Integration In Middle East Stock Markets: Determinants, Effects And Evolutions

Khaled Guesmi, IPAG Business School and University of Paris Ouest Nanterre La Défense, France
Mohamed Hedi Arouri, EDHEC Business School, France
Jean-Yves Moisseron, IRD, France
Frédéric Teulon, IPAG Business School, France

ABSTRACT

This article investigates the stock market integration within the Middle East region. We develop a regional dynamic version of the CAPM and estimate it using a multivariate GARCH methodology. We contribute to the financial literature by proposing the first empirical work that addresses the following three questions for emerging stock markets from Middle East region: (i) What factors determine Middle East regional stock market integration? (ii) Is exchange rate risk priced in Middle East emerging stock markets? And (iii) what are the relative contributions of regional and local risk factors to the total risk premium in Middle East emerging stock markets?

Keywords: Market Integration Determinants; Middle East Emerging Markets; Risk Premium; Multivariate GARCH Models

1. INTRODUCTION

The Middle East is often seen as areas of political tension, rarely as an integrated and emerging zone into the global economy, zone in which investment opportunities could be attractive. To determine the benefits perceived by investors in emerging markets, it is necessary to know the expected returns and the risk associated with it. Generally, the most rigorous analysis of risk is provided by the Capital Asset Pricing Model (CAPM). However, early versions of CAPM require that the law of one price (purchasing power parity, PPP) is verified. This strong assumption nevertheless poses a major problem when one takes into account the currency risk in an international context heterogeneous. Taking into account these difficulties, a second generation of models has proposed a method of valuation of assets in an international framework based on the deviation from PPP. Adler and Qi (2003) extend the model of Bekaert and Harvey (1995) which basically combines the domestic and international versions of the International Asset Pricing Model to test the power of domestic factors, relative to that of common factors, to explain expected returns, and empirically infers segmentation when the weight of the domestic factors is high. Adler and Qi (2003) investigate the evolution of the process of integration between the Mexican and North American equity markets, between 1991 and 2002, using a model that combines the domestic and international versions of the CAPM. They show that the degree of market integration is higher at the end of the period than at the beginning, and that Mexico's currency risk is priced. Furthermore, there is significant asymmetric volatility, which is strongly related to the asymmetric volatility of the Mexican equity market return process.

Carrieri and *al.* (2007) study the integration levels of eight emerging markets over the period 1977–2000. They show that the local pricing factor continues to be relevant in the valuation of emerging-market assets, but none of the markets considered is completely segmented from the world market. Guesmi and Nguyen (2011) inspired by the model of Bekaert and Harvey (1995) use a conditional version of the ICAPM to evaluate the dynamics of the global integration process of four emerging market regions (Latin America, Asia, Southeastern Europe, and the Middle East) into the world market. They show that the integration degree in the four emerging market regions varies widely through time over the period 1996-2008, and that this can be explained by the regional factors.

Our study contributes to the existing literature by examining the dynamic regional integration of four major emerging markets in Middle East (Egypt, Jordan, Syria, and Turkey) together with its determinants in the context of the partially integrated ICAPM whose theoretical foundations have recently developed in Arouri et *al.* (2012).

If we except Iraq, the Middle East remains an area of political and financial stability until the early 2010s. Here we investigate this area by retaining four countries geographically close and near the Mediterranean: Turkey, Egypt, Syria and Jordan. These countries have a shared history because they were part of the Ottoman Empire (or zone of influence). They are located on the periphery of international finance, although Stocks Exchange (Istanbul (IMKB), Cairo, Damascus and Amman) have sought from the late 1990s to modernize. This choice is explained by the desire to exclude from the sample studied countries with powerful sovereign wealth funds (Qatar, Abu Dhabi) and those that are too distant from their history, their culture or geographical location (Saudi Arabia, Iran ...). It is also explained by the desire to eliminate political regimes "neo-patrimonialism" (Eisenstadt, 1973) – case of the Gulf states – countries both very authoritarian (poorly differentiated institutionally because of the weakness of the counter-power), in which the ruling family assumes almost all powers and strengthens allegiances by distributing discretionary benefits, income or employment.

Because of its geostrategic location between the Balkans, the Middle East and the Caucasus, Turkey is a cornerstone for regional stability, a model combining Islam, democracy and prosperity presentable (Turkey is one of the most attractive emerging economies). Egypt modern lives of four annuities: the Nile (agriculture), the history of (tourism), the Suez Canal (shipping), that its strategic position (which earned him large U.S. subsidies). Syria shares a border about 800 kilometers with Turkey and aims to play a role as a regional power. Jordan is the geographical extension of Syria to the Red Sea.

To the Arab revolutions of 2011/2012, these countries were not confronted with a situation of default or major crisis in their banking system. Their integration into the global economy has gradually made through transactions on sovereign debt, liberalization of foreign exchange markets and the modernization of exchanges. The contribution of this paper is to emphasize the fact that financial integration is often overlooked because it usually emphasizes regional political instability.

The financial integration is studied through the evolution of the risk premium using a multivariate BEKK-GARCH process. Our empirical results show that inflation rates and exchange rate volatility significantly affects changes in regional financial integration. They also point to the validity of the model we estimate and indicate that exchange rate risk is priced regionally.

The remainder of the article is organized as follows. Section 2 provides a dynamic version of ICAPM model (our aim is to measure and investigate the level of emerging market integration over time). Section 3 presents and discusses the results obtained. Section 4 provides some concluding remarks.

2. THE MODEL

Our aim is to investigate stock market integration within Middle East region. To do that, we rely on a regional extension of the CAPM of Sharpe (1964) and Lintner (1965) which predicts that, under the assumption of purchasing power parity (PPP), the excess return on a particular asset is proportional to the excess return on the reference market portfolio, with the factor of proportionality being the coefficient beta. More precisely, we adopt a partially integrated conditional regional CAPM with three risk factors: the regional risk, the exchange rate risk and the domestic risk non-diversifiable regionally. Formally, our asset pricing model takes the following form:

$$E_{t-1}(\tilde{r}_{i,t}) = \Pi_{t-1}\left[\gamma_{reg,t-1}Cov_{t-1}(\tilde{r}_{i,t},\tilde{r}_{reg,t}) + \sum_{c=1}^{l}\gamma_{c,t-1}Cov_{t-1}(\tilde{r}_{i,t},\tilde{r}_{c,t})\right] + (1-\Pi_{t-1})(\gamma_{it-1}Var_{t-1}(\tilde{r}_{i,t}))$$
$$\Pi_{i,t-1} = Exp(-|\eta'_i F_{reg,t-1}|) \quad (1)$$

With:

$i = E$ (Egypt), S (Syria), T (Turkey), and J (Jordan)

$E_{t-1}(\tilde{r}_{i,t})$ is the conditionally expected excess return on the market index of country *i*;

$E_{t-1}(\tilde{r}_{reg,t})$ the conditionally expected excess return on a regional market index;

$E_{t-1}(\tilde{r}_{c,t})$ is the return on the exchange rate of the currency of country *c* against the currency of the reference country;

Π_{it-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 one. η_i is a vector of region-specific parameters (including a constant), and F_{reg} is a vector of region-specific predetermined information variables related to convergence toward a regional market at time t-1.

If Π_{it-1} = 1, only the regional common risk is priced and the strict segmentation hypothesis is rejected; the market of country i is perfectly integrated at the regional level. If Π_{it-1} = 0, the country-specific risk is non-diversifiable regionally, only the domestic risk is priced and the market of country i is strictly segmented from the regional market.

$\gamma_{reg,t-1}$ expressed that the price of risk in the regional market depending on information z_{t-1} available at (t-1). We follow previous works to specify the evolution of prices of risk as a positive function of information variables, $\gamma_{reg,t-1} = Exp(\phi'_{reg} z_{reg,t-1})$;

$\gamma_{i,t-1} = Exp(\tau'_i z_{L,t-1})$ expresses that the price of risk in the local market depending on local information variables available at (t-1);

$\gamma_{c,t-1} = \vartheta'_c z_{c,t-1}$ denotes the price of exchange rate risk. The theory does not impose any restrictions on its sign.

l= (1, 2, 3, 4) is the number of markets included in the sample.

Returns are expressed in the currency of the reference country;

$Cov_{t-1}(\tilde{r}_{i,t}, \tilde{r}_{reg,t})$ is the conditional covariance between the excess returns of country *i*'s market index and the regional market index;

$Var_{t-1}(\tilde{r}_{i,t})$ is the conditional variance of the excess return on the domestic market non market index.

Finally, $Cov_{t-1}(\tilde{r}_{i,t}, \tilde{r}_{c,t})$ is the conditional covariance between the excess returns of country *i*'s market index and the changes of the country i's exchange rate vis-à-vis the reference currency. When the studied market is fully integrated within the region, only regional risk is priced, and the expected returns are not affected by domestic factors. If one assumes that purchasing power parity (PPP) does not hold, then in addition to regional and domestic risk, expected returns depend on deviations from PPP (Adler and Dumas, 1983). Some evidence shows this is likely the case (Dumas and Solnik, 1995 and Guesmi and Nguyen 2011). In this case, investors do not perceive domestic and foreign assets as perfect substitutes and will demand a currency risk premium to compensate for accepting risk exposure.

Under the hypothesis of rational expectations, the econometric specification of the model to be estimated, i.e. Equation (1), can be characterized by the following system of equations:

$$\tilde{r}_{it} = \Pi_{it-1}(\gamma_{reg,t-1} h_{ireg,t} + \sum_{c=1}^{l} \gamma_{c,t-1} h_{ic,t}) + (1-\Pi_{it-1})\gamma_{it-1} h_{i,t} + \varepsilon_{i,t} \quad (2)$$

$\tilde{r}_{it}$ refers to excess returns of asset i (i is one the 4 nationals returns, the 4 exchange rate returns or the regional index returns) and $\varepsilon_{i,t}$ is the residual assumed to be normally distributed. Following Guesmi and Nguyen (2011), we adopt a two-stage procedure to estimate the pricing system (2) since the simultaneous estimation of the full model is not feasible given a large number of unknown parameters. We first estimate a subsystem of five equations for excess returns on regional market and four real exchange rate indices:

$$\begin{aligned}
\tilde{r}_{reg,t} &= \gamma_{reg,t-1} h_{reg,reg,t} + \sum_{k=1}^{l} \gamma_{k,t-1} h_{reg,k,t} + \varepsilon_{reg,t} \\
\tilde{r}_{E,t} &= \gamma_{reg,t-1} h_{E,m,t} + \gamma_{1,t-1} h_{E,E,t} + \gamma_{S,t-1} h_{E,S,t} + \gamma_{T,t-1} h_{E,T,t} + \gamma_{J,t-1} h_{E,J,t} + \varepsilon_{E,t} \\
\tilde{r}_{S,t} &= \gamma_{reg,t-1} h_{S,reg,t} + \gamma_{E,t-1} h_{S,E,t} + \gamma_{S,t-1} h_{S,S,t} + \gamma_{J,t-1} h_{S,T,t} + \gamma_{T,t-1} h_{S,J,t} + \varepsilon_{S,t} \\
\tilde{r}_{T,t} &= \gamma_{reg,t-1} h_{T,reg,t} + \gamma_{E,t-1} h_{T,E,t} + \gamma_{S,t-1} h_{T,S,t} + \gamma_{T,t-1} h_{T,T,t} + \gamma_{T,t-1} h_{T,J,t} + \varepsilon_{T,t} \\
\tilde{r}_{J,t} &= \gamma_{reg,t-1} h_{J,reg,t} + \gamma_{E,t-1} h_{J,E,t} + \gamma_{S,t-1} h_{J,S,t} + \gamma_{T,t-1} h_{J,T,t} + \gamma_{T,t-1} h_{J,J,t} + \varepsilon_{J,t} \\
\varepsilon_t | \psi_{t-1} &\sim N(0, H_t) \\
H_t &= H_0 * (\tau\tau' - aa' - bb') + aa' * \varepsilon_{t-1}\varepsilon_{t-1}' + bb' * H_{t-1}
\end{aligned} \quad (3)$$

H_t is the variance-covariance matrix of returns at time *t*. H_0 is the unconditional variance-covariance matrix of the residuals. τ is a vector of ones, *a* and *b* are vectors of unknown parameters, and * denotes the Hadamard matrix product.

This stage allows us to obtain the conditional variances of regional market and real exchange rate indices, their conditional covariances as well as the prices of regional market and exchange rate risks.

Under the assumption of conditional normality, the log-likelihood function can be written as follows:

$$\ln L(\theta) = -\frac{1}{2}\left[TN \ln(2\pi) + \sum_{t=1}^{n} \ln|H_t(\theta)| + \sum_{t=1}^{n} \varepsilon_t'(\Omega) \mathrm{H}_t^{-1}(\Omega)\, \varepsilon_t(\theta) \right] \quad (4)$$

Where θ is the vector of unknown parameters. Since the assumption of conditional normality is often violated when using financial time series, we estimate the model and compute all our tests using the quasi-maximum likelihood (*QML*) approach proposed by Bollerslev and Wooldridge (1992). Under certain regularity conditions, the *QML* estimator is consistent and asymptotically normal. We obtain *QML* estimates by using the *BHHH* algorithm.

In the second stage, we impose estimations from the first step in system (5) and estimate the price of domestic market risk and the time-varying level of integration for each emerging market. Note that by doing so we explicitly maintain the same prices of regional market and exchange rate risks across different emerging market. More specifically, the second stage is characterized by the following system of equations:

$$r_{i,t} = \Pi_{i,t-1}(\hat{\gamma}_{reg,t-1}h_{ireg,t} + \hat{\gamma}_{1,t-1}h_{i,1,t}\hat{\gamma}_{2,t-1}h_{i,2,t} + \hat{\gamma}_{3,t-1}h_{i,3,t} + \hat{\gamma}_{4,t-1}h_{i,4,t})$$
$$+ (1-\Pi_{i,t-1})\hat{\gamma}_{i,t-1}h_{ii,t} + \varepsilon_{i,t}$$
$$\varepsilon_t = (\varepsilon_{i,t}, \hat{\varepsilon}_{E,t}, \hat{\varepsilon}_{S,t}, \hat{\varepsilon}_{T,t}, \hat{\varepsilon}_{J,t}, \hat{\varepsilon}_{reg,t}) / \psi_{t-1} \sim N(0, H_t) \quad (5)$$
$$\Pi_{i,t-1} = Exp(-|\eta_0 + \eta_1 F_{i,t-1}|)$$
$$\gamma_{i,t-1} = Exp(\phi_i' z_{t-1})$$

F_{t-1} is a vector of information variables expected to be linked to regional market integration.

3. DATA AND EMPIRICAL RESULTS

We first introduce the data we use and some primary analysis. Then, we discuss our main empirical findings: determinants of Middle East region stock market integration, evolution of integration and decomposition of the implied risk premium.

3.1 Data and Primary Analysis

Stock Returns and Exchange Rates

This study investigates the regional integration process of four Middle East emerging market regions (Turkey, Egypt Jordan, and Syria). The data source is Datastream International. We use monthly data collected for stock market indices, a regional stock market index calculated from a geometric average of the returns series of the four countries weighted by the series of market capitalization, also taken from Datastream International, and real effective exchange rate over the period from March 31, 1996 to March 31, 2008. All returns are expressed in American dollar. We use the real effective exchange rate (REER) index to represent the exchange rate risk since variations in the inflation rates of emerging market are much significant in comparison to those in the exchange rates.

Global and Local Information Variables

Global instrumental variables are used to explain changes in the prices of regional markets and foreign exchange risk. We employ the following variables: a constant term, the dividend yield of the region in excess of the 30-day Eurodollar interest rate which is denoted by (RDY), the return of regional market index (RRENT) and the region term premium which is denoted by (RPRM).

The local instrumental variables include a constant term, the dividend yield of a market portfolio (RDIV), the return on the stock market index in excess of the 30-day Eurodollar interest rate (RRI), and the variation in the inflation rate (VIR).

Table 1 reports the main statistics of return series for stock market and real exchange rate indices for four emerging market considered. Examination of these statistics shows that average exchange rate returns range from -0.90% (Syria) to 0.30% (Egypt). All the series display departures from normality conditions and conditional heteroscedasticity. The Jordan market was the most volatile during the studied period in terms of standard deviation (9.80%), while Turkey was the least volatile (1.80%). The skewness coefficients are positive for Egypt and Syria. They are significantly different from zero for almost all markets, indicating the presence of asymmetry in the return distribution. In addition, all the return series are characterized by a kurtosis coefficient statistically significant and greater than 3, and thus have fatter tails than those of a normal distribution. The findings from *Jarque-Bera* test, not presented here for concision purpose, confirm the rejection of normality. Engle (1982)'s test for the 1st order of conditional heteroscedasticity is also performed and rejects the hypothesis of no ARCH effects for all return series considered, which motivates our choice of GARCH modeling approach for conditional variance processes.

Table 1. Descriptive Statistics of Return Series

Panel A: Excess Returns on Regional Stock Market Indices							
	Mean	**Std. dev.**	**Skewness**	**Kurtosis**	**J.B**	**Q(12)**	**ARCH(1)**
Egypt	0.003	0.084	0.342	4.524	16.64	168.26	1.886^{+++}
Jordan	-0.004	0.098	-0.066	9.096	221.58	157.52^{+++}	0.341^{+++}
Syria	0.002	0.096	0.027	3.122	14.56	98.52^{+++}	0.141^{+++}
Turkey	0.0004	0.018	-0.433	5.054	29.63	107.12^{+++}	0.937^{+++}
Panel B: Returns on Real Exchange Rate							
Egypt	0.214	0.0401	-0.132	1.471	14.434	56.81	0.064^{+++}
Jordan	1.437	0.040	2.219	2.219	8.071	54.89	0.032^{+++}
Syria	-0.048	0.024	-0.480	1.47	7.095	52.89^{+++}	0.245^{+++}
Turkey	1.437	0.033	0.428	2.219	8.071	54.89^{+++}	0.021^{+++}

Notes: This table shows the basic statistics and the stochastic properties for stock returns in excess of the Eurodollar rates at 1 month and exchange rate. $^{+}$, $^{++}$, and $^{+++}$ indicate that the null hypothesis of normality, no autocorrelation and no ARCH effect is rejected at the 10%, 5% and 1% rate respectively.

3.2. Discussion of Empirical Results

Which Factors Determine Regional Stock Market Integration?

The CAPM is a partial equilibrium model and it does not specify state variables that can explain the observed dynamics of regional integration and thus determining the factors of integration remains a pure empirical question. Based on the findings of previous studies (e.g., Bekaert and Harvey, 1997, 2000; Bhattacharya and Daouk, 2002), a large set of candidate factors that may cause the movements in the degree of regional financial integration is studied: trade openness (measured by the ratio of total trade with the world to nominal GDP), stock market development (measured by the ratio of market capitalization to nominal GDP), industrial production (the level of industrial production in logarithm), Differences in industrial production growth rates (the difference between growth rates of the country i's industrial production and the industrial production of the G7 countries), short-term interest rate (can be the T-bill rate or the interbank rate), interest rate spread (measured by the difference between the long-term and short-term interest rates), Differences in dividend yield (refer to the difference between the country i's and the world dividend yields), Exchange rate volatility (the conditional volatility that is estimated by applying an AR(1)-GARCH(1,1) model to the exchange rates in logarithm), economic growth rate (measured by the logarithm of the changes in the GDP), Current account deficit (refers to the logarithm of the differences between exports and imports). It is expected that these factors, being important determinants of cross-border investment flows and international market convergence, have an explanatory power for the non-monotonous process of financial integration.

To identify the factors of financial integration, we estimate the system (5) simultaneously for the four studied countries by introducing the candidate factors of market integration one by one using the nonlinear least squares method and assuming that all the prices of risk are constant, as in Bhattacharya and Daouk (2002). This permits to get estimations of the coefficients η_0 and η_1 for each Middle East integration candidate factor.

The estimation results are summarized in Table 2. We find that the degree of trade openness, the level of stock market development, inflation rate, exchange rate volatility economic growth, dividend yield on the regional market, the current account deficit, and regional market returns exert a significant impact on financial integration. Our findings thus corroborate those of previous studies (Bekaert & Harveyb (1995), Bhattacharya & Daouk (200), Adler & Qi (2003), Hardouvelis & al. (2006) and Guesmi & Nguyen (2011)).

Table 2. Factors of Financial Integration

	Bilateral Exchange Rates Against the Dollar	
	η_0	η_1
Degree of trade openness	40.850***	56.500***
	(4.110)	(12.020)
Degree of stock market development	19.060***	12.990***
	(3.028)	(3.038)
National industrial production	0.161	-5.462
	(0.295)	(-0.257)
World industrial production	0.399	1.258
	(1.058)	(1.125)
Differences in industrial production growth rates	-0.081	0.064
	(-0.089)	(-0.072)
Inflation rate	21.410***	-56.700***
	(5.227)	(-5.010)
Exchange rate volatility	0.408***	6.940***
	(0.067)	(0.032)
Economic growth rate	3.033***	7.585*
	(0.228)	(2.072)
Dividend yield on the local market index	-0.092	0.483***
	(-0.228)	(-0.272)
Dividend yield on the regional market index	-40.000***	-56.500***
	(-4.51)	(0.002)
Dividend yield on the world market index	0.499	0.155
	(0.518)	(0.557)
Differences in dividend yield	-0.0393	0.007
	(0.0856)	(0.006)
Short-term interest rate	-3.530	-2.820
	(-2.270)	(-2.219)
Long-term interest rate	0.599	0.600
	(1.150)	(0.650)
Interest rate spread	0.050***	0.050*
	(0.010)	(0.030)
Current account deficit	1.260***	0.050***
	(1.065)	(0.001)
Local market returns	1.460***	0.483
	(0.465)	(1.771)
Regional market returns	-12.800***	-8.680***
	(-4.500)	(-2.328)
World market returns	0.920	0.247
	(0.598)	(0.689)
World interest rate	0.064	0.247
	(0.056)	(0.689)

Notes: We estimate the system (5) for all countries by imposing the same prices of exchange rate and regional market risks as well as conditional variances and covariances obtained during the first estimation stage. We consider one candidate factor for financial integration at a time. The numbers in parenthesis are the associated standard deviations. *, **, and *** indicate significance at the 10%, 5% and 1% levels respectively.

Since there is a numerical convergence problem at the estimation stage when we have more than two unknown parameters, only two information variables are used to capture the evolution of market integration. We choice the variation in the inflation rates (VIR) and exchange rate volatility (ERV)[1]. The choice of these factors allows for better statistical results. The degree of integration is finally modeled as follows:

$$\Pi_{i,t-1} = Exp(-|\eta_0 + \eta_1 VIR_{i,t-1} + \eta_2 ERV_{i,t-1}|) \quad (6)$$

Prices of Regional Market and Real Exchange Rate Risks

Next, we turn to the estimated prices of risk. The estimation results are reported in Table 3. It is found that the dividend yield, the term premium and the stock returns explain variations in the prices of currency risk of Egypt and Syria. However, the price of currency risk in Jordan is mainly explained by the dividend yield, and the term premium. These variables are significant at 1% level. Concerning Turkey, the dividend yields and excess returns explain regional variations in prices of real exchange risk. They negatively associated with stock returns and positively related with dividend yield and the term premium (except for Turkey). In fact, when local markets offer higher returns, increasing trading activity in stock exchanges may potentially imply higher volatility in foreign exchange markets owing to increased foreign investments.

Table 3. Prices of Regional Market, Local Market and Real Exchange Rate Risks

	Constant	RDY	RRENT	RPRM
Panel A: Price of Exchange Rate Risk				
Egypt	0.256*	0.014***	-0.003**	-0.035***
	(0.157)	(0.002)	(0.001)	(0.010)
Syria	0.165	0.011***	-0.002**	-0.001**
	(0.133)	(0.001)	(0.001)	(0.003)
Jordan	0.057	0.015***	-0.001	-0.020***
	(0.126)	(0.002)	(0.001)	(0.008)
Turkey	0.252**	0.013***	-0.003***	0.007
	(0.105)	(0.002)	(0.001)	(0.009)
Panel B: Price of Regional Market Risk				
Middle East	0.246	0.013***	0.006***	0.007
	(0.090)	(0.002)	(0.0009)	(0.008)
Panel C: Price of Local Risk				
	Constant	**RDIV**	**RRI**	**VIR**
Egypt	0.212	0.011	0.003***	0.021***
	(0.133)	(0.001)	(0.001)	(0.002)
Syria	0.005	0.001	0.021***	0.015***
	(0.003)	(0.002)	(0.001)	(0.002)
Jordan	0.033	0.014***	0.033	0.040***
	(0.120)	(0.001)	(0.032)	(0.005)
Turkey	0.152***	0.011***	0.022***	0.017***
	(0.04)	(0.002)	(0.012)	(0.003)
Panel D: Specification Test of Regional and Exchange Rate Risk				
Hypothsis nulls			χ^2	***p-value***
Is the regional risk price null? $H_0 : \lambda_i = 0$			183.361***	0.0000
Is the regional risk price constant? $H_0 : \lambda_i = 1$			217.508***	0.0000
Are the prices of the exchange rate risks jointly null? $H_0 : \lambda_i = 1$			118.122***	0.0000
Are the prices of the exchange rate risks jointly constant? $H_0 : \lambda_i = 1$			89.183***	0.0000
Is the Egyptian exchange risk price null? $H_0 : \lambda_i = 0$			12.534***	0.000
Is the Egyptian exchange risk price constant? $H_0 : \lambda_i = 1$			149.862***	0.000

[1] These variables give best statistical results.

Table 3 cont.

Is the Jordan exchange risk price null? $H_0 : \lambda_i = 0$	387.182***	0.000
Is the Jordan exchange risk price constant? $H_0 : \lambda_i = 1$	70.393***	0.000
Is the Syrian exchange risk price null? $H_0 : \lambda_i = 0$	38.716**	0.084
Is the Syrian exchange c risk price constant? $H_0 : \lambda_i = 1$	45.451**	0.076
Is the Turkish exchange risk price null? $H_0 : \lambda_i = 0$	16.80837***	0.000
Is the Turkish exchange risk price constant? $H_0 : \lambda_i = 1$	26.784***	0.000

Panel E. Analysis of Residuals

	Skewness	Kurtosis	J.B	Q(12)	ARCH(1)
Egypt	1.037^{***}	4.687^{***}	53.154^{+++}	14.413	0.886
Syria	1.311^{***}	7.427^{***}	28.013^{+++}	12.669	0.341
Turkey	-0.344^{***}	4.887^{***}	26.842^{+++}	39.194^{+++}	0.391
Jordan	2.607^{***}	8.599^{***}	258.646^{+++}	9.054	0.937
Middle East	1.201^{***}	8.567^{***}	217.508^{+++}	2.26	0.001

Notes: This table presents the estimation results of the system (4) and (5) for regional market and four real exchange index returns. JB, Q(1), 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 hypotheses of normality and autocorrelation is rejected at the 10%, 5% and 1% levels respectively.

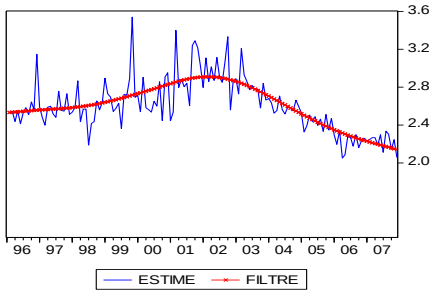
Except Turkey, the interest rate spread is significant all the markets, suggesting that changes in the prices of exchange rate risks is dependent on the movements of long- and short-term interest rates.

Similarly, the price of regional market risk is also significantly explained by regional variables and . However, the impact of these factors is positive.

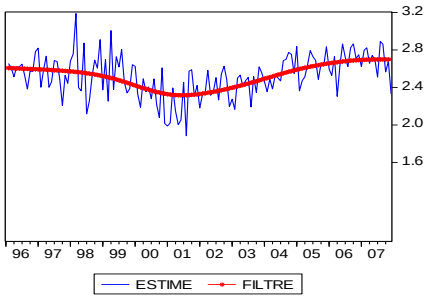
Turning out to the analysis of the prices of local risk. The lagged changes of the return on the stock market index in excess of the 30-day Eurodollar interest rate and the variation in the inflation rate affect the local price of risk in the case of Egypt and Syria. The Turkish price of local risk is mainly driven by the dividend yields of the local market, the return on the stock market index, and the variation in the inflation because the associated coefficients are statistically significant at the conventional levels. Note however that the return on the stock market index is not significant in case of Jordan.

Inspection of Figure 1 and 2, which represents changes in the prices of currency risk in different countries as well as in the regional market and local market risks, invites us to make several points to refine our analysis. First, for all studied countries, the prices of exchange rate risk react significantly to most of the economic, financial and international events such as the various monetary and financial crises in Asian countries and South America in 1997, 1998 and 2001. The price of currency risk in Turkey declined from year 2004 due to the opening of accession negotiations with the European Union and the improvement of trade balance were the cause of increased credibility combined with an influx of short-term capital. However, the price of currency risk in Jordan increases from year 2001. In fact, the local country has been affected by the global financial crisis and political uncertainties related to the death of King Hussein.

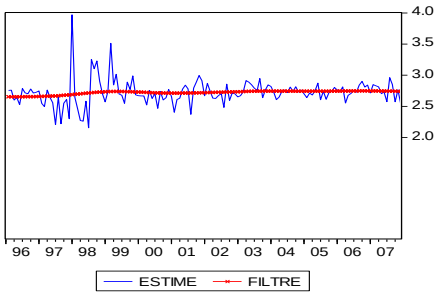
Figure 1. Prices of Exchange Rate and Regional Market Risk



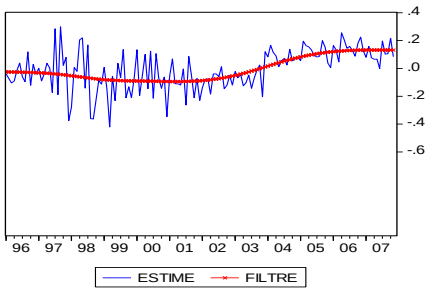
a-Price of Exchange Rate Risk for Turkey



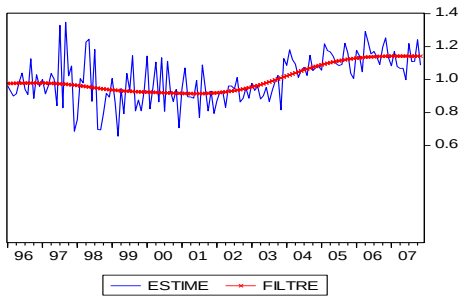
b-Price of Exchange Rate Risk for Jordan



c-Price of Exchange Rate Risk for Syria

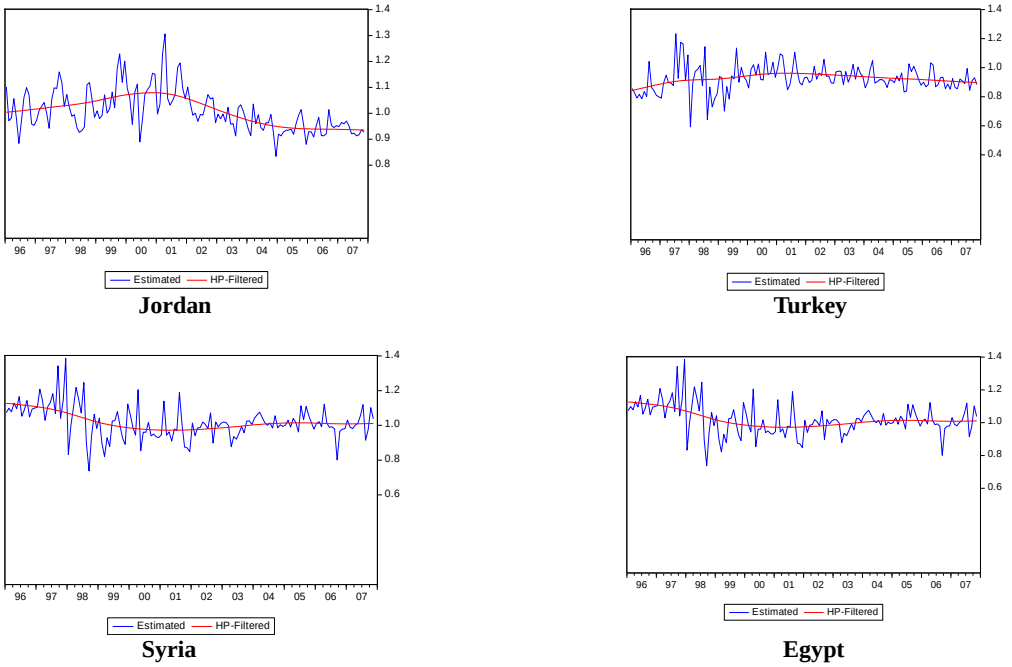


d-Price of Exchange Rate Risk for Egypt



e- Price of Regional Market Risk

Figure 2. Prices of Local Risk



The price of currency risk for Syria has not registered a particular trend, but its average is 2.8 and it remains significantly higher than in other member countries of the region. It's explained by the small opening of the country to the outside world and its foreign policy pro-Iranian make Syria a separate country that inspires suspicion to investors. The price of Egyptian currency risk, meanwhile, rose slightly from the end of 2004 because of terrorist attacks causing a sharp contraction of tourist flows.

The price of regional risk seems to react more significantly to regional and international events, while the prices of local risk show different evolutions across countries suggesting their strong dependence on pure local events.

As we also want to test for the effects of deviations from PPP on the equilibrium asset pricing relationships in Middle East countries, Wald tests of the null hypothesis of no significance of coefficients of prices of currency risk were applied and summarized in Panel D. They indicate the rejection of these null hypotheses at the 1% level for all the emerging markets considered. These findings are effectively in agreement with those of previous studies, including Carrieri et al. (2007) and Tai (2007), in that the exchange rate risk is a relevant factor of risk for asset pricing in emerging markets, and that they change over time. We finally examine the hypotheses of joint nullity and constancy of all the four prices of exchange rate risk and find evidence against their validity.

Panel E of Table 3 presents a detailed analysis of the model's standardized residuals. The departure from normality decreases substantially, but it remains significant in most cases. The Ljung-Box test reveals that the first-order autocorrelations of the standardized residuals are no longer significant, and their values decrease substantially. The Engle (1982)'s test for conditional heteroscedasticity of the standardized residuals indicates that ARCH effects no longer exist in all cases, thus revealing the suitability of the GARCH approach. Overall, this confirms the time-variation in both prices and quantities of risk as we have found based on Wald tests.

Time Varying Integration

Next, we examine the estimated degree of regional integration of the studied Middle East stock markets. The results are summarized in Table 4 and the degrees of integration evolutions are represented in Figure 3. It seems that the studied countries have relatively high levels of regional integration. Egypt is the most integrated market: its level of integration was initially about 95% during the 1996-1999 sub-period before knowing the values slightly

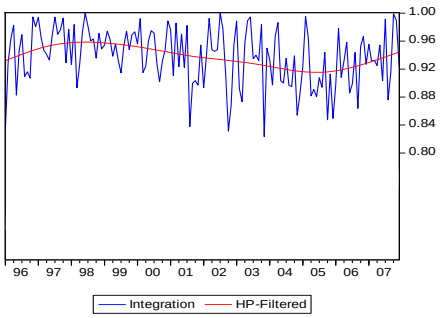
lower, around 90%. With rates of around 90% and 75%, levels of integration of Jordan and Turkey are more important in the end. Syria presents a level of integration of the order of 68.1%. Jordan has a level of integration (73.2%) slightly higher than that of Syria. The observation charts (3.2) show an upward trend in Syrian, Jordan and Turkey.

Table 4. Dynamics of Stock Market Integration

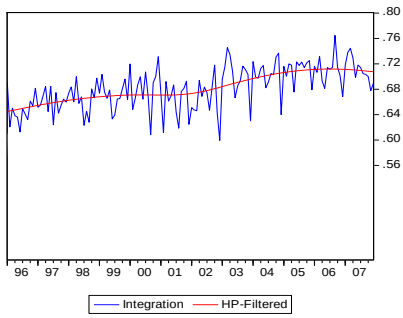
Panel A: **Parameters of the Market Integration Measure**	**Constant**	**VIR**	**ERV**
Turkey	0.681***	0.781***	0.665
	(0.034)	(0.024)	(0.566)
Egypt	0.937***	0.052***	0.04***
	(0.040)	(0.004)	(0.008)
Jordan	0.732***	0.049***	0.084*
	(0.078)	(0.021)	(0.058)
Syria	0.481***	0.0018***	0.0012
	(0.020)	(0.0003)	(0.0001)
Panel B: Statistics of Market Integration Measure	**Π mean**	**Π max**	**Π min**
Turkey	0.681***	0.764	0.505
	(0.034)		
Egypt	0.937***	0.999	0.823
	(0.040)		
Jordan	0.732***	0.929	0.586
	(0.078)		
Syria	0.681***	0.765	0.575
	(0.030)		
Panel C: Specification Test of Domestic Risk		χ^2	**p-value**
Is the Egyptian domestic risk price null? $H_0 : \lambda_i = 0$		57.030***	0.0000
Is the Egyptian domestic risk price constant? $H_0 : \lambda_i = 1$		77.52***	0.0000
Is the Jordan domestic risk price null? $H_0 : \lambda_i = 0$		22.189***	0.0002
Is the Jordan domestic risk price constant? $H_0 : \lambda_i = 1$		12.510***	0.0000
Is the Syrian domestic risk price null? $H_0 : \lambda_i = 0$		27.189***	0.0000
Is the Syrian domestic risk price constant? $H_0 : \lambda_i = 1$		32.586***	0.0000
Is the Turkish domestic risk price null? $H_0 : \lambda_i = 0$		11.067***	0.0258
Is the Turkish domestic risk price constant? $H_0 : \lambda_i = 1$		68.346***	0.0000

Notes: χ^2 is the empirical statistics of the Wald tests examining the null hypotheses of nullity and constant coefficients. $^{++}$, and $^{+++}$ indicate rejection of the null hypotheses at the 5% and 1% rate respectively.

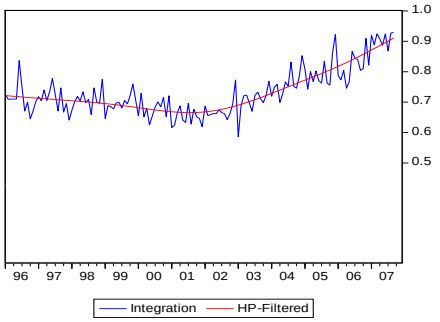
Figure 3. Degrees of Regional Integration



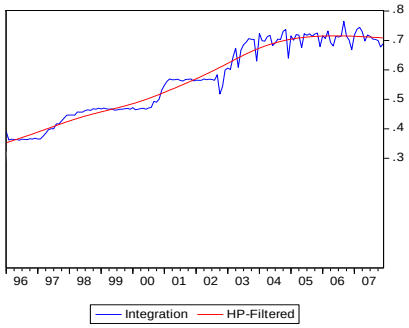
Egypt



Syria



Jordan



Turkey

The High levels of intra-regional financial integration we obtained may be explained by increasing trade between the studied countries. If institutional integration is not structured by the regulatory framework of the governments of the studied countries, financial integration is greater thanks to private initiative which is not inconsistent with the financial structures of countries in the region. A number of works, such as Krugman (1991) have sought to reintroduce the role of distance and proximity in determining trade flows. Indeed, the existence of more developed countries such as Turkey (in particular in terms of GNP) in the vicinity of Egypt and Jordan exerts a pull on these countries and, conversely, the less developed becomes attractive for investment by most developed countries of the region. From this point of view, the heterogeneity of levels of development for the Middle East, promotes intra-regional integration.

Risk Premium Analysis

The purpose of this section is to analyze the formation of the total premium risk in the studied Middle East emerging countries. The total risk premium (PRT) is divided into the regional risk premium (the sum of the regional market risk premium and the currency risk premium) and residual domestic risk premium. These risk premiums are calculated based on the estimation results from Table 3.

Table 5 reports the average values of the total, the global and local risk premiums. The two-sided Student-t test indicates that both the global and local risk premiums are significantly different from zero at the 1% level for all the countries considered. Egypt has the highest total risk premium, followed by Jordan, Syria. As expected, Turkey, the most developed market in the region, has the lowest estimated total risk premium.

Table 5. Decomposition of the Total Risk Premium

	PRT(%)	PRD(%)	PRR(%)
Syria	9.421^{+++}	2.247^{+++}	7.174^{+++}
	(0.115)	(0.009)	(0.114)
Jordan	9.580^{+++}	4.326^{+++}	5.255^{+++}
	(0.179)	(0.048)	(0.174)
Egypt	15.608^{+++}	0.594^{+++}	15.014^{+++}
	(0.210)	(0.003)	(0.195)
Turkey	7.385^{+++}	0.065^{+++}	7.320^{+++}
	(0.157)	(0.009)	(0.157)

Notes: $^{+++}$ indicates that the average risk premiums are significantly different from zero at the 1% level with respect to the two-sided Student-t test. PRT = Total risk premium, PRD= domestic risk premium and PRR = regional risk premium.

The local risk premiums are on average smaller than the regional premiums for all markets studies. The local risk premium in Jordan is the largest in terms of contribution to the total risk premium. This result is in fact expected, given the high risk exposure of this country, e.g., repeated political and economic crises. For the remaining country members, the proportion of local risk premium in the total risk premium ranges from 0.08 % (Turkey) to 31.32% (Syria).

4. CONCLUSION

The purpose of this paper is to study the dynamics of the global integration process of four emerging market into the regional market, while taking into account the importance of exchange rate and domestic market risk. A capital asset pricing model suitable for partially integrated markets and departure from purchasing power parity was developed in the spirit of Bekaert and Harvey (1995)'s regime-switching model in order to explain the time-variations in expected returns. In its fully functional form, the model allows the market integration measure as well as the regional and domestic risk premiums to vary through time and thus permits the investigation of regional integration determinants as well as a detailed examination of the implied total risk premium.

Our findings show that the studied Middle East countries are highly regionally integrated. Changes in the degree of regional stock market integration are essentially determined by variations in inflation rates and exchange rate volatility. Moreover, we show that deviations from PPP are significantly priced and that currency risk and regional market risk are the most components of the total estimated risk premium. However, significant differences exist across the studied countries.

AUTHOR INFORMATION

Khaled Guesmi, Department of Finance, IPAG Business School, IPAG – Lab EconomiX – University of Paris Ouest Nanterre La Défense, France, E-mail: khaled.guesmi@ipag.fr (Corresponding author)

Mohamed Hedi Arouri, CRCGM Université d'Auvergne and EDHEC Business School, France, E-mail: Mohamed.arouri@u-clermont1.fr

Jean-Yves Moisseron, IRD Paris, France; E-mail: jean-yves.moisseron@ird.fr

Frédéric Teulon, Department of Finance, IPAG Business School, IPAG – Lab, France, E-mail: f.teulon@ipag.fr

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