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New evidence on time-varying financial integration within Gulf Cooperation Council stock markets

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Abstract: The aim of this study is to investigate the dynamics of regional financial integration among Gulf Cooperation Council (GCC) countries by pricing the local stock market return based on different risk premia related to the regional stock market and exchange market. Our approach is based on the international capital asset pricing model (ICAPM), which accounts for the degree of financial integration in the pricing of market risk premia. We also construct a regional currency basket, named *Khaleeji*, in order to obtain a reference currency in this area and to prospect the twin objective: a lesser peg to the US dollar and the emergence of regional monetary cooperation. Our main findings show that GCC stock markets are impacted by both regional and local financial shocks and crises. Analysis of the long-term dynamics highlights that the regional risk premium is not negligible for GCC countries, and better cooperation can enhance regional risk-sharing. The results also indicate that the degree of regional financial integration varies from country to country, leaning toward a partial integration level of GCC countries within their region. The increasing importance of regional risk premia and financial integration could encourage further financial cooperation among GCC countries, ultimately leading to better economic integration.

Keywords: Regional financial integration, GCC countries, international capital asset pricing model (ICAPM), common currency, *Khaleeji*.

JEL classification: C32, F31, F36, G11, G15.

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1. Introduction

In 1981 the Cooperation Council of the Arab States of the Gulf (hereafter the Gulf Cooperation Council, or the GCC) was created, which groups together six countries, including: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates. The council was originally created to build a regional security alliance.[3] These countries share many similarities, including culture, religion, and language. In addition, they have common economic criteria: a common business cycle (Al-Hassan, 2009), financial links with the global equity market (Sedik and Williams, 2011)[4] and energy dependence, namely, oil and gas (Abed et al., 2003). In 1983 the first stage of economic integration took place with the creation of a free trade area.[5] This agreement was initiated to promote economic diversification, efficiency, and greater competition (Sager, 1997). Although the region was created several years ago, implementation has been slow and is not yet complete. In 1999 the idea of a customs union was initiated; it was effectively launched in 2003.[6]

The GCC countries have pursued economic and financial integration since 1981, although several steps remain before full integration of the financial markets is reached. Despite the increase in the degree of financial integration, the GCC area still faces various challenges (Jouini, 2020). We assess the extent of regional financial integration in the countries of the GCC using the international capital asset pricing model (ICAPM), which accounts for the degree of financial integration in the pricing of market risk premia. We also construct a regional currency basket, the *Khaleeji*, to obtain a reference currency in this area and to prospect for the emergence of regional monetary cooperation.

At a global level, the importance of financial market integration lies in implementing openness and a strategy of economic liberalization. Since the 1980s, financial integration has arguably brought many benefits, such as better inter-temporal consumption smoothing, international risk-sharing, and more efficient allocation of capital for investment (Yu, 2015; Billio et al., 2017), although conversely it has the potential to fuel troublesome reversals of capital flow and contagion effects in times of crisis (Forbes and Rigobon, 2002). At a regional level, financial integration can achieve the same aims, with lower potential risk of reversal if completed through

[3] See, for example, Sassanpour (1996) for a discussion.
[4] See also Aloui and Hkiri (2014) and Jouini (2023).
[5] See Tables A.1 to A.4 for detailed statistics on the geographical trade repartition of GCC countries. All detailed statistics on trade since 2000 are available upon request from the authors.
[6] See Dar and Presley (2001) for a complete discussion of the Gulf Cooperation Council. See also, for example, Kamar and Ben Naceur (2007).

adequate regional cooperation agreements. It can also be viewed as a strategic choice to enhance trade and firm cooperation within a geographical area.

In general, a broad range of definitions for financial integration is frequently cited in the literature, including financial openness, free movement of capital, integration of financial services and relaxation of capital controls, and interest rate convergence. Moreover, there is a vast body of literature covering the evaluation of financial integration, ranging from investigating the return co-movements, to assessing international capital flows, and studying the spillovers of market shocks and volatilities. The existing literature, for example Gérard et al. (2003), documents the time-varying nature of expected returns and risk exposures, in a purely domestic setting and in the international markets. To include this specification, we estimate a conditional version of the ICAPM, in which both the exposure to risk and the degree of financial integration in the Gulf change over time.

The international version of the capital asset pricing model (CAPM) allows purchasing power parity (PPP) deviations and assumes that local inflation is volatile. In fact, some international investors can obtain goods more cheaply than others because the law of one price is not held (see, for example, Pippenger and Phillips, 2008). Thus, in the ICAPM the expected return in any country is affected by its covariance with the exchange rate market, in addition to the "classical" risk premium measured by the covariance between asset returns on the market portfolio.

A number of empirical studies on financial integration deal with the global level, centered around developed or developing stock markets (for example, Bekaert and Harvey, 1995; Gérard et al., 2003; Carrieri et al., 2007; Chaieb and Errunza, 2014; Alotaibi and Mishra, 2017).[7] Meanwhile, several papers have tackled the regional level, for example Graham et al. (2013) on the MENA region, Hardouvelis et al. (2006) on the euro area,[8] Chi et al. (2006) and Park and Lee (2011) on East Asia,[9] and Adler and Qi (2003) on North America. Nevertheless, the authors believe that few studies have covered GCC countries.

We consider the stock indices of the six GCC countries: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates. Our study contains several contributions compared to the previous literature on GCC financial integration. First, we improve upon previous papers by

[7] See also Billio et al. (2017). See also, for example, Bekaert et al. (2023) for a large literature review (and new empirical evidence) for emerging markets.

[8] See also Adam et al. (2002) and Baele et al. (2004).

[9] We can also quote the paper of Bekaert et al. (2005), which studies the regional aspect of financial integration and the contagion effect. Boubakri and Guillaumin (2015) assess the degree of regional financial integration in East Asia using the ICAPM methodology and the degree of cooperation among East Asian countries.

providing a more complete picture of the dynamic of regional financial integration in the GCC based on the ICAPM framework, instead of studying bilateral co-movement between GCC stock markets. We implement several processes to estimate the ICAPM, such as a multivariate GARCH-DCC model, to obtain the terms of variance–covariance between the local and GCC stock markets. Second, the ICAPM includes the currency risk premium to better capture the total market risk premium, which impacts the measure of the degree of financial integration. We create a "virtual" regional currency basket, the *Khaleeji*, to obtain a reference currency in this area that allows us to estimate the currency risk premium. Third, we consider the evolution of integration over a long period of time, from the first steps of trade integration and the idea of a common currency at the beginning of the 2000s. Finally, our study attempts to provide private investors and policymakers with reliable analysis on the dynamics of financial integration within GCC stock markets, to foster regional financial investment and contribute to financing sustainable economic development in the GCC region. Our results show that the regional risk premium is not negligible for GCC countries, and better cooperation can enhance regional risk-sharing. The results also highlight that the degree of regional financial integration varies from country to country, leaning toward partial integration of GCC countries within their region. Saudi Arabia has the highest level of regional financial integration (0.63 on average) and Bahrain has the lowest (0.27 on average). Moreover, the empirical results demonstrate the importance of currency market risk when evaluating the total risk premium.

The remainder of the paper is organized as follows. Section 2 provides some stylized facts on the measures taken to improve financial cooperation between these countries, as well as a brief review of the relevant previous literature. Section 3 presents the method used. Section 4 describes the data and its statistical properties. Section 5 comments on the results obtained and the specification tests. Finally, Section 6 concludes.

2. Literature review

The development of stock markets has been a top priority in the Gulf Cooperation Council (GCC) region over the past decade (Espinoza et al., 2011; Alotaibi and Mishra, 2017). Following the initial agreement in 1981, the GCC countries decided in 2002 to implement a unified economic agreement and gradually move toward establishing a single market and forming a monetary union (Al-Jasser and Al-Hamidy, 2003; Abu-Qarn and Abu-Bader, 2008). In 2010 the member countries approved the statute of the Monetary Council of the Cooperation Council for the Arab States of the Gulf, which focused on the development and coordination of

monetary and exchange rate policies for national currencies until the establishment of the GCC Central Bank (Kamar and Ben Naceur, 2007). GCC member countries have taken – or are currently taking – important steps to improve the size and quality of their capital markets. Significant privatization has occurred, and some member states have built independent and dedicated capital market regulators.[10] Several initiatives have improved the level of integration among stock markets, to strengthen each individual market and make the entire GCC region a more attractive destination for regional capital relative to external investment options. For example, the stock exchanges of Bahrain, Kuwait, Qatar, Dubai, and Abu Dhabi cross-list some of their stock on other exchanges (World Bank, 2010).

Compared to other geographical areas, the literature on the dynamics of financial integration within the GCC region is limited to a few studies. Assaf (2003), based on VEC models, provided strong evidence of interdependence among the six GCC stock markets. He found that during the study period – between 1997 and 2000 – Bahrain played an important role in influencing the other GCC markets. Hammoudeh and Aleisa (2004) examined the long- and short-term dependency among GCC market returns for a longer period of time: 1994–2001. Their findings showed that Saudi Arabia exerts the most influence on the GCC stock markets. Hammoudeh and Choi (2006), within the framework of VEC models, pointed out that the short-term weekly bilateral causal relationship between five GCC stock returns (except Qatar) are limited and mostly unidirectional. Also, the dynamic effects of impulse response within GCC markets illustrate that only the Saudi positive shock has a positive effect on all of the GCC markets.

Sedik and Williams (2011) studied the impact of global and regional spillovers to GCC equity markets. Using the trivariate GARCH framework, they found that GCC equity markets were impacted by spillovers from both global – represented by the US equity markets – and regional markets. Spillovers from regional equity markets were important, but the magnitude of the effects were, on average, smaller than those from mature markets. The results also illustrated episodes of contagion during the global financial crisis of 2008–9. The impact of regional spillovers to local equity markets demonstrated the need for cross-border coordination and supervision to minimize adverse spillover effects.

Fayyad and Daly (2011) used a VAR model to highlight the significant contribution of foreign variables (mostly for Kuwait and Oman stock market returns) to the variance of the United Arab Emirates (the UAE), Bahrain, and Qatar stock markets. Contrary to Sedik and Williams (2011),

[10] See, for example, Alotaibi and Mishra (2017) for a complete literature review.

they found that US stock market and oil price shocks do not significantly affect these GCC markets. Using interest rate data, equity markets, and capital flows, Espinoza et al. (2011) analyzed the regional financial integration of GCC countries, especially the convergence of these financial markets. For the convergence process, they used the framework developed by Barro and Sala-i-Martin (1991) and Mankiw et al. (1995). They found partial regional integration, especially between Bahrain and Kuwait. For the authors, regional integration is at least equal to global integration.

Aloui and Hkiri (2014) studied the co-movements between GCC equity index markets. They highlighted an increase in the relationship between these markets, but only in the short term, during the global financial crisis. Jouini (2023) explored the financial interconnectedness in the GCC area using the methodology proposed by Diebold and Yilmaz (2012, 2014). He found that the interconnection between financial markets in the GCC area was dynamic and relatively high, specifically between October 2008 and September 2013. Furthermore, some financial markets (e.g., the UAE) have more interconnectedness than others (e.g., Bahrain), which are more segmented.

The findings of all of the previous studies are based on a limited amount of data and/or the short term; for this reason, they missed the rapid dynamic and recent change in the GCC region during the last decade. Countries such as Saudi Arabia and the UAE implemented new fiscal policies and launched bilateral cooperation in terms of corporate taxation.[11] Also, most GCC countries created their own sovereign wealth fund to better reallocate their revenue from oil exports and diversify their economy (Amar et al., 2022). The previous research did not consider these new economic structural changes that affected the financial markets during the last decade.

Moreover, there are several empirical methods and techniques used by the literature to measure the financial integration of stock markets, such as a quantity-based approach (Lane and Milesi-Ferretti, 2007) or a price-based approach (based on deviations to the uncovered interest rate parity),[12] among others. However, most of these approaches suffer from a variety of shortcomings. Specifically, none of these methods can propose a suitable measure of regional financial integration as they are based on the assumption of perfect market integration, which is inconsistent with the financial literature based on partial segmentation or time-varying integration of markets. Also, there is evidence that financial integration assessment and risk premia related to the volatility of equity and currency markets are singularly linked in the case of emerging markets (Phylaktis and Ravazzolo, 2004). These more specific measures for the

[11] See, for example, Magazzino (2022).
[12] See, for example, Baharumshah et al. (2011).

financial integration of markets have included several comprehensive studies (Hardouvelis et al., 2006), with inclusion of the concept of risk-sharing in equity and currency markets.

The aim of our study of GCC stock markets is to provide a measure of regional financial integration, the weight of each source of risk, including those linked to regional financial markets and foreign exchange markets in the assessment of the expected equity return. To this end, we estimate a conditional international capital asset pricing model, in which both the regional risk exposures and the degree of financial integration in the GCC change over time and determine the excess return on local equity.

3. Empirical methodology

3.1. The ICAPM

To study the time-varying regional financial integration in the member countries of the GCC, we mobilize a variant of the international capital asset pricing model (ICAPM) developed initially by Adler and Dumas (1983). The ICAPM variant has three main advantages. First, it relies on the real situation of the markets where financial integration is located between the two polar cases of perfect integration and market segmentation (see among other, Errunza and Losq, 1985; Bekaert and Harvey, 1995; Hardouvelis et al., 2006). Second, our approach allows for a time-varying financial integration measure that can switch smoothly over time. Third, our model includes the currency risk premium in addition to the regional and local risk premia (Carrieri et al., 2007). Given the deviations of real exchange rates to purchasing power parity (PPP), any investor expecting to invest in foreign assets will consider the foreign currency risk. Accordingly, the conditionally expected excess returns of the local market can be affected by their covariance with the regional financial market and the currency market and by the variance of the local stock market returns.

The ICAPM can be written as follows:

$$E_{t-1}\left(R_{i,t}|\psi_{t-1}\right) - R_{f,t} = \varphi_{t-1}^{i}\left[\lambda_{t-1}^{GCC} Cov_{t-1}\left(R_{i,t}, r_{GCC,t}|\psi_{t-1}\right) + \lambda_{t-1}^{k} Cov_{t-1}\left(R_{i,t}, s_{k,t}|\psi_{t-1}\right)\right] + \left(1-\varphi_{t-1}^{i}\right)\left[\lambda_{t-1}^{i} Var_{t-1}\left(R_{i,t}|\psi_{t-1}\right)\right] \quad (1)$$

where $E_{t-1}\left(R_{i,t}|\psi_{t-1}\right)$ is the conditionally expected return on the local stock market index, $R_{f,t}$ is the risk-free rate, $r_{GCC,t}$ is the excess return on the GCC market index, and $s_{k,t}$ is the variation of the real exchange rate against the reference currency. λ_{t-1}^{GCC} is the price of the regional (here GCC region) market risk, λ_{t-1}^{k} is the price of the foreign exchange risk of currency *k* against the reference currency, and λ_{t-1}^{i} is the price of the local risk in market *i*. *Var* and *Cov,* respectively, denote the variance and covariance operators. All expectations are conditioned on

ψ_{t-1}, the data that investors use to set prices at time $t-1$. φ_{t-1}^{i} corresponds to the degree of dynamic regional financial integration, which can vary between 0 (i.e. strict segmentation) and 1 (i.e. perfect integration).

3.2. The estimation method

We follow the comprehensive study of Hardouvelis et al. (2006) to estimate the different parameters of the ICAPM. Indeed, estimation of equation (1) requires the use of a sequential procedure since it includes a variety of variables that are not observable and need to be predicted. Therefore, equations (2) and (3) (below) are used to retrieve, respectively, the dynamics of regional and currency prices:

$$r_{GCC,t} = \lambda_{t-1}^{GCC} Var(r_{GCC,t}) + \lambda_{t-1}^{k} Cov(r_{GCC,t}, s_{k,t}) + \varepsilon_{GCC,t} \quad (2)$$

$$s_{k,t} = \lambda_{t-1}^{k} Var(s_{k,t}) + \lambda_{t-1}^{GCC} Cov(r_{GCC,t}, s_{k,t}) + \varepsilon_{k,t} \quad (3)$$

where $\varepsilon_t = (\varepsilon_{GCC,t}, \varepsilon_{k,t}/X_{t-1}) \sim \mathrm{N}(0, \mathrm{H}_t)$, representing the vector of errors conditional to the matrix of information variables X at time $t-1$ and H_t designates the conditional variance–covariance matrix of excess returns.

Following Hardouvelis et al. (2006), the time-variant parameter φ_{t-1}^{i} is conditioned on a set of variables that measure integration:

$$\varphi_{t-1}^{i} = exp\left(-\left|g_i' Z_{t-1}^{i}\right|\right) \quad (4)$$

where $exp(.)$ denotes exponentiation, $|.|$ denotes absolute value, Z_{t-1}^{i} is a vector of country-specific information variables related to convergence toward the GCC area, and g_i is the weight associated with each variable Z_{t-1}^{i}.

As mentioned above, equation (1) includes the price of the regional market risk (here GCC), the price of the currency risk related to the unexpected fluctuations in real exchange rates, and the price of the local market risk. The risk price of regional and local markets is described by an exponential function of macroeconomic and financial international variables as follows:

$$\lambda_{t-1}^{GCC} = exp\left(\delta_{GCC}' X_{t-1}\right) \quad (5)$$

$$\lambda_{t-1}^{i} = exp\left(\gamma_i' Z_{t-1}^{i}\right) \quad (6)$$

where X_{t-1} denotes all of the information on regional variables available at $t-1$ and δ_{GCC}' represents the weight associated with these variables. Z_{t-1}^{i} is the vector of local information variables observable on the market *i* at $t-1$, and γ_i' represents the weight associated with these variables.

The price of currency risk can theoretically take positive or negative values; it is supposed to vary as a linear function of information variables:

$$\lambda_{t-1}^{k} = (\delta'_{k} X_{t-1}) \quad (7)$$

where δ_k' is the weight of each variable in the vector X_{t-1}.

The ICAPM includes the dynamic conditional covariance (DCC) that can be modelized based on the approach introduced by Engle (2002) and Tse and Tsui (2002). In this paper, we will refer to it as the $DCC(P,Q) - GARCH(p,q)$ model. It can be presented as:

$$cov_t = D_t cor_t D_t \quad (8)$$

$$cor_t = Q_t^{*-1} Q_t Q_t^{*-1} \quad (9)$$

$$Q_t = \left(1 - \sum_{i=1}^{Q} \zeta_i - \sum_{j=1}^{P} \theta_j\right) S + \sum_{i=1}^{Q} \zeta_i \left(z_{t-i} z'_{t-i}\right) + \sum_{j=1}^{P} \theta_j \, Q_{t-j} \quad (10)$$

where cov_t is the $N \times N$ symmetric conditional covariance matrix.

$D_t = diag\left(\sqrt{h_{1t}}, \sqrt{h_{2t}} \ldots, \sqrt{h_{Nt}}\right)$, where h_{kt} are the conditional variances (for $k = 1, 2 \ldots, N$), z_t is the standardized $N \times 1$ residual vector, assumed to be serially independently distributed, given as $z_t = Q_t^{-1} \varepsilon_t$, cor_t is the time-varying $N \times N$ conditional correlation matrix of z_t, S is the unconditional $N \times N$covariance matrix of z_t, and Q_t^* is the diagonal $N \times N$ matrix composed of the square root of the diagonal elements of Q_t. The parameters ζ_i (for $i = 1, 2 \ldots, Q$), θ_j (for $j = 1, 2 \ldots, P$) are non-negative and satisfy the condition $\sum_{i=1}^{Q} \zeta_i + \sum_{j=1}^{P} \theta_j < 1$.

4. Data and descriptive statistics

We use monthly data over the period May 2000 to March 2023 for six GCC countries: Bahrain (BA), Kuwait (KU), Oman (OM), Qatar (QA), Saudi Arabia (SA), and the United Arab Emirates (the UAE).[13] With this data sample, we can include the main economic episodes that have characterized the integration process of GCC countries. The ICAPM considers three groups of data: (i) the stock market returns of each GCC member and for the regional market, (ii) the real exchange rates expressed vis-à-vis the new currency basket, and (iii) the instrumental variables used in the estimation of risk prices and the degree of regional integration.

4.1. Stock returns

The data for each local stock market return and for the GCC region are extracted from the *Morgan Stanley Capital International* (MSCI) database. Stock market returns, $R_{i,t}$, are

[13] The data for Qatar and the UAE cover the period from July 2005 to March 2023 because of a problem with data availability.

computed using the following formula, $R_{i,t} = \ln\left(\frac{MSCI_{i,t}}{MSCI_{i,t-1}}\right)$, where $MSCI_{i,t}$ is the country's stock market index at time *t*.[14] The excess returns included in the ICAPM are calculated from a risk-free rate at 1 month extracted from the *Datastream* database. Unit root tests highlight that all excess stock returns are stationary.[15]

Table 1 reports some summary statistics. They highlight that the stock market returns of GCC countries have high volatility with a negative skewness coefficient. Also, except for Qatar and Saudi Arabia, returns are autocorrelated.

Table 1: Summary statistics on monthly stock returns

	BA	KU	OM	QA	SA	UAE	GCC
Mean (%)	-0.36	0.70	0.28	0.17	0.65	0.14	0.36
StdDev	5.99	5.72	5.22	6.13	7.06	8.03	5.58
Skewness	-0.76***	-0.45***	-0.67***	0.17	-0.52***	0.13	-0.72***
Kurtosis	4.10***	2.33***	3.50***	4.48***	2.38***	4.16***	2.21***
B-J	218.8***	71.09***	160.9***	230.8***	77.55***	198.7***	79.27***
Q(z)12	43.49***	25.24**	55.12***	17.39	17.41	22.78**	22.77**

Notes: significant at 1% (***), 5% (**) and 10% (*). StDev is the Standard Deviation. B-J is the Jarque-Bera test statistic for normality. Q(z)12 is the Ljung-Box test statistic of order 12 autocorrelation. GCC corresponds to GCC regional stock market which includes 6 countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates). Country codes are given in the first paragraph of section 4.

4.2. Exchange rates, currency basket, and common currency, *Khaleeji*

To estimate our model, we need to determine a reference/anchor currency for Gulf Cooperation Council (GCC) countries. As we are in a regional framework, the US dollar is not necessarily an appropriate reference currency.[16] Indeed, since the foundation of the GCC in 1981, the creation of a common currency has been one of the goals of the constituent countries. Following this aim, GCC countries seek to develop, enhance, coordinate, and deepen their financial, monetary, and banking policies.[17] For this reason, we decided to build a GCC currency basket. To do this, we took up the countries incorporated in the GCC.[18] We call this currency basket

[14] Stock market returns are expressed in real terms.
[15] Results are available upon request from the authors.
[16] Even if the US dollar is the peg currency for all GCC countries (except for Kuwait, which is pegged to a basket currency, including the US dollar and the euro), all of these countries have expected to create a common currency since the creation of the GCC.
[17] See Al-Jasser and Al-Hamidy (2003) for analysis of the GCC process.
[18] In the literature some studies build a regional currency basket. For example, the Asian currency unit is a common currency basket composed of 13 East Asian currencies, which form Asean+3. See Ogawa and Shimizu (2006) and Boubakri and Guillaumin (2015) for a large literature review. See also BIS (2003) for a lengthy discussion about regional currency.

Khaleeji and we use GCC as an ISO code. The name *Khaleeji* was proposed by the member states of the GCC for a common currency.[19]

The value of the *Khaleeji* (GCC) in terms of currency *i* (the *Khaleeji* rate of currency *i*) is defined as follows:

$$GCC^i = \sum_j \alpha_j / E_j^i \tag{11}$$

where α_j is the amount of currency *j* in the basket and E_j^i is the price of currency *i* in units of currency *j* (the bilateral exchange rate). In order to determine the weight of each country (and therefore of each currency), we can choose three types of measure: GDP measured at purchasing power parity (PPP); GDP measured at current prices (in US dollars); and trade volume (the sum of exports and imports) in the total of the sampled countries. We choose the GCC constructed from the GDP measured at PPP.[20]

If, for example, we consider the US dollar to be the currency *i* and assume that the weight is based on the share of GDP measured at PPP, equation (11) becomes:

$$GCC^{\$} = \sum_j \alpha_j / E_j^{\$} \tag{12}$$

where α_j is the amount of currency *j* in the basket and $E_j^{\$}$ is the price of the US dollar in units of currency *j* (*USD/j* exchange rate). α_j is defined as:

$$\alpha_j = \gamma_j E_j^{\$}(b) \tag{13}$$

where $E_j^{\$}(b)$ is the benchmark exchange rate[21] and with:

$$\gamma_j = \frac{GDP(PPP)_j}{\sum_j GDP(PPP)_j} \tag{14}$$

with $GDP(PPP)_j$ as the GDP measured at the purchasing power parity (PPP) of the country *j*.

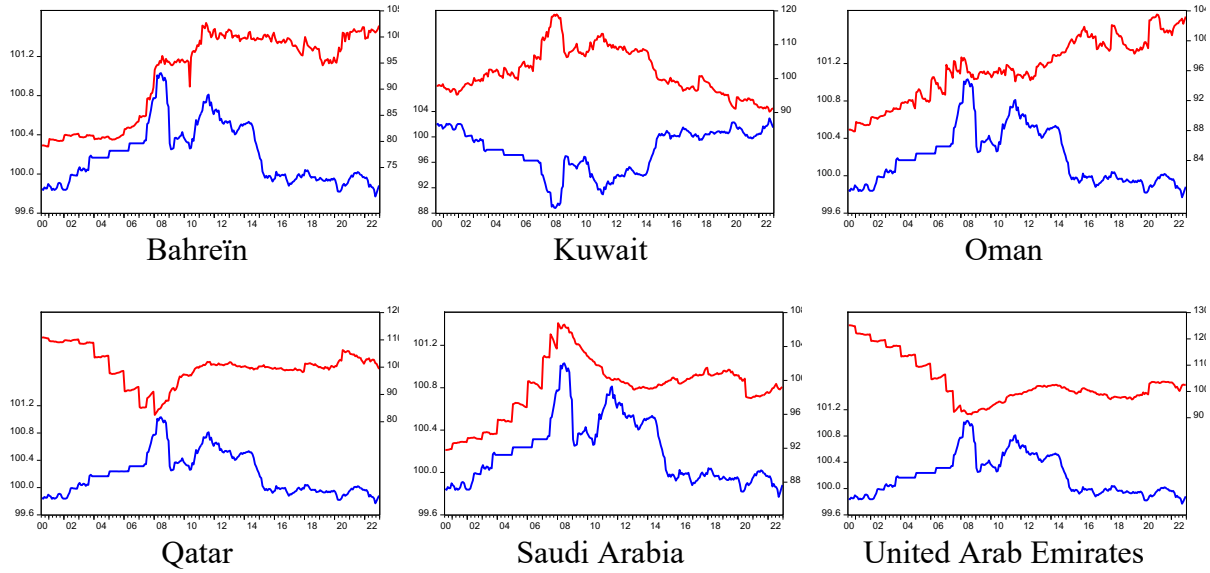
Then, we express each Gulf currency against the GCC (nominal and real exchange rates), as in equation (11). All nominal exchange rates (against the US dollar), and the consumer price index data used for the construction of the GCC, come from the IMF's *International Financial Statistics*. GDP measured at PPP, GDP at current prices, and intra-regional trade data are extracted from the *CHELEM* (Cepii) database. Series are annual, and we choose 2015 as the reference year. Figure 1 displays our results.

[19] See, for example, Al-Jasser and Al-Hamidy (2003) for a discussion about this.

[20] We compare the nominal and real exchange rates of the GCC against the US dollar according to the various weights. We calculate the correlation between each nominal and real exchange rate according to the weight. The correlation coefficient is, in each case, included between 0.98 and 1.00 and is statistically significant. Detailed results are available upon request from the authors.

[21] The benchmark exchange rate (USD/j) is the average of the monthly USD/j exchange rate in 2015.

Figure 1: Nominal and Real Exchange rate of GCC currencies against *Khaleeji*



Notes: Authors'own calculations. 2015=100.
Blue lines indicate Nominal exchange rate (left scale) and red lines indicate Real exchange rate (right scale).

4.3. Instrumental variables

Equation (1) includes the price of the regional market risk, the price of the currency risk related to the unexpected fluctuations in real exchange rates, and the price of the local market risk. To predict the dynamics of these prices, we consider two sets of instrumental variables (regional and local) that have been widely used in previous research. The regional instrumental variables are: (i) the first lag of the regional market dividend yields in excess of the risk-free rate; (ii) the first lag of the monthly change in the term spread; (iii) the first lag of the monthly change of default spread; (iv) the first lag of the monthly change of the short-term interest rate; and (v) the inflation rate. The term spread is the difference between the long-term interest rate (10 years) and a 1-month interest rate. The set of local instrumental variables includes: (i) the lagged change in the real exchange rate; (ii) the lagged local equity returns in excess of the risk-free rate; and (iii) the lagged monthly change in the short-term interest rate.

All of these instrumental variables are taken from *Datastream* and are used with one lag for better conditioning of excess returns.

5. Empirical results

5.1. Risk premia dynamics

This sub-section shows the estimation results of equations (1) to (7), as discussed in Section 3. Indeed, interpretation of the different components of the model highlights the importance of

each risk premium in the total risk. Thus, it provides valuable information about the relationship between the local and the regional stock market, as well as the importance of the currency market.

The empirical model includes several parameters to predict and a common price for the regional stock market risk. To this end, we follow the previous literature (see, for instance, Hardouvelis et al., 2006) and estimate the model in two steps. First, we estimate the regional stock market return from equation (2) to obtain the price of the regional market risk (λ_{t-1}^{GCC}). Second, equations (3), (6), and (7) are estimated country-by-country, conditioning on the estimation of the price of the regional market risk from the first step. This second step gives us the estimation of the price of the currency risk (λ_{t-1}^{k}), the price of the local stock market risk (λ_{t-1}^{i}), the total risk premium, and the three components of each country member (*i*) of the GCC.

The first step allows us to obtain the price of the regional stock market risk (λ_{t-1}^{GCC}). The estimation results show that the average (0.3) is substantially lower than in regions such as East Asia or the eurozone.[22] We conduct a Wald test to check the dynamics of this risk price, and we find that the hypothesis that the price of the regional market risk is constant is rejected (*p-value* of 0.0001).

In the second step we estimate the price of the local stock market risk and the price of the currency market risk. Estimation of these prices is conditionally based on the instrumental variables that take into account all of the macroeconomic fundamentals to better estimate the risk of the two markets. The results highlight that the dynamics of the currency risk prices are mostly driven by the first lag of the monthly change in the term spread, as well as the inflation rate. The first lag of the regional market dividend yields in excess of the risk-free rate, which also explains the currency risk premium of Bahrain and Qatar. The estimation results of the local market risk are mainly determined by the lagged change in the real exchange rate and the lagged local equity returns in excess of the risk-free rate. Table 2 reports the significance level of each risk premium and their average in the total risk premium for each country member of the GCC: the regional stock market premium (RP_{reg}), the local market premium (RP_{local}), and the currency risk premium (RP_{cur}) related to the unexpected fluctuations of real exchange rates vis-à-vis the common GCC currency unit. The two risk premia of the GCC stock market and currency market represent the regional source of risk; the risk premium of the local stock market represents the domestic source of risk.

[22] See Carrieri et al. (2007), among others.

Table 2: Significance and importance of each risk premium

	The significance of each risk premium			*The average weight of each component of risk in the total risk premium*		
	RP_{reg}	RP_{cur}	RP_{local}	RP_{reg} (%)	RP_{cur} (%)	RP_{local} (%)
BA	0.41*** (11.71)	0.11 (0.68)	0.48*** (3.36)	41.28	10.96	47.76
KU	0.37*** (13.59)	0.35*** (2.58)	0.27** (2.33)	37.31	35.40	27.29
OM	0.32*** (25.11)	0.16** (2.06)	0.52*** (7.02)	31.60	16.00	52.40
QA	0.35*** (23.96)	0.31*** (3.66)	0.34*** (4.16)	34.78	31.35	33.87
SA	0.56*** (11.92)	0.23*** (3.15)	0.21*** (7.39)	55.79	22.79	21.42
UAE	0.49*** (7.23)	0.04 (0.837)	0.46*** (3.39)	49.67	4.41	45.91

Notes: significant at 1% (***), 5% (**) and 10% (*). *t-stat* are given in parentheses.
RP_{reg} is the regional stock market risk premium, RP_{cur} the currency market risk premium, RP_{local} the local stock market risk premium.
RP_{reg} (%), RP_{cur} (%), RP_{local} (%) are, respectively, the average weight of each risk premium (regional, currency, and local) in the total risk premium.
Country codes are given in the first paragraph of section 4.

Let us first interpret the estimation results of the risk component related to the fluctuations in real exchange rates. Column 3 of Table 2 shows that the currency risk premium is significant for four GCC countries (Kuwait, Oman, Qatar, and Saudi Arabia). While its value is lower than local and regional stock market premia for markets such as Oman, the estimation results highlight the importance of currency market risk when evaluating the total risk premium. According to the IMF de facto classification of exchange rate arrangements, GCC countries are characterized by a fixed peg on the US dollar, except for Kuwait, which has opted for a currencies' basket peg since 2007. However, even for countries with a fixed exchange rate regime, there is an interest in pricing currency risk based on the unexpected volatilities of real exchange rates, which is mainly explained by (i) the deviation to purchasing power parity (PPP) (see, for instance, Rogoff, 1996) and (ii) the variation in inflation rates. Moreover, as demonstrated by Phylaktis and Ravazzolo (2004), there is a connection between the foreign exchange market and the stock markets. The exchange rates have an impact on the stock markets through their effects on the current and future cash flows of companies. For instance, Saudi Arabia highlights this interdependency between currency and the stock markets, as well as their importance. Indeed, columns 6 and 7 of Table 2 show a similar weight for both risk premia (about 22%) in the total risk.

Column 6 of Table 2 also shows that Kuwait has the most significant and prominent currency risk premium (35% of total risk premium) compared to other GCC countries. This can be explained by the exchange rate arrangement, namely, a currency basket peg instead of a fixed peg on the US dollar. However, the estimation results are not significant for Bahrain and the UAE, and the currency risk does not seem to play a role in the appreciation of the total risk premium for the two countries.

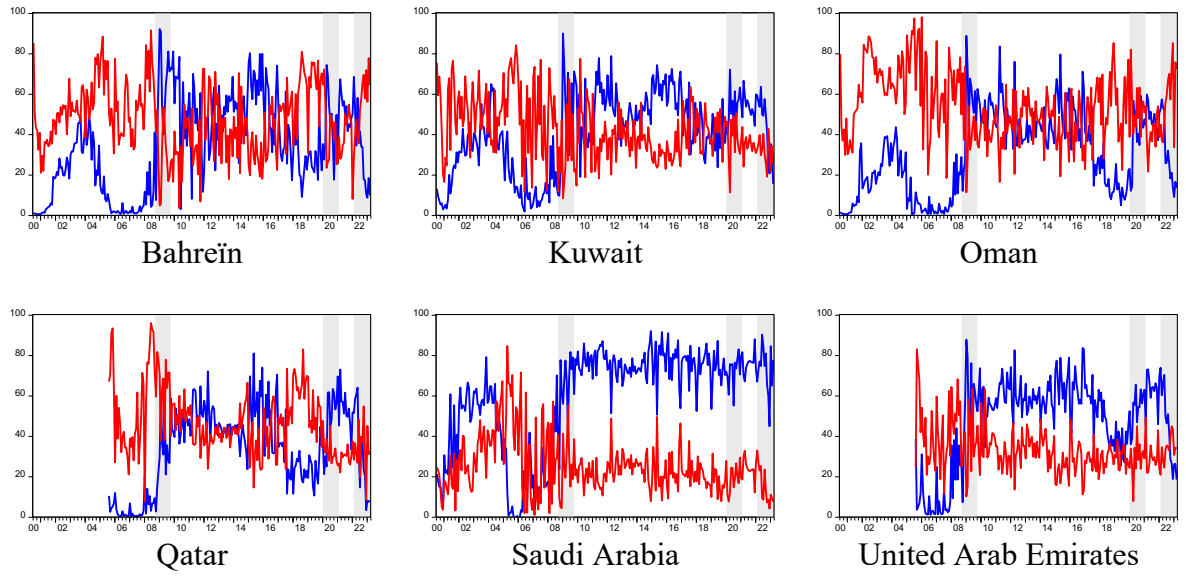
The results in Table 2 also highlight that the other two risk premia related to the GCC region and local stock markets are highly significant for the six countries. This finding supports the idea of an intermediate level of financial integration within the GCC region. We can classify our sample into two groups, as follows: (i) the first group includes Bahrain, Kuwait, Oman, and Qatar, for which the regional stock market risk premium is less than 50% of the total risk premium. Oman has the lowest regional risk premium, representing around 32% of the total risk. This situation is mainly a consequence of the lack of financial openness and stock market development. (ii) The second group contains Saudi Arabia and the UAE, where the average weight of the regional stock market risk premium is around 50% and above the total risk. For Saudi Arabia, if we add the premium related to the currency market, we reach an average weight of 78% of the total risk premium, which represents almost four times the average weight of the local stock market risk premium. These two countries are more connected within their region than the countries of the first group, and their financial markets are more open to foreign investors. Indeed, the UAE has emerged as a hub for international business in sectors such as construction, banking, and finance. The UAE has developed three principal stock markets: (i) the Abu Dhabi Securities Exchange (ADX); (ii) the Dubai Financial Market (DFM); and (iii) the Nasdaq Dubai. Tadawul is the principal stock exchange of Saudi Arabia and the leading stock market in the MENA region because of the size of the economy of Saudi Arabia, as well as the implementation of a regulatory framework. Indeed, in March 2010 Saudi Arabia established its first exchange traded fund that was open to foreign investors.

Analysis of the three risk premia should consider the stock market shocks and financial disturbances over time. Therefore, the above statistics on the average of the different risk premia can be both misleading and insufficient. We therefore propose to analyze the evolution and dynamics of the three components of risk over time.

Figure 2 shows for each GCC stock market the time variation of the weights of the local and regional risk premia as a percentage of the total risk premium. Figure 2 clearly shows that the regional risk premium is not negligible for all countries and changes over time, specifically in times of financial crisis (for instance, the global crisis of 2008–9), the COVID-19 health crisis

(2020–21), and oil price volatilities (2003–5 and 2014–15). Moreover, during many periods (for instance, 2008, 2015, and 2020–21) the regional stock market risk premium has outperformed the local risk premium. However, for the most recent period (2022–23), almost all countries have been affected by the economic slowdown and inflation rate increases. Indeed, we see that the local component of the risk premium is the most important of the three risk premia, as the regional risk premium has dropped for all countries. The exception is Saudi Arabia.

Figure 2: Regional and local risk premia



Notes: Authors'own calculations.
Blue lines indicate regional risk premium and red lines indicate local risk premium.
The regional risk premium is the premium related to the regional market risk $\left(\lambda_{t-1}^{GCC} Cov_{t-1}\left(R_{i,t}, r_{GCC,t} | \psi_{t-1}\right)\right)$.
The local risk premium is the premium related to the local market risk $\left(\lambda_{t-1}^{i} Var_{t-1}\left(R_{i,t} | \psi_{t-1}\right)\right)$.
Shared areas correspond to, respectively, the global financial crisis (2008:09-2009:09), the pandemic crisis Covid-19 (2020:01-2021:01) and the war in Ukraine (since 2022:02).

Figure 2 also highlights a slight difference between GCC countries regarding the long-term dynamics of each risk premium, as well as the influence of each crisis on its evolution. For example, countries such as Bahrain and Kuwait are characterized by a high local risk premium that exceeds the regional one, mainly during the sub-period from 2000 to 2008. Then, after the global crisis, the regional risk premium was significantly higher and outperformed the local risk. Both risk premia continue to be relatively similar until the end of the study period, but with some episodes of high fluctuations. For Oman and Qatar, their local risk premium follows the same evolution as the previous two countries during the first sub-period, before the global crisis (2008–9). Their regional risk premium also increased after 2008 before dropping again

from 2017 until 2020. The last two countries, Saudi Arabia and the UAE, are characterized by a different dynamic to the other four countries. Figure 2 clearly shows that the regional stock market risk premium outperforms the local one, as demonstrated by the results in Table 2, for almost the full study period, except the sub-period 2005–7. From the global crisis until the end of the study period, the regional premium is the most important component of the total risk premium. This result confirms the preponderant place of Saudi Arabia in the region as the largest economy among GCC countries and the most integrated market within both the GCC region and the international financial market (as demonstrated, for example, by Jouini, 2015).

Figure 2 also illustrates that all countries were affected by the global health crisis of COVID-19. Indeed, for all GCC countries, the regional risk premium increased and reached a level of around 60% of the total risk premium, on average.

Accordingly, our findings demonstrate that GCC stock markets are impacted by both regional and local financial shocks and crises; analysis of the long-term dynamics shows that the regional risk premium is not negligible for GCC countries, and better cooperation can enhance regional risk-sharing.

The investigation of the significance of the different sources of risk could be motivated by the level of financial and economic convergence within the region. In this context we dedicate the next section to investigating the measure of the degree of financial integration of each GCC country. Then, we will draw some conclusions regarding the link between the importance of the regional risk premium and the level of financial integration.

5.2. Time-varying regional financial integration in the GCC region

This section studies the dynamics of integration of each local stock market within the GCC region. As mentioned in Section 3, regional integration is estimated using equations (2) to (4). The integration degree varies over the study period to account for the dynamics of stock market integration and the convergence – or not – of each country member toward the GCC region.

Table 3 reports the estimates of regional fianancial integration of each country member for the full study period and two sub-periods. The results indicate that the degree of financial integration varies from country to country, leaning toward partial integration of GCC countries within the region. Saudi Arabia has the highest regional financial integration level (0.63 on average) and Bahrain has the lowest (0.27 on average). More precisely, we can split the country members into two groups, as follows: the first group includes three countries (Bahrain, Kuwait, and Oman), characterized by partial segmentation/integration (approximately 0.30 on average). This finding is consistent with the previous results regarding the weight and importance of stock

market risk premia. Specifically, for Bahrain and Oman, the share of the local risk premium is almost equal to the regional premium, which is consistent with the situation of partial segmentation of its financial market. The second group includes the other three countries (Qatar, Saudi Arabia, and the UAE), characterized by a higher degree of regional financial integration (approximately 0.50 or more).

Table 3: Regional financial integration dynamics

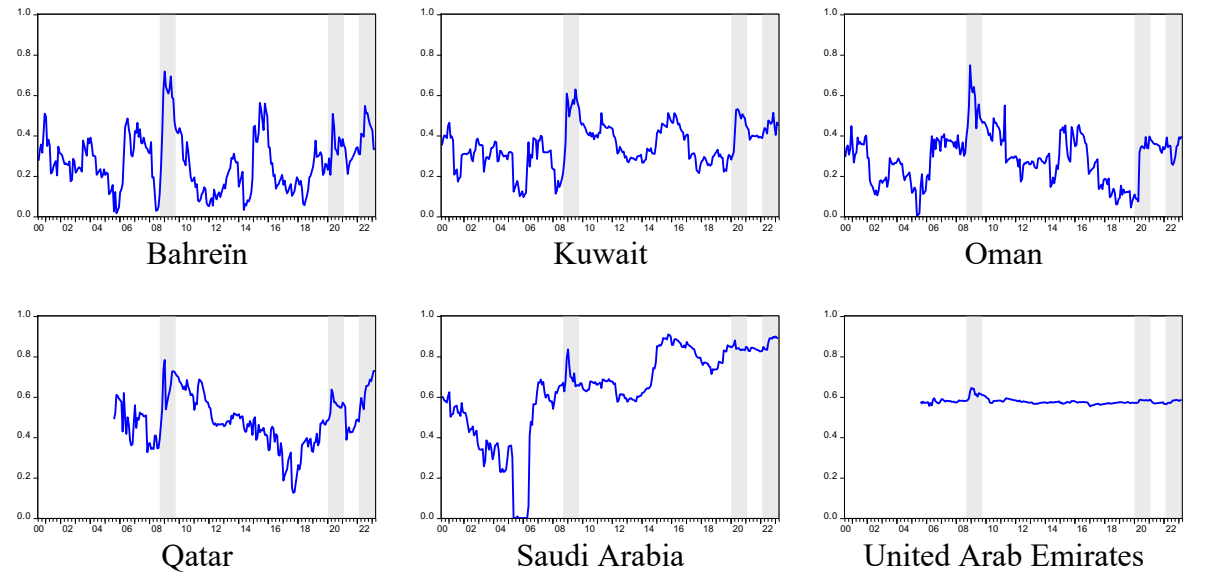
Financial degree	BA	KU	OM	QA	SA	UAE
Overall average	**0.27**	**0.35**	**0.29**	**0.48**	**0.63**	**0.58**
StDev	0.14	0.10	0.12	0.13	0.22	0.01
Min	0.02	0.09	0.01	0.12	0.01	0.55
Max	0.72	0.63	0.75	0.78	0.91	0.65
Sub-periods average						
July 2000 – August 2008	**0.28**	**0.29**	**0.26**	**0.46**	**0.41**	**0.58**
StDev	0.11	0.09	0.10	0.09	0.20	0.01
October 2009 – February 2020	**0.22**	**0.36**	**0.27**	**0.46**	**0.73**	**0.57**
StDev	0.12	0.08	0.12	0.13	0.10	0.01

Notes: StDev is the Standard Deviation. Min is minimum. Max is maximum. Country codes are given in the first paragraph of section 4.

This analysis is based on the whole study period. However, to better understand the dynamics of financial integration within the GCC region, we distinguish different sub-periods to assess how the level of regional integration has evolved over time. We thus propose to divide the whole period into two sub-periods. The choice of the two sub-periods is related to the crisis periods, particularly the global financial crisis of 2008–9 and the COVID-19 crisis (2020–21). To obtain a realistic assessment of the degree of financial integration, we removed the periods of very high volatility. Therefore, the first sub-period runs from July 2000 to August 2008, and the second sub-period runs from October 2009 to February 2020. The results are given in the lower part of Table 3 and highlight two different categories of dynamics. Indeed, in countries such as Oman, Qatar, and the UAE, the regional financial integration is almost stable over time. On the other hand, the other countries (Bahrain, Kuwait, and Saudi Arabia) demonstrate an increasing degree of integration toward the regional stock market. Saudi Arabia has a significant dynamic, as the integration level increased from 0.46 to 0.73 during the last decade, on average. To highlight these findings, Figure 3 shows more details regarding the time-varying process of regional financial integration within the GCC region. Several observations can be made based on this figure: (i) first, during the sub-period of 2000–8, the degree of financial integration was below 0.4 for Bahrain, Kuwait, and Oman. This result confirms the previous one in Table 3

regarding the partial segmentation of these three countries. (ii) Second, during the global crisis of 2008–9, for all member countries (except the UAE), the degree of regional integration has a high level of around 0.8. This jump may reflect a common dynamic among the member countries of the GCC region, which may be explained by the propagation of financial shocks during the global crisis rather than a specific evolution related to each country. This result should be interpreted with caution. Indeed, the estimates given by the ICAPM consider the volatility of the stock and exchange markets and reflect the effect of external shocks. Thus, it is likely that the high degree of regional integration encompasses the effects of stock market turbulence linked to the subprime crisis. (iii) Third, for four GCC countries (Bahrain, Kuwait, Oman, and Qatar), the degree of financial integration decreased after the global crisis, between 2010 and 2015. Then, the regional integration increased after the fall in the oil price in June 2014. The GCC countries appear to have enhanced their cooperation following this period of a common negative shock related to the oil market. Indeed, most of the countries took a similar decision in terms of fiscal policy to reduce their dependence on oil revenue (development of sovereign wealth fund, economic diversification, implementing new taxes, etc.).

Figure 3: Regional integration dynamics of each GCC country member



Notes: Authors'own calculations.
Shared areas correspond to, respectively, the global financial crisis (2008:09-2009:09), the pandemic crisis Covid-19 (2020:01-2021:01) and the war in Ukraine (since 2022:02).

Figure 3 also shows that the degree of regional financial integration increased during the COVID-19 crisis. Once again, during the periods of external shocks, all GCC countries were affected by global and regional turbulence. This finding demonstrates that the six GCC markets

are likely to have a significant degree of connection/integration with their regional and global markets. Our results align with previous literature, such as Espinoza et al. (2011), who found partial regional integration between some GCC countries, especially Bahrain and Kuwait. The authors also demonstrated that regional integration is at least equal to global integration.

Even though the regional financial integration is still not particularly high compared to many other regions, for example, in East Asia or Europe, GCC countries seem to be more averse to external and regional challenges. This could be a positive signal for policymakers to embrace new common initiatives to enhance regional cooperation and increase regional integration to overcome the different crises coming from the international markets.

5.3. Robustness tests

The aim of this section is to check the robustness of the ICAPM and the validity of its empirical results regarding the assessment of financial integration within the GCC region. Following the reference study of Bekaert and Harvey (1995), we conduct a specification test by regressing the model errors for each GCC country on three components related to the international market: (i) the covariance between the excess return of domestic and global markets, to assess the global risk (*GRP*); (ii) the covariance of the equity local market with the US dollar, to include the currency risk (*CRP*); and (iii) the covariance between the excess returns of the regional (GCC) and global markets (*COV*). The results of the regression show the level of adjusted R-squared and a heteroscedasticity consistent χ^2 with the Wald test. The χ^2-statistic tests the null hypothesis that the estimators of the new regression are equal to zero. To perform our robustness tests, we also report the results of the Lagrange multiplier test of the alternative specification model. These robustness tests are very interesting when it comes to interpreting the ICAPM results. Following the previous literature, such as Bekaert and Harvey (1995), this model often suffers from misspecification concerns.

Table 4 shows the results of the diagnostic tests. Based on the Wald and LM tests, the results indicate mixed evidence against the model. Indeed, we can distinguish three different situations. First, let us consider the two countries – Oman and Saudi Arabia – where the model's errors are only correlated with the US currency market (*CRP*). Also, we note that the adjusted R-squared is very low (4% for Oman and 9% for Saudi Arabia). This result is explained by the hard peg of these countries to the US dollar. We point out that, except for the US currency market, there is no evidence of an existing relationship between local and global stock markets for the two countries. This result corroborates our ICAPM results, highlighting the importance of regional financial integration. Second, for Qatar and the UAE, the ICAPM's errors are not

determined by any factor related to the international market. As in the previous two countries, the R-squared is also very low (4% in Qatar and 9% in the UAE). Third, in contrast with the previous four countries, the problem of misspecification is better proved for Bahrain and Kuwait. For instance, Kuwait's ICAPM model errors are highly correlated with the global stock return and the US currency market. The adjusted R-squared is also slightly higher (23%) than for all of the other GCC countries. The rejection for Bahrain follows similar patterns, even though the adjusted R-squared is small (5%).

Table 4: Model diagnostics: correlation of the country asset pricing errors with world and U.S. markets

	BA	KU	OM	QA	SA	UAE
$\bar{R}^2$	0.05	0.23	0.04	0.04	0.09	0.09
W	5.78	4.37	4.23	11.56	7.21	8.12
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LM	17.15	66.24	12.5	10.55	27.27	22.12
	(0.000)	(0.000)	(0.002)	(0.005)	(0.000)	(0.000)
GRP	0.16**	0.11**	-0.05	-0.03	-0.07	-0.01
CRP	-0.07	-0.47***	-0.12**	-0.06	-0.14***	-0.13
COV	-0.22***	-0.19***	-0.02	-0.04	-0.01	-0.19

Notes: significant at 1% (***), 5% (**) and 10% (*). p-value are given in parentheses.
The $\bar{R}^2$ statistics are adjusted for degrees of freedom and result from a regression of the country asset pricing error on: (i) the covariance between the excess return of domestic and global markets, for the global risk (*GRP*), (ii) the covariance of equity local market with the US dollar for the currency risk (*CRP*) and (iii) the covariance between excess returns of regional (GCC) and global markets (*COV*). The W-statistics are heteroscedasticity consistent Wald test. The p-values are based on a χ^2 distribution with degrees of freedom equal to the number of included regressors. The *LM* tests are standard Lagrange multiplier tests of the alternative specification (e.g. including the three components of global markets, *GRP*, *CRP*, *COV*).
Country codes are given in the first paragraph of section 4.

Globally, the results of the robustness tests show that the ICAPM suffers from misspecification problems. However, according to Bekaert and Harvey (1995), in the case of ICAPM rejection, this does not imply that this type of model provides no useful information.

5.4. Regional versus global integration

Given the importance of the global risk premium and the financial interactions with global and regional markets, we suggest estimating the degree of global financial integration between our GCC countries and the global market. This section aims to explain the previous results, which

highlight that, even though global factors continue to determine local excess returns, regional factors are also significant.

Thus, we estimate the ICAPM in the global framework. The excess returns on the local market are determined by the risk premia on (i) covariance with the global market, (ii) covariance with the US currency markets, and (iii) variance of the local stock market. The aim of this section is to assess the dynamics of the global financial integration of each GCC country and highlight that this global integration is caught up by the regional one.

We now use the US dollar as the reference currency to estimate the degree of global financial integration. The model can be written as follows:

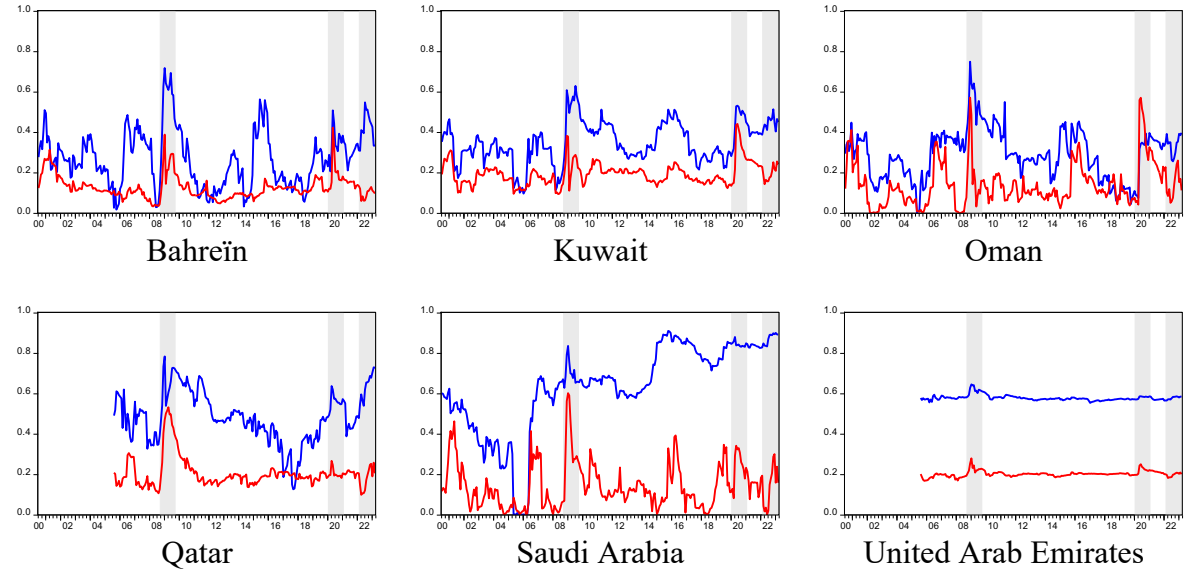
$$E\left(R_{i,t}|\psi_{t-1}\right) - R_{f,t} = \varphi_{t-1}^{i}\left[\lambda_{t-1}^{m} Cov\left(R_{i,t}, r_{m,t}|\psi_{t-1}\right) + \lambda_{t-1}^{k} Cov\left(R_{i,t}, s_{k,t}|\psi_{t-1}\right)\right] + \left(1 - \varphi_{t-1}^{i}\right)\left[\lambda_{t-1}^{i} Var_{t-1}\left(R_{i,t}|\psi_{t-1}\right)\right] \quad (15)$$

where $E\left(R_{i,t}|\psi_{t-1}\right)$ is the conditionally expected return on the local stock market index, $R_{f,t}$ is the risk-free rate, $r_{m,t}$ is the excess return on the international stock market index, and $s_{k,t}$ is the variation of the real exchange rate against the reference currency (in this case, the US dollar). λ_{t-1}^{m} is the price of the global market risk, λ_{t-1}^{k} is the price of the foreign exchange risk of currency *k* against the reference currency, and λ_{t-1}^{i} is the price of the local risk in market *i*. φ_{t-1}^{i} corresponds to the degree of financial integration between the local and global markets and ranges between 0 and 1.

Figure 4 highlights the dynamics of the degree of financial integration of GCC countries with the world market, and the evolution of regional financial integration within the GCC presented in the previous section.

Our results show that member countries of the GCC region are less integrated with the global financial market than they are with the regional one. The low degree of integration with the international stock markets can be explained in different ways. First, even though the GCC region has real potential to emerge as a key player in the global stock market, the region still faces challenges in terms of market instability and regulation issues, such as the restrictions on foreign ownership in some countries. Second, the global financial crisis of 2008–9 hit the GCC region hard. The volume of transactions decreased significantly in response to falling stock markets and overheated property markets, as well as the exodus of institutional investor money.

Figure 4: Regional vs. global stock market integration dynamics



Notes: Authors'own calculations.
Blue lines indicate regional financial integration and red lines indicate global financial integration.
Shared areas correspond to, respectively, the global financial crisis (2008:09-2009:09), the pandemic crisis Covid-19 (2020:01-2021:01) and the war in Ukraine (since 2022:02).

6. Conclusion

The aim of this investigation was to assess the dynamics of regional financial integration among GCC countries by pricing the local stock market return based on different risk premia related to the regional stock market and exchange market. Our approach was based on the international capital asset pricing model (ICAPM), developed by Adler and Dumas (1983), which accounts for the degree of financial integration in the pricing of market risk premium. We also constructed a regional currency basket, the *Khaleeji*, in order to obtain a reference currency in this area and to prospect the twin objective: a lesser peg to the US dollar; and the emergence of regional monetary cooperation.

Our empirical model estimation yields several findings on the process of regional financial integration and on the risk premia in the six GCC markets. Our results show that the regional risk premium is not negligible for GCC countries, and better cooperation can enhance regional risk-sharing. The results also highlight that the degree of regional financial integration varies from country to country and leans toward partial integration of GCC countries within their region. Saudi Arabia has the highest level of regional financial integration (0.63 on average) and Bahrain has the lowest (0.27 on average). Moreover, the empirical results demonstrate the importance of currency market risk in the evaluation of the total risk premium.

These findings demonstrate that the six GCC markets are likely to have a significant connection and integration with their regional and global markets. Our results align with previous literature,

such as Espinoza et al. (2011), who found partial regional integration between some GCC countries, especially Bahrain and Kuwait. The authors also demonstrated that regional integration is at least equal to global integration.

Even though regional financial integration is still not particularly high compared to many other regions, for example, in East Asia or Europe, GCC countries seem to be more averse to external and regional challenges. This is a positive signal for policymakers to embrace new common initiatives to enhance regional cooperation and increase regional integration to overcome the different crises coming from the international markets.

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Appendix

Table A.1: trade dependence ratio

	USA				European Union				GCC			
	1980	1995	2015	Average	1980	1995	2015	Average	1980	1995	2015	Average
Saudi Arabia	16.5	18.5	11.0	16.4	41.0	26.0	18.6	24.6	1.9	5.6	6.7	4.4
Bahrein	7.0	5.5	4.3	6.1	6.7	10.9	5.6	10.8	41.2	26.3	16.0	23.3
UAE	9.8	4.9	5.7	5.7	34.6	17.7	14.2	18.6	3.4	6.0	8.0	5.6
Kuwait	4.4	6.2	8.3	10.4	28.6	14.7	13.1	21.1	3.9	4.8	7.9	4.2
Qatar	3.7	5.2	5.0	4.2	41.9	12.5	17.5	18.6	3.3	9.3	13.3	7.3
Oman	3.9	4.6	4.7	4.5	27.1	12.3	8.3	13.7	7.9	19.0	29.2	21.1

Notes: Authors'own calculations. Average is calculated between 1980 and 2015.
GCC (Gulf Council Cooperation): Bahrein, Kuwait, Oman, Qatar, Saudi Arabia and UAE (United Arab Emirates).
Source: *Direction of Trade Statistics*, International Monetary Fund.

Table A.2: average of trade dependence ratio

	Saudi Arabia	Bahrein	UAE	Kuwait	Qatar	Oman
Saudi Arabia	-	17.7	1.8	2.2	2.2	2.3
Bahrein	1.86	-	0.6	0.2	0.4	0.6
UAE	1.45	3.8	-	1.2	3.8	17.3
Kuwait	0.56	0.5	0.4	-	0.6	0.4
Qatar	0.33	0.7	0.8	0.3	-	0.4
Oman	0.25	0.6	1.9	0.2	0.3	-

Notes: Authors'own calculations. Average is calculated between 1980 and 2015.
GCC (Gulf Council Cooperation): Bahrein, Kuwait, Oman, Qatar, Saudi Arabia and UAE (United Arab Emirates).
Source: *Direction of Trade Statistics*, International Monetary Fund.

Table A.3: Share of exports (in % of total exports)

	BA	KU	OM	QA	SA	UAE	GCC	USA	EU	China
BA	-	1.97	4.13	0.01	16.56	8.94	31.60	6.01	6.02	1.16
KU	0.13	-	0.24	0.57	1.48	1.64	4.06	0.04	0.29	0.59
OM	0.47	1.28	-	3.96	6.88	15.30	27.89	6.78	2.94	4.07
QA	0.00	1.95	0.70	-	0.18	3.98	6.83	1.94	9.04	15.45
SA	2.51	0.70	0.42	0.20	-	5.53	9.37	5.22	9.68	18.38
UAE	0.33	0.50	3.50	0.02	3.96	-	8.31	1.89	3.54	8.95

Notes: Authors'own calculations.
GCC (Gulf Council Cooperation): Bahrein, Kuwait, Oman, Qatar, Saudi Arabia and UAE (United Arab Emirates).
EU: European Union (27 countries).
Lecture: 1.97 is the share of exports of Bahrein to Kuwait (in % of total exports of Bahrein).
Source: *Direction of Trade Statistics*, International Monetary Fund.

Table A.4: Share of imports (in % of total imports)

	BA	KU	OM	QA	SA	UAE	GCC	USA	EU	China
BA	-	0.65	0.91	0.00	25.03	5.32	31.92	4.99	13.66	8.85
KU	1.53	-	0.34	0.56	5.19	14.35	21.96	8.34	16.96	16.15
OM	2.33	0.96	-	6.42	4.71	35.54	49.97	2.31	7.51	6.98
QA	0.00	0.81	2.18	-	0.09	0.22	3.29	11.84	23.42	16.26
SA	1.72	0.37	1.18	0.11	-	8.23	11.61	10.40	20.67	20.35
UAE	0.79	0.38	0.74	0.37	2.11	-	4.40	4.84	10.80	14.85

Notes: Authors'own calculations.
GCC (Gulf Council Cooperation): Bahrein, Kuwait, Oman, Qatar, Saudi Arabia and UAE (United Arab Emirates).
EU: European Union (27 countries).
Lecture: 0.65 is the share of imports of Bahrein from Kuwait (in % of total imports of Bahrein).
Source: *Direction of Trade Statistics*, International Monetary Fund.