



## International Portfolio Diversification in the Era of Globalisation: A British Perspective

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### Abstract

This paper looks at whether the benefits of international portfolio diversification in terms of reducing portfolio risk of investors still exist in the era of globalization and increasing interconnectedness amongst nations. By using Johansen's Cointegration Technique, this study endeavours to evaluate the gains from international diversification in the context of globalisation through a set of 30 countries' monthly stock index data, and while adopting a United Kingdom's perspective. The study has a special focus on periods of crisis and evaluates whether investors can still park their money in "safe havens" and be shielded from the perils of crisis. Countries are identified where British investors can safeguard their money and emerging economies are given a special focus in this study as they are deemed as destinations 'safe' from economic and financial crisis. The study finds that globalization has had drastic repercussions on portfolio diversification and economic and financial integration and development has enhanced the dangers stemming from contagion effects of various economic crises.

**Keywords:** International Diversification, Cointegration, Portfolio, Financial Crisis, Global Linkages

**JEL Classification:** G11, G15, F36

**Paper Classification :** Research Paper

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### Introduction

The pioneering theoretical model of portfolio selection developed by Markowitz favours the diversification of securities underlining that the degree to which diversification can reduce risk depends upon the correlations among security returns. Should the returns not be correlated, then diversification could eliminate risk. In the current context, the increasing trend in the free capital flows, technological developments in communication, thereby reducing transactions costs, create more diversification opportunities for investors.

It must be pointed out that within an economy a strong tendency usually exists for economic phenomena to move in conjunction with periods of relatively high or low general economic activity. Thus, there is a strong tendency for returns on individual securities within an economy

to move in the same direction; the greater the magnitude of co-movement implies that there is less opportunity for risk reduction through diversification. To address such a conundrum in the process of diversifying into a range of various securities, international portfolio diversification has for long been advocated as a strategy to enhance average returns while simultaneously reducing portfolio risk of investors who are considering diversifying into foreign securities. The essence of this strategy is that international stocks tend to display weaker levels of co-movement than stocks trading on the same market. To the extent that countries are prey to different shocks, holding foreign stocks and international diversification facilitates risk reduction among global investors; as a result idiosyncratic shocks can be curtailed. Thus investors who pursue cross-country diversification strategies may eliminate country-specific risks but remain vulnerable to common shocks.

Notwithstanding, since the 1970s, a revolution, namely, globalization, has changed the very fabric of society. Globalization, economic and financial integration and assimilation between countries have all contributed to exacerbating the interdependence of global markets and the contagion effect. Consequently, adopting the framework of globalisation, this study shall endeavor to assess whether these factors affect the decisions of investors in the allocation of financial assets in the current context. In a nutshell, this paper seeks to analyze whether the benefits derived from international portfolio diversification still matter in an increasingly globalized and connected world, wherein the weaknesses of an economy can be transmitted to others and to the world within a matter of seconds. More specifically, it adopts a United Kingdom perspective, to evaluate the gains from international portfolio diversification from a hedging perspective in times of crisis.

The reason for selecting a British perspective would be in the current economic context, wherein the European Union has had to face a number of setbacks, it would be interesting to assess Britain's position as an economic force to reckon with. Also it is not only one of the most globalized economies of the world, which provides with the ideal economic data to experiment with, but it is also the fastest growing economy amongst the G7 countries since the recent financial crisis.

The conclusions of the study are indeed interesting and provide a novel perspective on the strategy of international portfolio diversification in the current context of increasing economic linkages amongst nations. Despite the instance of globalization and enhanced economic linkages, there still exists much potential and scope for international portfolio diversification. Emerging countries like Brazil and India offer great diversification opportunities for British investors in the long run; Argentina, Australia, Turkey, Mexico and Canada also exhibit such characteristics.

The paper is structured in the following manner: Section 2 analyzes the major literatures as well as their findings in this realm; Section 3 presents the theoretical framework; Section 4 describes the data and methodology used to investigate the phenomenon; Section 5 presents the empirical findings and Section 6 summarizes the findings and conclusions.

## Literature Review

This section of the paper presents the major studies and findings in the realm of international portfolio diversification. Before embarking upon such an endeavour, it was paramount to contemplate and consider all the major works in this arena and incorporate their contributions and findings. There are a number of prerequisites to be considered before considering to invest abroad as shown below.

Levy & Sarnat (1970) and Lessard (1973) demonstrated that there is a strong tendency

for returns on individual securities within an economy to move together; the greater the magnitude of co-movement would imply that there is less opportunity for risk reduction through diversification. Errunza (1977) and Drissen & Laeven (2005) reaffirm that the benefits of international diversification are not only limited to developed countries but rather are greatest for investors in developing countries even after accounting for foreign currency fluctuations. Phylatkis & Ravazzolo (2005) go further by demonstrating that other factors such as information availability, accounting standards, liquidity risk and political risk do not seem to respond to a common world growth factor, but rather are triggered by national factors, thereby leaving room for long-term gains by investing in these markets. Biger's (1979) paper reaffirms the same.

Flavin & Panopoulou (2006) extol the benefits of international diversification, by showing that periods of high volatility such as "bear runs" still do not completely erode the therapeutic effect of international diversification. Valadkhani, Chancharat & Harvie (2008) show that geographical proximity and level of economic development do matter when it comes to co-movements of stock returns and has implications on diversification to reduce systematic risk across countries while Eun, Huang & Lai (2008) show that that small-cap funds have low correlations not only with large-cap funds but also with each other but large-cap funds tend to have relatively high correlations with each other, reflecting common exposures to global factors. Santis & Bruno (1997) discussed that while there are drawbacks against falls in American stock markets; gains from international diversification remain appealing in dollar terms. Eptas & Leger (2010) argue in favour of safe haven countries which would be relatively unaffected by shocks of world consumption despite increased globalization. Vermeulen (2011) empirically indicate that international stock market diversification provides large gains during the recent financial crisis (subprime crisis). Niklewski & Rogers (2014) reaffirm the same by demonstrating that the conditional correlation between the United States and emerging markets has increased and may well be attributed to globalization, consequently, leading to greater market integration. Nevertheless, the subprime crisis had an impact on the linkages and architecture of the global financial system.

Vardar & Aydogan (n.d.) and Bouslama & Ouda (n.d.) again confirm the strong interrelations between the stock markets after the crisis period, which, in turn, implies that the international portfolio diversification benefits disappear after financial turmoil. However, Balarezo (2010) takes a contrarian standpoint of the above mentioned scholars by arguing that diversifying internationally, may at times, not be very effective and thus investors might choose not to do so.

Maldonado & Saunders (1981) and Tiwari, Dar, Bhanja & Shah (2013) in their respective papers, illustrate different and opposing findings over different point in time. The former concludes that in the very short-term, defined as two quarters, there is a relatively predictable relationship between inter-country correlations, which for investors in for the short run, means good news. Beyond time period though, such inter-country correlations are generally unstable. The latter states that increased gains of diversification can be witnessed from longer period of investment compares to shorter periods.

### **Research Gap and Resulting Objective**

As it can be seen from the previous section, there exists a gap in academia wherein a British perspective had not been studied in detail before despite not only being an economic superpower but also one of the most globalized nations. To analyze the gains of international portfolio diversification as a strategy, to protect assets against crisis periods in the age of globalization, by adopting a British investor's perspective.

## Significance of the Study

The study is of paramount importance for investors wishing to enhance their returns and hedge against risk prevalent in the domestic economy, which in this case is the United Kingdom. The world has changed significantly in the past couple of decades and had become increasingly connected and the events of a country do not leave the rest of the world indifferent. Such phenomenon is especially prevalent in the context of stock markets around the world. Therefore, this study seeks to investigate whether the gains of international portfolio diversification are still prominent in the age of globalization. More importantly, it seeks to guide British investors by reaffirming or denying that in times of economic crises, emerging markets can be perceived and considered to be an interesting and appealing destination to park one's money and keep it 'safe' from the risks and jeopardy involved from crisis.

## Limitations of the study

One of the major limitations of this study would be the data set that has been considered. Daily data would have been preferred for the purpose of this study but due to extreme variances in number of holidays and working days of various exchanges around the world, monthly data has been used. Monthly data fails to show the extreme short run variations occurring within a day or over a week, caused by changes in the global economy. The second limitation of this study is that it fails to account for intrinsic and non-diversifiable risks present within individual economies and this may negatively affect the results. The third limitation is that this study restricts the analysis of international portfolio diversification by only basing itself on the stock indices of various countries. However, international portfolio diversification includes various other avenues such as bonds, real estate and venture capital.

## Theoretical Framework

Markowitz (1952) provided an invaluable tool to understand how a portfolio should be constructed. Consider the hypothetical case wherein an investor had knowledge with certainty of the future returns of a given security, he then would solely invest in that particular security. John Williams (1938) proposed the key definition which is still extremely relevant in today's context that the value of a stock should be equal to its present future income stream. Markowitz built upon that definition and refined it to mean the expected value of a stock discounted future income stream. His study uses the expected returns-variance of returns (E-V) rule framework to illustrate the method of portfolio selection. He argues that given fixed probability beliefs which are the expected return of a given security and the covariance between that given security and another one, an investor will opt between various combinations of expected return (E) and variance of returns (V) depending on his allocation percentage to a range of assets.

The Modern Portfolio Theory ("MPT") is Markowitz's brainchild and is an investment strategy and quantitative method through which portfolio managers endeavor to attain a specified level of return while minimizing investment risk. The theory is a synergy of financial, economic and mathematical tools that argues that through the appropriate composition of a portfolio, investment risks may be curtailed without compromising potential returns. The objective of MPT is to achieve the desired investment results, or range of results, while diminishing the risk to which the portfolio would be otherwise subject to. Expected return and standard deviation of return are the two of the basic criteria which form the essence of MPT.

This theory is especially relevant in the context of this study, for based on the results; it

will offer a novel perspective to British investors and thereby redefine the process of portfolio diversification. As Markowitz mentioned that future expectations define the process of portfolio diversification, the countries identified as being not co-integrated with the United Kingdom can increasingly find space in investors' portfolios. It also needs to be highlighted that Eun & Resnick's (1984) contribution to making modern portfolio theory amenable to implementation in an international setting was essential in the realm of this study.

## Research Methodology

This paper adopts Johansen's co-integration analysis in order to investigate the validity of the likely benefits of diversification through the mechanism of the dynamic co-movements and linkages among developed and emerging markets (Johansen, 1988). The relationships and linkages between the various countries that this study considers are arrived at by testing for the presence and number of co-integrating vectors and to test for the causal dynamic relationship between these stock markets, the vector error correction model is used.

### Unit Root Test

The Augmented Dickey and Fuller (ADF) unit root test was used to check the non-stationarity properties of the series; the order of the integration of all series must be determined and verified whether it is the same for all the series. After identifying whether the series has unit roots, the first differences were taken and the ADF was performed a second time in the series in differences to assess if it became stationary. Such a process is vital for the next part of the approach that this paper adopts as co-integration results between non stationary series are only valid if the integration of said series is of the same order. The equation of the ADF used is as follows:-

$$\Delta X = a_1 + a_2t + \delta X_{t-1} + \Delta X_{t-1} + \Delta X_{t-2} + \dots \mu_t$$

Where  $\Delta X_{t-1} = X_{t-1} - X_{t-2}$  and  $\mu_t$  is pure white noise.

The formula for first differencing involves subtracting the value of the dependent variable in the preceding period from its present value so as to define a new dependent variable in the following manner:

$$\Delta X_t = X_t - X_{t-1}$$

### Johansen test for Co-integration

If two or more variables are co-integrated, the phenomenon of stationary linear combinations of these variables may exist. Should there exist no co-integrating relationship among the variables, the variables have no long-run interdependence and can drift arbitrarily from each other. Johansen's methodology was applied in order to examine whether stock indices of the set of countries selected move together over the long run. The Johansen method is used to identify the presence of co-integrating vectors in non stationary time series; it begins from the vector autoregressive (VAR) analysis and utilizes the maximum likelihood estimates to test for the number of cointegrating relationships in the multivariate system. Such an approach depends upon the linkage between the rank of a matrix and its characteristic roots (eigenvalues). The Johansen method was applied in both a bivariate or multivariate setting for this paper. In the case of a multivariate setting, it has the benefit of finding and providing estimates for all the cointegrating vectors within a Vector Autoregressive model (VAR).

A VAR(k) model is extension of the AR(p) model wherein there is more than one dependent variable under study and thus more than one equation. In the model, each equation has explanatory variables lagged values of all variables under study.

A (k) order VAR has the following representation:

$$X_t = \mu_0 + \delta_0 t + \pi_1 X_{t-1} + \dots + \pi_k X_{t-k} + \epsilon_t \quad t = 1, \dots,$$

Where  $X_t$  is a (nx1) vector of variables,  $\delta$  a deterministic trend and  $\delta_t$  is a white noise process. The Johansen method is based on the error correction representation of the VAR, Vector Equilibrium Correction Model (VECM) that reformulate the previous equation in terms of differences, lagged differences and levels of the process to obtain:

$$\Delta X_t = \Gamma_1 \Delta X_{t-1} + \pi X_{t-1} + \epsilon_t$$

It can be observed that in the above equation, the left hand side is stationary. Consequently, the right hand too must be stationary; for such an occurrence, either  $\pi = 0$ , or it must have a reduced rank. To test the restrictions in  $\pi$ , Johansen defines two matrices  $\alpha$  and  $\beta$ , both of dimensions  $n \times r$  where  $r$  is the rank of  $\pi$  and  $n$  is the number of variables. The properties of  $\alpha$  and  $\beta$  can be expressed in the following manner:-

$$\pi = \alpha\beta'$$

which subsequently implies

$$\Delta X_t = \Gamma_1 \Delta X_{t-1} + \alpha\beta' X_{t-1} + \epsilon_t$$

In the above equation,  $\beta$  represents the matrix of cointegrating parameters and  $\alpha$  is the matrix of weights with which each cointegrating vector enters the n equations of the VAR, in other words,  $\alpha$  can be seen as the matrix of the speed of adjustment parameters. Moreover the Drift in the VECM but none in the cointegrating relation was chosen in the assumptions option before running the Cointegration test. This case is consistent with linear trend in the variables that cancel out in the cointegrating space and the equation is given below: -

$$\Delta X_t = a_0 + \alpha\beta' X_{t-1} + \Gamma_1 \Delta X_{t-1} + \epsilon_t$$

The Johansen Cointegration method was applied in two steps. Firstly, it was applied at a bivariate level between the United Kingdom and every other country in the set so as to show the level of cointegration between each pair of countries. It was next applied at a multivariate level for various sets of countries. These sets of countries were selected based upon their geographical locations and the results of the same would provide valuable insights for a British investor as to identify which markets do not have any long term equilibrium with others. The Johansen cointegration test was also applied to BRIC (Brazil Russia India China) countries to evaluate the therapeutic effects as a safe haven of possessing an internationally diversified portfolio consisting of these emerging economies.

## Vector Error Correction Model

In the presence of a cointegrating relationship, it is imperative to undertake further exploratory testing on the long-run equilibrium relationship between the nations and this is undertaken using the VECM. The direction of the relationship between the variables is investigated, in the presence of cointegration, by a vector error correction model (VECM). The model captures both the long-run relationship and the short-run dynamics of the variables and



model depicts the feedback process and adjustment speed of short-run deviations towards the long-run equilibrium path. In addition to the short run causalities, the VECM can, not only capture the short-run causalities, but also the speed of adjustment through the long-run equilibrium path as well as the lead-lag relationships between developed and emerging markets. This makes it possible to make inferences from these results for the purpose of international investment allocation.

In this model, the causal relationship between the stock markets can be estimated by two ways; the first is through the error correction term, which estimates the response of the dependent variable to departure from equilibrium and the second one is through the lagged values of the differences variables. For two cointegrated series, the error correction mechanism can take the following form:

$$\Delta y_t = \alpha_1 + \sum_{i=1}^{m1} \beta_{1i} \Delta x_{t-1} + \sum_{i=1}^{m2} \beta_{2i} \Delta y_{t-i} + \gamma_1 z_{t-1} + u_{1t}$$

$$\Delta y_t = \alpha_2 + \sum_{i=1}^{m3} \beta_{3i} \Delta x_{t-1} + \sum_{i=1}^{m4} \beta_{4i} \Delta y_{t-i} + \gamma_2 z_{t-1} + u_{2t}$$

## Type of Study

This study is an empirical one for on the basis of the data obtained, the required analysis is performed and then generalizations are made. Moreover, it is a quantitative one for it seeks to quantify and thereby further enhance the understanding of the linkages between various economies, hence stock exchanges, and to establish whether the benefits of international portfolio diversification still exist especially in the context of a globalized economy.

## Area and Unit of Study

The area of study is broadly in the realm of financial economics and shall study 30 stock exchanges of 30 different countries.

## Sources of Data Collection

The secondary data has been obtained from Yahoo Finance for all the 30 indices mentioned above. It must also be highlighted that this study shall use time series data. Data of 30 stock indexes from around the world was collected on a monthly basis for the period from July 1997 to January 2015. This represents data for 211 months for 30 indexes which results in 6330 observations. It must be underlined that in the cases wherein countries have more than one stock exchange, the most sensitive on to global phenomena has been selected; for instance, in India the BSE Sensex was selected and in the United States, the Dow Jones.

## Empirical Findings

### Unit Root Test

In the case of a time series having a unit root, it can be transformed into a stationary series by taking the differences of the series. Firstly, the ADF test was performed and it could be seen that all the stock indexes were non-stationary but what was needed was to ascertain how many times was it necessary to difference the series before they became stationary. At the first integrated order

I (1), the stock indices became non stationary in levels but stationary in differences. The first level of ADF test was performed on all of the 30 stock indices data and it was seen that they all became stationary at I (1).

**Table 1: Bivariate test**

Countries	H=0	H=1	Trace Statistic	5% Critical Value	Probability	Decision
U.K- Argentina	r=0	r= 1	6.55	15.5	0.63	r=0
U.K- Australia	r=0	r= 1	6	15.5	0.6945	r=0
U.K- Austria	r=0	r= 1	8.04	15.5	0.4615	r=0
U.K- Belgium	r=0	r= 1	8.6	15.5	0.404	r=0
U.K- Brazil	r=0	r= 1	6.14	15.5	0.6792	r=0
U.K- Canada	r=0	r= 1	5.68	15.5	0.7329	r=0
<b>U.K- China</b>	<b>r=0</b>	<b>r= 1</b>	15.09	15.5	0.06	<b>r=0</b>
U.K- Denmark	r=0	r= 1	8.95	15.5	0.37	r=0
<b>U.K- France</b>	r=0	r= 1	11.4	15.5	0.18	<b>r=0</b>
U.K- Germany	r=0	r= 1	7.48	15.5	0.523	r=0
U.K- Greece	r=0	r= 1	7.81	15.5	0.486	r=0
U.K- Hong Kong	r=0	r= 1	6.47	15.5	0.64	r=0
U.K- India	r=0	r= 1	5.54	15.5	0.75	r=0
U.K- Indonesia	r=0	r= 1	6.5	15.5	0.64	r=0
U.K- Ireland	r=0	r= 1	6.34	15.5	0.66	r=0
<b>U.K- Japan</b>	<b>r=0</b>	<b>r= 1</b>	13.6	15.5	0.09	<b>r=0</b>
U.K- Malaysia	r=0	r= 1	5.34	15.5	0.77	r=0
U.K- Mauritius	r=0	r= 1	6.35	15.5	0.66	r=0
U.K- Mexico	r=0	r= 1	5.93	15.5	0.7	r=0
U.K- Russia	r=0	r= 1	6.6	15.5	0.62	r=0
U.K- Singapore	r=0	r= 1	5.963	15.5	0.71	r=0
U.K- South Korea	r=0	r= 1	6.06	15.5	0.69	r=0
U.K- Spain	r=0	r= 1	7.713	15.5	0.5	r=0
<b>U.K- Sweden</b>	<b>r=0</b>	<b>r= 1</b>	42.7	15.5	0	<b>r=1</b>
U.K- Switzerland	r=0	r= 1	9.71	15.5	0.3	r=0
<b>U.K- Taiwan</b>	<b>r=0</b>	r= 1	19.1	15.5	0.01	<b>r=1</b>
U.K- Thailand	r=0	r= 1	6.8	15.5	0.6	r=0
U.K- Turkey	r=0	r= 1	5.71	15.5	0.73	r=0
U.K- United States	r=0	r= 1	6.11	15.5	0.68	r=0



From the above test results, it can be clearly seen that Taiwan and Sweden are cointegrated with the United Kingdom's stock exchange. The rationale behind this phenomenon can be understood by the following statements: 70% of Taiwan's Europe investment is concentrated in the United Kingdom; this fact reinforces and throws light upon the links between the Taiwanese and British Economy. As the major part of European investment of Taiwanese origin is channelled to the UK, factors whether conducive or pernicious to the British economy and consequently, the British stock market will transmit the same repercussions whether therapeutic or harmful to the Taiwanese stock market. As for Sweden, the United Kingdom has constantly remained one of its top 5 trading partners. This strategic ally has profound ramifications when it comes to the realm of international portfolio diversification; as such, the UK has a more significant trade figure with Sweden than compared with India and Russia. Consequently, the effects of periods of bull or bear run in the United Kingdom would also be transmitted to the Swedish stock market.

It must also be pointed out that China and Japan despite not being cointegrated display high levels of trace statistics at a critical level of 5 %. It can also be inferred that further research into the above with enhanced time periods into the future for China and the past for Japan could lead to higher trace statistics and be significant, which would thereby imply that the Chinese and Japanese stock markets are/were cointegrated with the British stock market. Interestingly, the results highlight the evolution and the blossoming of the Chinese market. The country is benefiting from the phenomenon of globalization and as it can be seen by the increasing link between the British and Chinese stock exchange. As far as Japan is concerned, it can be inferred that its golden years are behind it; probably the level of cointegration between Japanese and British Stock markets were erstwhile high but have gradually declined in recent years. China has instead dethroned it.

A high trace value can also be seen for France (despite the fact that both markets are not cointegrated) which is due to the fact that it is the United Kingdom's third largest market and its stock market will subsequently be impacted, though to a lesser extent, by shocks or impetuses granted to the British Economy. The Gravity Model of Trade from economics can also be used to explain the high trace value of France; the model says that the trade between two countries will be proportional to the respective GDPs of each country but inversely related to their distance apart. As the United Kingdom and France are close and found in the same continent, their trade volume is extremely significant and should a factor affect the British economy, it shall be felt in France with a much lesser intensity.

Special attention must be given to Germany as well. Recent statistics demonstrate that the United Kingdom has become the number one trading partner of Germany. The data in this study fails to fully demonstrate this but should this study be conducted in the future and years such as 2014 and post it should be taken, it can be inferred that the trace statistics for Germany would be high and there could lie a strong probability that both stock markets could be cointegrated. Interestingly, the results demonstrate a low level of cointegration between the United States and the United Kingdom; this is in contrast to what was expected and not conform to previous findings from other studies. However, previous studies have not considered the same timeline as this one which may explain the difference in results. It may be inferred that this low cointegration is a phenomenon that has occurred in recent years wherein post the subprime crisis, the United States has been recovering as shown by a reduction in the degree of quantitative easing and favourable employment growth data. Moreover, a fall in crude oil prices has also been favourable to the American economy. In stark contrast to that, England has been affected by various and ongoing crisis in Europe such as the Greek crisis, the alleged failure of the Eurozone and the PIGS (Portugal Ireland Greece Spain) dilemma.

All the above inferences and explanations are in line with both the Fama's Efficient Market Hypothesis as well as Markowitz's Modern Portfolio Theory. The first theory helps explain why newly acquired information which will impact the British economy will be transmitted to those with which it is cointegrated and the MPT explains why should a British investor not invest and acquire securities in such economies.

**Table 2: Multivariate Tests**

Countries	H=0	H=1	Trace Statistic	5% Critical Value	Probability	Decision
Latin America and North America(5 Countries)	r=0	r> 0	60.06258	69.8	0.23	r=0
Europe(8 Countries)	r=0	r> 0	184.4	159.5	0.001	r=1
South Asia(6 countries)	r=0	r> 0	107.22	95.8	0.01	r=1
Scandinavian Countries(2 countries)	r=0	r> 0	32.4	29.8	0.01	r=1

- i) Latin America and North America includes Brazil, Mexico, Argentina, USA and Canada.
- ii) Europe includes France, Germany, Greece, Ireland, Spain, Belgium, Switzerland, Austria,
- iii) Scandinavian countries includes Sweden and Denmark
- iv) South Asia includes India, China, Japan, Singapore, Hong Kong and South Korea

The above test has been conducted for investors when seeking to diversify internationally will prefer to invest in a multitude of countries rather than a single one. Therefore, this study has classified certain countries based upon their geographical locations and has then found which set of locations are cointegrated with each other and those that are not. From the above graph, it can be clearly seen that Europe, South Asia and Scandinavian countries have higher trace statistics than critical values and demonstrate one cointegrating vector each.

From a British investor's perspective, investing in Europe, South Asia and the Scandinavian countries would not be advisable for these stock markets display long term relationships among themselves as can be shown from the above data. Rather investing in North America and Latin America would be a better option. These tests on these select countries have been selected so as to segment specific geographical locations and quantify and ascertain their impacts of being included in a British's investor internationally diversified portfolio.

**Table 3: BRI & BRIC Countries Test**

Countries	H=0	H=1	Trace Statistic	5% Critical Value	Probability	Decision
BRIC Countries	r=0	r> 0	49.66	47.86	0.03	r=1
BRI Countries	r=0	r> 0	21.73	29.8	0.31	r=0

The paper also isolates the much sought after BRIC (Brazil, Russia, India and China) nations and examines whether they have long term relationships. While this may be true for BRIC countries, it is not the case for BRI (Brazil, Russia and India) nations and investors can "safely" invest in such havens without worrying about the long term relations between them.

## Vector Error Correction Mechanism

**Table 4 : VECM Results**

CointegratingEq:	CointEq1
United Kingdom(-1)	1.000000
Argentina(-1)	-1.900998
	(0.23554)
	[-8.07072]
Australia(-1)	-1.940028
	(0.76650)
	[-2.53104]
Austria(-1)	-0.290861
	(0.77665)
	[-0.37451]
Belgium(-1)	0.958558
	(0.63351)
	[ 1.51309]
Brazil(-1)	-0.124208
	(0.02959)
	[-4.19738]
Canada(-1)	1.533144
	(0.28150)
	[ 5.44626]
China(-1)	1.624962
	(0.26731)
	[ 6.07895]
Denmark(-1)	14.19172
	(7.05596)
	[ 2.01131]

(Continued...)

France(-1)	-5.515425
	(0.79203)
	[-6.96365]
Germany(-1)	2.096671
	(0.52561)
	[ 3.98902]
Greece(-1)	-0.432127
	(0.38015)
	[-1.13671]
Hong Kong(-1)	-0.661855
	(0.14924)
	[-4.43485]
India(-1)	0.675816
	(0.15496)
	[ 4.36109]
Indonesia(-1)	-1.592799
	(0.72375)
	[-2.20075]
Ireland(-1)	-0.598952
	(0.41863)
	[-1.43075]
Japan(-1)	0.578284
	(0.14680)
	[ 3.93922]
Malaysia(-1)	-3.657756
	(1.79013)
	[-2.04329]
Mauritius(-1)	-8.619855
	(1.38784)
	[-6.21099]

(Continued...)

Mexico(-1)	0.038539
	(0.06650)
	[ 0.57951]
Russia(-1)	-0.564102
	(0.65769)
	[-0.85770]
Singapore(-1)	6.990222
	(0.98750)
	[ 7.07872]
South Korea(-1)	-0.124774
	(1.09431)
	[-0.11402]
Spain(-1)	1.728803
	(0.25745)
	[ 6.71502]
Sweden(-1)	-2.184097
	(0.44274)
	[-4.93319]
Switzerland(-1)	-3.361672
	(0.42907)
	[-7.83471]
Taiwan(-1)	-0.910064
	(0.19828)
	[-4.58975]
Thailand(-1)	-2.613216
	(2.19917)
	[-1.18827]
Turkey(-1)	0.029325
	(0.03112)
	[ 0.94235]

(Continued...)

United States(-1)	0.898293
	(0.30954)
	[ 2.90200]
C	603.9118

From the above results table of the VEC model, values for Malaysia, Mauritius, South Korea and Thailand are statistically significant. This implies that the stock markets of these nations are more prone to be affected by the changes in United Kingdom in the short-run shocks. The rationale behind this occurrence is as follows, Mauritius exports a fifth of its products to the British economy and the latter is the former's biggest market; thus any shocks to the British economy in the short run will be magnified and transmitted and negatively affect the Mauritian economy. Since both South Korea and Malaysia, possess small stock markets which are not mature enough, most of their investment, especially that of their National Pension Funds and Employees Provident Fund, the largest South Korean and Malaysian government pension fund by assets respectively, are channelled abroad. This factor makes it more vulnerable to contagion effects and short-run shocks to the British economy have a negative impact on the Malaysian economy in the short-run. This is not the case for the long-run as investors can change their portfolio allocation. 9% of the FDI into Thailand originates from the United Kingdom which reinforces the fact that shocks to the British economy in the short-run will make Thai stock indices plummet in the short run. While the four countries mentioned above have negative coefficients, Denmark presents a very interesting and intriguing result after running the VECM. It presents a very high positive figure which is statistically significant. This implies that a short run shock to the British economy will translate into an impetus to the Danish stock exchange. Such an occurrence can be attributed to the fact the Danish economy has been dubbed by many economists as "the model that more countries should follow" which translates into investors, fearing periods of bear run in the British stock market, shall be prompt and swift to channel their funds to the Danish stock market. Notwithstanding, it must be underscored that this phenomenon is visible only in the short run; in the long run on the other hand, the Scandinavian countries, examined in this study, do display long run equilibriums with Britain's economy. While this may be true of Sweden and not of Denmark, it must be highlighted that the Swedish and Danish economies are highly cointegrated with one another and are very important partners to one another.

### Findings and Implications of the Study

This study has identified the best countries where British investors should channel their funds in the context of international portfolio diversification. Despite the instance of globalisation and enhanced economic linkages, there still exists much potential and scope for international portfolio diversification. Emerging countries like Brazil and India offer great diversification opportunities for British investors for the long run. Similarly, Argentina, Australia, Turkey, Mexico and Canada exhibit such characteristics. Once again, based on the results America is not cointegrated with the United Kingdom and can therefore be included as a place to invest in Denmark presents the perfect investment location for the short-term and investors can sail through shocks to the British by investing there and benefit from increased gains and enjoy a "safe haven". Russia has been omitted despite having a low trace statistics, as at present, its economy is going through a recession and with the ongoing Ukraine debacle, its economic future is marred in uncertainty. Malaysia, Mauritius, South Korea and Thailand would not be desirable for investors in the short haul as well, for they respond in greater magnitudes to short-run fluctuations in the British

Economy. China and Japan would best be avoided as despite the fact that their trace statistics are high but insignificant; the future could imply an enhanced trace statistic and therefore cointegration. As for Europe, the Scandinavian and the South Asian segments constructed in this study, exhibit the phenomenon of cointegration (European countries are cointegrated with one another and the same applies to the Scandinavian and South Asian countries); consequently British investors should not invest in Europe, the Scandinavian countries and South Asia for the long-term horizon.

This study is extremely relevant and significant for British investors because on the basis of the results, it identifies the markets which are not cointegrated with their domestic market which also implies that these would be 'safe havens' in times of economic crisis.

### General Conclusions

The study points out to the fact that despite living in a globalised world and an increasingly connected one, the gain from international portfolio diversification as a shielding mechanism during crisis periods has not been completely eradicated and British investors can still take full advantage of this philosophy and to 'safeguard' their investments in times of crisis. Based upon this study, some suitable destinations have been identified where British investors can park their money for long term investments, short term gains and to shield their portfolios from periods of crisis experienced.

### Scope for further research

This study has modestly tried to contribute to academia by providing a fresh perspective and hoping to further enlighten it. Nevertheless, there exists much scope to further enhance, for instance, by incorporating daily or weekly data instead of monthly data to better account for huge variations and stock market volatility. It would also be interesting to see how over the last century the economic linkages throughout the world economy have blossomed and their implications on stock market investments.

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## Appendix A

### Descriptive Statistics

Country	Argentina	Australia	Austria	Belgium	Brazil	Canada	China	Denmark
Mean	1973.315	4119.482	2232.243	2866.131	35914.84	10358.55	2089.74	363.1564
Median	1558.62	4107.3	2105.39	2782.01	36596	10422.9	1961.29	335.03
Maximum	12548.99	6754.1	4885.38	4697.86	72593	15625.7	5954.77	810.94
Minimum	202.45	2415	1033.79	1635.22	6472	5530.7	1060.74	176.95
Standard Deviation	2018.863	1058.639	1046.978	655.0865	21385.8	2737.872	877.1049	141.4772
Skewness	2.526065	0.298484	0.86014	0.695225	0.110108	0.009055	1.640277	1.037947

(Continued...)

Kurtosis	10.54891	2.077828	2.849306	3.200438	1.420712	1.644839	6.561462	3.760815
Jarque-Bera	725.4009	10.60955	26.21739	17.3506	22.35409	16.14845	206.1298	42.97521
Mean	4206.11	5942.274	2517.611	16844.88	11035.14	1915.835	4911.649	12918.48
Median	4027.16	5861.19	2297.56	16102.3	9647.31	1256.7	4885.59	12525.54
Maximum	6625.42	10694.32	5712.26	31352.6	29182.95	5289.4	9854.86	20337.32
Minimum	2618.46	2423.87	525.45	7275.04	2810.66	276.15	2074.32	7568.42
Standard Deviation	939.3358	1720.426	1310.026	5206.279	7201.474	1579.999	1701.689	3252.674
Skewness	0.67348	0.400463	0.534942	0.146545	0.438444	0.716249	0.741766	0.245161
Kurtosis	2.731741	2.779874	2.355902	1.952192	1.949638	2.064726	3.258633	1.824232
Jarque-Bera	16.58341	6.06571	13.71072	10.40761	16.4597	25.73134	19.93737	14.26753

Country	Malaysia	Mauritius	Mexico	Russia	Singapore	South Korea	Spain	Sweden
Mean	1079.904	1096.765	20716.8	953.6755	2367.842	1252.783	9723.762	1019.757
Median	926.63	841.39	18907.1	832.87	2305.14	1221.01	9740.7	961.98
Maximum	1882.71	2154.41	45628.09	2459.88	3805.7	2192.36	15890.5	2910.77
Minimum	302.91	340.92	2991.93	43.81	856.43	297.88	5431.7	445.65
Standard Deviation	412.2444	658.2603	14190.47	656.5877	708.8388	572.848	2176.202	408.8469
Skewness	0.435072	0.252663	0.274493	0.249119	-0.01446	0.056073	0.597977	2.162497
Kurtosis	1.964946	1.37346	1.506339	1.762895	1.754003	1.493331	3.196839	9.435214
Jarque-Bera	16.07545	25.50452	22.2641	15.63747	13.65649	20.0681	12.91542	528.5335

Country	Switzerland	Taiwan	Thailand	Turkey	United Kingdom	United States
Mean	6831.365	7111.706	727.5945	35046.35	5548.253	11188.54
Median	6655.2	7329.37	675.67	31963	5702.1	10729.86
Maximum	9450.8	10066.35	1597.86	88945	6930.2	17828.24
Minimum	4085.6	3636.94	214.53	1686	3567.4	7062.93
Standard Deviation	1205.955	1478.564	372.2384	25435.93	823.8499	2341.774
Skewness	0.101003	-0.254916	0.803367	0.383064	-0.456047	0.878625
Kurtosis	2.245035	2.209618	2.676093	1.880836	2.290687	3.456939
Jarque-Bera	5.369755	7.777391	23.61891	16.17211	11.73723	28.98369

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