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# International Diversification in Frontier Real Estate Markets

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The paper investigates the effects of international diversification in reducing risk. A test is applied on real estate returns by analyzing global portfolios that invest in the real estate of Gulf Cooperating Countries (GCC). The correlations between markets are not low enough to produce effective diversification. Nine out of the twelve portfolios have produced high enough correlations that when opposite positions (long and short) are taken, only then we begin to see significant reduction in risk. When comparing the effects of the real estate of the GCC with those of the real estate of Brazil, Russia, India and China (BRIC) in the context of a global equity portfolio, both the real estate of the GCC and BRIC do not produce diversification benefits when a long position is taken in developed markets. Nonetheless, when taking a long position in the real estate of the GCC, effective diversification is found when taking a short position in the developed markets. A similar case can also be concluded when taking a long position in the real estate of the BRIC countries and shorting the developed markets. The results suggest serious concerns on effective diversification among global investors with the current long only exposure to real estate in the region and suggests the introduction of shorting financial instruments for active hedging and portfolio optimization.

### Keywords

Diversification, Real Estate, Emerging Markets, Asset Allocation, Capital Markets, Investment Management

## 1. Introduction

During the period of 2013-2016, the governments of the Gulf Cooperating Countries (GCC)<sup>1</sup> took the serious initiative of transforming the GCC into a global financial center. They endeavored to attract foreign capital and liberalize financial markets to realize this plan. Despite the attractive returns from regional real estate markets during the past four years, local investors still dominate trading activity in the GCC with the exception of Dubai. As such, global investors have indicated some concern about future diversification benefits as markets in the region become more integrated. This paper therefore quantifies the benefits of regional real estate diversification in the GCC. The paper follows the work of Moosa et al. (2015) to test the effectiveness of GCC diversification in reducing risk as measured by the variance of the real estate rate of return.

The vast majority of studies on the topic of international diversification benefits have mainly investigated the U.S. and other major developed markets, such as the U.K., Canada, Australia, Japan, Germany, France, Ireland and Hong Kong. Recently, however, much focus has been on the emerging markets and the unexplored benefits of portfolio diversification. Nevertheless, most studies have focused on selectively investigating certain emerging markets, mainly the BRIC<sup>2</sup> countries, Turkey, Malaysia and South Africa. The current literature thus lacks any extensive analysis of the potential benefits of diversification in the real estate markets of the GCC. The scarcity of research on such markets is mainly due to: (i) the lack of substantial and adequate data and/or (ii) the lack of confidence in the investment climate of these markets, hence, the findings may be thought to be unpractical and useless.

The benefits of international real estate diversification have become more apparent with the enhancement of information technology and advanced communication means. Although studies still identify home bias regardless of the benefits of global asset allocation, practitioners and academics have continued to explore the different means of enhancing portfolio return while controlling risk. Over the period of 1993-2005, Cavaglia *et al.* (2006) find that a global country-neutral value-tilted investment strategy gains a premium of approximately 1.5 per cent each year over the world return.<sup>3</sup>

It is evident that home bias exists in many markets. French and Poterba (1991) state that the lack of diversification “is a result of investor choices, rather than

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<sup>1</sup> GCC refers to the Gulf Cooperating Countries, namely Saudi Arabia, Kuwait, United Arab Emirates, Bahrain, Oman and Qatar.

<sup>2</sup> BRIC is a widely used acronym between professional money managers which refers to Brazil, Russia, India and China.

<sup>3</sup> The world benchmark was proxied by the Financial Times Stock Exchange (FTSE) World Index (or what is recently referred to as the FTSE All-World Developed Market Index).

institutional constraints". From a practical perspective, Allen (1991) notes that global investing can be problematic. Allen (1991) summarises the challenges that face money managers as follows:

- (i) "The choice, at the policy level, of the unhedged dollar-denominated index against which the active equity manager is measured.
- (ii) Security selection decisions by the active manager within each country.
- (iii) Overweighting or underweighting of a country relative to the index based on the country's expected equity returns.
- (iv) Overweighting or underweighting of a country relative to the index based on the country's expected currency returns.
- (v) The timing of purchases and sales of securities (which implicitly impacts the currency appreciation of the portfolio).
- (vi) The choice, at the policy level, of the benchmark percentage of the portfolio that is to be hedged passively against currency fluctuation.
- (vii) Active decisions in the currency forward markets that cause the portfolio's return to deviate from that of the passively hedged benchmark."

Niendorf and Lang (1995) suggest that investors should consider international equity mutual funds as these enhance risk-adjusted portfolios and eliminate investor hesitance in entering foreign markets. Alternatively, Grinold and Meese (2000) advise the use of strategic asset allocation when considering international investing. They find that the bulk of international investments are hedged as most portfolio managers are home biased. Furthermore, Evnine and Henriksson (1987) emphasize that successful market-timing is more powerful than portfolio insurance strategy that use options. Consequently, Levy and Spector (1996) find that time diversification is more powerful than cross-asset diversification. They find supporting evidence that portfolio managers should focus on risky stocks which will ultimately attain higher mean-returns with relatively low risk.

## **2. Diversification Benefits in Emerging Markets**

Many academics have observed the investment flows of global portfolios in the attempt to determine the direction of international investors. Khoury (2003) finds that international funds and country-specific funds have outperformed domestic funds. He states that "an American investor typically holds an undiversified portfolio of assets consisting largely of 'the house'". Although Khoury (2003) advocates the proposition that the portfolio theory suggests a 40-60 per cent allocation of foreign securities in a typical portfolio, American investors ignore the positive aspects of international investing and focus on negative surprises such as Mexico in 1994 and Argentina in 2002. Bohn and Tesar (1996) find that U.S. investors are triggered by time-varying investment opportunities. They, however, confirm home bias in U.S. portfolios.

Nonetheless, investing in emerging markets remains an asset class of interest. Saunders and Walter (2002) argue that it is difficult to differentiate emerging market equities as a separate asset class. They identify financial liberalisation as the reason for increasing capital flows in the emerging markets. Consequently, rapid capital flows into those markets have resulted in increased integration with the developed markets. The study relates the integration to (i) improved technology over time, (ii) increased country funds, and (iii) increased American Depository Receipts (ADRs). The enhancement of financial products along with improved information technology has advanced the facilitation of capital flows among the world financial markets.

### **3. International Real Estate Securities Diversification**

Real estate securities and their effects on international portfolio diversification are well documented in the finance literature. While the classical paper of Hendershott and Haurin (1990) suggests that real estate data indicate higher risk-adjusted returns than stocks and bonds, other literature on the effects of international real estate diversification has presented contrary results. This variation in results is most likely due to the differences in data periods, markets tested, and the methodologies used. However, Curcio and Gaines (1977) encourage portfolio managers to adopt the concept of continuous portfolio revision. This revision will allow money managers to “broaden” their perspectives of alternative investments including divestures, acquisitions and restructuring. This approach helps portfolio managers to constantly revert to optimization in asset allocation.

Hudson-Wilson and Stimpson (1995) address the effects of the four-quadrants in real estate, namely, private equity, private debt, public equity and public debt, proxied by the National Council of Real Estate Investment Fiduciaries (NCREIF), the Giliberto-Levy Mortgage Index, National Association of Real Estate Investment Trusts (NAREIT) and Property and Portfolio Research (PPR) returns, respectively. Gyourko and Nelling (1996) assess different types of properties owned by REITs and examine their effects on systematic risk and diversification. Lee and Stevenson (2005) consider the limitations of using the modern portfolio theory (MPT) in constructing a real estate portfolio given the instability of portfolio weights and the decline of optimal portfolio performance when asset mean returns are estimated out of a sample.

Chua (1999) extends the literature by looking at the benefits of international real estate diversification with an existing internationally diversified investment portfolio that already invests in bonds, equities and gold. Using mean-variance portfolio optimization and correcting for taxes, transaction costs and management fees, Chua (1999) confirms the viability of international real estate in global mixed-asset investment portfolios. More recently, Ciochetti *et al.* (2015) investigate the benefits of international diversification by using a

rational sentiment-based model for private and public real estate equities. The study confirms that diversification across countries does contribute to reducing risk.

#### **4. Literature Review: Evidence from Emerging Markets**

Diversification among emerging markets has increased in importance during the past decade. Benefits from investing in emerging markets have been well documented in the literature. Moreover, the consensus view is that emerging markets have higher average returns, low correlation with developed markets, greater serial correlation and greater volatility (Eaker *et al.* (2000)). Moreover, the benefits of including emerging markets in a global portfolio context are proven to be rewarding. The question then becomes: How much should global portfolios invest in emerging markets?

Errunza and Losq (1985) investigate the volatility of emerging markets and the types of risks associated with investing in emerging markets such as currency, political and investment risks. Their study suggests that investments in emerging markets attain enough excess returns to compensate for the underlying risks. They conclude that such investments are not as risky as perceived. Erb *et al.* (1995) research the effects of country risk on global equity selection. They find that country credit ratings have a substantial predictive power in determining investment inflows. Numerous studies such as Bekaert *et al.* (1998), Bekaert and Urias (1999), Liu and Mei (1999) and Sarkar and Li (2002) take the view point that U.S investors hold emerging market assets.

More recently, Flakenback (2009), Gallo and Zhang (2010), Shen *et al.* (2012) and Oyedele *et al.* (2014) all confirm that there are some benefits of emerging real estate markets diversification but subject to country specifics and type of real estate asset class. Akinsomi *et al.* (2015) focus on geographic diversification benefits in the African real estate market from the perspective of South African investors. The data used are 36 property companies listed on the Johannesburg Stock Exchange. Despite the evident diversification benefits, hesitation remains amongst investors due to the regulatory and legislative environments.

#### **5. International Diversification without Exchange Rate Factor**

It is known that international diversification is effective when domestic and foreign assets have low and or negative correlation. Solnik (1974), Lassarad (1976) and Biger (1979) have proven the effects of international diversification from the perspective of U.S. investors. This section will consider local returns that assume one of the following:

- (i) the exchange rate is fixed,
- (ii) the foreign currency position is fully hedged, or
- (iii) the foreign position is undertaken with the same foreign currency.

Suppose that an investor takes positions in both domestic and global markets. As such, the weights assigned for each of these markets are  $\beta$  and  $1-\beta$ , respectively. Therefore, the rate of return of the portfolio,  $R_p$ , is the weighted average of the rates of returns on both the domestic and foreign markets,  $R_d$  and  $R_f$ , respectively. The return on the portfolio can be written as:

$$R_p = \beta R_d + (1-\beta)R_f \quad (1)$$

The variance of the portfolio,  $\sigma_p^2$ , can be presented as:

$$\sigma_p^2 = \beta^2 \sigma_d^2 + (1-\beta)^2 \sigma_f^2 + 2\beta(1-\beta)\sigma_{d,f} \quad (2)$$

where  $\sigma_d^2$  and  $\sigma_f^2$  are the variances of the rates of return on the domestic and foreign positions, respectively, and  $\sigma_{d,f}$  is the covariance of the domestic and foreign rates of return. Given that  $\sigma_d$  is the standard deviation of the domestic rate of return and  $\sigma_f$  is the standard deviation of the foreign rate of return, the covariance can be represented as  $\sigma_{d,f} = \rho_{d,f}\sigma_d\sigma_f$ , where  $\rho_{d,f}$  is the correlation coefficient between the domestic and the foreign rates of return. Hence, the portfolio variance can be calculated as:

$$\sigma_p^2 = \beta^2 \sigma_d^2 + (1-\beta)^2 \sigma_f^2 + 2\beta(1-\beta)\rho_{d,f}\sigma_d\sigma_f \quad (3)$$

The equation clearly demonstrates that the maximum risk reduction is obtained when the correlation coefficient is -1. Based on Equation (3), portfolio managers are constantly searching for negatively correlated markets. As a result, many portfolio managers have begun to consider emerging equity markets as markets that are relatively low growth and negatively correlated with developed markets. Nonetheless, many began to question the sustainability of benefiting from international diversification with increased financial liberalization and market integration. Baxter and Jermann (1997) present evidence of diminishing international diversification benefits. Alternatively, international diversification can still reduce risks when taking opposite (long-short) positions. Assuming that short sales are available, an investor can take a long position in one market and a short one in another. To illustrate, suppose an investor takes a long position in the domestic market and shorts the foreign market, the rate of return of the portfolio can be calculated as:

$$R_p = \beta R_d - (1-\beta)R_f \quad (4)$$

in which the portfolio variance can be calculated as:

$$\sigma_p^2 = \beta^2 \sigma_d^2 + (1 - \beta)^2 \sigma_f^2 - 2\beta(1 - \beta)\rho_{d,f}\sigma_d\sigma_f \quad (5)$$

Hence, the maximum risk reduction is achieved when  $\rho_{d,f} = 1$ .

However, most studies on international diversification do not account for the statistical significance of correlations. Most studies have found numerical differences in standards of deviation as a measure of risk reduction. Moosa and Al-Deehani (2009) suggest that testing the effectiveness of hedging should include the variance ratio test, in which null is  $\sigma_d^2 = \sigma_p^2$ . When the null hypothesis is rejected, the alternative hypothesis is favored as  $\sigma_d^2 > \sigma_p^2$ .

## 6. Methodology

Many studies have developed quantitative techniques that aim to maintain a robust portfolio optimization process. Rudin and Morgan (2006) have constructed a portfolio diversification index (PDI) that measures the number of unique investments in a portfolio and assesses cumulative diversification benefits across asset classes. Fabozzi *et al.* (2007) discuss the concept of 'robust optimization' which incorporates estimation errors into the portfolio optimization process.

Dynamic asset allocation and portfolio rebalancing have become common practices in the investment industry. Assoe *et al.* (2006) examine the debate on whether asset allocation or security selection is important in investment performance. Sun *et al.* (2006) assert the robustness of dynamic portfolio rebalancing. They introduce the quantification of the cost of rebalancing a portfolio strategy and find that optimal rebalancing outperforms the traditional rebalancing of a portfolio.

In this study, a hedging approach presented by Moosa *et al.* (2015) is applied to examine the effects of real estate in the GCC on global all-equity portfolios. Hedging effectiveness is quantified by measuring the reduction in the variance of an unhedged (domestic) asset in addition to one or more foreign assets. Hedge ratios are calculated upon constructing portfolios by minimizing the variance of the rate of return on the hedged position of the portfolio. Therefore, a two-asset portfolio,  $R_p$  is defined as:

$$R_p = R_d - hR_f \quad (6)$$

where  $R_d$  and  $R_f$  are the rates of return for the domestic and foreign assets, respectively and  $h$  is the hedge ratio. Consequently, the variance for the portfolio rate of return,  $\sigma_p^2$  is written as:

$$\sigma_p^2 = \sigma_d^2 + h^2\sigma_f^2 - 2h\sigma_{d,f} \quad (7)$$

where  $\sigma_d^2$  and  $\sigma_f^2$  are the variances of the rates of return on the domestic and foreign assets, respectively and  $\sigma_{d,f}$  is the covariance of the rates of return on the domestic and foreign assets, respectively. The minimum-risk hedge ratio is obtained from the first order condition.

$$\frac{\partial(\sigma_p^2)}{\partial h} = 2\sigma_d^2 h - 2\sigma_{d,f} = 0 \quad (8)$$

Therefore,

$$h = \frac{\sigma_{d,p}^2}{\sigma_f^2} \quad (9)$$

The hedging effectiveness of international diversification is based on the null hypothesis:

$$H_0 : \sigma_d^2 = \sigma_p^2 \quad (10)$$

If the value of  $\sigma_d^2$  is greater than  $\sigma_p^2$ , the null is rejected, thus signifying diversification is effective in reducing risk; that is, if:

$$VR = \frac{\sigma_d^2}{\sigma_p^2} > F(n-1, n-1) \quad (11)$$

in which  $VR$  is the variance ratio and  $n$  is the sample size. It is further asserted by computing the variance reduction  $VD$  as:

$$VD = 1 - \frac{1}{VR} = 1 - \frac{\sigma_p^2}{\sigma_d^2} = \frac{\sigma^2(R_d - hR_f)}{\sigma^2 R_d} \quad (12)$$

## 7. Data and Empirical Results

The empirical results presented in this section are based on the monthly data of five markets: three developed and two emerging markets in the period of January 2011 to April 2016. The three developed markets are those of the U.S., U.K. and Europe which are represented by investable exchange traded funds



(ETFs). The U.S. market is represented by S&P 500, the U.K. by FTSE 100 and Europe by EURO STOXX 50. The emerging markets under investigation are GCC represented by the GCC real estate index by Thomson Reuters and BRIC represented by FTSE BRIC 50.

To test for diversification effectiveness, the frontier region of the GCC performance is benchmarked against the emerging economic bloc of the well known BRIC. Therefore, it is presumed that if the results reveal variance reductions that are statistically significant between the GCC and developed markets, then it is safe to say that variance reductions can also be found between GCC markets and other developed markets that are not as highly correlated and are inversely affected by oil price volatility. The results can also be utilized for comparing performance in relation to the predominant emerging markets from a global-all equity portfolio perspective. Monthly data are used on the five markets where all but the GCC data are the historical rates of return of ETFs. A GCC focused real estate ETF does not currently exist and therefore, historical index returns are used as a valid proxy.

First, the analysis starts by looking at the macroeconomic indicators of the underlying GCC markets. Table 1 presents a snapshot of the major indicators. In summary, the GCC represents an aggregate GDP of approximately USD 1.4 trillion, total population of 90 million and an average GDP/capita of USD 30,000 which is considered amongst the highest worldwide. With the exception of Kuwait and Saudi Arabia, the number of days to start a business is less than 10 and inflation in all markets is below 3%. Market capitalization is USD 958 billion.

Proceeding to the descriptive statistics of the monthly returns on the five markets, Table 2 shows that the monthly real estate mean returns of the GCC is the highest among the five markets followed closely by those of the U.S. while the real estate of the GCC also has the highest standard deviation (SD) followed by that of the BRIC. Table 3 presents the correlation matrix among the five markets. The highest correlation is found between the U.S. and the U.K. while the lowest is found between the GCC and Europe. Interestingly, the BRIC seems to have larger correlations with the other markets than the real estate returns of the GCC.

Figure 1 provides a graphical representation of the cumulative returns of the five markets under investigation. Clearly, the real estate index of the GCC shows an apparent volatility in comparison to the other four markets while the BRIC shows a stable downward trend. Figure 2 shows the plot of the variance ratio ( $\sigma_d^2 / \sigma_f^2$ ) relating to the twelve portfolios which represents all possible combinations between the developed markets and the real estate index of the GCC. The horizontal line represents the five per cent critical value of the variance ratio (=1.513), such that a significant variance ratio is plotted above the horizontal line of the critical value. When similar positions are taken, three

out of the twelve possible combinations are above the line as seen in Figure 2(a). As such, effective diversification with similar positions taken is only obtained in three out of twelve cases. However, when opposite positions are taken, nine out of twelve cases produce effective diversification in all possible portfolios, (represented by dots in Figure 2(b)) which are above the critical line.

**Table 1 Economic Indicators of GCC**

	GCC					
	Saudi Arabia	UAE	Kuwait	Bahrain	Qatar	Oman
GDP (bn USD)	646	349	124	32	152	66
GDP Growth (%)	22	20	17	24	22	13
GDP/Capita (USD)	20029	37622	30010	22354	59331	14982
GDP/Capita Growth (%)	4	7	-22	8	-16	-22
Inflation (%)	2	2	3	2	2	0
Population (mn)	32	9	4	1	3	4
Market Cap. (bn USD)	449	213	99	19	155	23
Export (% of GDP)	31	104	54	85	47	56
FDI (% of GDP)	1	3	0	NA	1	NA
Time to Start a Business (days)	16	8	43	9	9	6

*Notes:* (GDP) is gross domestic product, (Market Cap) is market capitalization, and (FDI) is foreign direct investment. GDP figures are presented in (USD billions) and Population is presented in (millions). GDP, GDP/Capita, Export and Population figures presented are for 2016. Inflation and FDI are 2015. GDP Growth and Market Cap. Growth are measured as the percentage change of the period (2010-2016). NA=Not Available. Source: World Bank.

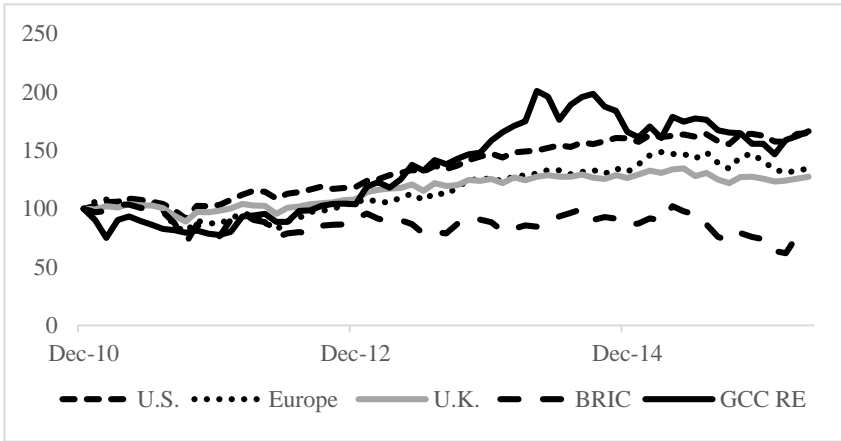
**Table 2 Descriptive Statistics**

	U.S.	U.K.	EUROPE	BRIC	RE of GCC
Mean (%)	1.01	0.43	0.53	-0.33	1.03
Median (%)	1.15	0.77	1.13	-1.04	0.54
Maximum (%)	10.90	8.14	10.37	16.30	25.91
Minimum (%)	-7.02	-6.77	-13.70	-17.51	-19.96
SD (%)	3.43	3.22	4.74	6.40	8.48
Skewness	0.00	-0.21	-0.39	0.16	0.15
Kurtosis	3.41	3.01	3.06	3.67	3.59

**Table 3 Correlation Matrix of Rates of Return**

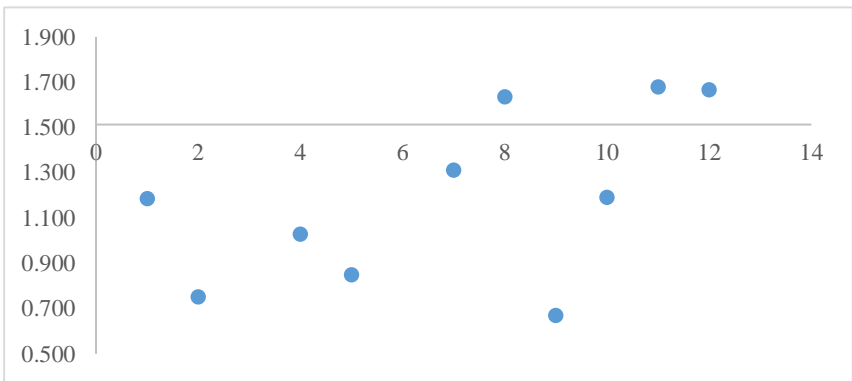
	U.S.	U.K.	EUROPE	BRIC	RE of GCC
U.S.	1.00				
U.K.	0.82	1.00			
EUROPE	0.76	0.80	1.00		
BRIC	0.73	0.64	0.56	1.00	
RE of GCC	0.24	0.39	0.18	0.32	1.00

**Figure 1 Cumulative Performance of Markets (Re-based at 100)**

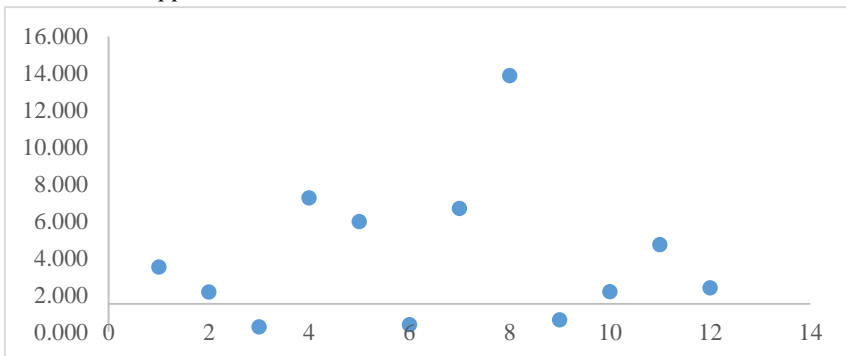


**Figure 2 Variance Ratios against 5% Critical Value (GCC as Emerging Market)**

*Panel A Similar Positions*



*Panel B Opposite Positions*



Tables 4 and 5 show the underlying calculations of the portfolios represented in Figure 2. The results confirm that when opposite positions are taken, the variance reductions range from 53 to 93 per cent. A variance reduction of 93 per cent is observed when taking a long position in Europe and a short position in the U.K. It is interesting to see that when the GCC markets take the short positions, they do not produce variance reductions for all three developed markets. In fact, risk is enhanced. However, when a long position is taken in the GCC and a short position is taken in the developed markets, the average variance reduction is found to be 64%.

**Table 4 Effective Diversification with Long Position in Foreign Market (GCC as Emerging Market)**

Domestic Market	Foreign Market	$\sigma_d^2$	$\sigma_p^2$	VR	VD
U.S.	U.K.	11.780	9.936	1.186	0.157
U.S.	Europe	11.780	15.665	0.752	-0.330
U.S.	GCC	11.780	44.396	0.265	-2.769
U.K.	U.S.	10.384	10.084	1.030	0.029
U.K.	Europe	10.384	12.221	0.850	-0.177
U.K.	GCC	10.384	25.861	0.402	-1.490
Europe	U.S.	22.434	17.096	1.312	0.238
Europe	U.K.	22.434	13.711	1.636	0.389
Europe	GCC	22.434	33.463	0.670	-0.492
GCC	U.S.	71.896	60.321	1.192	0.161
GCC	U.K.	71.896	42.796	1.680	0.405
GCC	Europe	71.896	43.127	1.667	0.400

When substituting the real estate index of the GCC with that of the BRIC, the portfolio returns and variance reductions are measured and compared against the results of the real estate allocation of the GCC. Figure 3 shows a plot of the variance ratios for the twelve portfolios. With similar positions, Figure 3(a) shows that only one portfolio results in effective diversification. The variance reduction calculations are shown in Table 6. The percentage reductions range from 3 per cent to 39 per cent.

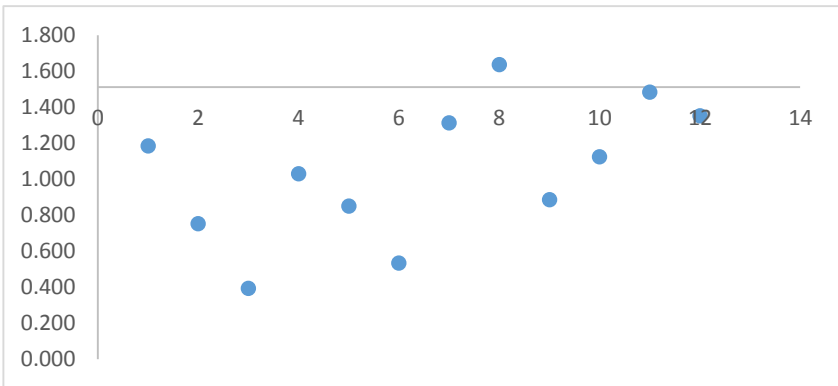
In summary, when comparing the effects of the real estate of the GCC with those of the real estate of the BRIC countries in a global equity portfolio context, both do not produce diversification benefits when a short position is taken while a long position is taken in developed markets. Nonetheless, by taking the viewpoint of real estate investors in the GCC into consideration, effective diversification is found when taking short positions in developed markets. A similar case can also be concluded when taking long positions in BRIC and shorting the developed markets.

**Table 5 Effective Diversification with Short Position in Foreign Market (GCC as Emerging Market)**

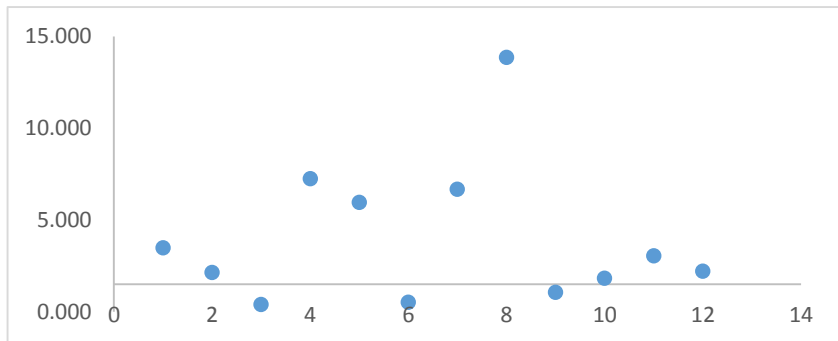
Domestic Market	Foreign Market	$\sigma_d^2$	$\sigma_p^2$	VR	VD
U.S.	U.K.	11.780	3.364	3.502	0.714
U.S.	Europe	11.780	5.475	2.152	0.535
U.S.	GCC	11.780	45.666	0.258	-2.877
U.K.	U.S.	10.384	1.431	7.257	0.862
U.K.	Europe	10.384	1.742	5.961	0.832
U.K.	GCC	10.384	27.298	0.380	-1.629
Europe	U.S.	22.434	3.357	6.683	0.850
Europe	U.K.	22.434	1.618	13.869	0.928
Europe	GCC	22.434	34.985	0.641	-0.559
GCC	U.S.	71.896	33.028	2.177	0.541
GCC	U.K.	71.896	15.218	4.724	0.788
GCC	Europe	71.896	30.252	2.377	0.579

**Figure 3 Variance Ratios against 5% Critical Value (BRIC as Emerging Market)**

*Panel A Similar Positions*



*Panel B Opposite Positions*



Moreover, by taking the viewpoint of global investors into consideration, both the GCC and BRIC are more effective in bear markets. The question then becomes, why should investors consider investing in real estate in the GCC if the diversification effects are similar? First, allocating to real estate in the GCC is considered to be an effective hedge against volatile oil fluctuations. This is specifically important to hedge funds and alternative investment managers with commodity exposures. Al-Abduljader (2009) empirically investigate multiple GCC sectors and find the correlation of real estate with oil prices to be among the highest. Second, U.S dollar-based funds that are invested in emerging markets are in constant search to minimize foreign exchange volatility and therefore, the GCC allocation would be a more effective hedge compared to that of the BRIC as all GCC currencies are pegged against the U.S. dollar. Third, the mere investment appetite in the BRIC countries, per se, has seemed to witness a significant decline. A major BRIC ETF has witnessed a 69% decline over the past five years in primary outstanding shares. Cooper and Farooq (2013) describe the group as a ‘loose club’ while Evenett (2015) states that it is ‘time for a rethink’. The arguments made are that the BRIC countries are perceived to benefit mostly China and India with ‘little or no relevance’ to the remaining countries (Vieira and Ouriques, 2016). Establishing the GCC as an alternative is not an exclusive conclusion but rather a valid option among other markets for the investing public.

**Table 6 Effective Diversification with Long Position in Foreign Market (BRIC as Emerging Market)**

Domestic Market	Foreign Market	$\sigma_d^2$	$\sigma_p^2$	VR	VD
U.S.	U.K.	11.780	9.936	1.186	0.157
U.S.	Europe	11.780	15.665	0.752	-0.330
U.S.	BRIC	11.780	30.010	0.393	-1.548
U.K.	U.S.	10.384	10.084	1.030	0.029
U.K.	Europe	10.384	12.221	0.850	-0.177
U.K.	BRIC	10.384	19.461	0.534	-0.874
Europe	U.S.	22.434	17.096	1.312	0.238
Europe	U.K.	22.434	13.711	1.636	0.389
Europe	BRIC	22.434	25.329	0.886	-0.129
BRIC	U.S.	40.990	36.466	1.124	0.110
BRIC	U.K.	40.990	27.608	1.485	0.326
BRIC	Europe	40.990	30.317	1.352	0.260

## 8. Concluding Remarks

The results of this paper should shed light on some of the diversification benefits that investors have neglected or disregarded. With an eye towards the future, large global investment banks and Asian investors have now set foot in GCC markets either through branches, satellite offices or strategic alliances, or simply through close monitoring. Forecasts that emerging markets will spend

**Table 7 Effective Diversification with Short Position in Foreign Market (BRIC as Emerging Market)**

Domestic Market	Foreign Market	$\sigma_d^2$	$\sigma_p^2$	VR	VD
U.S.	U.K.	11.780	3.364	3.502	0.714
U.S.	Europe	11.780	5.475	2.152	0.535
U.S.	BRIC	11.780	28.331	0.416	-1.405
U.K.	U.S.	10.384	1.431	7.257	0.862
U.K.	Europe	10.384	1.742	5.961	0.832
U.K.	BRIC	10.384	19.309	0.538	-0.859
Europe	U.S.	22.434	3.357	6.683	0.850
Europe	U.K.	22.434	1.618	13.869	0.928
Europe	BRIC	22.434	20.873	1.075	0.070
BRIC	U.S.	40.990	22.280	1.840	0.456
BRIC	U.K.	40.990	13.381	3.063	0.674
BRIC	Europe	40.990	18.525	2.213	0.548

USD 1.1 trillion on infrastructure in the next three years apparently have multiple effects on the real estate market of the GCC. It is crucial, however, to realize that the competent design and development of real estate investment vehicles such as real estate investment trusts (REITs) and real estate ETFs all provide investors with an array of structures to gain exposure to the region. Therefore, with the unavailability of limited options of shorting markets to most investors through synthetic structures, the results would suggest serious concerns on effective diversification among the retail investor base with exposure to real estate in the region. This would cast serious doubt amongst the majority of real estate investors in effectively diversifying their portfolios when exclusively investing in the region.

Real estate exposure beyond direct investment is currently immature in most of Asia with the exception of sophisticated developed markets such as those of Hong Kong, Singapore, Tokyo and Kuala Lumpur. We hope that this study facilitates further interest to regulators and decision makers in Asia to take another look at financial instruments that enable investors to gain exposure to multiple asset classes, and more so in real estate via capital markets. Furthermore, the diversification benefits of frontier markets, such as those of the GCC, in the viewpoint of global investors, are increasing in importance in parallel with notable emerging markets as risk/return profiles are relatively competitive. The rise in the term 'frontier markets' is arguably setting the stage for investors to analyze markets that have different, yet promising, investment characteristics for alternative investors. It is, therefore, suggested that future research undertakes further investigation of other frontier markets in a global portfolio context.

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