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What Drives the Regional Integration of Emerging Stock Markets?

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Abstract

This study explores the fundamental driving forces of regional equity market integration. The determinant factors are categorized into three dimensions: local, regional and world instrumental variables. My sample consists of equity markets in 4 notable regional trading blocs: Latin America, Southeastern Asia, Southeastern Europe and Middle East over the period March 31, 1996 to March 31, 2008. We measure market integration based on pricing error as proposed by Bhattacharya and Daouk (2002) and Adler and Qi (2003). Using multivariate BEKK- GARCH (1, 1) process and non linear regression, our results show that the time-varying degree of integration of Latin America, Southeastern Asia, and Southeastern Europe region, are satisfactorily explained by the regional level of trade openness and market development. For the Middle East, individual-market volatility and inflation play a significant role in the integration process.

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1. Introduction

By the end of last century, the international economy started moving towards a single market, due to the liberalization of trade and production, which allowed better and more efficient allocation of resources. Globalization is related to regionalization, based on the fact that globalization can only be achieved by deepening trade relations among regions. The number of regional trade agreements has jumped from 27 in 1990 to 205 as of July 2007. While much of the empirical evaluation on the impact of economic integration has focused on the terms of trade, recently the scope of research has shifted from the economic sector to the financial sector. (Langhammer, 1995 and Blomström and Kokko, 1997).

At the empirical front, Bekaert and Harvey (1995) allow for partial integration of a country to the world equity markets. After controlling for a world, domestic, foreign exchange and liquidity factor, they find that enforcement has a negative effect on the cost of equity that is significant both statistically and economically. More recently, Bekaert and Harvey (2000) use changes in dividend yields to measure changes in the cost of equity. They find that changes in dividend yields have an insignificant effect on the cost of equity.

Ewing and *al.* (1999), Adler and Qi (2003) investigate the case for NAFTA; Soydemir (2000), Seabra (2001), Edwards and Susmel (2001), Chen et *al.* (2002), Heaney and *al.* (2002) and Johnson and Soenen (2003) have examined those in *Mercado Comun del Cono Sur* (MERCOSUR); while Ng (2002) and Click and Plummer (2005) covered AFTA. These studies examine various channels of stock market interaction: linkages in returns, volatility spillover, portfolio diversification, and more recently, the contagion effect during financial crises. The results of these studies are discerning in showing regional interdependence, but do not offer insights into the causes of regionalism in equity market integration.

Bracker et *al.* (1999) reported macroeconomic variables as having significant effects in the bilateral lead-lag linkages that were constructed following Geweke (1982), but Cheung and Lai (1999) found a weak contribution from macroeconomic fundamentals in explaining long run cointegration of stock returns. In a recent study, Chinn and Forbes (2004) found that direct trade with large economies to be the only important factor in explaining cross-section market linkages whereas trade competition, bank lending and foreign investment have no significant effect. The above literature provides a general picture of the current state of affairs for the driving forces on market integration. However, as market correlations and linkages reflect ex-post causalities, these studies basically represent weak tests for market integration, and do not effectively capture the process of market integration. Adler and Dumas (1983) point out that the correlation between markets depends very much on their level of international trade. As a result, market co-movement reflects only sectoral linkages instead of market integration. This argument implies that the study on stock market integration cannot be based on co-movement of stock returns. A test for market integration needs to be built on asset pricing model, which is fundamentally an ex-ante framework (Bekaert and Harvey, 1995, Bhattacharya and Daouk, 2002 and Arouri (2006)).

Carrieri and *al.* (2007) employed monthly data for eight emerging markets; Argentina, Brazil, Chile, India, Korea, Mexico, Taiwan and Thailand. In their paper, market integration is calculated from systematic risk and a pooled regression was applied on eight emerging markets, but only with four explanatory variables. They found the effect of financial development and market liberalization to have a positive impact on market integration, but trade openness and world market volatility do not show any significant impact on market integration.

Taken together, the preceding studies show that : *i*) financial development, market liberalization, linkages in returns and volatility spillover are among the most important segmentation factors for emerging markets; *ii*) asset pricing models use arbitrary two or three financial integration factors to explain their levels of integration. This suggests the testing a priori set of determinants of financial integration in the model of ICAPM.

In this study we contribute to the existing literature as follows: First, to our knowledge, this work is the first that seeks to identify a priori set of factors influencing the degree of regional integration. Second, since this study is exploratory in nature, we try to encompass as many explanatory variables as possible. We compile a list of potential determinants from the existing empirical literature on market integration. Expected returns are obtained using International Capital Asset Pricing Model (ICAPM) which permits the movement from a perfectly segmented regime to a regime which is perfectly integrated. ICAPM was pioneered by Bekaert and Harvey (1995). It enables conditional covariance between stock returns by using the multivariate BEKK-GARCH model (Baba, Engle, Kraft and Kroner, 1990).

The remainder of the article is organized as follows. Section 2 describes the empirical approach. Section 3 presents the data. Section 4 discusses the results obtained. Section 5 provides some concluding remarks.

2. Empirical approach

We adopt a simplified version of Bekaert and Harvey (1995) as our international asset pricing model. Their empirical specification allows for partial integration of a country to the world equity markets. Their model is very appealing as it permits a country to evolve from a developing segmented market (where risk is measured by the country's variance) to a developed country which is integrated to world equity markets (where risk is measured by the sensitivity of a country's equity returns to movements in the world market portfolio). This international asset pricing model is expressed as follows:

$$
\begin{aligned}
&R_{it} - R_{ft} = \Omega_{i,t-1}(\lambda_{reg,\mathrm{cov}} h_{i,reg,t} + \sum_{K=1}^{L} \lambda_{k,\mathrm{cov}} h_{i,k,t})) + (1-\Omega_{i,t-1})\lambda_{\mathrm{var}} h_{ii,t} + \varepsilon_{i,t} \\
&\varepsilon_t / \psi_{t-1} \sim N(0, H_t) \\
&H_t = C'C + aa' * \varepsilon_{t-1}\varepsilon_{t-1}' + gg' * H_{t-1} \\
&\Omega^{i}_{t-1} = Exp(\left| g'_i X_{i,t-1} \right|)
\end{aligned}
\qquad (1)
$$

where R_{it} is the dollar monthly return of the stock market index of country i at time t, R_{ft} is the one month US T-Bill at time t, R_{regt} is the dollar monthly return of the regional stock market index at time t, Ω^{i}_{t-1} is a measure of the level of integration of country i at time t, $\lambda_{reg,\mathrm{cov}}, \lambda_{k,\mathrm{cov}} and \lambda_{\mathrm{var}}$ are respectively the price of covariance risk of market i with the regional one, the price of covariance risk of market i with changes in exchange rates and the price variance of the local market. H_t is the variance-covariance matrix of returns at time $t. h_{i,reg,t}, h_{i,k,t} and h_{ii,t}$ are respectively the conditional covariance of the monthly return of the regional stock market index, the conditional covariance of the exchange rate and the conditional variance of the monthly return of the stock local market index and $\varepsilon_{i,t}$ is the residual error term.

Following Bekaert and Harvey (1995) and Bhattacharya and Daouk (2002), we adopt a 2-stage procedure to estimate the pricing system (1) since the simultaneous estimation of the full model is not feasible given a large number of unknown parameters. We first estimate a subsystem specified below:

$$
\begin{aligned}
&R_{i,t} = c_1 + \varepsilon_{it} \\
&R_{K,t} = c_2 + \varepsilon_{kt} \\
&R_{reg,t} = c_3 + \varepsilon_{regt} \\
&h_{ii,t} = b_1 + a_1(\frac{1}{2}\varepsilon^2{}_{i,t-1} + \frac{1}{3}\varepsilon^2{}_{i,t-2} + \frac{1}{6}\varepsilon^2{}_{i,t-3}) \\
&h_{ireg,t} = b_2 + a_2(\frac{1}{2}\varepsilon_{\ i,t-1}\varepsilon_{\ reg,t-1} + \frac{1}{3}\varepsilon_{\ i,t-2}\varepsilon_{\ reg,t-2} + \frac{1}{6}\varepsilon_{\ i,t-3}\varepsilon_{\ reg,t-3}) \\
&h_{ik,t} = b_3 + a_3(\frac{1}{2}\varepsilon_{\ i,t-1}\varepsilon_{\ k,t-1} + \frac{1}{3}\varepsilon_{\ i,t-2}\varepsilon_{\ k,t-2} + \frac{1}{6}\varepsilon_{\ i,t-3}\varepsilon_{\ k,t-3})
\end{aligned}
\tag{2}
$$

Model (2) was first introduced by Bollerslev, Engle, and Wooldrige (1988). As in Engle, Lilien, and Robins (1987), the weights of the lagged residual vectors are taken to be 1/2, 1/3, and 1/6, respectively. The constants c_1, c_2, and c_3 are constrained to be identical for all country-region. Quasi-maximum likelihood is used to estimate model parameters (2). $R_{K,t}$ is the return on the exchange rate of the currency of country *k* against the currency of the reference country *f*. $\varepsilon_{i,t}$ is the innovation in monthly return of the stock market index of country i, $\varepsilon_{k,t}$ is the innovation in monthly return on the exchange rate of the currency of country *k* against the currency of the reference country *f*. $\varepsilon_{reg,t}$ is the innovation in monthly return of the stock region market index. The equations (2) allow us to obtain the constants c_1, c_2, and c_3 and the conditional variance of regional market and real exchange rate, their conditional covariances as well as the prices of regional market and exchange rate risk. They are estimated first using the SIMPLEX algorithm based on starting values obtained from OLS and NLLS and then by quasi-maximum likelihood estimation (QMLE) method which is robust to departures from normality of return series under some regular conditions (see, Bollerslev and Wooldridge, 1992). The log-likelihood function to be maximized is expressed as:

$$
\ln L(\theta) = -\frac{TN}{2}\ln(2\pi) - \frac{1}{2}\sum_{t=1}^{T}\ln\left|H_t(\theta)\right| - \frac{1}{2}\sum_{t=1}^{T}\varepsilon_t'(\theta)H_t^{-1}(\theta)\varepsilon_t(\theta)
$$

where θ in the unknown parameters in the model . In the second stage, we estimate the price of local market risk and the time-varying level of integration for each emerging market in the system (3) by imposing the estimators obtained from the first stage. The system (3) is characterized by the following system of equations:

$$
\begin{aligned}
&R_{it} - R_{ft} = \Omega_{i,t-1}(\hat{\lambda}_{reg,\mathrm{cov}}\hat{h}_{i,reg,t} + \sum_{K=1}^{L}\hat{\lambda}_{k,\mathrm{cov}}\hat{h}_{i,k,t})) + (1-\Omega_{i,t-1})\hat{\lambda}_{t,\mathrm{var}}\hat{h}_{ii,t} + \hat{\varepsilon}_{i,t} \\
&H_t = C'C + aa'^{*}\varepsilon_{t-1}\varepsilon_{t-1}' + gg'^{*}H_{t-1} \\
&\Omega^{i}_{\ t-1} = Exp(-\left|\alpha_0 + \alpha_1 * F_{it-1}\right|) \\
&\varepsilon_t \sim N(0, H_t)
\end{aligned}
\tag{3}
$$

Ω^i_{t-1} is the conditional probability of transition between segmentation and integration states, which falls within the interval [0,1] and can be thus interpreted as a conditional measure of integration of market *i* into the regional market. If Ω^i_{t-1} = 1, only the covariance risk is priced and the strict segmentation hypothesis is rejected. If Ω^i_{t-1} = 0, the unique source of systematic risk is the variance and the pricing relationship in a strictly segmented market applies. Otherwise, we have an asset pricing model for partially integrated markets. Model (3) is

estimated using non-linear least squares. This step identifies the factors that contribute significantly to the explanation of financial integration.

3. Data

3.1 Stock market returns and real exchange rate

This study investigates the global integration process of four emerging market regions (Latin America, Asia, Southeastern Europe, and Middle East). Monthly data are collected for regional stock market indices, world stock market index, and real effective exchange rate indices over the period from March 31, 1996 to March 31, 2008. We use the real effective exchange rate (REER) to represent the exchange rate risk since variations in the inflation rates of emerging countries are more significant in comparison to those in the exchange rates. We use monthly stock returns for the US and regional markets. For each emerging region, the regional market index is measured by the geometric weighted average of all individual countries' stock returns against the US dollar, where the weights are the market value. These indices are extracted from Datastream International, the Federal Reserve Bank of St Louis, and the IMF's International Financial Statistics (see table 1).

3.2 Global, regional and local information variables

Global instrumental variables are used to explain changes in the prices of the world and the regional market and foreign exchange risks. Following Hardouvelis and *al.* (2006), and Carrieri and *al.* (2007), we employ the following variables:

List of Variables for Stock Market Integration Model

Determinant Variable	Measurement	Reference
Trade Openness	*TNS* = total trade with the world / Nominal GDP	Bekaert and Harvey (1997, 2000), Rajan et Zingales (2001), Bhattacharya et Daouk (2002) Carrieri et *al.* (2007)
Market Development	*MDV* = changes of (Market value / Nominal GDP)	Levine and Zervos (1996), Bekaert et Harvey (1995,1997), Bekaert et *al.* (2002), Carrieri et *al.* (2007)
Industrial production	*IPR*= Industrial production (IP)	King et Levine (1992, 1993), Savides (1995) et Odedokun (1996), Honig (2008)
Inflation Rate	$IFL = (CPI_t\text{-}CPI_{t-1})/CPI_{t-1}$	Boyd et *al.* (2001)
Yield spread	*YIS=log(L.T spread-C.T spread)*	Harvey(1995), hardouvelis and *al.* (2006)
Dividend Yield Differential	*DIVYD =DY* country *i* - *DY* world; *DY* = dividend/price	Ferson and Harvey (1993, 1994, 1998), Bekaert and Harvey (1995, 2000Chari et Henry (2004), Hardouvelis and *al.* (2006)
Exchange Rate Volatility	*EVL* = conditional volatility generated from an AR(1) process with GARCH(1,1) errors on $\log(Ex_t)$. Exchange rate is expressed in terms of domestic currency per unit of USD	Jorion (1991), De Santis and Gerard (1998), Bollerslev et *al.* (1992), Ng (2004)
Economic growth	*IPG*= Gross Domestic Product (GDP)	King et Levine (1992, 1993), Savides (1995) et Odedokun (1996), Honig (2008)

Current Account Deficit	DCA=Export-Import	-
Local market returns	$MRE = \ln(P_t / P_{t-1})$	-
Interest Rate	*INR* = log (Short term interest rate, TB rate or interbank rate)	Desroches and Francis (2007), Arouri (2006), Carrieri et *al.* (2007)
Difference in industrial production	DIP= *IP* country *i* - *IP* G7	Gurley et Shaw (1967), King et Levine (1993), Arouri (2006)

4. Results

As discussed above, we first estimate the system (2) for excess returns on regional market and returns on four real exchange rate indices. Table 3 presents the estimated parameters for the price of local market risk and the price of foreign exchange rate. Accordingly, the coefficients associated with the dividend yield (ZLDY), the regional excess return (ZRENT) and the interest rate spread (ZSPR) have a significant effect on the evolution of the price of exchange rate and local market risk. They are significant at the 1% level. Further we observe that the degree of trade openness of Latin America and South-east Europe are also significant at 1%.

Table 4 reports the factors that contribute significantly to the explanation of financial integration, which is obtained by estimating the whole system (3), while imposing the estimates from the subsystem for regional and exchange rate index returns.

The degree of trade openness of the Latin American region and Southeastern Europe is significant at 1%. Asia is characterized by a significant degree of trade openness found to be significant at 5%. These results show that these three areas are characterized by a significant and positive relationship between trade openness and intra-regional financial integration. The degree of market openness is measured by the ratio of imports plus exports to GDP. It is useful in the sense that the trade liberalization is commonly considered as a factor of convergence between markets. This liberalization process has sharply accelerated in a number of emerging market countries during the early 1980s in order to deal with the lack of resources available to finance economic growth, and to remedy the poor performance of their financial markets. Bekaert and Harvey (1997, 2000), Rajan and Zingales (2001), and Bhattacharya and Daouk (2002) document that higher degree of market openness lead to increase the exposure of national markets to global risk factors. Thus, as the markets become more open to foreign trade and capital flows, their level of economic integration rise, and asset exchanges become significant. Accordingly, the degree of market openness can be stated as a potential factor in promoting financial integration.

Market development is one of the most popular information variable applied in conditional asset pricing test for market integration (see Bekaert and *al.* 2002 and Carrieri and *al.*, 2007). Better developed markets logically attract higher international capital inflows for portfolio investment. The statistical evidence documented here shows that Market development of Latin America, Southern Asia and South East Europe are insignificant at 1%. Stock market development is positively correlated with market integration.

The coefficients of the volatility of exchange rates are statistically different from zero for the Middle East. In addition, these coefficients are negative for almost all markets surveyed. Bodart and Reding (1999) and Bracker and *al.* (1999) show that the correlations of financial markets are often explained by changes in exchange rates.

Inflation is an important determinant of financial integration in the Europe Southeast and Middle East. It is significant at 5% for the Middle East and 1% for the Southeast Europe region. These results show that higher inflation has a negative effect on the level of financial integration in these regions. Boyd and *al.* (2001) argue that high rates of inflation exacerbate financial market frictions, interfere with the efficiency of the financial system and thus inhibit long-run growth.

Short and long term interest rates are not significant for all studied markets. These results are consistent with those of Bekaert and *al.* (2005), and Hardouvelis and *al.* (2006) show that there is no relationship between increased financial integration and changes in interest rates on stock markets.

The yield spread has a positive effect on the degree of intra-regional integration in all studied areas. The positive sign shows that the rise in interest rates increases the level of intra-regional integration. These results contradict those of Arouri (2006) reveals that this variable is not significant for all emerging countries in the study of integration with the global market.

The current account deficit is statistically significant in all regions and has a negative effect on financial integration. Our results contradict those Bhattacharya and Daouk (2002) find that this factor has a positive effect on financial integration.

Regarding industrial production, the coefficient of this variable is positive and significant for the Latin American region. For the Asian market, there is a positive link between this factor and intra-regional financial integration. However this link is statistically insignificant. Southeast Europe Area and Middle East have a negative relationship between this factor and level of financial integration. These results show that strong economic growth in Latin America continued to intensify the degree of integration. Arouri (2006) confirms some of our results. Taking into account the effects of individual characteristics on the degree of market integration and using panel data, it shows that industrial production has a positive effect on the degree of integration of emerging stock markets.

Now consider the regional market returns. The coefficients of Latin America and Asia region are positive and significant. Levine and Loayza (2000) show that indicators of economic growth are positively related to the integration of capital markets in developed markets. The global market returns is not statistically significant in all regions. The local market returns is only statistically significant in Southeast Europe.

Dividend yield is an important factor in pricing the international equity risk premium (see Fama and French, 1998), and a popular instrument in international conditional asset pricing model (see Ferson and Harvey, 1993, 1994, 1998; and Bekaert and Harvey, 1995). Bekaert and Harvey (2000) show that dividend yield is a predictor for equity integration in emerging markets. So if the dividend yield differential is significant, we can expect more segmentation. The coefficients of dividend yields of the regional market are significant at conventional levels of risk in South East Europe and Middle East. In addition, the results show that dividend yields of world market are not statistically different from zero in almost all markets.

If one looks at economic growth factor, Carrieri and *al.* (2007) argue that GDP is a better approximation to capture the level of economic integration and should lead to greater integration of capital markets. Our results show that for the all studied regions, GDP is statistically different from zero. However, the signs obtained differ from one market to another. For the Latin American and Asian markets, the coefficients of this factor are negative. Southeast Europe and Middle East are characterized by positive coefficients showing that financial integration is positively affected by the level of economic growth.

Finally, the factor of global interest rates, we observe some positive signs and exist to be significant showing that the financial integration is positively related to global interest rate. However, with the exception of the Latin American region, the coefficients of this variable are not statistically different from zero. This result reaffirms the work of Arouri (2006) where he finds that this factor affect the level of integration only in the developed countries. Similarly, Chinn and Forbes (2003) and Kose and *al.* (2003) show that international interest rates are key factors in explaining co-movements of financial markets in developed countries.

5. Conclusion

Our results indicate that with the exception of the Middle East, the indicators of trade openness, stock market development and the regional market returns are significant and represent a potential source of regional interdependent stock markets. The degree of integration of Middle East is determined essentially by the factors of inflation, volatility of exchange rates and yield spread. However, the global factors such as Global market returns; difference in growth rates and difference in Dividend Yield do not affect the degree of integration of stock markets.

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Table 1 – Descriptive statistics of return series

Panel A: *Excess returns*							
	Mean	Std. dev.	**Skewness**	**Kurtosis**	**J.B**	**Q(12)**	**ARCH(1)**
Argentina	0.0001	0.067	1.497	9.482	303.812	84.22^{++}	0.327^{+++}
Brazil	-0.007	0.112	0.303	5.083	28.047	75.97^{+++}	0.209^{+++}
Mexico	-0.007	0.067	1.105	7.327	140.721	83.929^{+++}	0.634^{+++}
Chili	-0.015	-0.313	1.071	5.768	73.034	68.446^{+++}	0.957^{+++}
Malaysia	-0.014	0.072	0.941	5.395	55.332	68.860^{+++}	0.403^{+++}
Singapur	0.0009	0.113	-0.075	6.660	79.957	101.97	0.016^{+++}
Sri Lanka	-0.017	0.144	0.961	5.614	62.749	52.018	0.072^{+++}
Thailand	-0.008	0.071	0.442	4.312	14.926	58.433^{+++}	0.472^{+++}
Greece	-0.014	0.084	1.106	7.226	16.641	61.52^{+++}	0.196^{+++}
Poland	-0.002	0.103	-0.127	8.257	165.078	150.1^{+++}	0.190^{+++}
Romania	-0.004	0.076	0.496	4.951	165.079	99.948	0.285^{+++}
Czech	-0.004	0.099	-0.430	5.657	46.488	127.55^{+++}	0.062^{+++}
Egypt	0.003	0.084	0.342	4.524	16.641	168.26	1.886^{+++}
Jordanis	-0.004	0.098	-0.066	9.096	221.58	157.52^{+++}	0.341^{+++}
Israel	-0.009	0.08	0.009	6.385	68.313	70.077^{+++}	0.391^{+++}
Turkey	0.0004	0.018	-0.433	5.054	29.633	107.12^{+++}	0.937^{+++}
Monde	-0.006	0.0398	0.796	4.1402	22.852	64.761	0.554^{+++}
Panel B : *Returns on real exchange rate*							
	Mean	Std. dev.	**Skewness**	**Kurtosis**	**J.B**	**Q(12)**	**ARCH(1)**
Argentina	0.001	0.0002	-0.038	1.90	7.17	83.85^{+++}	0.020^{+++}
Brazil	0.089	0.007	-0.70	3.25	12.26	62.78^{+++}	0.418^{+++}
Mexico	0.009	0.0008	0.237	1.854	9.235	148.15^{+++}	0.828^{+++}
Chili	0.027	0.004	1.339	3.873	73.034	35.78^{+++}	1.080^{+++}
Malaysia	0.034	0.007	0.703	2.587	12.914	41.79^{+++}	0.093^{+++}
Singapur	0.269	0.038	1.109	3.594	31.689	55.55^{+++}	0.169^{+++}
Sri Lanka	0.291	0.045	1.905	4.965	110.342	30.02^{+++}	0.260^{+++}
Thailand	0.655	0.075	1.362	3.575	46.543	27.72^{+++}	0.322^{+++}
Greece	0.609	0.135	0.862	3.334	18.525	62.77^{+++}	1.366^{++}
Poland	0.531	0.337	1.315	3.360	42.312	61.64^{+++}	6.25^{++}
Romania	0.257	0.023	2.135	4.951	8.553	16.77^{+++}	0.007^{+++}
Czech	1.183	0.326	6.633	67.278	258.26	35.76^{+++}	0.944^{+++}
Egypt	0.214	0.0401	-0.132	1.471	14.434	56.81	0.064^{+++}
Jordanis	1.437	0.040	2.219	2.219	8.071	54.89	0.032^{+++}
Israel	0.214	0.040	-0.132	1.47	14.43	56.89^{+++}	0.568^{+++}
Turkey	1.437	0.033	0.428	2.219	8.071	54.89^{+++}	0.021^{+++}

Notes: JB, Q(12), and ARCH(1) are the empirical statistics of the Jarque-Bera test for normality, Ljung-Box test for serial correlation of order 1, and Engle (1982)'s test for conditional heteroscedasticity. *, **, and *** indicate that the coefficients are significant at the 10%, 5%, and 1% levels respectively. $^{+}$, $^{++}$, and $^{+++}$ indicate that the null hypothesis of normality and autocorrelation is rejected at the 10%, 5% and 1% levels respectively.

Table 2 - Descriptive statistics of instrumental variables

	L. America		S. Asia		S. Europe		Middle East	
Panel A :*Local information variables*	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
Trade openness	0.402	0.051	0.014	0.256	-0.008	0.240	0.520	0.100
Market development	0.003	0.021	0.002	0.003	0.040	0.0015	0.004	0.001
Inflation	0.015	0.011	0.017	0.014	0.004	0.002	0.280	0.021
volatility of exchange rates	0.252	0.019	0.829	0.120	0.829	0.120	0.040	0.012
Economic growth	0.022	0.007	0.040	0.006	0.025	0.0022	0.002	0.007
Current Account Deficit	9.267	9.032	103.61	11.781	0.482	1.210	0.280	0.021
National Industrial production	0.008	0.069	0.009	0.079	0.002	0.016	0.002	0.070
National Dividend Yield	2.699	1.117	1.386	0.495	1.530	1.042	1.755	1.012
Regional Dividend Yield	2.793	0.807	1.313	0.423	1.707	0.701	2.599	0.672
regional market returns	2.074	8.174	0.789	8.128	1.774	7.312	2.240	10.04
Short term interest rates	0.250	0.144	0.675	0.788	0.234	0.435	0.679	0.896
Long term interest rates	0.456	0.567	0.456	0.543	0.674	0.213	0.122	0.677
Yield spread	0.234	0.786	0.453	0.765	0.567	0.897	0.324	0.789

Panel B *: Word information variables*	***All country***	
	Mean	Std. dev.
International Interest Rate	6.373	6.373
Global market returns	3.980	3.980
International Dividend Yield	0.0398	0.0398
G7 Industrial Production	0.897	0.897
Difference in growth rates	1.897	1.897
Difference in dividend yields	2.564	2.564

Table 3 – Prices of local market and real exchange rate risks

Latin America	***Argentina***	***Brazil***	***Chili***	***Mexico***
Price of exchange rate risk	0.354***	0.426***	0.001***	0.093***
	(0.005)	(0.010)	(0.0003)	(0.001)
Price of local risk	0.008	0.016	0.030***	0.012**
	(0.008)	(0.011)	(0.012)	(0.006)
Southeastern Asia	***Malaysia***	***Singapore***	***Sri Lanka***	***Thailand***
Price of exchange rate risk	0.611***	0.009***	0.024***	0.267***
	(0.004)	(0.0009)	(0.0022)	(0.091)
Price of local risk	0.021***	0.007	0.030***	0.018***
	(0.007)	(0.010)	(0.012)	(0.007)
Southeastern Europe	***Greece***	***Poland***	***Romania***	***Czech rep***
Price of exchange rate risk	1.157***	0.237***	0.586***	0.028***
	(0.020)	(0.003)	(0.017)	(0.003)
Price of local risk	0.023	0.011***	0.012*	0.009
	(0.008)	(0.008)	(0.008)	(0.008)
Middle East	***Egypt***	***Jordanis***	***Israel***	***Turkey***
Price of exchange rate risk	0.262***	1.450***	0.258***	0.548***
	(0.02)	(0.042)	(0.019)	(0.098)
Price of local risk	-0.016**	-0.022*	-0.020*	0.0005
	(0.009)	(0.005)	(0.006)	(0.001)

Notes: *, **, and *** indicate that the coefficients are significant at the 10%, 5%, and 1% levels respectively. Numbers in parenthesis are the associated standard deviations.

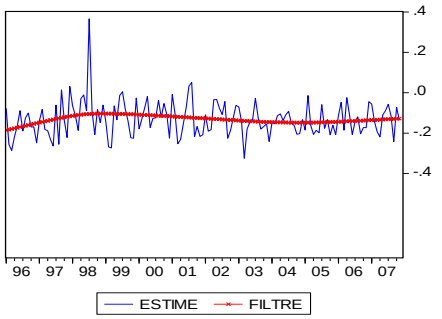
Table 4 - Variables for Stock Market Integration Model

	Latin America		S. Asia		S. Europe		Middle East	
	α_0	α_1	α_0	α_1	α_0	α_1	α_0	α_1
Trade openness	18.051***	1.107***	-1.944***	4.486**	40.85***	56.50***	-0.254	-0.39
	(6.253)	(4.044)	(-1.08)	(2.738)	(4.11)	(12.02)	(0.753)	(-0.425)
Market development	45.902***	3.603	7.764***	13.057***	19.06***	12.99***	-0.130	0.3488
	(11.553)	(11.568)	(3.339)	(3.614)	(3.028)	(3.038)	(-0.450)	(0.284)
Industrial production	52.656***	11.5***	-0.27	0.0115	0.161	-5.462	0.227	-0.0212
	(0.933)	(0.93)	(-0.739)	(0.373)	(0.295)	(-0.257)	(0.717)	(-0.459)
Inflation	1.819*	1.28	-0.243***	-0.0048	21.41***	-56.7***	-6.824**	-3.50**
	(1.085)	(1.01)	(-0.0673)	(-0.103)	(5.227)	-(5.01)	(-1.69)	(1.817)
Short term interest rates	-0.371	0.0218	-0.20	0.822*	-3.53	-2.82	-0.139	1.822
	(-0.698)	(0.475)	(-0.54)	(0.423)	(-2.27)	(-2.219)	(-0.417)	(1.728)
Yield spread	0.902*	0.900*	0.263***	0.100***	0.05***	0.050*	0.99***	0.900***
	(0.601)	(0.646)	(0.093)	(0.02)	(0.01)	(0.03)	(0.474)	(0.0001)
Short term interest rates	-0.0001	0.0004	-0.143	0.020	0.599	0.600	1.800	1.900
	(-0.0004)	(0.002)	(-0.432)	(0.01)	(1.150)	(0.650)	(6.255)	(1.700)
volatility of exchange rates	-1.978	-0.262	-4.96	-1.25	0.208	-6.94	-6.75***	-5.68***
	-(2.233)	(-2.219)	(-5.62)	(-5.545)	(0.267)	(-4.532)	(-6.34)	(-2.101)
Economic growth	0.645***	-3.66***	0.704***	-1.464***	3.033***	7.585*	-0.242	17.947***
	(0.043)	(-0.731)	(0.073)	(-0.819)	(0.228)	(2.072)	(-0.335)	(0.792)
Current Account Deficit	-6.620***	-1.533	-0.290	-0.0234	1.260***	0.05***	-0.834	0.095
	(0.782)	(1.878)	(-0.771)	(-0.364)	(1.065)	(0.001)	(-0.758)	(0.075)
local market returns	0.290	-5.80	0.498	-4.596	1.460***	0.483	0.216	-0.397
	(1.10)	(19.010)	(0.475)	(5.147)	(0.465)	(1.771)	(0.309)	(1.449)
regional market returns	-2.736***	1.546***	11.706***	0.0010***	-12.8***	-8.68***	-0.194	-2.495
	(-0.353)	(0.289)	(1.643)	(0.0001)	(-4.50)	(-2.328)	(-0.103)	-(2.443)
National Dividend Yield	0.292	-5.80***	0.495	-4.597***	-0.092	0.483**	0.216	-0.937
	(-0.264)	(-0.305)	(1.043)	(-0.893)	(-0.228)	(-0.272)	(0.698)	(-0.646)
Regional Dividend Yield	0.240	0.0189	0.288	0.0010	-40.0***	-56.5***	1.312***	0.087
	(0.44)	(0.575)	(0.474)	(0.030)	(-4.51)	(0.0021)	(0.6217)	(0.061)
Word Interest Rate	-0.0605	6.052***	-0.383	0.155	0.064	0.247	1.659	0.282
	(-0.058)	(0.290)	(-0.524)	(0.748)	(0.056)	(0.689)	(-1.79)	(1.646)
Global market returns	0.020	0.920	-0.0216	-0.0401	0.920	0.247	-0.0344	0.0547
	(0.033)	(0.598)	(-0.0541)	(-0.543)	(0.598)	(0.689)	(-0.0855)	(0.634)
International Dividend Yield	-0.207	0.559	0.0803	-0.140	0.499	0.155	-2.504**	-0.607*
	(-0.163)	(0.300)	(0.18)	(-0.76)	(0.518)	(0.557)	(-2.047)	-(1.99)
G7 Industrial Production	-0.112	-0.125	1.080	-5.589	0.399	1.258	2.704	1.508
	(-0.125)	(0.322)	(0.114)	(-4.761)	(1.058)	(1.125)	(1.778)	-(1.521)
Difference in growth rates	-0.111	0.0358	-0.283	0.255	-0.081	0.064	-4.34	0.981
	(0.123)	(0.675)	(-0.425)	0.54906	(-0.089)	(-0.072)	(-3.82)	(0.920)
Difference in Dividend Yield	-0.0028	0.605	0.043	0.075	-0.0393	0.0070	-0.089	0.659
	(0.004)	(0.426)	(0.213)	(0.078)	(0.0856)	(0.006)	(-0.857)	(0.721)

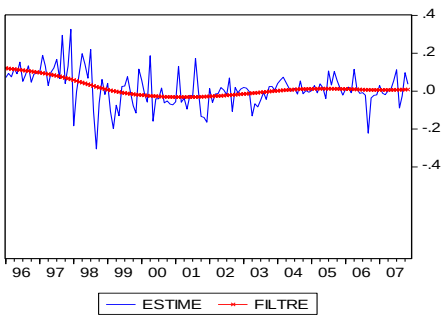
Notes: *, **, and *** indicate that the coefficients are significant at the 10%, 5%, and 1% levels respectively. Numbers in parenthesis are the associated standard deviations.

Figure 1 – *Price of exchange rate*

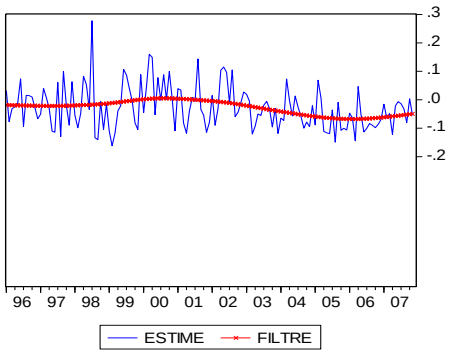
1.1 *Brazil*



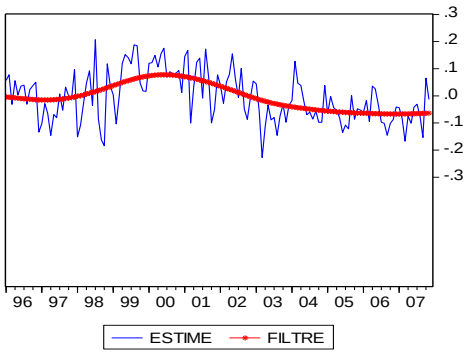
1.2 *Argentina*



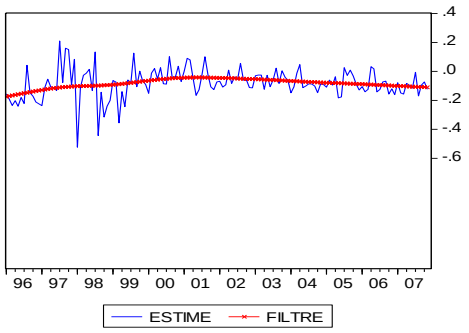
1.3 *Chili*



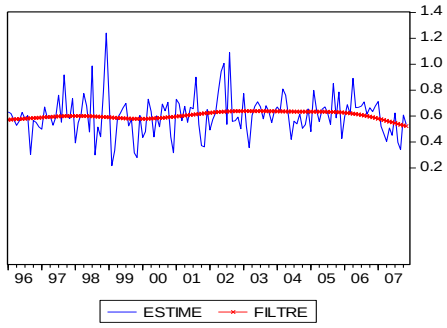
1.4 *Mexico*



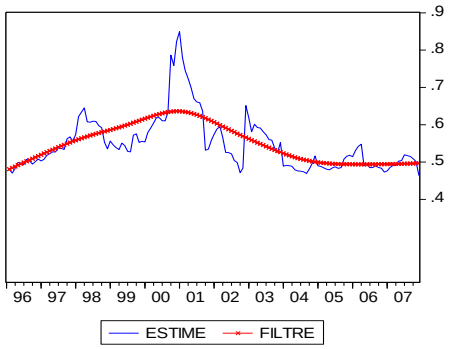
1.5 *Romania*



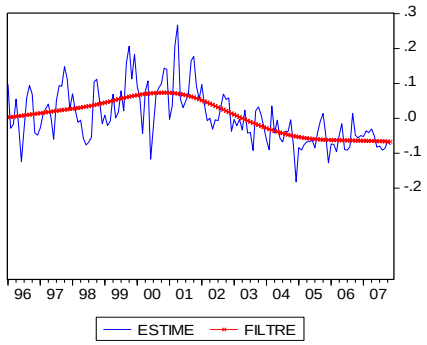
1.6 *Poland*



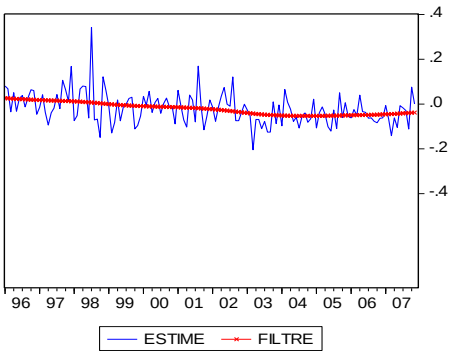
1.7 Czech



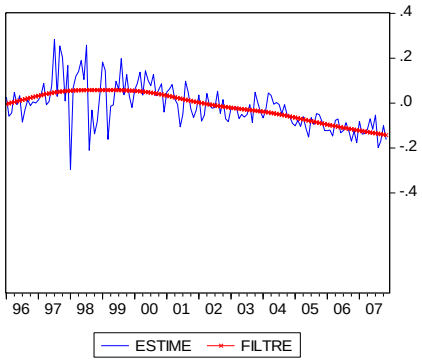
1.8 *Greece*



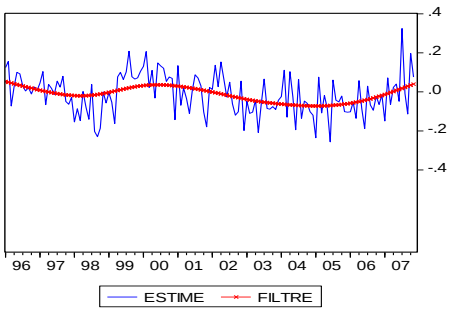
1.9 *Malaysia*



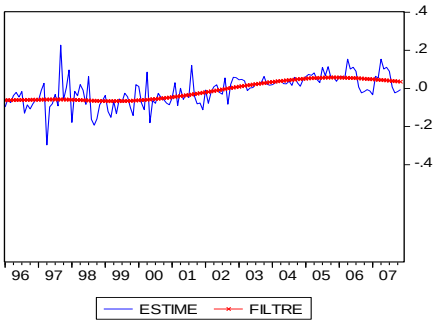
1.10 *Singapore*



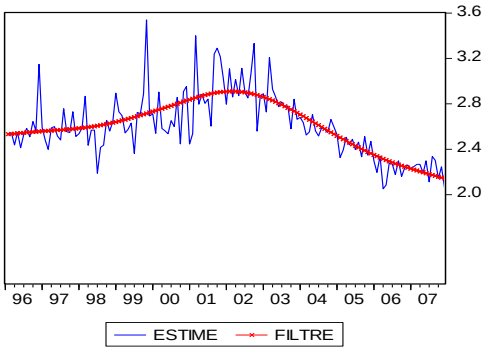
1.11 *Sri Lanka*



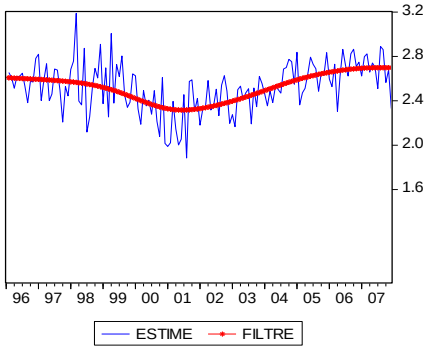
1.12 *Thailand*



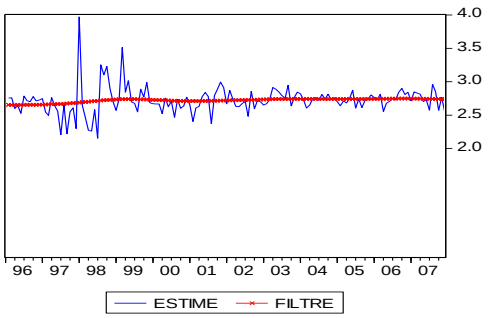
1.13 *Turkey*



1.14 *Jordan*



1.15 *Israel*



1.16 *Egypt*

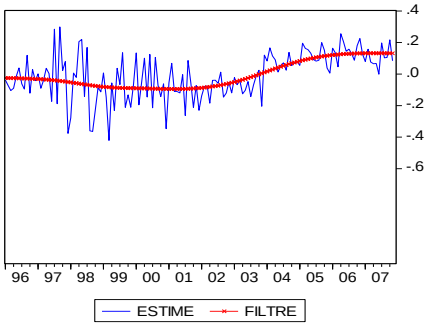
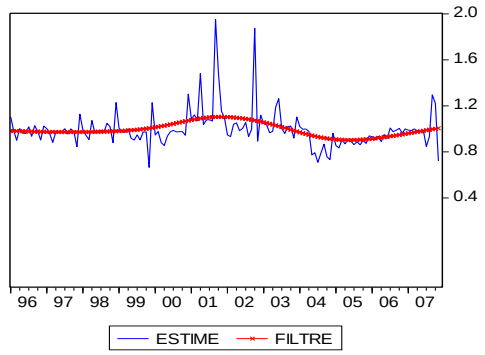
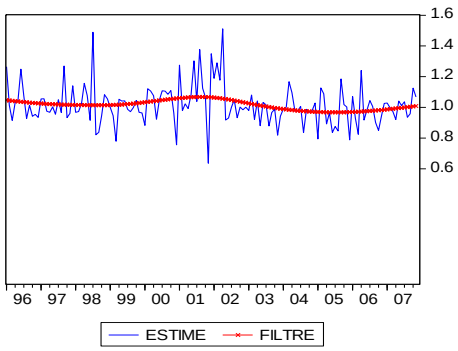


Figure 2 - Prices of regional market

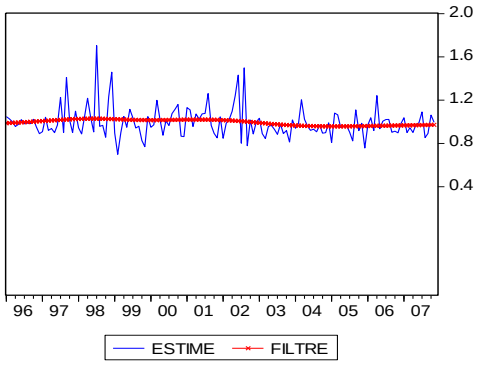
2.1 *Latin America*



2.2 *Southeastern Asia*



2.1 Southeastern Europe



2.2 *Middle East*