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## Integration versus segmentation in Middle East North Africa Equity Market: Time variations and currency risk

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### ABSTRACT

This article investigates the dynamics of regional financial integration and its determinants in an international setting. We test a conditional version of the international capital asset pricing model (ICAPM) accounting for the deviations from purchasing power parity (PPP) as well as temporal variations in both regional and local sources of risk. Using data from seven major countries of the Middle East North Africa (MENA) region (Turkey, Israel, Egypt, Jordan, Syria, Kuwait and Tunisia), our results support the validity of ICAPM and indicate that the risk is regionally priced. Furthermore, we show that changes in the degree of regional stock market integration are explained principally by inflation, exchange rate volatility, rate spread variations, short-term interest rate and world market dividend yield.

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## 1. Introduction

Despite there is a consensus in the literature to say that the degree of emerging market integration varies over time (Bekaert and Harvey, 1995; Carrieri et al., 2007; Guesmi and Nguyen, 2011), empirical results are relatively divergent regarding the identification procedure of market integration determinants. Studies such as Bekaert and Harvey (1995, 1997), Adler and Qi (2003), and Hardouvelis et al.

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(2006) opt for an arbitrary choice of two or three financial and macroeconomic variables to model the dynamics of integration, while [Carrieri et al. \(2007\)](#) determine *ex-post* financial integration factors. The method proposed by [Carrieri et al. \(2007\)](#) may be subject to criticism because it arbitrarily introduces certain information variables to assess financial integration before they are considered as candidate variables that might explain financial integration.

Our study contributes to the existing literature by examining the dynamic regional integration with its determinants of seven major emerging markets in MENA (Turkey, Israel, Jordan, Egypt, Syria, Kuwait and Tunisia) together in the context of the partially integrated ICAPM whose theoretical foundations have recently developed in [Aroui et al. \(2012\)](#). We believe it makes sense to compare countries that do not belong to a single currency area but which are geographically close to each other, but unlike previous works, we firstly attempt to identify *ex ante* the driving forces behind the integration process of national stock markets from a set of local, regional and global variables. We also consider, in addition to the systematic risks associated with regional and local markets, changes in exchange rates which are, according to previous studies, a relevant source of risk in pricing emerging market assets ([Adler and Dumas, 1983](#); [Carrieri et al., 2007](#); [Tai, 2007](#)).

Our empirical results show that the inflation, exchange rate volatility, rate spread variations and world market dividend yield significantly affects changes in regional financial integration. They also point to the validity of the ICAPM and indicate that exchange rate risk is priced regionally. As in previous studies ([Hardouvelis et al., 2006](#); [Carrieri et al., 2007](#); [Tai, 2007](#)), we find that stock market integration involves through time and its changing patterns differ across studied markets.

The paper is organized in five sections. Section 2 presents the model with the estimation methodology used. Section 3 presents the data, while Section 4 presents analyses the empirical findings. Section 5 concludes.

## 2. The model

Time varying capital market integration should be characterized on the basis of theoretical model that satisfies some properties: (i) the model should be rich enough to accommodate the continuously progressing international stock market from segmented to completely integrated markets, (ii) the model must characterize the changes in market integration through time owing to the impacts of the gradual removal of direct and indirect barriers to emerging market investments.

Consider first a fully integrated regional financial market in which purchasing power parity holds. Under these assumptions, several authors ([Adler and Dumas, 1983](#)) have extended the domestic CAPM of [Sharpe \(1964\)](#) to an international setting. Formally, a conditional version of the model can be written as:

$$E_{t-1}(R_{it}^c/\psi_{t-1}) = \delta_{reg,t-1} Cov(R_{it}^c, R_{reg,t}^c/\psi_{t-1}) \quad (1)$$

where  $E_{t-1}(R_{it}^c)$  is the excess return issued in country  $i$ , conditionally on a set of information  $\psi_{t-1}$  that is available to investors up to time  $t - 1$ .  $R_{reg,t}^c$  is the return on the regional market portfolio.  $Cov$  is the conditional covariance between the security's return and the region market returns.  $\delta_{reg,t-1}$  refers to the conditionally expected price of covariance risk.

However, the existence of explicit restrictions to capital flows in emerging markets, and the empirical record ([Bekaert and Harvey, 1995, 1997](#)) suggests that emerging markets, may not be fully integrated. [Errunza and Losq \(1989\)](#) extend the ICAPM to account for mild segmentation between markets: a subset of the assets is available to all investors, while ownership of the remaining assets is restricted to a subset of the investors. Under these assumptions, expected returns are a function of two risk factors: exposure to global market risk and exposure to non diversifiable national risk. This model can be written as follows:

$$E_{t-1}(R_{it}^c) = \Delta_{t-1}^i \left[ \delta_{reg,t-1} Cov(R_{it}^c, R_{reg,t}^c) + \sum_{k=1}^l \delta_{k,t-1} Cov(R_{it}^c, t_{kt}^c) \right] + (1 - \Delta_{t-1}^i) \delta_{i,t-1} Var(R_{it}^c) \quad (2)$$

where  $t_{kt}^c$  is the return on the exchange rate of the currency of country  $k$  against the currency of the reference country  $c$ .  $\delta_{k,t-1}$  expresses the expected price of the exchange risk for currency  $k$ .  $l$

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