets (Singapore and Hong Kong) and three global markets (the United States, the United Kingdom and Japan) were not cointegrated.

Notwithstanding these results, it was found that regional markets could not be redundant in the long-run cointegration relation, as shown subsequently in terms of the coefficients and associated asymptotic t statistic. Furthermore, the likelihood ratio (LR) for the null hypothesis of zero restriction on the coefficients of regional markets taken individually or in pairs yielded a statistically significant chi-square statistic, thus revealing the critical importance of these markets.

5.4 Cointegration over the sample period (1993–2008)

After ascertaining that at best a single cointegration relation among the US dollar-denominated stock prices is supported, it is of interest to derive some useful perspectives from the sign condition and size of the coefficients in the long-run cointegration relation pertaining to stock price indices. Since our interest is in the Indian market vis-à-vis global and regional markets, we present the cointegrating vector normalised to India's stock price (Table 5) using daily and weekly data for the full sample (1993–2008) and for two subperiods, phase I (1993–2002) and the post-Asian crisis phase (2003–08).

Table 5

Cointegration relation of stock prices in US dollars

Stock prices	Daily data			Weekly data		
	Full	Phase I	Phase II	Full	Phase I	Phase II
LWBSE (normalised)	1.00	1.00	1.00	1.00	1.00	1.00
LWHNK	–0.97 (–5.65)	–0.76 (–4.99)	–0.96 (–2.43)	–1.13 (–5.88)	–0.82 (–4.63)	–1.38 (–3.07)
LWSNG	0.42 (3.42)	0.35 (3.14)	1.02 (2.48)	0.43 (3.13)	0.38 (2.96)	1.55 (3.37)
LWJP	–0.53 (–5.05)	–0.62 (–6.34)	0.62 (2.24)	–0.46 (–3.90)	–0.65 (–5.74)	1.26 (3.94)
LWUK	–4.04 (–15.53)	–3.83 (–11.36)	5.79 (5.91)	–3.65 (–11.89)	–3.53 (–9.19)	5.95 (5.07)
LWNYSE	4.88 (17.36)	4.51 (12.17)	–10.77 (–6.72)	4.47 (12.58)	4.26 (10.05)	–12.20 (–6.39)
Trend	–0.76 (–22.19)	–0.70 (–9.62)	0.03 (0.11)	–3.29 (–10.04)	–3.38 (–8.25)	1.21 (0.84)
Intercept	–3.29	–2.75	21.41	–2.83	–2.70	24.78

Note: Figures in brackets indicate asymptotic *t* statistic.

5.4.1 Cointegration in phase I (April 1993–March 2003)

First, the coefficients of regional and global stock price indicators in the cointegration relation do not have similar signs; some are positive while others are negative, a finding attributable to the differential risks associated with global and regional markets relative to the Indian market. This implies that the six stock markets chosen could meet investors' long-run portfolio diversification objective. Second, in absolute terms, the coefficients of global markets (the United States and the United Kingdom) are substantially higher than those of regional markets such as Singapore and Hong Kong. Illustratively, for daily stock prices in US dollars, a percentage point change in the US stock index could be associated with a

4.5 per cent change in the Indian market during the period 1993–2002. However, during the same period, a percentage point change in a regional index, such as the Singapore and Hong Kong stock indices, could affect the Indian market by 0.4 per cent and 0.8 per cent, respectively. A similar finding also holds for weekly stock price data. Third, among Asian stock markets, Singapore has a negative coefficient, but Hong Kong and Japan have positive coefficients. This implies that Singapore stocks could serve as a competitor to Indian stocks and that the two markets would not be coterminous; a rise (fall) in one market could induce a fall (rise) in the other market. This finding derives from the view that Singapore is a more liberal and open economy than India. However, a crucial factor with regard to Singapore is that it has the most favourable taxation regime in terms of promoting external trade and investment. On the other hand, the Indian market could be coterminous with the Hong Kong and Japanese markets. Such a relationship among India, Hong Kong and Japan could be attributable to common risks and asset substitution on the part of investors between these markets. Fourth, as regards global markets, the United States has a negative impact while the United Kingdom has a positive impact on the Indian market, attributable to various factors. One, a naïve perspective is that the United States is the most advanced economy and a dominant trade and investment partner for most of the countries in the world. Its stock market could be characterised by international investors as having less risky assets. If the US stock market rises amid better macroeconomic fundamentals, then investors would prefer US stocks to Indian stocks. Consequently, there would be disinvestment by FIIs in India, and the stock market would witness a declining trend. However, we shall demonstrate subsequently that in a rapidly changing global environment, such perception of a country's riskiness could be contextual, varying with time or shifts in the global economic and financial environment, especially when emerging market assets show significant improvement in terms of underlying risks due to strong growth prospects. Two, the positive association of the Indian market with the London market may be plausible because the latter is considered as a benchmark by most international investors. A rise or fall in the benchmark asset return would necessitate a similar adjustment in the return on alternative stock assets of other countries. The relative strength of the UK currency vis-à-vis other currencies, especially the US dollar, could be another factor. Moreover, resident and non-resident Indians have significant business interests in the UK economy. India also constitutes a major source of foreign investment for the British economy. Three, the US and UK markets could provide competing asset portfolio choices for investors and, in the presence of two globally competitive assets, the domestic market is likely to be differentially linked with global markets.

5.4.2 Cointegration in phase II (April 2003–March 2008)

The empirical analysis for the recent period suggests various significant aspects of financial integration in the long and short run. First, the most crucial finding during the post-Asian crisis period 2003–08 pertains to changes in the cointegration relation as compared with the earlier sample from the period 1993–2002 (Table 5). Notably, a significant difference is seen in respect of global markets, including the United States, the United Kingdom and Japan. Illustratively, the cointegration relation based on daily stock prices in US dollars showed that a percentage point increase in the US stock price could in the long run induce a sharp decline in India's stock price during 1993–2002. However, during the post-Asian crisis phase (2003–08), the US market could have a strong positive effect on the Indian market, albeit stronger in absolute terms during 2003–08 than in the earlier period 1993–2002. The role of the UK market is opposite to that of the US market. Alternatively, there is a shift in the role of the UK stock market, possibly from a benchmark to a portfolio diversifier asset. Also, for the Japanese market, the coefficient was negative for the recent period as against a positive coefficient in the earlier period. Similar results were found for the cointegration relation based on weekly stock prices in US dollars. Second, regional markets such as Singapore and Hong Kong showed some stability in terms of sign condition of the coefficients in the cointegration relation between the two subsample periods. At the same time, regional markets do not have a similar impact on the Indian market; an increase in the Hong Kong

market could be associated with a rise, while an increase in the Singapore market could be associated with a fall in the Indian market. Third, in absolute terms, there is an indication of a strengthening of the long-run integration of the Indian market with regional markets such as Hong Kong and Singapore. Illustratively, a percentage point increase in the Hong Kong market could be associated with a 0.76 per cent and a 1.25 per cent change in the Indian market during 1993–2002 and 2003–07, respectively, implying a strengthening of India's integration with Hong Kong by 67 per cent between the two periods.

5.5 Short-run market linkage

The nature of short-run integration of stock markets is evident from the coefficient of the error correction term in the VECM error correction equations pertaining to the six stock price indices (Table 6). First, for daily stock prices, it is clear that the Hong Kong, Singapore and US stock markets have an inverse response, whereas the Japanese and UK stock markets have a positive response to the short-term increase in the Indian stock market during 1993–2002. Second, the coefficient of the error correction term provides another important insight about the speed of adjustment of stock markets to the underlying long-run equilibrium path during the same period. Given an unanticipated positive shock, which would cause the Indian market to deviate from the long-run path, about half a year would be required by the Indian market to revert to its potential long-run trend path during 1993–2002. As regards the response of other markets to short-term changes in the Indian market, the Singapore and US markets would adjust at a relatively faster rate than the Hong Kong, Japanese and UK markets. Third, weekly stock price data show a much higher adjustment response than daily data for all markets, excluding the United Kingdom.

In phase II, the speed of adjustment of the Indian and US markets to a short-term deviation from the long-run path increased significantly as compared with the earlier period, which includes the developments in the 1990s (Table 6). The absolute response of the Indian market has increased from 0.6 during 1993–2002 to 0.9 during 2003–08; thus, the number of days required for unit response or complete adjustment to the long-run path has declined from 166 days to 110 days during the same period. There is also a shift in the nature of short-run adjustment of other markets, ie from downward adjustment to upward adjustment in the case of the US market and vice versa for the United Kingdom and Japan, reflecting the importance of a shift in the economic and financial environment for the long- and short-run nature of the financial integration process. The short-run adjustment of regional markets in the more recent period is not statistically significant, in contrast to the significant effect of the cointegration relation, implying that India's integration with regional markets is of a long-run rather than a short-run nature in the more recent period. There are also some differences in the short-run response of global markets measured in weekly data as compared with daily data. Illustratively, the response of the US market is significant for the daily rather than the weekly sample. For the more recent period, Asian markets such as Hong Kong and Japan have become sensitive to developments in the Indian market.

Table 6

Short-run dynamics of stock markets: error correction equations (coefficient of the error correction term)

	D(LWBSE)	D(LWHNK)	D(LWSNG)	D(LWJP)	D(LWUK)	D(LWNYSE)
Daily data						
Sample (1993–2008)	–0.45 (–2.34)	–0.34 (–1.73)	–0.64 (–3.64)	0.31 (2.00)	0.25 (2.51)	–0.65 (–6.02)
Phase I (1993–2002)	–0.60 (–2.64)	–0.66 (–2.69)	–0.94 (–3.94)	0.33 (1.55)	0.30 (2.08)	–0.84 (–6.09)
Phase II (2003–2007)	–0.91 (–3.60)	–0.11 (–0.34)	–0.36 (–1.40)	–0.34 (–1.60)	–0.27 (–1.31)	0.60 (3.00)
Weekly data						
Sample (1993–2008)	–2.36 (–2.15)	–0.47 (0.18)	–1.81 (–1.65)	1.36 (2.42)	–0.37 (–0.05)	–2.23 (–4.06)
Phase I (1993–2002)	–3.00 (–2.66)	–2.03 (–1.74)	–3.41 (–3.06)	1.68 (1.15)	–0.30 (–0.95)	–2.75 (–4.74)
Phase II (2003–2007)	–4.13 (–3.64)	–1.42 (–1.89)	–1.17 (–1.48)	–3.89 (–4.20)	–0.74 (–1.92)	0.44 (–0.17)
Absolute per cent change in short-run response between phases I and II						
(Daily data)	50.69	83.01	61.91	203.63	190.50	170.63
(Weekly data)	37.99	29.97	65.57	332.28	145.01	116.02
Speed of adjustment (daily data): number of days to have unit impact						
Full sample	221	297	156	326	403	154
Phase I	166	151	106	305	338	119
Phase II	110	889	279	294	374	168
Speed of adjustment (weekly data): number of weeks to have unit impact						
Full sample	42	211	55	74	268	45
Phase I	33	49	29	60	331	36
Phase II	24	70	85	26	135	227

Notes: Figures in brackets indicate *t* statistic. For large sample, critical value of the t' is about 1.8 and 1.7 for 5 and 10 per cent level of significance, respectively. For ease of reporting, the coefficient of the error correction term is multiplied by 100. For instance, during 1993–2008, the coefficient against the Indian market at 0.45 = 0.0045 * 100.

5.6. Variance decomposition analysis

Apart from the long- and short-run dynamics, the VECM model of stock prices is useful for identifying the relative importance of each stock price to others, based on the dynamic interaction among markets through impulse response functions and forecast error variance decomposition. The latter, in particular, is useful for gauging the importance of innovations in one market to other markets and the nature of volatility transmission across markets (Chen et al (2002)). The results of the Forecast Error Variance Decomposition (FEVD) arising from the VECM for India's stock market over daily, weekly, monthly (22-day), quarterly (66-day)

and annual (250 business-day) horizons are summarised in Annex Table 6. Similar to the long-run cointegration relation, the variance decomposition analysis shows a different level of financial integration for the two different phases. It is evident that in the more recent period, the US market has had a dominant effect on the Indian stock market. Singapore is the major regional source of variation for India's stock market. Based on daily data, global and regional markets together account for about 56 per cent of the total variation in the Indian stock market over a monthly horizon for the more recent period (phase II), while they accounted for 92 per cent of such variation during 1993–2003 (phase I). However, over a six-month to one-year horizon, global and regional markets could account for as much as three fourths of the total variation in India's stock market. A notable finding here is that the impact of global markets on India was more pronounced in weekly than in daily data. The impact of regional markets was substantially lower in the weekly data model than in the daily data model. Thus, there is a declining importance of domestic factors attributable to domestic stock prices' own lags. As compared with other regional markets, it was evident that Hong Kong has a more or less similar dependence on the Singapore and US markets. On the other hand, Singapore and Japan are more dependent on the US market than is Hong Kong. The US market could account for the bulk of variation in the UK market. Finally, for the US market, domestic factors play a dominant role.

5.7 The crisis since January 2008

During 20–21 January 2008, regional markets witnessed a sharp decline in the wake of a more severe than anticipated credit market crisis in the United States. In the run-up to the crisis, the NYSE index declined by a total of 6.8 per cent between 14 and 18 January 2008, while the UK market declined by 10.8 per cent during the same period. In response, regional markets in Asia fell sharply during the two-day period of 20-21 January. From their peak level on 14 January 2008, stock markets in India, Singapore, Hong Kong and Japan declined by 22.8, 12.0, 15.1 and 10.5 per cent, respectively.

A pertinent question arises as to how the January 2008 crisis and developments thereafter up to 31 March 2008 impinged on financial market integration. In this regard there are four major findings. First, the earlier result of the single cointegration relation for the daily and weekly data continued to hold for the phase II sample, including data from 21 January to 31 March 2008. The cointegration rank tests were stronger for the extended sample period (phase II) than for the sample excluding the period from 21 January to 31 March 2008. Second, there was nonetheless a weakening of India's long-run integration, as evidenced by the coefficients of the cointegrating vector in respect of global and regional markets (Table 7). The decline was highest in respect of the impact of Singapore, followed by that of Japan, the United States, Hong Kong and the United Kingdom. Third, there was a strengthening of India's short-run integration with regional markets, as demonstrated by the size of the error correction term in the error correction equations for various markets. The increase was highest for Hong Kong, followed by India, the United Kingdom, Singapore, Japan and the United States. The weekly data showed more or less stable cointegration relations and short-run dynamics than did the daily data. Finally, in terms of variance decomposition, global and regional markets accounted for about 69 per cent of the total variation in the Indian stock market in the sample including the period from 21 January to 31 March 2008, as compared with 56 per cent in the sample excluding that period. The bulk of the increase was due to the impact of global markets such as the United States (8 per cent) and the United Kingdom (5 per cent).

Table 7

Cointegration of stock markets (impact of January 2008 crisis)

Variables	Daily data		Weekly data	
	Phase II (without 21 Jan–31 Mar 2008)	**Phase II (with 21 Jan–31 Mar 2008)**	**Phase II (without 21 Jan–31 Mar 2008)**	**Phase II (with 21 Jan–31 Mar 2008)**
LWBSE	1.00	1.00	1.00	1.00
LWHNK	–0.96 (–2.43)	–0.82 (–2.57)	–1.38 (–3.07)	–1.36 (–4.03)
LWSNG	1.02 (2.48)	0.65 (1.96)	1.55 (3.37)	1.13 (3.23)
LWJP	0.62 (2.24)	0.43 (1.87)	1.26 (3.94)	0.88 (3.63)
LWUK	5.79 (5.91)	5.24 (6.72)	5.95 (5.07)	4.65 (5.36)
LWNYSE	–10.77 (–6.72)	–9.09 (–6.98)	–12.20 (–6.39)	–9.34 (–6.41)
Trend	0.03 (0.11)	–0.19 (–1.14)	1.21 (0.84)	0.61 (0.65)
Intercept	21.41	17.43	24.78	19.55

Note: Figures in brackets indicate *t* statistic.

5.8 Some reflections on sample sensitivity

India's stock market witnessed a substantial jump from the second half of 2007, especially during the period between October 2007 and 18 January 2008. This had a significant impact in terms of strengthening India's long-run integration with global and regional markets, as evidenced by the cointegration relation estimated for the sample periods (i) from April 2003 to end-June 2007 and (ii) from April 2003 to 18 January 2008, based on daily stock price data in US dollars (Table 8). The strengthening of India's integration was significant with respect to Hong Kong, Japan and the United Kingdom.

Another interesting finding emerges from the variance decomposition results of the VECM. Between April 2003 and September 2007, about 43 per cent of the total variation in the Indian stock market over a one-year horizon (250 trading days) could be attributable to global and regional markets, with the United States and Singapore playing a major role (25 per cent and 11 per cent, respectively). In other words, domestic factors had a large impact on the Indian stock market during this period. However, for the extended sample (April 2003–18 January 2008), the variance decomposition results showed that global and regional markets could have accounted for the major component (56 per cent) of the total variation in the Indian stock market, with the United States (38 per cent) and Singapore (9 per cent) making up the largest share.

Table 8

Sample sensitivity of cointegration vector (stock prices in US dollars)

	Daily data		Weekly data	
	Phase I (April 2003 to October 2007)	**Phase I (April 2003 to 18 January 2007)**	**Phase I (April 2003 to October 2007)**	**Phase I (April 2003 to 18 January 2007)**
LWBSE (–1)	1	1	1	1
LWHNK (–1)	–0.61 [–2.10]	–0.96 [–2.44]	–0.77 [–2.14]	–1.38 [–3.07]
LWSNG (–1)	0.55 [2.21]	1.02 [2.48]	0.94 [3.10]	1.55 [3.37]
LWJP (–1)	0.05 [0.26]	0.62 [2.24]	0.49 [2.27]	1.26 [3.94]
LWUK (–2)	2.62 [4.34]	5.79 [5.91]	3.27 [4.20]	5.95 [5.07]
LWNYSE (–2)	–6.62 [–6.68]	–10.77 [–6.73]	–8.23 [–6.49]	–12.20 [–6.40]
Trend	0.354 [2.15]	0.03 [0.12]	1.799 [1.85]	1.214 [0.84]
Constant	16.96	21.41	19.59	24.78

Note: Figures in brackets indicate *t* statistic.

6. Conclusion

This study investigated the nature of the financial integration of India's stock market with global and major regional markets. The empirical analysis provides various applied finance perspectives on cointegration among stock markets, checking the sensitivity of results to sample periods in an environment of structural shifts, to the currency denomination of stock prices, and to the frequency of daily and weekly data. Empirical evidence supports the international integration of India's stock market in terms of stock prices measured in US dollars but not in local currency, a finding attributable to investment decisions of foreign investors. The differential nature of stock market cointegration arising from US dollar- and local currency-denominated stock prices also has implications for the efficiency of national stock markets. At the same time, it was found that India's stock market provides opportunities for higher returns than other regional and global markets. Also, in terms of risk-adjusted return, the Indian market outperforms others. Correlations of daily stock price indices and returns suggest a strengthening of the integration of India's stock market with global and regional markets in the more recent period since 2003. There is evidence of the differential impact of regional and global stock markets on the Indian market in the long run as well as the short run. The absolute size of coefficients in the long-run cointegration relation suggests that the Indian market's dependence on global markets, such as the United States and the United Kingdom, is substantially higher than on regional markets such as Singapore and Hong Kong. Innovation accounting in the VECM for the more recent period shows that international market developments at regional and global levels together could account for the bulk of the total variation in the Indian stock market. Within Asia, the Singapore and Hong Kong markets have significant influence, while the Japanese market

has weak influence on the Indian market. The two global markets, the United States and the United Kingdom, could have a differential impact on the Indian market in the opposite direction, amid a structural shift in India's integration with these global markets.

From a policy perspective, cointegrated stock markets would contribute to financial stability, since they cannot deviate too far from the long-run equilibrium path. From the standpoint of their portfolio diversification objective, investors cannot benefit from arbitrage activities in the long run. However, in the short run, markets would continue to be influenced by the portfolio diversification objective of foreign investors. The lack of evidence of integration of stock markets in terms of local currency gives rise to a concern that India's stock market integration may not be complete, a finding attributable to the inadequate role of domestic investors.

Annex Table 1

Stock price data definition

Country	Stock price symbol used in the study (natural log scale)	Thomson Financial's Datastream symbol	Description of the stock indices	Original data provider
India	BSE (LBSE)	IBOMDLX	BSE dollex – the 200-scrip BSE index in US dollar terms	Bombay Stock Exchange
Singapore	SNG (LSNG)	SBBSNG$	Broad market index in US dollar terms	S&P Citigroup
Hong Kong SAR	HK (LHK)	SBBHNK$	Broad market index in US dollar terms	S&P Citigroup
Japan	JP (LJP)	TOTMJP$	Broad market index in US dollar terms	Datastream
United Kingdom	UK (LUK)	SBBUKD$	Broad market index in US dollar terms	S&P Citigroup
United States	NYSE (LNYSE)	NYSEALL	NYSE composite price index	NYSE

Notes: 1. For each of the variable with the prefix "D" denotes for first difference series. Illustratively, DLBSE refers to first difference of natural logarithm transformed stock price index in India, as defined in the above. 2. In order to account for different time zones in respect of global markets and regional markets, stock prices of the US and UK markets are lagged by one day.

Annex Table 2

Cointegration test of stock prices (Johansen and Juselius VECM approach)

Stock prices in US dollars, daily data

Full sample (1993–2008) with 2 lags

Hypothesis (no of *r*)		Computed statistic (trace/Eigen) for trends		5% critical value	
Computed statistic (trace)					
H0	**H1**	**Trend 1**	**Trend 2**	**Trend 1**	**Trend 2**
None	1	75.0	162.0	95.8	117.7
At most 1	2	43.9	64.5	69.8	88.8
At most 2	3	25.5	36.6	47.9	63.9
At most 3	4	13.5	20.5	29.8	42.9
At most 4	5	3.5	8.7	15.5	25.9
At most 5	6	0.2	3.3	3.8	12.5
Computed statistic (maximum Eigen)					
H0	**H1**	**Trend 1**	**Trend 2**	**Trend 1**	**Trend 2**
None	1	31.1	97.5	40.1	44.5
At most 1	2	18.5	27.9	33.9	38.3
At most 2	3	11.9	16.0	27.6	32.1
At most 3	4	10.0	11.8	21.1	25.8
At most 4	5	3.3	5.4	14.3	19.4
At most 5	6	0.2	3.3	3.8	12.5
Phase I (1 April 1993–31 March 2003)					
Computed statistic (trace)					
H0	**H1**	**Trend 1**	**Trend 2**	**Trend 1**	**Trend 2**
None	1	86.0	149.6	95.8	117.7
At most 1	2	52.9	63.3	69.8	88.8
At most 2	3	26.3	36.6	47.9	63.9
At most 3	4	15.2	21.4	29.8	42.9
At most 4	5	4.2	10.4	15.5	25.9
At most 5	6	1.1	1.3	3.8	12.5

Annex Table 2 (cont)

Cointegration test of stock prices (Johansen and Juselius VECM approach)

Stock prices in US dollars, daily data

Phase I (1 April 1993–31 March 2003) (cont)

Hypothesis (no of *r*)		Computed statistic (trace/Eigen) for trends		5% critical value	
Computed statistic (maximum Eigen)					
H0	**H1**	**Trend 1**	**Trend 2**	**Trend 1**	**Trend 2**
None	1	33.1	86.3	40.1	44.5
At most 1	2	26.6	26.7	33.9	38.3
At most 2	3	11.1	15.2	27.6	32.1
At most 3	4	10.9	11.1	21.1	25.8
At most 4	5	3.1	9.0	14.3	19.4
At most 5	6	1.1	1.3	3.8	12.5

Phase II (1 April 1993–18 January 2008)

Computed statistic (trace)					
H0	**H1**	**Trend 1**	**Trend 2**	**Trend 1**	**Trend 2**
None	1	110.7	125.19	95.8	117.7
At most 1	2	65.5	80.03	69.8	88.8
At most 2	3	39.1	51.47	47.9	63.9
At most 3	4	23.3	32.18	29.8	42.9
At most 4	5	13.8	16.62	15.5	25.9
At most 5	6	5.9	7.83	3.8	12.5
Computed statistic (maximum Eigen)					
H0	**H1**	**Trend 1**	**Trend 2**	**Trend 1**	**Trend 2**
None	1	45.1	45.16	40.1	44.5
At most 1	2	26.5	28.57	33.9	38.3
At most 2	3	15.7	19.29	27.6	32.1
At most 3	4	9.5	15.56	21.1	25.8
At most 4	5	7.8	8.78	14.3	19.4
At most 5	6	5.9	7.83	3.8	12.5

Annex Table 3

Cointegration test of stock prices (Johansen and Juselius VECM approach)

Stock prices in US dollars, weekly data

Full sample (1993–2008) with 2 lags

Hypothesis (no of *r*)		Computed statistic (trace/Eigen) for alternative trends		5% critical value	
Computed statistic (trace)					
H0	**H1**	**Trend 1**	**Trend 2**	**Trend 1**	**Trend 2**
None	1	84.50	132.8	95.8	117.7
At most 1	2	48.46	71.3	69.8	88.8
At most 2	3	28.79	42.5	47.9	63.9
At most 3	4	14.15	23.2	29.8	42.9
At most 4	5	6.20	9.2	15.5	25.9
At most 5	6	1.25	1.6	3.8	12.5
Computed statistic (maximum Eigen)					
H0	**H1**	**Trend 1**	**Trend 2**	**Trend 1**	**Trend 2**
None	1	36.0	61.5	40.1	44.5
At most 1	2	19.7	28.8	33.9	38.3
At most 2	3	14.6	19.3	27.6	32.1
At most 3	4	8.0	14.0	21.1	25.8
At most 4	5	5.0	7.6	14.3	19.4
At most 5	6	1.2	1.6	3.8	12.5

Phase I (sample 1993–2002)

Computed statistic (trace)					
H0	**H1**	**Trend 1**	**Trend 2**	**Trend 1**	**Trend 2**
None	1	74.6	115.6	95.8	117.7
At most 1	2	46.4	64.5	69.8	88.8
At most 2	3	26.1	36.5	47.9	63.9
At most 3	4	13.7	22.9	29.8	42.9
At most 4	5	4.9	10.6	15.5	25.9
At most 5	6	1.9	1.9	3.8	12.5

Annex Table 3 (cont)

Cointegration test of stock prices (Johansen and Juselius VECM approach)

Stock prices in US dollars, weekly data

Phase I (sample 1993–2002) (cont)

Hypothesis (no of *r*)		Computed statistic (trace/Eigen) for alternative trends		5% critical value	
Computed statistic (maximum Eigen)					
H0	**H1**	**Trend 1**	**Trend 2**	**Trend 1**	**Trend 2**
None	1	28.2	51.2	40.1	44.5
At most 1	2	20.3	28.0	33.9	38.3
At most 2	3	12.4	13.5	27.6	32.1
At most 3	4	8.8	12.4	21.1	25.8
At most 4	5	3.0	8.7	14.3	19.4
At most 5	6	1.9	1.9	3.8	12.5

Phase II (sample 2003–2008)

Computed statistic (trace)					
H0	**H1**	**Trend 1**	**Trend 2**	**Trend 1**	**Trend 2**
None	1	103.5	118.92	95.8	117.7
At most 1	2	63.0	77.78	69.8	88.8
At most 2	3	40.4	51.00	47.9	63.9
At most 3	4	24.9	34.48	29.8	42.9
At most 4	5	12.1	20.53	15.5	25.9
At most 5	6	3.4	9.74	3.8	12.5
Computed statistic (maximum Eigen)					
H0	**H1**	**Trend 1**	**Trend 2**	**Trend 1**	**Trend 2**
None	1	40.5	42.76	40.1	44.5
At most 1	2	22.6	23.63	33.9	38.3
At most 2	3	15.5	16.94	27.6	32.1
At most 3	4	12.8	15.04	21.1	25.8
At most 4	5	8.8	11.05	14.3	19.4
At most 5	6	3.4	6.76	3.8	12.5

Annex Table 4

Cointegration rank test for stock prices in local currency

Daily data

Full sample (1993–2008)

Hypothesis		Computed statistic (trace/Eigen) for alternative trends		5% critical value	
Computed statistic (trace)					
H0	**H1**	**Trend 1**	**Trend 2**	**Trend 1**	**Trend 2**
None	1	78.9	104.8	95.8	117.7
At most 1	2	45.3	64.0	69.8	88.8
At most 2	3	24.5	42.1	47.9	63.9
At most 3	4	6.8	21.8	29.8	42.9
At most 4	5	2.6	6.3	15.5	25.9
At most 5	6	0.0	2.5	3.8	12.5
Computed statistic (maximum Eigen)					
H0	**H1**	**Trend 1**	**Trend 2**	**Trend 1**	**Trend 2**
None	1	33.6	40.8	40.1	44.5
At most 1	2	20.8	21.9	33.9	38.3
At most 2	3	17.7	20.3	27.6	32.1
At most 3	4	4.2	15.5	21.1	25.8
At most 4	5	2.6	3.8	14.3	19.4
At most 5	6	0.0	2.5	3.8	12.5
Phase I (Sample 1993–2003)					
Computed statistic (trace)					
H0	**H1**	**Trend 1**	**Trend 2**	**Trend 1**	**Trend 2**
None	1	86.3	118.3	95.8	117.7
At most 1	2	49.6	69.0	69.8	88.8
At most 2	3	31.3	41.7	47.9	63.9
At most 3	4	14.4	24.6	29.8	42.9
At most 4	5	2.2	9.3	15.5	25.9
At most 5	6	0.7	1.4	3.8	12.5

Annex Table 4 (cont)

Cointegration rank test for stock prices in local currency

Daily data

Phase I (Sample 1993–2003) (cont)

Hypothesis		Computed statistic (trace/Eigen) for alternative trends		5% critical value	
Computed statistic (maximum Eigen)					
H0	**H1**	**Trend 1**	**Trend 2**	**Trend 1**	**Trend 2**
None	1	36.7	49.3	40.1	44.5
At most 1	2	18.3	27.3	33.9	38.3
At most 2	3	16.9	17.0	27.6	32.1
At most 3	4	12.2	15.3	21.1	25.8
At most 4	5	1.5	8.0	14.3	19.4
At most 5	6	0.7	1.4	3.8	12.5

Phase II (2003–2008)

Computed statistic (trace)					
H0	**H1**	**Trend 1**	**Trend 2**	**Trend 1**	**Trend 2**
None	1	100.0	120.2	95.8	117.7
At most 1	2	58.4	77.8	69.8	88.8
At most 2	3	38.4	49.9	47.9	63.9
At most 3	4	19.8	30.6	29.8	42.9
At most 4	5	8.7	13.8	15.5	25.9
At most 5	6	2.5	5.2	3.8	12.5
Computed statistic (maximum Eigen)					
H0	**H1**	**Trend 1**	**Trend 2**	**Trend 1**	**Trend 2**
None	1	41.6	42.4	40.1	44.5
At most 1	2	20.0	27.9	33.9	38.3
At most 2	3	18.6	19.3	27.6	32.1
At most 3	4	11.1	16.8	21.1	25.8
At most 4	5	6.2	8.6	14.3	19.4
At most 5	6	2.5	5.2	3.8	12.5

Annex Table 5

Cointegration rank test for stock prices in local currency

Weekly data

Full sample (1993–2008)

Hypothesis		Computed statistic (trace/Eigen) for alternative trends		5% critical value	
Computed statistic (trace)					
H0	**H1**	**Trend 1**	**Trend 2**	**Trend 1**	**Trend 2**
None	1	76.4	97.1	95.8	117.7
At most 1	2	42.2	61.9	69.8	88.8
At most 2	3	22.5	38.5	47.9	63.9
At most 3	4	7.0	18.8	29.8	42.9
At most 4	5	2.7	6.3	15.5	25.9
At most 5	6	0.0	2.5	3.8	12.5
Computed statistic (maximum Eigen)					
H0	**H1**	**Trend 1**	**Trend 2**	**Trend 1**	**Trend 2**
None	1	34.2	35.1	40.1	44.5
At most 1	2	19.7	23.4	33.9	38.3
At most 2	3	15.5	19.7	27.6	32.1
At most 3	4	4.3	12.5	21.1	25.8
At most 4	5	2.7	3.8	14.3	19.4
At most 5	6	0.0	2.5	3.8	12.5
Phase I (1993–2003)					
Computed statistic (trace)					
H0	**H1**	**Trend 1**	**Trend 2**	**Trend 1**	**Trend 2**
None	1	75.5	103.8	95.8	117.7
At most 1	2	46.3	71.4	69.8	88.8
At most 2	3	26.9	42.4	47.9	63.9
At most 3	4	13.5	23.3	29.8	42.9
At most 4	5	2.4	9.8	15.5	25.9
At most 5	6	0.3	1.7	3.8	12.5

Annex Table 5 (cont)

Cointegration rank test for stock prices in local currency

Weekly data

Phase I (1993–2003) (cont)

Hypothesis		Computed statistic (trace/Eigen) for alternative trends		5% critical value	
Computed statistic (maximum Eigen)					
H0	**H1**	**Trend 1**	**Trend 2**	**Trend 1**	**Trend 2**
None	1	29.2	32.4	40.1	44.5
At most 1	2	19.4	29.0	33.9	38.3
At most 2	3	13.4	19.1	27.6	32.1
At most 3	4	11.1	13.4	21.1	25.8
At most 4	5	2.1	8.1	14.3	19.4
At most 5	6	0.3	1.7	3.8	12.5

Phase II (2003–2008)

Computed statistic (trace)					
H0	**H1**	**Trend 1**	**Trend 2**	**Trend 1**	**Trend 2**
None	1	85.9	104.3	95.8	117.7
At most 1	2	52.6	70.6	69.8	88.8
At most 2	3	28.8	43.0	47.9	63.9
At most 3	4	14.1	25.8	29.8	42.9
At most 4	5	5.4	11.1	15.5	25.9
At most 5	6	1.3	3.6	3.8	12.5
Computed statistic (maximum Eigen)					
H0	**H1**	**Trend 1**	**Trend 2**	**Trend 1**	**Trend 2**
None	1	33.3	33.7	40.1	44.5
At most 1	2	23.7	27.6	33.9	38.3
At most 2	3	14.8	17.1	27.6	32.1
At most 3	4	8.7	14.7	21.1	25.8
At most 4	5	4.1	7.5	14.3	19.4
At most 5	6	1.3	3.6	3.8	12.5

Annex Table 6

Variance decomposition of Bombay Stock Exchange (VECM model)

Stock price indices in US dollars

Horizon	LWBSE	LWHNK	LWSNG	LWJP	LWUK	LWNYSE
Daily data						
Full sample (1993–2008)						
Daily	93.7	0.9	2.5	1.4	0.2	1.4
Monthly	87.8	1.9	3.7	1.9	2.4	2.4
Weekly	91.4	1.1	3.2	1.2	0.4	2.7
Quarterly	80.9	3.5	4.1	3.0	7.3	1.3
Annual	73.3	5.0	4.3	4.0	12.9	0.6
Phase I (1993–2003)						
Daily	96.5	0.7	1.4	0.7	0.4	0.4
Monthly	91.8	1.9	2.1	1.0	2.7	0.5
Weekly	95.4	1.0	1.9	0.4	0.4	0.8
Quarterly	84.1	3.2	2.3	2.1	8.1	0.2
Annual	77.3	4.3	2.4	3.0	12.9	0.2
Phase II (2003–2008)						
Daily	76.5	2.2	10.0	3.1	0.1	8.2
Monthly	56.3	2.1	10.7	3.4	0.7	26.8
Weekly	66.7	1.9	10.7	3.5	0.0	17.1
Quarterly	48.3	2.3	9.8	3.0	2.3	34.3
Annual	44.1	2.4	9.3	2.7	3.2	38.3
Weekly data						
Full sample (1993–2008)						
Weekly	88.1	0.9	2.7	1.4	2.5	4.3
Monthly	77.1	3.7	2.7	2.3	6.2	8.0
Quarterly	65.7	8.0	3.4	2.6	12.6	7.6
Annual	55.2	11.6	3.5	3.5	20.3	5.9
Phase I (1993–2003)						
Weekly	93.3	0.7	2.7	0.6	1.9	0.9
Monthly	83.1	3.4	2.1	1.7	6.9	2.7
Quarterly	69.2	8.1	2.4	2.8	15.3	2.3
Annual	58.0	11.3	2.1	4.4	22.9	1.2

Annex Table 6 (cont)

Variance decomposition of Bombay Stock Exchange (VECM model)

Stock price indices in US dollars

Horizon	LWBSE	LWHNK	LWSNG	LWJP	LWUK	LWNYSE
Weekly data						
Phase II (2003–2008)						
Weekly	62.0	3.1	3.8	0.9	0.2	30.0
Monthly	43.7	4.2	4.0	0.4	0.1	47.5
Quarterly	32.2	5.2	3.7	1.2	1.6	56.0
Annual	26.9	5.5	3.2	1.9	2.5	59.9

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