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Financial Crisis and International Portfolio Management

A dissertation submitted in partial fulfilment of the requirements of the Royal Docks Business School, University of East London for the degree of **MSc Finance and Risk**

SEPTEMBER 2015

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FIANACIAL CRISIS

AND

INTERNATIONAL PORTFOLIO MANAGEMENT

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This work is dedicated to my Parents and to all the members of my family, my wife Blessing Adejonwo for believing in me, my children Samuel, Sharon and Shawna for enduring with me.

Abstract

Purpose – The aim of this dissertation is to examine the impact of financial crisis on portfolio performance. The objective is to evaluate how the returns and risks from selected stocks performed during and after the 2007 financial crisis.

Methodologies –This study uses time series data from stocks indices. This paper uses mean variance approach model to measure these stocks indices' returns and risks. The periods studies were grouped into three period's: period before financial crisis (January 2004- December 2006), period during financial crisis (January 2007- December 2009) and the period after financial crisis (January 2010- December 2012).

Results- Evidences from the findings shows that there are greater impacts of financial crisis in the period especially the 2007-2009 on the return and the risk via the activities of stocks in the markets of selected countries. This means higher returns from the investments and less risk before crisis 2007. And this is opposite during the period of financial crisis with higher variance (risk) and less return from investment.

Recommendations- The key goal of this research is to find the impact of financial crisis on portfolio. Based on the results, I recommend that future research should not be based on foreign stocks markets portfolio only, but should include indices from underdeveloped countries, given that these countries have low correlation with developed economies and as such do not experience the same risks.

Originality- This dissertation examines the impact of crisis on portfolio via the Markowitz model on five selected countries indices.

Keywords: Financial crisis, Risk, Returns, Investment, data and Portfolio.

CHAPTER ONE: INTRODUCTION

1.1 Introduction

Since 1929, world economies have experienced various ups and downs, due to diverse forms of financial crises. The aftermath of the recent financial crisis which started in 2007 is still being felt in different countries even up until now, almost a decade later. This concept, i.e. financial crisis, has captivated a lot of investor's attention all over the world and many economists have given different views regarding the impact on portfolio management, economic growth and development. Therefore this research is basically focused on examining financial crisis, and its impact on international portfolio management.

Financial crisis originating in one country can travel far and beyond its borders and carry on spreading among countries, like a contagious disease. Given that most investors build their portfolio on minimised risk and high expected returns, it becomes problematic when crisis is contagious beyond borders. It is because of this that investors tend to diversify their portfolios, in the bid to minimise their risk and get highest return from their investment.

For example, the world financial crisis that began to develop in 2007 has proven longer lasting stated by Eptein and Wolfson (2012). This has become a global crisis because of relatively unregulated and globalized nature of finance and the massive degrees of uncontrolled capital mobility and global financial trading.

Although, one of the reason most investors invest is to be able to get highest returns with less risk. And to invest internationally means investing outside the country of residence. The word international (foreign) portfolio management is to model uncertainty towards prices of selected foreign stocks. According to Brown (2012) stated that the selectivity component represent s the portion of the portfolio's actual return beyond that available to an unmanaged portfolio with identical systematic risk and is used to assess the manager's investment prowess.

This research is section and explained in three parts: financial crisis, the international portfolio management and the impact of financial crises. This concept has captivated a lot of investor's attention all over the world and many economists gave their views towards this concept. Therefore this research is basically focused on examining financial crisis and the

international portfolio management especially to UK investors. And some of the views from some researchers are explained in this research for a better understanding.

Considering that some researchers to my knowledge also fail to provide the missing links for example the economist of the two portfolios and crisis but I will attempt to provide this link in my research. According to Chittedi (2014), the globalization of financial systems and the acceleration of information transmission have increased the risk of financial crises, as crisis in one country can spread to other countries and bring about worldwide crises.

A financial crisis originating in one country can travel far and beyond its borders and carry on spreading among countries like a contagious disease. And most investors build their portfolio on minimised risk and high expected returns. This is supported by Blanchett and Straehl (2015) explained that when building portfolios , most investors tend to focus entirely on the risk and return characteristics of investments such as cash, bonds and stocks, ignoring the interconnectedness of their portfolio with other assets that they effectively own, such as human capital, real estate, and pensions. Therefore by diversification on selected stocks on an international basis the investors will tend to minimise their risk and get highest return from their investment. Even the coefficient correlation will be reduced within a portfolio in other to maximise their returns.

According to Pilbeam (2010), said that ‘‘a well diversified portfolio will tend to be one that is made of securities that have a tendency to move in opposite direction or have low correlations, rather than securities that tend to move in a similar directions and with high correlations.’’ It means that every process in portfolio management always enable investor to improve their returns and at the same reduce the risk to the minimum. This will allow us to find a distinction between systematic (market) risk and unsystematic (diversifiable) risk. And this will be broadly explained later in the paragraph.

In summary, this study was summarised into six main chapters. Firstly, the topic and the background study were introduced then the research objectives are introduced with justification for the study. In chapter 2 academic journals were critically evaluated and also covered the origin of financial crisis, the cause, its impact and the effect on international portfolio management. Chapter 3 revisits the research questions and it objectives via the explanations of the research methodology for this study. Chapter 4 shows the introduction, data analysis for all periods, correlation coefficient, mean return, return of portfolio, covariance, variance and standard deviation, the descriptions and conclusion. Chapter 5

disclose finding, results, and all relevant theories. Finally chapter 6 will includes general conclusions and recommendation for this research study.

1.2 Aims and objectives

The main aim of this research is to examine the impact of financial crisis on portfolio management especially during financial crisis.

The objectives

The main objectives for this study are as follows:

- ✓ Examine for the origin of financial crisis
- ✓ Examine the theories of portfolio management
- ✓ Examine the impact of financial crisis on portfolio management in three periods

    1- Period before financial crisis (Jan. 2004-Dec.2006)

    2- Period during financial crisis (Jan. 2007-Dec.2009)

    3- Period after financial crisis (Jan. 2010-Dec.2012)

Justification of this research

This research will help to prove that the financial crisis as had a great impacts on international portfolio management, and Justifying the differences between the period before, during and after the financial crisis. Even though, the financial crisis is still an ongoing situation which might be difficult to eliminate completely.

This research is aimed at examining the impact of financial crisis on portfolio management for especially the investment in UK (FTSE) and four other countries (DAX Index, S&P500, CAC 30 and IBEX) the periods of 9years from January 2004 to December 2012. The weekly indices prices from selected international stocks markets are collected and fully used for this study. The reason for these indices is to capture the main significance of equal weight of the

world market value from five major relevant countries in a continent. On the other hand, due to some error of omission in data collection it could make it difficult to get up to twenty years in the series for a short period to complete this research on time.

Extra care was taken in downloading data from Bloomberg terminal, Microsoft Office excel because of the size for this research and since the aim of this research is to ascertain the impact of financial crisis before, during and after crisis periods mentioned above. Conversely, the basis for this research analysis is the use of means - variance approach model as explained by Harry Markowitz will be one of the bases for this research study for better examination.

1.3 Project outline

This study will be in six main chapters. In Chapter 1, this research came in with introducing the topic of the study and the background study. The research objectives are introduced with justification for the study discussed; Chapter 2 critically evaluates academic journals in this research topic and the covering areas from origin of financial crisis and international portfolio management. Also, the causes of financial crisis, its impact on portfolio, financial crisis and international portfolio management justification are explained for clarity of chosing this topic and conclusion. Chapter 3 revisits the research questions and it objectives via the explanations of the research methodology for this study. Even the research model approach, theory, the data description, formulae and sources are explained. Chapter 4 shows the introduction, data analysis for all periods, correlation coefficient, mean return, return of portfolio, covariance, variance and standard deviation, the descriptions and conclusion. Also, all the data relevant for this research questions and objectives. Chapter 5 reveal the discussion of this research finding, results, and relating all relevant theories and the preposition in the area of the study for this research studies. Chapter 6 this will includes general conclusions and recommendation for this research study.

CHAPTER TWO: REVIEW OF LITERATURE

2.1 Introduction

Since 1929, world economies have experienced various ups and downs, due to diverse forms of financial crises. The aftermath of the recent financial crisis which started in 2007 is still being felt in different countries even up until now, almost a decade later. This chapter presents a critical review of literatures on the causes of financial crisis, and the consequences of the crisis on international portfolio management. To begin with, attempt will be made to elucidate the various forms of financial crisis, the origin of the recent financial crisis that started in 2007 and its impact on international portfolio management.

For a coherent discussion, this chapter is structured as follows: section 2.2 will document a historical overview of financial crisis. In section 2.3, the focus will be on most recent financial crisis – including the views held by many scholars regarding the fundamental cause of the crisis. Section 2.4 would concentrate on the impact of the crisis on international portfolio management. The conclusion to the chapter is contained in section 2.5.

2.2 Origins and causes of financial crisis

A historical overview of financial crisis

Since 1929, the world economy has experienced diverse financial crises – ranging from the stock-market crash in 1929 to the most recent banking system failure in 2007. Most of these financial crises have left disastrous impact on the real economy, and various views have also been expressed regarding their main causes. For instance, some scholars hold the view that the 2007 financial crisis was as a result of the greed of financial institution and other hold that its root causes stems from the neoliberal reforms that were implemented in the late 1970s and early 1980 (Kotz, 2013). Despite the divergent views on the main cause of financial crises, there is consensus that financial crises undermine economic growth.

Despite the ubiquity of financial crises in recent years, not all decades, since the Great Depression, experienced the same frequency of financial crises as with since 1980. In fact, the disappearance of financial crises was observed between 1940s to mid-1960, following the Keynesian orthodoxy that regulated financial activities in those periods (Wolfson, 2013). The re-emergence of financial crisis came to light between the late 1960s - 1980s. For example, the credit crunch of 1966, the commercial paper crisis of 1970, the failure of Franklin

National Bank in 1974, all of which caused a negative impact on both domestic, international foreign exchange and Eurodollar markets, came during the periods most of the regulations on financial activities were relaxed (ibid). From 1980 however, the crises have been severe – like the case of the depositor runs on state–insured thrifts in Ohio, Maryland, and Rhode Island in 1980, the sharp crash in 1987, and even the bailout of the thrift industry in 1989: these are all indicators of the pervasiveness of financial crisis in the late 1980s till date (ref).

Financial crises can be grouped into different categories, these are – foreign exchange crashes, debt crisis, banking crisis and inflation crisis (Kindleberger 2005). The severity and rate of occurrence of some of these crises over the years have been unprecedented. For example, according to Wolfson (2013), there has been regularity in banking crisis in the world economy since the 1980s – such as the banking crisis in 1980 in US, which was as result of the problems at thrift institutions that caused depositor runs in Ohio, Maryland: the collapse of speculative lending is also argued to have added to this failure and loss – which eventually led to a sharp crash of the stock market on October 1987.

The foreign exchange crashes also intensified in the 1990s. According to Wolfson (2013), Palma (2013) and Chandrasekhar and Ghosh (2013), the globalized financial structure caused currency crisis in the 1990s – starting with the European Monetary System in 1992 and to the Asian and Latin American financial crisis of 1980s-2000s[1]. The Asian crisis, which began in Thailand, was remarked to be as a result of the collapse of speculative lending and investment. The run on the Thai currency (Baht), Wolfson observed, quickly escalated into a panicked withdrawal from other Asian countries, which resulted in the slowdown of economic activities in the region. All these crises, these authors observed, were preceded by booms of capital inflows.

Same excessive inflows were remarked by Palma (2013) as the causes of inflation and debt crisis in Latin America. According to Palma, Latin America (LA) experienced three major cycles of capital inflows since the mid -1970s, which all ended in major financial crises. The first cycle, between the oil- price increase that followed the 1973 ‘‘Yom Kippur’’ war and 1982 debt crisis, affected Chile the most: the evidence, he observed, was shown with the 20 percent drop in the country’s GDP between the third quarters of 1981 and 1983. And the

[1] Between 1980 and 2000s, Latin America experienced two major waves of financial crises (Damill *et al*, 2013): The first one, which spread all over the region, occurred during the early 1980 and its effect extended virtually all over the region. The second wave began with the Mexican crisis in 1995 and continued with those in Brazil in 1998-1999 and in Argentina in 2001-2002.

second cycle, Palma noted, was experienced between the 1989 ‘‘Brady bonds’’ agreement and the 2001-2002 Argentinean crisis – it ended with four major crisis (as well as the 1997 one in East Asia): one in Mexico (1994), one in Brazil (1999), and two in Argentina (the 1995 ‘‘Tequila- crisis’’ and the 2001-2004 debt crises). The last (the third) inflow, Palma observed, began in 2003, as soon as international financial markets were deregulated, following the surprisingly neoliberal orientation of President Lula da Silva’s government. Although this cycle intensified in 2004 with the beginning of a commodity – price boom, and strengthened after a brief interlude, it also resulted in a global crash in 2008 (Palma 2013).

In summary, since the 1980s, financial crisis has deepened and has been causing greater impacts on the world economies. In some instances the consequences are severe and ubiquitous and in some, it is restricted to the economies concerned. Nonetheless, it is clear that financial crisis is detrimental to overall economic growth.

Origin and causes of the 2007 financial crisis

The origin of the recent financial crisis which started in 2007 has been traced to many factors. For instance, according to Jarsulic (2013), the crisis has its root to events that began a decade earlier – i.e. the house prices bubble that started around 1997. These bubbles, according to Jarsulic, were, to a significant extent, induced by the activities of financial intermediaries: Jarsulic remarked that the negligence of these institutions, by allowing households take mortgages without the strict underwriting criteria for any defaults allowed for the house price bubble – because many households, even the subprime borrowers, were able to buy houses, which inevitably induced increases in house prices.

The eventual collapse of house prices, brought about largely due to increased defaults, Jarsulic remarked, induced the collapse of the financial system – given that many financial institutions invested in the mortgaged back securities that depended to some part on increasing house prices and steady stream of premiums paid by mortgage holders.

It was at the back of the credit crunch that emanated from the collapse of the mortgage speculation that the economic crisis in 2008 kicked off – starting with the collapse of notable financial institutions in the US and Europe (such as the collapse of Lehman Brothers, Goldman Sachs and several other mortgage finance companies)

On the other end, Kotz (2013) contended that the financial and economic crisis that manifested in 2008, which originated in the United States and then immediately spread to the

global economy, was as a consequence of the neoliberal reforms of financial system deregulation and liberalisation that took place in the 1980s.

He explained that the post-war system of regulated capitalism that has been in existence for 25 years after World War 2 had ensured minimal speculation by financial institutions. However, following the neoliberal reforms by early 1980s, which necessitated the removal of controls on financial activities (such the repeal of the Glass-Steagal Act of 1932), he contended that there emerged unsustainable long-run trends that set the stage for the severe and economic financial crisis that broke out in 2008. Kotz views can be seen to relate to that by Minsky (1986). Minsky noted that previously, before the deregulation of the financial system, banks dealt only on treasury securities for 'position making' (i.e financial instrument that can be bought and sold to manage liquidity). However, since the liberalisation and deregulation of financial activities, banks, he noted, has evolved and now uses various financial instruments for 'position making'. Also, the reforms, he observed, have created, what he called 'Hierarchical Banking' – the use of special purpose vehicles (SPVs) by banks. This hierarchical relation, including the emergence of extensive financial instruments, Minksy concluded, contributes to the instability of the financial system. (check Minsky's work)

In summary, several authors, such as Crotty (2013), Kregel (2013), have also espoused this view that the root cause of the 2007 financial crisis, following Minsky's financial fragility hypothesis, stems from the system that deregulated financial systems; which they argued contributed to the emergence of shadow banks and several other financial instruments, which all contributed to the instability experienced in the financial system in 2007.

2.3 Impact of Financial crisis on portfolio management

In addition to the contribution above this crisis impact could also put pressures on emerging market by creating attention in emerging economies like Asia in their stock markets that is internationally changes could come via the firm microeconomic environment. Like Can and Ariff (2009) examines this.

As at 2015, the most severe financial crises on record is in its eight year now, a lot of names had been given to this crises like some called it weapons of mass destruction due to it excessive impacts on every sectors of economy and even international portfolios. A lot of lessons have been learnt from this crisis that transforms into debt. According to Rizvi and

Arshad (2013) said the ripple of financial crisis are still being felt over different parts of the world causing a much distress to the real economy.

2.3.1 Theories of portfolio management

There are several assumptions of portfolio theories – ranging from what we mean by an optimum portfolio to risk aversion and risk. One assumption of portfolio theory is that investors want to maximize the returns and minimise risk from all their total investment (Brown, 2012). It is generally posited that a portfolio should include all assets and liabilities, not only marketable securities but also assets such as cars, houses, and less marketable investments such as coins, stamps, art etc. According to (Reilly and Brown, 2009), the full spectrum of investments must be considered because the return from all investment interacts and this relationship among the returns for assets in the portfolio is important for making optimum portfolio choice: hence, a good portfolio is remarked to be a collection of individually good investments (Reilly and Brown, 2010).

Secondly, portfolio theory also assumes that investors are risk adverse, meaning that, given a choice between two assets with equal rates of return, they will select the asset with the lower level of risk (Brown, 2012). For example most investors purchase various types of insurance, car insurance, including life insurance, and health insurance. And buying of insurance is to guard against an uncertainty. On the other hand, not everybody is risk averse, for example some people don't have insurance against anything, either by choice or they cannot afford it. However some get insurance for related some risks such as accidents or illness and they also gamble.

Although there is a difference in the specific definition of risk and uncertainty, for our purposes and in most financial literatures, the two terms are used interchangeably. For most investors, risk means the uncertainty of future outcomes (Reilly and Brown, 2009). An alternative definition might be the probability of an adverse outcome (Brown, 2012)

Thirdly, in the early 1960, the investment community talked about risk, but there was no specific measure for the terms. To build a portfolio model, however, investors had to qualify their risk variable. And the basic portfolio model was developed by Harry Markowitz (1952, 1959), who derived the expected rate of return for a portfolio of assets and an expected risk measure. Markowitz showed that the variance of the rate of return was a meaningful measure of portfolio risk under a reasonable set of assumptions. More importantly, he derived the formula for computing the variance of a portfolio. This portfolio variance formula not only

indicated the importance of diversifying investments to reduce the total risk of a portfolio but also showed how to effectively diversify. The Markowitz model is based on several assumptions regarding investor behaviour.

Diversification of risk

Some of these risks are in the above topics are discussed below

As explained by Brown (2012) as the probability of an adverse outcome. And risk could be divided into systematic and unsystematic risks. The systematic risks could influence various types of assets while unsystematic is called diversifiable risks for example labour strike which could be unique. And for systematic risks could be interpreted as non diversifiable risk, examples are political risks or exchange risk etc

To buttress systematic and unsystematic for example if an investor A that have a portfolio that contain single asset in a certain company what do think would happened to this company if there is any shocks or crisis ? Any crisis could hinder the returns on the future stocks. Now look at an example of investors A with diversifiable assets. The argument is that the portfolio of investor B will increase in value even during crisis but portfolio of investor A will decrease in value. .

In addition to the above Statman and Schied (2008, 2013) noted that, for two reasons, correlation is not a good measure. He explained that high correlations bring relatively low diversification benefits, but even correlations greater than 0.90 provide substantial diversification benefits. Secondly, the benefits of diversification it not only depend on correlations between investment returns but also on the standard deviations of each investment's returns.

Moreover, the argument is that Staman and Scheid observed that, although correlations tend to be higher in bear markets than in bull markets, the benefits of diversification are actually higher in bear markets than in bull markets. This is because standard deviations also tend to be higher in bear markets than bull markets, and higher standard deviations in bear markets add to the benefits of diversification more than higher correlations subtract from these benefits.

According to Statman (2013) said Markowitz was right. He explained the market turmoil led too many investors and investment to abandon the traditional approach for non-traditional

approaches that are more likely to harm than to help. In my opinion, I believed that Harry Markowitz approach to investments is best way to manage risk plus valuation. This approach could be applicable both within and outside the countries. Since 1950 diversification formed via the combination of stocks and asset in a portfolio in other to get maximum returns.

On the other hand, Bhatti et al (2015) argue that co- movement among stocks indices is investigated by using different that degree and correlation were applied to diversify portfolio risk. The argument is that correlation shows the returns on the different assets movement. This could be positive or negative in correlation according to the Modern portfolio theories which accept that there is positive correlation in returns from international portfolio management of different combination of assets or stocks in the markets for investment. The correlation ranges from -1 to +1, this is explained that every investment of positive correlation moves in the same direction while negative correlation moves in opposite direction.

Coulibaly and Miller (2011) studied on how the levels investment and debt changed via the pre crisis and post – crisis periods. The argument here was that this studies focus pre-crisis and year surrounding the financial crisis. Conversely, the impacts financial crisis could be negative on portfolio of an assets selection for investment. When the crisis hit a nation affect all sectors of economy which could then moves from one country to another. In the extension to this studies is the Song and Lee (2012) whom examined the Long run changes in the liquidity of firms though they focus on the influence of the level of cash holdings for eight East Asian countries.

From all the analysis none has been able to examine the pattern of financial crisis in a country led to changes in investment returns of portfolio from a particular country that is both in short and longer term. Also, the after effect of financial crisis on the selected asset or stock in a portfolio market o f investment. No wonder why Prasad (2015) stated that it is important to study the longer run for the post – crisis period where firms have greater internal control for improving their financial profitability and thereby be in a position to return to sustainable profitability. Likewise, globalisation has a greater impact on the portfolio management.

This paper will intend to examine the integration of foreign stocks, the extent of stocks in international portfolio management with the impact of financial crisis. And it is believed in my opinion that every impact could raise greater correlations may surface in national market where it would reduced some of the benefit from international diversification. The extent of

diversification would be from UK and some of international diversification and it would also cover the some of the major systematic factor of the economy is looked into in the return via market the indices.

There are many journals and researches that were previously used to form various resources to establish the correlation and the relationship between financial crises and international portfolio management. Satyendra (2013) said that these four basic economic parameters that determine the behaviour of any economy and its dynamics generate income and expenditure.

However, it is this consumption that drives the production. Another one that drives production is the investment for example in an open economy foreign trade is a relatively important sector in the economy, although export trigger and sustain growth. Japan and Germany could be described as classical examples.

Analysis from Markowitz method of selecting share and securities rather than random selection of share will be taking into account in correlation between shares and selected securities will be examined significantly. Tobin (1958) described it as an extension of Markowitz's analysis also that it gives a possibility of allowing riskless security to be added to asset holder's portfolios. This theory will be tested to prove and also to add and give my own opinion.

Also the impact of capital flows emerging markets have become volatile, according to Nasha and Zhang (2014) net flows turned into net outflows as global risk aversion spiked around the peak of euro area crisis in 2011-12, before recovering in 2013. This will be further explained for example the expectations of an exit from quantitative easing by the U.S. Federal Reserve impacts in emerging market increase will be explained further. This will be very good to fully assess the pro and cons internationally.

Asset pricing in international emerging markets could be another factor used to determine how the swings in capital flow surges and reversals. I shall also be looking at the critical view of the Black Swan book's author, Nassim Nicholas Taleb, is critical about the Value at Risk approach which he called fraud. He said in rare and extreme cases it would be difficult to predict black swans with regard to when it is happening and the magnitude of losses that might result from this, consequently the value at risk has reduced. His point here is that it would be difficult to foresee when financial crisis is coming; probably that is why He calls it fraud.

2.3.2 Financial crisis and portfolio management

The financial crisis impact according to (Chittedi 2014) said in one of her journals that ‘‘according to World bank data, the global financial crisis had a pronounced impact on net capital flows to developing countries in 2008, Portfolio equity inflows turn sharply negative’’. This could be argued that the impact of this shock could give negative effects on

In addition to the contribution above this crisis impact could also put pressures on emerging market by creating attention in emerging economies like Asia in their stock markets that is internationally changes could come via the firm microeconomic environment. Like Can and Ariff (2009) examines this.

As of 2015, the most severe financial crises on record is in its eight year now, a lot of names had been given to this crises like some called it weapons of mass destruction due to it excessive impacts on every sectors of economy and even international portfolios. A lot of lessons have been learnt from this crisis that transforms into debt.

2.4 Conclusion

From the past two decades we have witnessed so many changes in movement and behaviour of equity markets which constantly require new information. One of the benefits is the first hand information received. And this understanding was buttress upon by Horvath and Petrovski (2013) whom were among the first to undertake a comparative study on central and south Eastern Europe. This I believed will throw light towards my understanding of this empirical research benefits.

Conversely, portfolio diversification via Mean-variance approach was originated by Markowitz (1952) in one of his paper called ‘‘Portfolio Selection.’’ And this has been supported with several researchers all over the world.

Therefore, Bhatti (2015) said it is suggested that benefits of diversification would increase when dividends are included in returns. For example Asian stock markets returns were found to be highly correlated and that is why managing portfolio in internationally could also reduce risk from selected potential asset selection.

Similarly, Liu et al.,(2014) explored downside risks for euro-zone countries and study period is divided into pre-crisis and post crisis periods. This means that diversification should not be

optimized if investments are selected within euro-zone markets. And investors should make investments in both Asian emerging markets and developed markets. Also from all my observation from some of these literatures, are benefits that can be said to mount up to the international portfolio management to reduce risk and all researchers are pointer to increase returns from an investment.

According to Markowitz (1952), when two assets exist in a portfolio, an investor will gained from the portfolio. On the other hand the extension is done by Grubel (1968) which include international diversification shows that low correlation between returns in different countries, that investor returns will increase via diversifications that will includes stock, assets etc from different countries.

Similarly, most of the researchers believed that globalisation in technologies, liberations; government's policies could wipe out the benefit in international portfolio management due to the impact of correlation. Also some argument is that we have systematic risks which have dampened the opportunity investing abroad and the verse effect on the returns.

Finally international portfolio management provides investor to improve returns to a given level of risk provided that the returns to the asset s are not perfectly correlated. Above all the frying pan of investments is sometimes very hot, but we should pause and think before we jump into fire.

Chapter three: Research Methodology

3.1 Introduction

In this chapter the research methods used will be explained and the sources of the data used will be mentioned including the description of variables applied in this study. Every reasonable attempt will be used to justify all the variables and data set for the financial crisis and the international portfolio management for this period will be subdivided into three periods, January 2004 - December 2006, January 2007 - December 2009 and January 2010 - December 2012. Therefore, in measure and formula used to capture the impact of financial crisis on international portfolio management that is to show the effects of crisis before, during and after the financial crisis are explained below.

The market descriptive statistics for the assets analysed for the whole periods are shown in the tables below. The returns on the market of the various assets for the different periods analysed are also presented on figures and their correlation coefficients and the covariance estimate as well as the expected returns on the portfolio are in the table for easy understanding. Also the model and the approach used for these variables will be specified clearly in this chapter.

Firstly, the theoretical stance will be adopted in this research as explained by Olienyk, *et al*. (2000), this research viewpoint was to look into the impact of financial crisis on international diversification. As the evident also shows to understand the benefits from international diversification were well documented. This evidence shows the correlations between domestic and foreign securities allow for the construction of portfolio with improved international return/risk. This would be seen in the later in the observation below.

In addition, Olienyk, *et al* (2000) stated that the recent evidence indicates that correlations among international security market are related to this market volatility, thus reducing the efficacy of international diversification at the time it is needed most. The research sited example of Asian crisis and the devaluation of Baht by Thailand in July 1997. A similar financial crisis of 2007 would also be use to explain in the observation later below in order to

understand the impact of crisis on the returns of stock indices selected and the statistical analysis will be applied.

Subsequently, the inductive approach to this research design will be adopted in this research. This approach involves the development of a result of analysis carried out on the data collected Olienyk,*et al* (2000). The approach is adopted in this research is to eliminate if there are any bias of generalisation that is in existence.

This approach show case the relationship and interferences within the data collected. That is it laid emphasis from theory to data in better structure. The data will be from 5 foreign countries stock indices and the impact on their volatilities even to investors. These results will be presented in tables, figures, charts for a thorough comprehension and the analysis for this period will be subdivided into three periods, January 2004 - December 2006, January 2007 - December 2009 and January 2010 - December 2012. Therefore, in order to capture the impact of financial crisis on international portfolio management, that is to show the effects of crisis before, during and after the financial crisis.

The market descriptive statistics for the stocks analysed for the whole periods are shown in the tables below. The returns on the market of the various assets for the different periods analysed are also presented on figures and their correlation coefficients and the covariance estimate as well as the expected returns on the portfolio are in the table for easy understanding. The risk measures of the portfolio calculated as the variance are estimated for various periods and presented with its respective standard deviations. The interpretations and discussions of these outcomes will be presented in the next chapter.

Finally, an explanatory studies approach will be adopted in the design of this research. Also explanatory studies will place emphasis on studying in other to explain the correlation between stocks and it variables used Olienyk, *et al* (2000).

3.2 Data description and sources

All the data used has tremendously play role in this research outcome. According to (Koop, 2013) explained that microeconomic data measures phenomena such as real gross domestic product (denoted GDP), interest rates, the money supply, and so on. Bloomberg defined by **Investopedia 2015,** is a computer system that allows investors to access the Bloomberg data service, which provides real-time financial data, news feeds, messages and also facilitates the placement of trade. Bloomberg charges a monthly fee, typically in the range of thousands of

dollars per workstation **for access to its system.** Bloomberg terminals are one of the main product offerings from Bloomberg L.P, and it is one of the most heavily used highly regarded professional investment systems to be created for the financial marketplace.

Eventually, this data was courteously downloaded from Bloomberg, Microsoft Office Excel 2007 (see appendix 1) and correlation coefficient generated via EViews (this is software for econometric analysis, forecasting and simulation) for the purpose of clarity on international portfolio management studies because data often collected at a specific point in time e.g monthly, weekly, yearly etc. And, however it is very difficult to collect primary data on international stocks markets from the rest of the world, because it all spread out around the globe and data are order by time.

The weekly time series data are used and also the weekly prices of stock of indices are used from five stock markets for a period of 9years extracted from Bloomberg. This data could be described as quantitative due to numerical in nature and character wise just for the purpose of these research studies of financial crisis and international portfolio management (Koop, 2013).

The risk measures of the portfolio calculated as the variance are estimated for various periods and presented with its respective standard deviations.

These variables data for this research have been carefully selected for the purpose of coherent analysis and for main objective towards this research that will includes some of international stock markets.

As described on Bloomberg the FTSE 100 Index capitalization – weighted index of the 100 most highly capitalized companies traded on the London stock exchange. This index formed the domestic portfolio for UK investors and is for the period of 9years that is 2004-2012. It also formed the combination of domestic stock from United Kingdom added to foreign stock. Also the periods were divided into three division which are pre-crisis January 2004-December 2006, during crisis January 2007-December 2009 and post or after crisis January 2004-December 2006.

Same procedures were applied to all the other foreign stocks indices below:

Dax (Deutsche Boerse AG German Stock Index Dax) is the German Stock Index is a total return index of 30 selected German blue chip stocks traded on the Frankfurt Stock Exchange.

CAC 40 Index, the CAC 40, the most widely-used indicator of the Paris market, reflects the performance of the 40 largest equities listed in France, measured by free-float market-capitalization and liquidity.

S&P 500, is the Standard and Poor's 500 is a capitalisation –weighted index of 500 stocks. The index is designed to measure performance of the broad domestic economy through changes in the aggregate market value of 500 stocks representing all major industries.

IBEX 35 is the official index of the Spanish continuous Market. The index is comprised of the 35 most liquid stocks traded on the continuous market.

All these indices were selected randomly to represent each major country in the continent in the world to minimise any bias and also on the market share and the liquidity. In order to capture significant amount of the whole market shares, the historical prices of all the indices were downloaded from Bloomberg terminal and every utmost caution applied to all data to avoid any distortion. Also there is no any modification prior to the statistical descriptive analysis.

Summary of Stocks

Stock name	Ticker's number	Country
FTSE100	UKX	United Kingdom
DAX Index	DAX	Germany
CAC 40 index	CAC	France
S&P 500	SPX	United States
IBEX 35	IBEX	Spain

Table 1

3.3 Model description

Since 1960 and based on Harry Markowitz explanation earlier, the model used for this research will be the basic portfolio model that was developed by Harry Markowitz (1952, 1959), who derived the expected rate of return for a portfolio of assets and an expected risk measure. Markowitz showed that the variance of the rate of return was a meaningful measure of portfolio risk under a reasonable set of assumptions. More importantly, he derived the

formula for computing the variance of a portfolio. This portfolio variance formula not only indicated the importance of diversifying investments in other to reduce the total risk of a portfolio but also showed how to effectively diversify in domestic and international. The Markowitz model is based on quite a lot of assumptions regarding investor behaviour in which are summarised by Brown, (2012).

1. Investors consider each investment alternative as being represented by a probability distribution of expected returns over some holding period.
2. Investors maximize one –period expected utility, and their utility curves demonstrate diminishing marginal utility of wealth.
3. Investors estimate the risk of the portfolio on the basis of variability of expected returns
4. Investors base decisions solely on expected return and risk, so their utility curves are a function of expected return and the expected variance (or standard deviation) of returns only.
5. For a given risk level, investors prefer higher returns to lower returns. Similarly, for a given level of expected return, investors prefer less risk to high risk.

Portfolio total expected returns

The Mean –variance model states the expected return on a portfolio with 1,2.....N held in proportions x_1, x_2.....x_n respectively as follows:

$R_P = E(R_P) = \sum x_i R_i$..... Equation (1) adapted by Olienyk, *et al* (2000).

Interpretation of equation (1)

R_P = portfolio return

X_i = Assets held in weight by the proportion of value in portfolio

R_i = average of the returns of individual assets

Variance of the portfolio

The Mean- variance model uses the variance or the standard deviation of returns as the measure of risk. Therefore the estimates of variance of portfolio could be stated as follows;

$\sigma^2_p = Var(R_P) = 1/N\ \sigma^2_i + (N-1)/N\alpha_{ik}$ .....Equation 2

Interpretation of equation (2)

$\sigma^2_p = Var(R_P)$ = that is Variance for a portfolio

σ^2_i = average of the variances for the individual assets

$\alpha_i k$ = average of covariance estimates in between assets in a portfolio

N = number of assets in the portfolio the variance formula used are for multi asset portfolio is as adapted by Elton, J. E et al (2007, pg 58.)

Standard Deviation

Standard deviation is derived from the square root of the variance. The standard deviation could be rewriting like this..... $\partial = \sqrt{\sigma^2_p}$

Correlation coefficient

According to (Brown 2012) defined correlation coefficient as a standardized measure of the relationship between two variables that ranges from -1.00 to +1.00. This result is projected via Eviews.

Covariance

Mean –variance model describes the covariance as a measure of the degree to which two variables move together relative to their individual mean values over time. A positive covariance means that the rates of return for two investments tend to move in the same direction relative to their individual means during the same time period. In contrast, a negative covariance shows that the rates of return for two investments tend to move in different directions relative to their means during specified time intervals over a period

(Brown, 2013). The formula for calculating the covariance between different assets could be illustrated as follows:

$$Cov_{12} = \sum x_i (R_{ij} - Ri) x_2 (R_{2j} - R_2) \text{.....Equation (3)}$$

Xi = weights of individual assets in a portfolio

Rij = returns of the assets

Ri = average of the returns

Chapter four: Data analysis

4.1 Introduction

In this Chapter the result of analysis applied based on the data collection will be explained below. These results will be presented in tables, figures, formulae for a thorough comprehension and the analysis for these periods will be subdivided into three periods from January 2004 - December 2006, January 2007 - December 2009 and January 2010 - December 2012. Therefore, in order to capture the impact of financial crisis on international portfolio management, that is to show the effects of crisis before, during and after the financial crisis.

The market activities of stocks in the portfolio for these periods s are presented with tables and figures. Also the returns from stocks for all the periods are analysed and presented with tables and figures. Even correlation coefficients, covariance and the expected returns on portfolio are well presented with figures on the table for the periods.

4.2 Correlation coefficient

According to (Brown 2012) defined correlation coefficient as a standardized measure of the relationship between two variables that ranges from -1.00 to +1.00. This indicated that a positive correlation shows that the returns on both assets tend to rise together and a negative value shows that the returns tend to move in opposite directions. To calculate correlation coefficient via Eviews for all the periods Jan.2004-Dec. 2012, the following steps were followed:

- Select variables (see appendix1) ⟹ (click control to select multiple)
- Right click and select open as a group
- Click on view
- Go to covariance analysis change to correlation
- Click ok

Table 2: Correlation coefficient observed for periods Jan.2004 – Dec.2012

Covariance Analysis: Ordinary Date: 01/09/15 Time: 18:07 Sample: 9/01/2004 21/12/2012 Included observations: 468					
Correlation	CAC	DAX	IBEX	SPX	UKX
CAC	1				
DAX	0.935487	1			
IBEX	0.87003	0.824028	1		
SPX	0.858078	0.8629	0.76235	1	
UKX	0.928185	0.896052	0.796305	0.866009	1

Table 2

Also to calculate correlation coefficient via Eviews for period Jan.2004-Dec.2006, the following steps were followed in table 2:

Table 3: Correlation coefficient observed for Jan.2004 – Dec.2006 periods

Covariance Analysis: Ordinary Date: 01/09/15 Time: 18:41 Sample (adjusted): 9/01/2004 29/12/2006 Included observations: 156 after adjustments					
Correlation	CAC	DAX	IBEX	SPX	UKX
CAC	1				
DAX	0.9273	1			
IBEX	0.82984	0.836308	1		
SPX	0.73964	0.750737	0.698717	1	
UKX	0.867045	0.799456	0.783565	0.695258	1

Table3

On the other hand to calculate correlation coefficient via Eviews for period Jan.2007-Dec.2009, the following (see appendix1) steps were followed in table 3:

Table 4: Correlation coefficient for 2007 – 2009 periods

Covariance Analysis: Ordinary Date: 01/09/15 Time: 18:49 Sample (adjusted): 5/01/2007 25/12/2009 Included observations: 156 after adjustments					
Correlation	CAC	DAX	IBEX	SPX	UKX
CAC	1				
DAX	0.949579	1			
IBEX	0.902612	0.902447	1		
SPX	0.874457	0.887894	0.823786	1	
UKX	0.957458	0.928163	0.876735	0.881176	1

Table 4

Alternatively to calculate correlation coefficient via Eviews for period Jan.2010-Dec.2012, the following steps were followed in table 4:

Table 5: Correlation coefficient for 2010 – 2012 periods

Covariance Analysis: Ordinary Date: 01/09/15 Time: 18:52 Sample (adjusted): 1/01/2010 21/12/2012 Included observations: 156 after adjustments					
Correlation	CAC	DAX	IBEX	SPX	UKX
CAC	1				
DAX	0.919871	1			
IBEX	0.853522	0.749878	1		
SPX	0.874235	0.859729	0.733914	1	
UKX	0.904043	0.873398	0.727828	0.889019	1

Table 5

4.3 Mean return

4.3.1 Mean return of individual assets

The mean returns on the market for the individual indices used were calculated based on the capital gains yield formula (reference). This is illustrated as follows:-

$(P_{t+1} - P_t)/P_t$ .....equation (4)

P_{t+1} = price at the end of period t

P_t = price at the beginning of period t

Period Jan.2004-Dec.2012

The following results were obtained for the mean return of the individual assets (for the individual returns, see appendix 1).

Table 6a: Beside the mean returns for individual stocks for the periods of January 2004 – December 2012

	UK FTSE 100	DAX Index	CAC 40 Index	S&P 500	IBEX 35
Mean returns	-0.12%	-0.03%	-0.16%	-0.13%	-0.15%
Num of observation	468	468	468	468	468

Table6a.

Table 6b- Likewise the mean returns, standard deviation and variance for the period of January 2004 – December 2012

	UK FTSE 100	DAX Index	CAC 40 Index	S&P 500	IBEX 35
Mean returns On the market stocks	-0.12%	-0.03%	-0.16%	-0.13%	-0.15%
Standard Deviation	5.31%	5.61%	5.57%	5.31%	5.7%
Variance	0.28%	0.32%	0.31%	0.28%	0.32%
Num of observation	468	468	468	468	468

Table 6b

Period Jan.2004-Dec.2006

The following results were obtained for the mean return of the individual assets (for the individual returns, see appendix 1) for the periods of January 2004– December 2006.

Table 7a: Mean returns for individual assets for the periods of January 2004 – December 2006

	UK FTSE 100	DAX Index	CAC 40 Index	S&P 500	IBEX 35
Mean returns On the market stocks	0.22%	0.34%	0.29%	0.16%	0.39%
Num of observation	156	156	156	156	156

Table 7a

Table 7b: Mean returns, standard deviation and variance for individual assets for the periods of January 2004 – December 2006

	UK FTSE 100	DAX Index	CAC 40 Index	S&P 500	IBEX 35
Mean returns On the market stocks	0.22%	0.34%	0.29%	0.16%	0.39%
Standard Deviation	1.37%	1.95%	1.67%	1.39%	1.61%
Variance	0.019%	0.038%	0.028%	0.019%	0.026%
Num of observation	156	156	156	156	156

Table 7b

Period Jan.2007-Dec.2009

The following results were obtained for the mean return of the individual assets (for the individual returns, see appendix 1). Table 7: Mean returns for individual stocks for the periods of January 2007 – December 2009.

Table 8a: Mean returns for individual stocks for the periods of January 2007 – December 2009

	UK FTSE 100	**DAX Index**	**CAC 40 Index**	**S&P 500**	**IBEX 35**
Mean returns On the market stocks	-0.022%	0.023%	-0.134%	-0.085%	-0.038%
Num of observation	156	156	156	156	156

Table 8a

Table 8b: Mean returns, standard deviation and variance for individual stocks for the periods of January 2007 – December 2009

	UK FTSE 100	**DAX Index**	**CAC 40 Index**	**S&P 500**	**IBEX 35**
Mean returns On the market stocks	-0.022%	0.023%	-0.134%	-0.085%	-0.038%
Standard Deviation	3.63%	4.16%	4%	3.60%	3.89%
Variance	0.132%	0.173%	0.160%	0.129%	0.151%
Num of observation	156	156	156	156	156

Table 8b

Period Jan.2010-Dec.2012

The following results were obtained for the mean return of the individual assets (for the individual returns, see appendix 1). Table 8: Mean returns for individual assets for the periods of January 2010 – December 2012.

Table 9a: Mean returns for individual stocks for the periods of January 2010 – December 2012

	UK FTSE 100	DAX Index	CAC 40 Index	S&P 500	IBEX 35
Mean returns On the market stocks	-0.55%	-0.43%	-0.64%	-0.46%	-0.80%
Num of observation	156	156	156	156	156

Table 9a

Table 9b: Mean returns, standard deviation and variance for individual stocks for the periods of January 2010 – December 2012

	UK FTSE 100	DAX Index	CAC 40 Index	S&P 500	IBEX 35
Mean returns On the market stocks	-0.55%	-0.43%	-0.64%	-0.46%	-0.80%
Standard Deviation	1.43%	8.56%	8.60%	8.35%	8.90%
Variance	0.02%	0.73%	0.74%	0.02%	0.79%
Num of observation	156	156	156	156	156

Table9b

4.3.2 Return on portfolio

Now the expected return on an international portfolio that comprises of equal proportion of the various indices was calculated using the formula mentioned in equation (1) of chapter 3

Period Jan.2004-Dec.2012

The expected return on a portfolio with 5 stocks indices of proportionate weights for the period January 2004 to December 2012 is illustrated below in table 9.

Table 10a: Expected return on portfolio for the period Jan.2004-Dec.2012

	Individual Returns from all the 5 assets	**Weight**	**Expected Returns**	**Expected Returns (100%)**
UK FTSE 100	-0.12%	1/5	-0.00024	-0.02%
DAX Index	-0.03%	1/5	-0.0001	-0.01%
CAC 40 Index	-0.20%	1/5	-0.0004	-0.04%
S&P 500	-0.13%	1/5	-0.0003	-0.03%
IBEX 35	-0.15%	1/5	-0.0003	-0.03%
		$\mathbf{E(R_P) = \sum x_i R_i}$	**-0.0134**	**-0.13%.**

Table 10a, the expected return on the portfolio with equal proportion of assets is approximately **-0.13%.**

Table 10b shows variance versus combined returns on international portfolio for the period Jan. 2004 – Dec. 2012.

	UK FTSE 100	DAX Index	CAC 40 Index	S&P 500	IBEX 35
Expected returns	-0.02%	-0.01%	-0.04%	-0.03%	-0.03%
Variance	0.28%	0.32%	0.31%	0.28%	0.32%

Table 10b

Period Jan.2004-Dec.2006

In the same way, the expected returns on the portfolio for this period Jan.2004 - Dec. 2006 shown in below table 11a.

	Individual Returns from all the 5 stocks	**Weight**	**Expected Returns**	**Expected Returns (100%)**
UK FTSE 100	0.22%	1/5	0.00044	0.04%
DAX Index	0.34%	1/5	0.00068	0.07%
CAC 40 Index	0.29%	1/5	0.00058	0.06%
S&P 500	0.16%	1/5	0.00032	0.03%
IBEX 35	0.39%	1/5	0.00078	0.08%
		$E(R_P) = \sum x_i R_i$	0.0028	0.3%

Table 11a above shows the expected return on the portfolio in equals proportion approximately will be 0.28%

Table 11b shows variance versus combined returns on international portfolio for the period Jan. 2004 – Dec. 2006.

	UK FTSE 100	DAX Index	CAC 40 Index	S&P 500	IBEX 35
Expected returns	0.044%	0.068%	0.058%	0.032%	0.078%
Variance	0.02%	0.04%	0.03%	0.02%	0.03%

Table 11b

Period Jan.2007-Dec.2009

Also, the expected returns on the portfolio for this period Jan.2007 - Dec. 2009 of global financial crisis is shown in below table 12a.

	Individual Returns from all the 5 assets	**Weight**	**Expected Returns**	**Expected Returns (100%)**
UK FTSE 100	-0.022%	1/5	-0.0044	-0.44%
DAX Index	0.023%	1/5	0.0046	0.46%
CAC 40 Index	-0.134%	1/5	-0.0268	-2.7%
S&P 500	-0.085%	1/5	-0.017	-1.7%
IBEX 35	-0.038%	1/5	-0.0076	-0.76%
		$\mathbf{E(R_P) = \sum x_i R_i}$	**-0.0514**	-5.14

Table 12a above shows the expected return on the portfolio equals approximately will be **-5.1%**

Table 12b shows variance versus combined returns on international portfolio for the period Jan. 2010 – Dec. 2012.

	UK FTSE 100	DAX Index	CAC 40 Index	S&P 500	IBEX 35
Expected returns	-0.044%	0.46%	-2.6%	-1.7%	-0.76%
Variance	0.13%	0.17%	0.16%	0.13%	0.15%

Table 12b

Period Jan.2010-Dec.2012

Similarly, the expected returns on the portfolio for this period Jan.2010 - Dec. 2012 of global financial crisis is shown in below table 13a.

	Individual Returns from all the 5 assets	Weight	Expected Returns	Expected Returns (100%)
UK FTSE 100	-0.55%	1/5	-0.0011	-0.11%
DAX Index	-0.43%	1/5	-0.00086	-0.086%
CAC 40 Index	-0.64%	1/5	-0.00128	-0.13%
S&P 500	-0.46%	1/5	-0.00092	-0.092%
IBEX 35	-0.80%	1/5	-0.0016	-0.16%
		$\mathbf{E(R_P) = \sum x_i R_i}$	**-0.00576**	-0.58%

Table 13a above shows the expected return on the portfolio equals approximately will be **-0.58%**

Table 13b shows variance versus combined returns on international portfolio for the period Jan. 2010 – Dec. 2012.

	UK FTSE 100	DAX Index	CAC 40 Index	S&P 500	IBEX 35
Expected returns	-0.11%	-0.09%	-0.13%	-0.09%	-0.16%
Variance	0.02%	0.73%	0.74%	0.02%	0.79%

Table 13b

4.4 Covariance

Another method is to estimates the average covariance estimates of the various stocks in all the periods, the result are illustrated in tables below:

Period Jan.2004-Dec.2012

Table 14: Average Covariance Estimates

Cov(UKX, DAX)	0.002879
Cov(UKX, CAC)	0.002886
Cov(UKX, SPX)	0.002723
Cov(UKX, IBEX)	0.002825
Cov(DAX, CAC)	0.003057
Cov(DAX, SPX)	0.002849
Cov(DAX, IBEX)	0.003005
Cov(CAC, SPX)	0.002827
Cov(CAC, IBEX)	0.003031
Cov(SPX, IBEX)	0.002794

Table 14, the average for the covariance estimates equals = **0.002887**

Period Jan.2004-Dec.2006

Table 15 is illustrated with the average covariance estimates of various stocks for the period Jan. 2004 – Dec.2006.

Cov(UKX, DAX)	0.000212
Cov(UKX, CAC)	0.000197
Cov(UKX, SPX)	0.000131
Cov(UKX, IBEX)	0.000171
Cov(DAX, CAC)	0.000299
Cov(DAX, SPX)	0.000202
Cov(DAX, IBEX)	0.00026
Cov(CAC, SPX)	0.00017
Cov(CAC, IBEX)	0.000221
Cov(SPX, IBEX)	0.000155

Table 15, the average estimates for covariance for this period = 0.000202

Period Jan.2007-Dec.2009

Table 16 is illustrated with the average covariance estimates of various stocks for the period Jan. 2007 – Dec.2009.

Cov(UKX, DAX)	0.001393
Cov(UKX, CAC)	0.001384
Cov(UKX, SPX)	0.001142
Cov(UKX, IBEX)	0.00123
Cov(DAX, CAC)	0.001571
Cov(DAX, SPX)	0.0001318
Cov(DAX, IBEX)	0.001449
Cov(CAC, SPX)	0.001249
Cov(CAC, IBEX)	0.001396
Cov(SPX, IBEX)	0.001146

Table 16, the average estimates for covariance for this period = 0.001328

Period Jan.2010-Dec.2012

Table 17 is illustrated with the average covariance estimates of various assets for the period Jan. 2010 – Dec.2012.

Cov(UKX, DAX)	0.006974
Cov(UKX, CAC)	0.001384
Cov(UKX, SPX)	0.006845
Cov(UKX, IBEX)	0.006998
Cov(DAX, CAC)	0.007237
Cov(DAX, SPX)	0.006977
Cov(DAX, IBEX)	0.00723
Cov(CAC, SPX)	0.007006
Cov(CAC, IBEX)	0.007391
Cov(SPX, IBEX)	0.007018

Table 17, the average estimates for covariance for this period = 0.006506.

4.5 Variance and Standard deviation

The variances of portfolio for all the periods are shown below:

Period Jan.2004-Dec.2012

The variance and standard deviation of the portfolio were calculated using equation (2) estimates the risk of the portfolio for the period Jan.2004-Dec.2012 is calculated as:

a) Average of the individual asset via variance (σ^2_i) = **0.00302846**

b) Average of the individual assets via covariance = **0.002887**

Therefore σ^2_p = Var (P) = 1/5(**0.00302846) + 5-1/5(0.002887) = 0.0030.** That is it could be approximately as **0.30%.**

Standard deviation

Also the standard deviation of the portfolio is equal to the square root of the variance = **0.055** and this can be approximately estimated as **5.5%.**

Period Jan.2004-Dec.2006

The variance and standard deviation of the portfolio were calculated using equation (2) estimates the risk of the portfolio for the period Jan.2004-Dec.2006 is calculated as:

a) Average of the individual asset (σ^2_i) = **0.000259**

b) Average of the individual covariance of asset = **0.000202**

Therefore σ^2_p = Var (P) = 1/5(**0.000259) + 5-1/5(0.000202) = 0.0002134** that is it could be approximately as **0.021%.**

Standard deviation

Also the standard deviation of the portfolio is equal to the square root of the variance = **0.0146** and this can be approximately estimated as **1.5%.**

Period Jan.2007-Dec.2009

The variance and standard deviation of the portfolio were calculated using equation (2) estimates the risk of the portfolio for the period Jan.2007-Dec.2009 is calculated as:

a) Average of the individual asset (σ^2_i) = **0.001491**

b) Average of the individual covariance of asset = **0.001328**

Therefore σ^2_p = Var (P) = 1/5(**0.001491) + 5-1/5(0.001328) = 0.0013606** that is it could be approximately as 0.14**%.**

Standard deviation

Also the standard deviation of the portfolio is equal to the square root of the variance = **0.2236** and this can be approximately estimated as **0.04%.**

Period Jan.2010-Dec.2012

The variance and standard deviation of the portfolio were calculated using equation (2) estimates the risk of the portfolio for the period Jan.2010-Dec.2012 is calculated as:

a) Average of the individual asset (σ^2_i) = **0.004607**

b) Average of the individual covariance of assets = **0.006506**

Therefore σ^2_p = Var (P) = 1/5(**0.004607) + 5-1/5(0.006506) = 0.0061262** that is it could be approximately as **0.6%.**

Standard deviation

Also the standard deviation of the portfolio is equal to the square root of the variance = **0.078** and this can be approximately estimated as **7.8%.**

4.6 Conclusion

Above all, the risks and returns from the portfolios are measures via variance are estimated for the whole periods from pre-crisis Jan.2004 - Dec.2006, during-crisis Jan.2007 – Dec.2009, Jan.2010 – Dec.2012 including the standard deviations. And the outcomes for the interpretation and discussion will be explained in the next chapter.

Chapter five: Discussion of research findings

5.1 Introduction

In this Chapter the result of analysis applied based on the data collection will be explained and interpreted below. These results will be presented in charts for a thorough comprehension and the analysis for this period will be subdivided into three periods, January 2004 - December 2006, January 2007 - December 2009 and January 2010 - December 2012. Therefore, in order to capture the impact of financial crisis on international portfolio management, that is to show the effects of crisis before, during and after the financial crisis.

Also reasonable attempt will be made to explain the outcomes in relation the reviewed literature by other researchers. The interpretations and the discussions of these outcomes followed in sequence to the previous chapter. The returns on the market of the different stocks would be discussed which are also followed by the return on the portfolio when all the stocks are combined in equal proportion. Even the risk associated with each stock would be presented as well for comparisons.

Conversely, the outcomes from all the periods under observation would also be discussed with emphasis on the impact of financial crisis that stated in 2007 from the United State by the illegal activities of financial institution. Conversely the pair –wise analysis result of the relevant comparisons of diversified portfolio will be discussed. And the overall opinion unbiased with evidence would be used to support the results from the observation in the previous chapter.

5.2 Discussion of results

Blanchett and Straehl (2015) explained that when building portfolios, most investors tend to focus entirely on the risk and return characteristics of investments, such as cash, bonds, and stocks, ignoring the interconnectedness of their portfolios with other assets that they effectively own, such as human capital, real estate, and pensions. Intuitively, the observation period for this research was sub-divided and design into three periods, pre- crisis period 2004- 2006, during crisis period 2007-2009 and post crisis period 2010-2012 in other to capture the impacts of financial crisis are explained fully below.

Table 1 in the previous chapter shows the summary of all the major indices in Europe and the United States, which are denoted with their ticker's number (identification number). The FTSE 100 represents the indices for United Kingdom and this can be identified with UKX. DAX indices represent the German stocks which are denoted by DAX in the trading market platform. Equally, the CAC 40 indices represent the Paris market in France and this carry a ticker number called CAC for identification purpose. While the S&P 500 represents a trading platform in United States with a ticker number SPX. In addition to aforementioned IBEX 35 denoted with IBEX in the trading market of Spain.

According to Olienyk, *et al* (2000) said the correlation indicate the possibility of substantial diversification benefits. Despite the impact of financial crises there could be some evidence of benefits to international portfolio management. Therefore to all the observations above outcomes, the pair wise of correlation coefficient are positive for all the stocks from all the selected countries for this period from January 2004 – December 2012 with pair wise 468 weekly activities could be seen in appendix 2a.

Correlation, mean return, standard deviation and variance for all periods

According to Olienyk, *et al* (2000) said the correlation indicate the possibility of substantial diversification benefits. Despite the impact of financial crises there could be some evidence of benefits to international portfolio management. Therefore to all the observations above outcomes, the pair wise of correlation coefficient are positive for all the stocks from all the selected countries for this period from January 2004 – December 2012 with pair wise 468 weekly activities could be seen in appendix 2a. Even to all the three periods there had been a high volatility (high correlation coefficient) which were observed during the financial crisis from Jan. 2007 – Dec. 2009, this could be as a result of the impact of financial crises experienced in these periods.

Nonetheless, table 2 is the result of correlation coefficient for the period from Jan.2004 - Dec.2012. These variables were collected via Bloomberg to excel and the result projected via Eviews. The figures are correlated to another in the portfolio of stocks. This could be interpreted as positive correlation between the various stocks activities in the portfolio of each selected countries. The higher correlation between CAC and DAX was 0.935487. Also higher correlation between CAC and UK FTSE is 0.928185. The lowest correlation occurring between the IBEX and SPX is 0.76235 for this period.

On the other hand, table 3 with pair wise 156 weekly activities had same evidences of correlation shown in this period before financial crisis that Jan, 2004-Dec.2006, for example CAC and DAX is 0.9273. Followed by CAC and UKX are 0.867045 and the lowest occurring in SPX and UKX is 0.695258. One of the reasons for this research is to capture the impact of financial crisis on the portfolio in all the periods. Likewise table 4 is the periods during the financial crisis period Jan.2007-Dec.2009 with pair wise weekly activities of 156, the correlation was positive. The highest correlation during this period for the CAC and UKX is 0.957458 and the lowest goes to IBX and SPX with 0.823786. Similarly table 5 with pair wise weekly activities for this post crisis period Jan.2010-Dec, 2012 is with the highest correlation of 0.919871 between CAC and DAX for this period. And the lowest correlation is UKX and IBEX 0.727828.

Correspondingly, the highest correlation coefficient observations from all the periods are identify in the year during financial crisis that Jan.2007-Dec.2009 with CAC and UKX is 0.957458. This could be taken as a result of high volatility because of the impact of financial crisis on portfolio that started from US 2007 and spread to the rest of the world. Also lowest correlation occurred before financial crisis that is in the period Jan. 2004-December2006 is 0.69525.

Nonetheless, table 6afocus on mean returns for period Jan.2004-Dec.2012 in the previous chapter this is represented in the chart 1 below: Observation noted in CAC had the least return with -0.16% while DAX has 0.04 for this period.

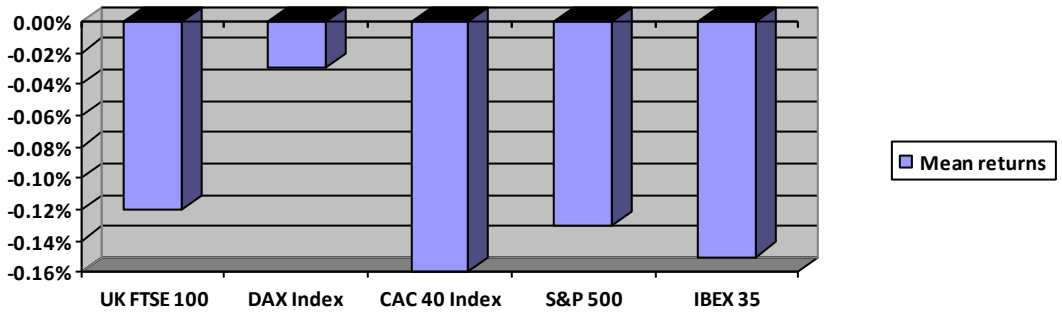

Chart 1, mean returns for individual stocks for the periods of January 2004 – December 2012.

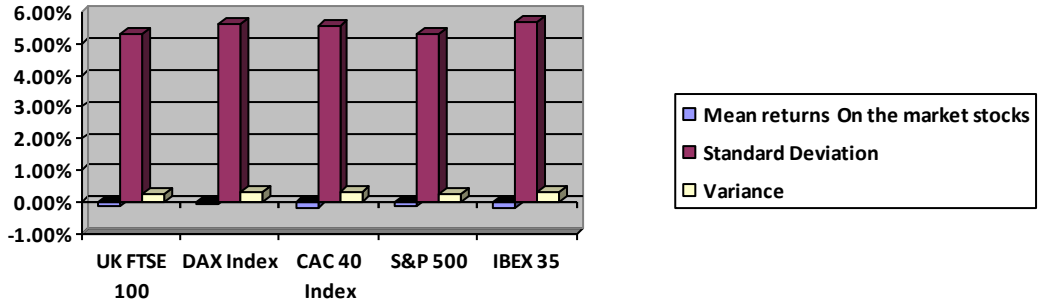

Chart 2, mean returns, standard deviation and variance for individual stocks for the periods of January 2004 – December 2012

Also table 6b has the combination storks in the portfolio of calculation the mean returns, standard deviation and the variance for observing 468 weekly activities of all stocks in the trading market platform for all the countries mentioned earlier for the period of January 2004 – December 2012. The highest returns of mean returns are negatives which were to be German DAX with -0.03% approximately. And the variance is 0.32% while the standard deviation is 5.6%. On this same table, followed by the United Kingdom FTSE 100 which has -12% mean returns with a variance 0.28% and the standard deviation of 5.3% approximately. The S&P 500 of United States had -013% of returns, 0.28% of variance and the standard deviation of 5.3%. On the other hand, the IBEX 35 had mean returns of -15%, 0.32% of variance and the standard deviation of 5.7%. And the least was CAC 40 with the mean returns of -0.16%, 0.31% of variance and the standard deviation for this period was for 5.6%. Numbers of observations were 468 weekly variables.

According to Brown (2012), stated that the higher returns on foreign equities can be justified by the higher growth rates for the countries they are issued. This is why most investor prefers to diversify internationally for better returns due to currency rates and to minimise risk in their returns. And a different countries economy attracts different growth rates and naturally the returns from different economies will give varying degrees of returns.

The phenomenon behind international portfolio management is that a higher return attracts higher risks. The risk is measure by their variances. For example the every index always posed high returns and higher volatility. This could be seen in a pictorial chart 2 that returns and the risks are relatives. For examples the UK FTSE 100 (0.28%) and S&P 500 (0.28%) had the least variances (risks) which are the same or similar, with close relative in mean

returns. And on the contrary, the highest variances noted in DAX (0.32%), IBEX 35 (0.32%) and the CAC 40 (0.31%).

Furthermore, Markowitz theory explained earlier that most investor are assume to be risk averse and will always expect more returns and less risk that it why they will always prefer to diversify their investment in several economies, this in order to minimise risk (variance). Since investment don't put all their eggs in one basket. Investing in different combination of portfolios of equal proportion will surely help investors in reducing in making the right decision and fewer risks.

In addition to the above observations, the table 7a it is a reflection of mean returns for individual stocks for the period before financial crises from Jan. 2004-Dec.2006 shown on below chart3. From the chart3 below the IBEX 35 has the highest (0.39%) mean return from the stock market of 5 selected countries? Following by the DAX Index had 0.34%, CAC 0.29%, 0.22% UK FTSE and 0.16% for S&P 500. Numbers of observations were 156 weekly variables.

Chart 3 Mean returns for individual assets for the periods of January 2004 – December 2006

Besides this is the observation from table 7b which has combination of mean returns, standard deviation and variance for individual assets for the periods of January 2004 – December 2006.From the chart 4 below showing that the variances were are almost the same to all selected countries for investment. This is an evidence of no crisis or economic turmoil at that time. Even the variance and the standard deviation are in a progressive shape. The number of observations was 156 weekly variables.

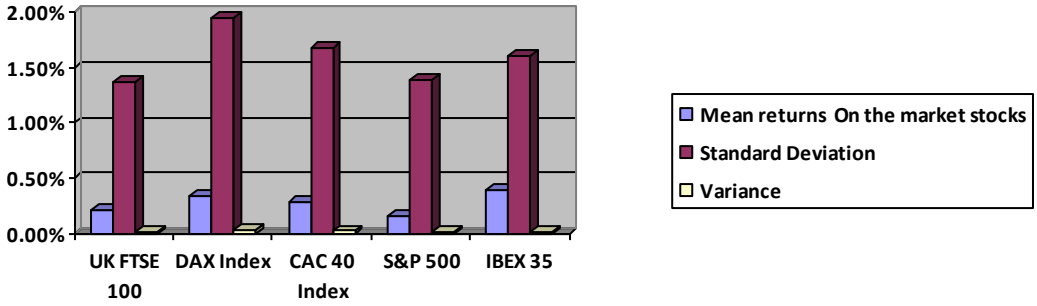

Chart 4 Mean returns, standard deviation and variance for individual assets for the periods of January 2004 – December 2006

Moreover, observation from table 8a is illustrated in chart 5. This is a mean returns for individual stocks for the periods during financial crisis from January 2007 – December 2009.

Best country to invest during this period is the German stocks had a positive mean return of 0.023% and the rest of the markets were negatives in mean returns. On the other hand, Statman (2013) said hedge funds are alternative investments, yet hedge fund investors tend to lag the stock market, and hedge fund investors who switch among do even worse. This could be interpreted that investors don't put all their eggs in one basket and not everybody are risk averse. And this is also supported with Brown (2012) version to Markowitz model assumption that is under these assumptions, a single asset or portfolio of assets is consider to be efficient if no other asset or portfolio of assets offers higher expected return with the same (or lower) risk or lower risk with the same (or higher) expected return. In addition this stock volatility could be as a result of other factors like financial crisis that hit the world late 2007 like a weapon of mass destructions which started from United State due to some of negligence of some of financial institutions.

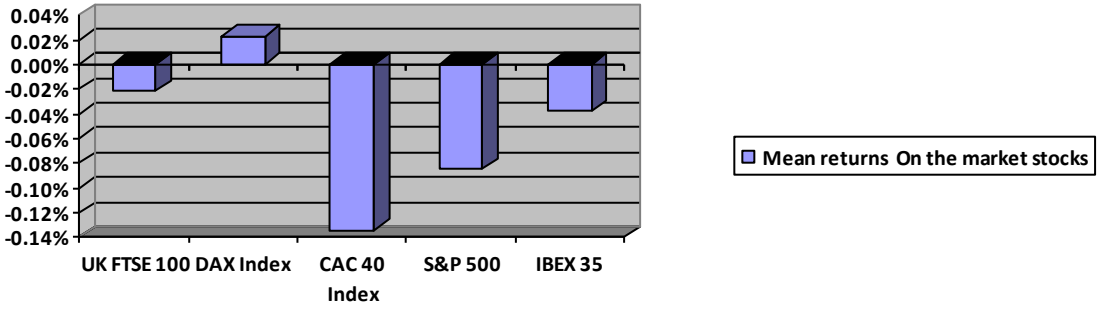

Chart 5, mean returns for individual stocks for the periods of January 2007 – December 2009.

Furthermore, the observation from the table 8b shows that there evidence of financial crises whose were detected due to low mean, low variance and high standard deviation which could be evidence of financial crises in the world economy. This is supported in the below chart6 of Mean returns, standard deviation and variance for individual assets for the periods of January 2004 – December 2006:

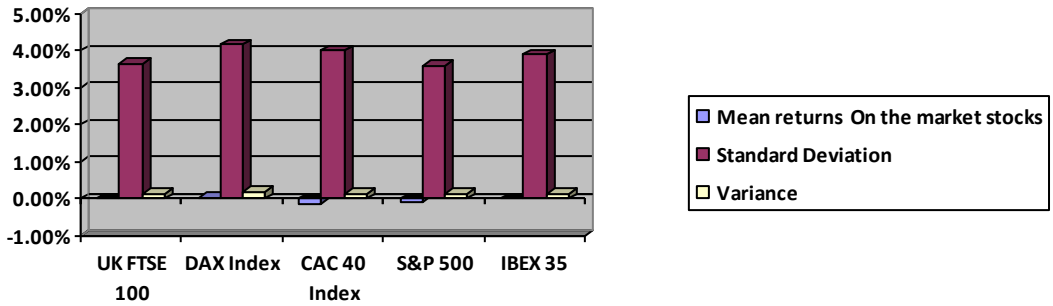

Chart 6 Mean returns, standard deviation and variance for individual assets for the periods of January 2004 – December 2006

On the other hand, table 9a, was as a result of significant observation in chart 7 of means returns for all individual country stocks for the period of post crisis, this picture illustrated below shows a negative in return from the market. This could be as a result of recovery from the impact of crisis from the market of portfolio. The recovery started from DAX Index, follow by S&P 500, FTSE100, CAC 40 and IBEX35

Chart 7 Mean returns for individual stocks for the periods of January 2010 – December 2012

Chart 7

Another similar observation is the table 9b, this is comprises of mean returns, standard deviation and the variance is clearly capture in chart 8 below where the UK FTSE 100 has lowest standard deviation of 1.43% and variance 0.02%. The rest of stocks in the selected countries have the highest standard deviation and variance. And the mean returns are almost level with rest except DAX of Germany.

Chart 8, Mean returns, standard deviation and variance for individual stocks for the periods of January 2010 – December 2012

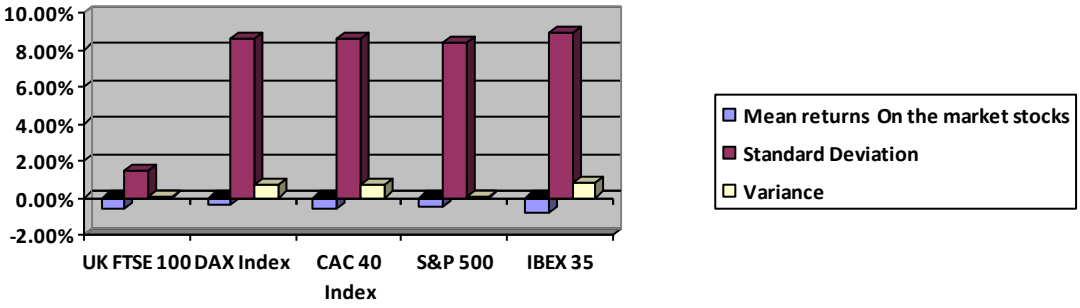

Chart 8

<u>Return on portfolio for all the periods</u>

In addition to this outcome results, international portfolio management increases the returns on a portfolio at a given relative risks, this could be identified by in table 10a the FTSE 100 when investor in UK invest 100% will achieve -0.12% mean returns but if combining with

foreign stocks in equal weight will achieve -0.13% for the period Jan.2004-Dec.2012 table10a for observation result from comparing portfolio expected returns and variance. And same procedures apply to all the rest of the stocks. There are also relationships between returns and the variance of all the stocks indices in a portfolio for all the country represented in the below.

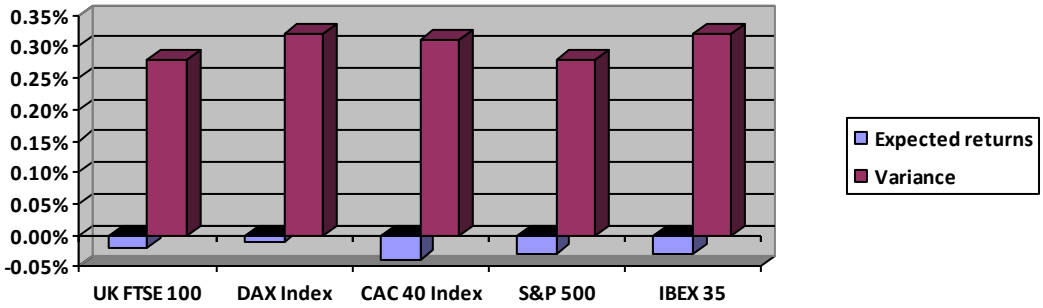

Chart 9 comparisons expected and variance on portfolio for the period Jan.2004-Dec.2012

Chart 9 showing the comparisons for the period from Jan. 2004-Dec. 2012 which indicated that there is positive correlation both on the table and chart. For example table 10b above indicate that the expected return for the UK FTSE 100 is -0.02% with the variance of 0.28%. Besides the DAX index had expected return of -0.01% with the variance of 0.32%. Moreover, the CAC 40 index had expected returns -0.04% with the variance of 0.31%. Likewise, S&P 500 had -0.03% with the variance of 0.28%. And the IBEX 35 expected return was -0.03% with the variance of 0.32%. This is an indication that international portfolio management should be the alternative.

On the other hand, table 11a showing the period before crisis Jan. 2004-Dec. 2006 is indicated with the expected returns from the combination of portfolios with variance of selected stocks. FTSE 100 investors in UK invest 100% will achieve 0.22% mean returns but if combining with foreign stocks in equal weight will achieve 0.3% for the period Jan.2004-Dec.2006.

Correspondingly, the below chart 10, this bar chart shows the comparison shows the same analysis as observed in table 11b. On this chart 10, before financial crisis 2007 the variances moved in the same direction due to some impacts like financial crisis mentioned earlier. And similarly, this same chart 10, the least variance starts from this picture with 0.02% the United

Kingdom FTSE 100 and the S&P 500 of United States had 0.02%. Equally, this is followed by the CAC 40 and IBEX 35 with variances of 0.03% and 0.03% respectively. And the highest variances observed on DAX indices with variance 0.04%.

These results from this observation one January 2004 – December 2006 indicated that no evidence of financial crises. This is also supported with Olienyk, *et al* (2000) research by their explaining that the variances of portfolio are also minimized when the covariance terms are minimized. The chart 10 is the comparison of individual stocks versus combined expected returns from the combination of all stocks in the portfolio. This is because the expected returns are could only be seen from great performance from the picture illustrated below.

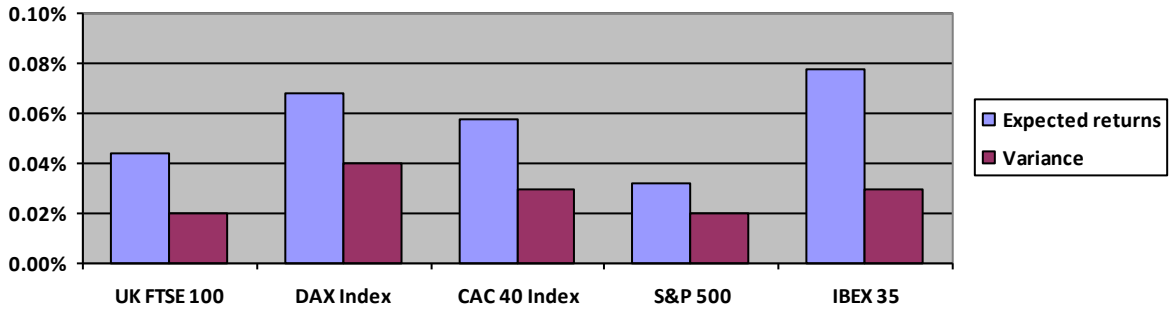

Chart 10 comparisons expected and variance on portfolio for the period Jan.2004-Dec.2006

Comparison of selected stocks versus combined expected returns from the combination of all stocks in the portfolio and even the volatility reveals that international portfolio could be of benefit to all investors whether domestic or foreign for this good period before financial crisis.

In contrast, table 12a showing the period during financial crisis from Jan. 2007-Dec. 2009 is indicated with the expected returns from the combination of portfolios with variance of selected stocks. FTSE 100 investors in UK invest 100% will achieve - 0.022% mean returns during crisis but if combining with foreign stocks in equal weight will achieve -5.14% for the period Jan.2007-Dec.2009. The period for below table 12a is indicated that the expected returns from the combination of portfolios via the selected countries. The S&P 500 had expected returns of -1.7%. And for the UK FTSE 100 could be identified with expected returns of -0.04%. On the other hand the CAC 40 index follows with -2.6% expected return, and the DAX could be identified with the expected return of 0.46%. The IBEX 35 had the

highest expected return of -0.76% and this would be explained better in the chart 11 that follows.

The chart 7 would be use to describe the information in the table 11b. This chart shows the pictorial comparison the same analysis as discussed in table 11a. Connectively the variances moved in the same direction during the crisis, this could also increase the volatility stocks during this period because of the impacts of financial crisis like 2007 financial crisis mentioned earlier. Evidence captured from this table shows that the German's DAX index had the best positive expected returns. Then all other countries stocks were negative in their expected return in the portfolio. In addition, this same chart 11 during the financial crisis it an evidence that there were more than 50% decreased in expected returns from every stocks from every countries represented in the chart below.

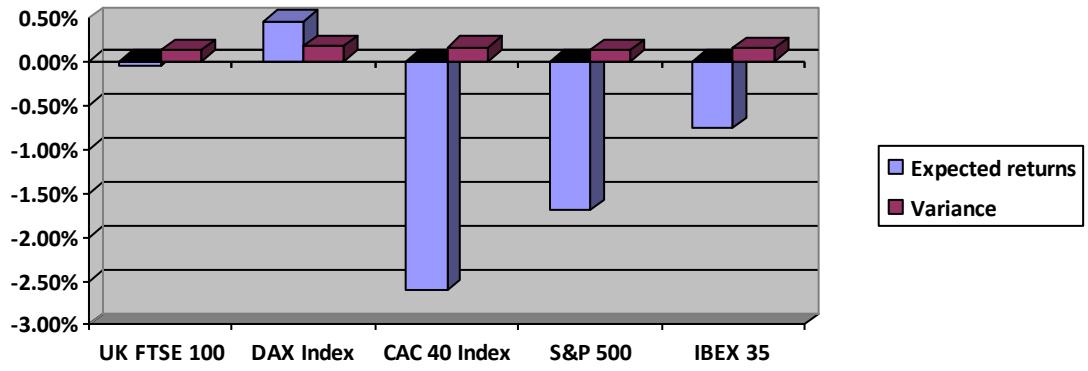

Chart 11 comparisons expected returns and variance on portfolio for the period Jan.2007-Dec.2009

Besides, the least variance starts from this area chart with 0.13% the United Kingdom FTSE 100 and the S&P 500 of United States had 0.13%. Equally, this is followed by the IBEX 35 with variances of 0.15%, and CAC 40 with 0.16% respectively. And the highest variances observed on DAX indices with variance 0.17%. These results from this observation one January 2007 – December 2009 indicated that there was evidence of financial crises in the world. The motivation behind this study is the observation that many firms continue to feel the pinch stemming from the 2007-2009 financial crisis even though more than six years have passed since the advent of the crisis. D. Prasad *et al* (2015).

This result confirms that the international portfolio management exposes investor to different types of risks. As said earlier that the financial crisis acted as a weapon of mass destruction to the world economy. The reason for this impact would have been be as a result of high correlation in the financial market which was clearly shown in the outcomes on the observation. On the other, the systematic risks would expose most investors to different type of risks whether foreign or domestic risks via the international portfolio management.

In contrast to global financial crises according to Feldman (2008) explained that the occurrence of global financial crises are based on two components which are one when global managers are added to the model, their total portfolio losses help form the perception of risk in both markets which can lead to a simultaneous widening of the gap between perceived and actual risk in both markets. Two, the global managers can put downward price pressure on both markets, including local managers to sell which amplifies the initial selling of the global managers. This in short means that the ability to diversify could leads global managers to become less risk averse and thus take on excessive leverage. These are accomplished by spreading the risk over several countries. And many countries were also affected by this after effect of 2007-2009 around the globe.

In spite of numerous measures taken by governments to stem the crisis and to support the recovery of their economies, many industrial firms are still falling short in returning to profitability according to D. Prasad *et al* (2015).

For example, the period for table 13a is indicated that the expected returns from the combination of portfolios via the individual countries for the post crisis period Jan. 2010 – Dec. 2012 could be refer to as recovery period due to the impact of financial crisis of 2007-2009. The S&P 500 had expected returns of -0.09%. And, for the UK FTSE 100 could be identify with expected returns of -0.11%. Alternatively the CAC 40 indexes follows with -0.13% expected return and the DAX could be identified with the expected return of -0.09%. The IBEX 35 had the highest expected return of -0.16% and all these could be identify with negative returns from stocks which would be explained better in the chart 12 that follows.

More to the these points are the least variance which starts from this line chart above with -0.02% the United Kingdom FTSE 100 and the S&P 500 of United States had -0.02%. Equally, this is followed by the DAX indices with variances of 0.73%, and CAC 40 with 0.74% respectively. And the highest variances observed on IBEX 35 with variance 0.79%. These results from this observation one January 2010 – December 2012 indicated that there

was still evidence of financial crises which were not as volatile like the previous explained earlier. This result confirms that the international portfolio management shows that the recovery was already in place to put a check and balance to the activities of financial institutions in the financial markets.

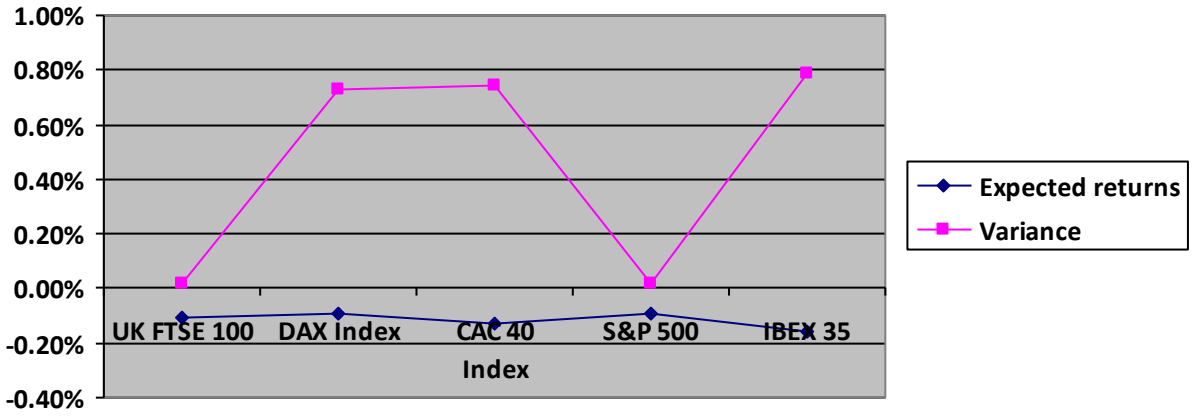

Chart 12 comparisons expected returns and variance on portfolio for the period Jan.2010-Dec.2012

Realistically, the information in the table above were use to project the outcomes result on from table 13b. This chart shows the pictorial comparison the same analysis as discussed in table 17. Practically, the variances affect every direction of trading activities after financial crisis in this period of recovery called post crisis period (Jan.2010 – Dec.2012). On the other hand these activities could also decrease the volatility of stocks during this period of post crisis because of the impacts of financial crisis that started in late 2007 which stated from USA via sub- prime mortgage via the greed and negligence of financial institutions. This had being mentioned earlier in other to buttress some evidences captured from the table above.

Alternatively, the meaning of this observation shows that the German's DAX index and S&P had the best negative expected returns compare to all other selected countries stocks whose were also negative in their expected returns in the portfolio from stocks.

Additionally, this same chart 8 after the financial crisis had some evidence that is during this period of recovery there had been increased via this expected returns from every selected stocks from all the countries represented in the line chart which were still negative but with a good sign of recovery from international portfolio management investment performance.

Covariance for all the periods

Further observation to the above, are the very significant from the outcome was the covariance from all the selected stocks (5 countries) for the whole periods from January 2004 – December 2012 could be seen in table 14 of observation with the average covariance was 0.002887 with pair wise 468 weekly activities. Also for the period before financial crisis 2007 (that is Jan. 2004-Dec. 2006) the average covariance was found in 5 selected countries on table15 was 0.000202 with pair wise 156 weekly activities. On the other hand for the period during financial crisis that is Jan. 2007- Dec. 2009 the average covariance was 0.001328 see table 16 from the observation with pair wise 156 weekly activities. And for the period after the financial crisis Jan.2010 – Dec. 2012, the average covariance was identified with 0.0006506 with also pair wise 156 weekly activities find in table 17.

Variance and Standard deviation for all the periods

For the result of variance and standard deviation for all the periods earlier mentioned above are explaining below:

Period Jan.2004-Dec.2012

To estimate or measure the risk in a portfolio the following result were obtained from previous chapter for this period. Inputting average variance and average covariance in equation 2 will approximately give 0.30% of risk for the portfolio of combination of selected five stocks for the period of Jan.2004 – Dec.2012. And the standard deviation of the variance portfolio is calculated as the square root of variance (risk) of portfolio and estimated to be 5.5%.

Period Jan.2004-Dec.2006

On the other hand, following the previous procedure mentioned above for this period Jan. 2004 – Dec. 2006 before crisis. The following result was obtained from previous chapter for this period approximately gives 0.021% of risk and the standard deviation1.5%.

Period Jan.2007-Dec.2009

Likewise to calculate for the period during financial crisis Jan. 2007 – Dec. 2009, the following result was obtained from previous chapter approximately gives 0.14% of risk and

the standard deviation0.04%. This result shows that there is high volatility during crisis due to observation and the comparison with period before crisis.

Period Jan.2010-Dec.2012

This period after financial crisis observed in Jan.2012 – Dec.2012 which still indicates that there is crisis but in economy in recovery state. For example the following result was obtained from previous chapter approximately gives 0.6% of risk and the standard deviation7.8%. There is less risk but still high to compare with during crisis.

The impacts of financial crisis could be observed fully between Jan. 2007- Dec.2009 due to high variance and less returns during this period. This has a greater impact on portfolio returns

5.3 Conclusion

In general, the financial crisis is like a weapon of mass destruction which reduces expected returns from a portfolio.

Return of financial repression is supported by Reinhart (2012) by said financial repression is well under way in the current post – crisis experience. The activities of the international portfolio management could enhance and increase returns from diversification from selected foreign stocks investment. However, the financial crisis cannot be easily eliminated via diversification because this is cause by systematic risk. No wonder why there are great increase in advance modern technology, integration in market (European Union) and also financial markets sector deregulations.

Therefore, Bhatti (2015) said it is suggested that benefits of diversification would increase when dividends are included in returns. For example Asian stock markets returns were found to be highly correlated and that is why managing portfolio in internationally could also reduce risk from selected potential asset selection. This is also supported by (Bailey and Stulz, 1990) explained that a high return through minimizing risk in general can be attained without stepping into brother diversification purpose. And greater diversification exists from potential market in other to minimise risks from international portfolio management to all investors.

Chapter six: Conclusion and recommendation

6.1 Summary of main findings

This is an unbiased conclusion based on empirical analysis presented with reasonable attempt to give a definite and concise summary of the whole chapter.

The summary of the finding from all observation are that there is high volatility during the peak of the financial crisis – from January 2007 to December 2009. This has impacted greatly on the attitude of investors to investment all over the world.

6.2 Conclusion

The main question for this research as mention was to examine that the impact of financial crisis on the international portfolio management and to give answers to this question of how far the global crisis impacted on international portfolio management based on reviewed literature and empirical analysis. The structure will be in three segments, the first will be the conclusion to this research work. And the other will include recommendation and lastly the future findings.

Firstly, since 1929, world economies have experienced various ups and downs, due to diverse forms of financial crises. The aftermath of the recent financial crisis which started in 2007 is still being felt in different countries even up until now, almost a decade later.

According to Olienyk, *et al* (2000) stated that as a result both institutional and individual investors worldwide are finding it increasingly attractive and convenient to engage in international portfolio diversification. In short adding foreign stocks to a domestic portfolio could give reward to volatility.

And the motivation behind this study is the observation that many firms continue to feel the pinch stemming from the 2007-2009 financial crisis even though more than six years have passed since the advent of the crisis. D. Prasad *et al* (2015). That is the impact of this recent financial crisis could increase globalisation and at the same time reducing international diversification.

Since some researchers failed to provide the missing links for example the economist of the two portfolios and crisis but I have attempted to provide this link in my research study. The

missing links are observed via the findings and was fully explained in the discussion for better understanding.

A review of some related studies revealed that shock could give negative effects on every countries nation balance sheets, such author (Chittedi 2014),Schwebach, R.G. *et al* (2002), Liu *et al (*2014*)* etc.

And most views from most writers were that the experience of high volatility from stock trading in the financial market could be causing high correlation between foreign stocks to investors in managing their portfolio. And the greater impacts to this research are the impact of financial crisis. Bahatti, (2015) said that due to imperfect correlation among international markets, it is possible that, risk that is systematic in one market might unsystematic in other economy or global market. This could be interpreted that international portfolio management can help in reducing portfolio risk.

The outcomes of this empirical analysis carried out on some selected indices for the three periods before crisis Jan.2004 – December 2006, during crisis Jan.2007- Dec.2008 and after crisis Jan.2010-Dec. 2012. For example high volatility was observed during the period of financial crisis compared to before the crisis. The result also shows high correlation between the countries of selected stocks in the financial market.

In spite of numerous measures taken by governments to stem the crisis and to support the recovery of their economies, many industrial firms are still falling short in returning to profitability according to D. Prasad *et al* (2015). And the international portfolio management can enhance the efficiency of returns from investment boosting the confidence of investors. Even though, the usual effect of good portfolio management have been affected by the financial crisis and turbulence in the market. The benefits of portfolio management cannot be eliminated completely.

Four lessons learnt are listed and summarised below:

(a) Prevention versus management. (Chittedi 2014) said, we have done better at the latter than the former. This understandable because of different kind of policies and laws to prevent fraud.
(b) Too much debts hanging. Too much debt is a burden to a nations or countries since the end of World War 11. For example external debt.

(c) How will debt be reduced? Although de Reduction in debt could start from restructuring and this could result in slow growth and could impact the GDP.

(d) Return of financial repression. This is supported by Reinhart (2012) by said financial repression is well under way in the current post – crisis experience. The argument here shows every repression via the negative real interest rates will definitely reduced which we can see it in USA and UK.

6.3 Recommendations

Although not many studies have being carried out in respect of financial crisis and international portfolio management. Similarly, since nobody can see financial crisis coming as some researches in this research have been reviewed especially in the area of stock market activities from five important countries such as UK for FTSE 100, DAX Index for Germany, CAC 40 for France, S&P 500 for US and IBEX 35 for Spain. The reason for this portfolio combination is for the benefit of UK and foreign investors or to plan and research very in order to have optimal and efficient portfolio with less risk. Also more research should focus on both domestic and foreign markets in the future.

I will therefore recommend that more research should be carried out in developed and, underdeveloped countries, domestic or foreign stocks which will include more assets activities and to be able to forecast the risks and returns on time. As evidenced in this research that there is relationship between risk and returns this is because the stock market is so integrated and on time information is valuable and important to both investment and investors. This could also add to the performance of a portfolio whether domestic or international.

On the other hand, the activities of this so called financial market should be monitored every second by government with strict laws and regulation. And further research should continually focus on the on management of both risks and returns in order to have a maximum returns with less risks because it is difficult to eliminate financial crisis completely. Considering the fact that, many studies have been carried out about the effect of global crisis on international portfolio management.

The focus of this research is mainly on five selected country stocks and how their portfolio is being managed especially during the period of financial crisis. It is therefore recommended that more research should be done on optimal and efficient portfolio management. Further research should be carried out on how to put together an efficient portfolio so it can achieve it maximum potential. More research should be carried out on the impact of global crisis on other underdeveloped countries.

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Appendix 1

Data from Bloomberg January 2004 –December 2012

Date	UKX	DAX Index	CAC Index	SPX Index	IBEX Index
09/01/2004	0.00483622	0.0237689	0.027134	0.016018	0.006902557
16/01/2004	-0.00603846	0.0097747	0.005872	0.001509	0.016943842
23/01/2004	-0.01571467	-0.0224552	-0.01487	-0.00913	-0.0227494
30/01/2004	0.00273305	-0.0033534	-0.00377	0.010282	0.011979975
06/02/2004	0.00211234	0.0029815	0.006792	0.002669	0.021769742
13/02/2004	0.02334542	0.0040177	0.023001	-0.00148	0.004658764
20/02/2004	-0.00504983	-0.0135490	-0.0021	0.000725	0.001408143
27/02/2004	0.01222118	0.0268730	0.009575	0.01042	0.011722065
05/03/2004	-0.01752765	-0.0510792	-0.02641	-0.03138	-0.03756245
12/03/2004	-0.01112504	-0.0245774	-0.01324	-0.00963	-0.01910963
19/03/2004	-0.01362700	0.0008326	-0.00578	-0.00155	0.00935386
26/03/2004	0.02480780	0.0484704	0.041065	0.030459	0.039847601
02/04/2004	0.00539681	0.0014797	5.35E-05	-0.00218	0.014559174
09/04/2004	0.01060204	0.0050953	0.003069	-0.00413	-0.00026221
16/04/2004	0.00719591	0.0172633	0.015951	0.005279	-0.00670013
23/04/2004	-0.01756037	-0.0288550	-0.03598	-0.0292	-0.02666923
30/04/2004	0.00193777	-0.0224756	-0.00574	-0.00777	-0.01017325
07/05/2004	-0.01258225	-0.0237548	-0.01366	-0.00273	-0.03080852
14/05/2004	-0.00234139	0.0075570	0.001043	-0.00195	0.003444863
21/05/2004	-0.00015796	0.0184976	0.012478	0.0248	0.018587075
28/05/2004	0.00534904	0.0151715	0.012826	0.001624	0.007432466
04/06/2004	0.00664511	0.0132839	0.000138	0.012445	0.006441385
11/06/2004	0.00486173	-0.0036791	0.011224	-0.00128	0.005817199
18/06/2004	-0.00259665	0.0033902	0.000396	-0.00052	0.001393479
25/06/2004	-0.01929196	-0.0036329	-0.01532	-0.00798	-0.01057817

02/07/2004	-0.00322185	-0.0185757	-0.0045	-0.01117	0.001605556
09/07/2004	-0.01229172	-0.0200179	-0.01583	-0.01026	-0.004548
16/07/2004	-0.00297290	-0.0126367	-0.01194	-0.01379	-0.02023493
23/07/2004	0.02006333	0.0258813	0.022373	0.014288	0.008982265
30/07/2004	-0.01704018	-0.0430921	-0.03248	-0.03426	-0.03009104
06/08/2004	-0.00839116	-0.0216619	-0.01241	0.00078	-0.01337065
13/08/2004	0.01573870	0.0179929	0.01526	0.031508	0.016995896
20/08/2004	0.02767097	0.0373241	0.031436	0.008577	0.022732286
27/08/2004	0.01351863	0.0041052	0.004576	0.00529	0.022683734
03/09/2004	-0.00127450	0.0049237	0.003183	0.00924	-0.00064507
10/09/2004	0.01012101	0.0262582	0.013218	0.00412	0.003649499
17/09/2004	-0.00280985	-0.0195007	-0.01415	-0.01634	-0.01226918
24/09/2004	0.01780214	0.0216505	0.015421	0.019268	0.029363519
01/10/2004	0.00843420	0.0051515	0.002067	-0.00827	0.012480841
08/10/2004	-0.01621656	-0.0232671	-0.01795	-0.01242	-0.00746107
15/10/2004	-0.00157916	0.0033222	0.00447	-0.01124	0.013472782
22/10/2004	0.00190666	0.0063810	0.005329	0.031449	0.005482299
29/10/2004	0.02499892	0.0260918	0.020009	0.031826	0.018091539
05/11/2004	0.01141398	0.0196305	0.014314	0.015435	-0.00240357
12/11/2004	-0.00690461	-0.0020418	-0.00947	-0.01168	0.008877193
19/11/2004	-0.00405394	0.0046869	-0.00436	0.010518	0.013134861
26/11/2004	0.00134978	0.0131431	0.000346	0.007204	0.005572592
03/12/2004	-0.01135239	-0.0081542	-0.00399	-0.00266	0.004472058
10/12/2004	0.00059651	0.0018493	-0.00624	0.005236	0.004395505
17/12/2004	0.02156788	0.0165819	0.020785	0.013323	0.02122716
24/12/2004	0.00337634	0.0010490	-0.00042	0.001479	0.002937863
31/12/2004	0.00826704	0.0141727	0.014865	-0.02123	-0.00437186
07/01/2005	-0.00686018	-0.0194699	-0.00602	-0.00141	-0.0017697
14/01/2005	-0.00363010	-0.0044089	-0.00011	-0.01406	-0.00284761
21/01/2005	0.00614161	-0.0028217	0.004193	0.002988	0.015556593
28/01/2005	0.02249214	0.0327169	0.022649	0.027037	0.030975775
04/02/2005	0.02078316	0.0111816	0.014841	0.001887	0.017596179

11/02/2005	0.00257722	-0.0064565	0.003055	-0.00308	-0.00189815
18/02/2005	-0.00996599	-0.0024842	0.001378	0.008139	-0.01362577
25/02/2005	0.00589199	0.0172192	0.01413	0.008874	0.010413467
04/03/2005	-0.01078172	-0.0142488	-0.01036	-0.01803	-0.02178654
11/03/2005	-0.01178242	-0.0076390	0.000393	-0.00869	-0.00710596
18/03/2005	-0.00016249	0.0037946	0.006799	-0.01532	0.004900744
25/03/2005	-0.00172676	0.0068906	0.000434	0.00128	-0.00212691
01/04/2005	0.01416361	0.0062078	0.010836	0.007059	0.010366543
08/04/2005	-0.01846055	-0.0200946	-0.02231	-0.03266	-0.02456903
15/04/2005	-0.00864748	-0.0206876	-0.01292	0.008314	-0.00642258
22/04/2005	-0.00981585	-0.0090456	-0.0172	0.004105	-0.01042171
29/04/2005	0.02440802	0.0301612	0.031124	0.012534	0.029050391
06/05/2005	-0.00658684	-0.0082022	-0.00386	-0.01477	-0.00438298
13/05/2005	0.01745626	0.0198751	0.019485	0.030527	0.015830848
20/05/2005	0.00291645	0.0192699	0.008703	0.007988	0.001387629
27/05/2005	0.00262720	0.0147771	0.007416	-0.0023	0.012386079
03/06/2005	0.00620074	0.0167857	0.005196	0.001747	0.006717416
10/06/2005	0.00938295	0.0040274	0.008798	0.015733	0.012634001
17/06/2005	0.00027572	-0.0082722	-0.00498	-0.02086	-0.00050608
24/06/2005	0.01614491	0.0110786	0.016608	0.002409	0.015675698
01/07/2005	0.01379578	-0.0041368	0.007188	0.014584	-0.00365242
08/07/2005	-0.00026757	0.0249958	0.017082	0.013252	0.015378017
15/07/2005	0.00210293	0.0263108	0.009546	0.004691	0.007542388
22/07/2005	0.00772635	0.0102545	0.008203	0.000405	0.009661836
29/07/2005	0.00613369	-0.0121396	-0.00675	-0.00629	-0.00693978
05/08/2005	0.00585169	0.0228187	0.012389	0.003237	0.014115914
12/08/2005	-0.00621048	-0.0015028	0.002551	-0.00868	-0.00533022
19/08/2005	-0.01590558	-0.0296375	-0.03235	-0.01198	-0.02251083
26/08/2005	0.01887875	0.0112902	0.014334	0.010721	0.024250868
02/09/2005	0.00610122	0.0347513	0.019689	0.019261	0.033671759
09/09/2005	0.00906835	-0.0038814	0.003965	-0.00288	0.004338871

16/09/2005	0.00105401	-0.0208403	-0.00716	-0.01827	0.00940933
23/09/2005	0.01184055	0.0330850	0.027432	0.011125	0.017185266
30/09/2005	-0.02106724	-0.0072064	-0.01548	-0.02678	-0.0075366
07/10/2005	-0.01628033	-0.0064320	-0.0103	-0.0078	-0.00960643
14/10/2005	-0.02519431	-0.0275667	-0.02579	-0.00588	-0.02450773
21/10/2005	0.01386593	-0.0026372	-0.00912	0.015955	-0.00282579
28/10/2005	0.04031918	0.0351456	0.039751	0.018132	0.007040959
04/11/2005	0.00765174	0.0191202	0.0084	0.011949	0.009411945
11/11/2005	0.00618470	0.0064332	0.004351	0.010974	0.001598432
18/11/2005	0.00452818	0.0138128	0.009712	0.016006	0.012273086
25/11/2005	0.00077845	0.0218934	0.013481	-0.0025	-0.00060997
02/12/2005	-0.00193557	-0.0048719	-0.00032	-0.00451	-0.01507071
09/12/2005	0.00257368	0.0135419	0.009311	0.006313	0.006292126
16/12/2005	0.01153373	0.0122141	0.011336	0.001057	0.015973018
23/12/2005	0.00418201	-0.0019911	-0.00893	-0.01606	0.000932497
30/12/2005	0.02011106	0.0236786	0.032219	0.029769	0.016741352
06/01/2006	-0.00362888	-0.0096147	-0.00341	0.00168	-0.00576345
13/01/2006	-0.00675889	-0.0244515	-0.01588	-0.02029	-0.01011916
20/01/2006	0.02016783	0.0557859	0.038362	0.017622	0.026282714
27/01/2006	-0.00475219	0.0017176	-0.00384	-0.01534	0.01384353
03/02/2006	0.00083343	0.0078397	-0.00542	0.002342	0.012240734
10/02/2006	0.01424333	0.0164887	0.01816	0.015983	0.015796545
17/02/2006	0.00244603	0.0129946	0.01479	0.001701	0.025723808
24/02/2006	-0.00030714	-0.0254361	-0.01671	-0.00171	-0.00264701
03/03/2006	0.00839777	0.0145872	0.016059	-0.00439	0.001369548
10/03/2006	0.01548774	0.0133439	0.014166	0.02003	0.008588321
17/03/2006	0.00615062	0.0154291	0.0151	-0.00329	0.006864372
24/03/2006	-0.01187814	-0.0005123	0.00041	-0.00623	-0.00837349
31/03/2006	0.01031083	-0.0028743	-0.00879	0.000517	-0.00317184
07/04/2006	0.00054762	-0.0057703	-0.01398	-0.00492	-0.01754297
14/04/2006	0.01713272	0.0297673	0.02935	0.01719	0.026220132
21/04/2006	-0.01787141	-0.0139235	-0.01218	-0.00051	-0.00178784

28/04/2006	0.01138948	0.0172050	0.018888	0.01156	0.01193189
05/05/2006	-0.02948274	-0.0322265	-0.02572	-0.02604	-0.02693944
12/05/2006	-0.04308114	-0.0412421	-0.03997	-0.01875	-0.03752284
19/05/2006	0.02361509	0.0204644	0.020329	0.010363	0.012776378
26/05/2006	-0.00455880	-0.0175041	-0.01693	0.006296	-0.00473946
02/06/2006	-0.01897790	-0.0392049	-0.03862	-0.02788	-0.02310597
09/06/2006	-0.01022068	-0.0161180	-0.01537	-0.00061	-0.01220018
16/06/2006	0.01691857	0.0285956	0.026143	-0.00563	0.028405152
23/06/2006	0.02482388	0.0277716	0.030789	0.020651	0.024294407
30/06/2006	0.00951418	-0.0002569	-0.00247	-0.00372	0.006806314
07/07/2006	-0.03078673	-0.0456946	-0.03491	-0.02314	-0.03324245
14/07/2006	0.00211998	0.0053096	0.007898	0.003309	0.008336151
21/07/2006	0.04461772	0.0466721	0.043573	0.030848	0.048835794
28/07/2006	-0.01430986	0.0030865	0.002474	0.000634	0.003928529
04/08/2006	-0.01176690	-0.0165402	-0.011	-0.00986	-0.01313882
11/08/2006	0.01431247	0.0335177	0.030121	0.028072	0.024666095
18/08/2006	-0.00420097	-0.0009541	-0.00478	-0.00554	-0.00206334
25/08/2006	0.01199265	0.0111968	0.01415	0.012293	0.012463775
01/09/2006	-0.01173287	-0.0138313	-0.0212	-0.00922	-0.00912819
08/09/2006	-0.00039120	0.0246080	0.014055	0.016129	0.016280821
15/09/2006	-0.00930747	-0.0091868	-0.00057	-0.00386	0.00904841
22/09/2006	0.02378785	0.0205683	0.021015	0.016025	0.044005004
29/09/2006	0.00677761	0.0135719	0.006105	0.010278	0.016807502
06/10/2006	0.02601146	0.0144368	0.013474	0.011885	0.022992526
13/10/2006	-0.00034106	0.0047200	0.004132	0.002182	0.007692594
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27/10/2006	-0.00207762	-0.0034155	-0.01107	-0.00947	0.005019744
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10/11/2006	-0.00264158	0.0085863	-0.00143	0.014701	0.011969377
17/11/2006	-0.01128876	-0.0000624	-0.00924	-0.00018	-0.00577982
24/11/2006	-	-	-0.02512	-0.00303	-0.03034476

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08/12/2006	0.01748911	0.0251143	0.029245	0.012235	0.022093403
15/12/2006	-0.01118211	-0.0130069	-0.01582	-0.01144	-0.02234563
22/12/2006	0.00497577	0.0144223	0.016102	0.005345	0.00571587
29/12/2006	-0.00011253	-0.0005806	-0.0044	-0.00606	0.011182978
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12/01/2007	-0.00028851	0.0062638	-0.00052	-0.00016	0.002067065
19/01/2007	-0.00147502	-0.0084228	-0.00577	-0.00582	0.001215455
26/01/2007	0.01331085	0.0292093	0.017018	0.018429	0.014970101
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09/02/2007	0.00574983	0.0066502	0.003714	0.012155	-0.00163356
16/02/2007	-0.00280396	0.0051042	0.000488	-0.00299	-0.00566284
23/02/2007	-0.04456768	-0.0556676	-0.05103	-0.04412	-0.0545063
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16/03/2007	0.03405866	0.0485101	0.046931	0.035445	0.040658492
23/03/2007	-0.00495315	0.0026047	-0.0001	-0.01062	0.006599889
30/03/2007	0.01415663	0.0264391	0.01903	0.016117	0.02275692
06/04/2007	0.01017617	0.0157974	0.008353	0.006296	-0.00064107
13/04/2007	0.00377569	0.0180905	0.025834	0.021682	0.007724536
20/04/2007	-0.01049824	0.0048457	-0.00137	0.006548	-0.04491111
27/04/2007	0.02882204	0.0187907	0.023279	0.007731	0.01504485
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11/05/2007	0.01145346	0.0171405	0.008348	0.011223	0.022536186
18/05/2007	-0.01060097	0.0173065	-0.00715	-0.00461	-0.00100873
25/05/2007	0.01616315	0.0321286	0.018268	0.013597	0.029781043
01/06/2007	-0.02570132	-0.0497443	-0.04618	-0.01866	-0.04418927
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15/06/2007	-0.02450835	-0.0100876	-0.01344	-0.0198	-0.03063185
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17/08/2007	0.02570826	0.0174810	0.03836	0.02312	0.00680597
24/08/2007	0.01337599	0.0174364	0.016756	-0.00364	0.010143431
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07/09/2007	0.01584507	0.0082174	0.02004	0.021121	-0.0008938
14/09/2007	0.02661663	0.0395706	0.029199	0.02796	0.042536614
21/09/2007	0.00156427	0.0086061	0.002638	0.000655	0.008712441
28/09/2007	0.01994804	0.0178935	0.022316	0.0202	0.021651288
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12/10/2007	-0.03013060	-0.0195417	-0.01771	-0.03917	0.017586968
19/10/2007	0.02043536	0.0082508	0.009475	0.02309	0.004777942
26/10/2007	-0.01962079	-0.0125397	-0.01285	-0.01669	0.014086222
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09/11/2007	-0.00217291	-0.0256182	-1E-04	0.003467	0.002402868
16/11/2007	-0.00462551	-0.0004335	-0.00045	-0.01237	-0.02389498
23/11/2007	0.02721132	0.0343753	0.027059	0.02807	0.023888723
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07/12/2007	-0.02408885	-0.0057180	-0.01983	-0.0244	-0.01541758
14/12/2007	0.00579959	0.0068329	-0.00046	0.011247	-0.01838762
21/12/2007	0.00665206	0.0080786	0.004369	-0.00402	-0.00699836
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22/02/2008	-0.00071325	-0.0085450	-0.00702	-0.01661	0.011745727
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07/03/2008	-0.01196512	-0.0095318	-0.0058	-0.00404	0.026009944
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21/03/2008	0.03597685	0.0379605	0.035776	-0.01075	0.036886194
28/03/2008	0.04465211	0.0310203	0.043646	0.041955	0.030054157
04/04/2008	-0.00867650	-0.0236302	-0.02101	-0.02742	-0.04102872
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09/05/2008	0.01605235	0.0219015	0.023683	0.026702	0.012886247
16/05/2008	-0.03442095	-0.0296931	-0.02841	-0.03467	-0.03874037
23/05/2008	-0.00555254	0.0219958	0.016318	0.01777	0.001716062
30/05/2008	-0.02423391	-0.0412835	-0.04367	-0.02835	-0.05081281
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23/01/2009	0.02397797	0.0381460	0.043796	-0.0073	0.033966327
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22/05/2009	0.01206105	0.0044869	0.01539	0.036234	0.012429366
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16/10/2009	0.01008239	-0.0005467	-0.00506	-0.00743	0.005429756
23/10/2009	-0.03777155	-0.0566683	-0.05266	-0.04021	-0.02768361
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29/01/2010	-0.02459275	-0.0311030	-0.04699	-0.00715	-0.07713036
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26/02/2010	0.04580056	0.0498173	0.054363	0.030974	0.066404738
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26/03/2010	0.00734172	0.0188740	0.011356	0.009866	-0.00028904
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16/04/2010	-0.00353589	0.0127214	-0.00886	0.021097	-0.0303294
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07/05/2010	0.02729445	0.0597751	0.049452	0.022325	0.029692354
14/05/2010	-0.03798702	-0.0375550	-0.03641	-0.04226	0.009941276
21/05/2010	0.02478802	0.0200592	0.024578	0.001581	0.001934668
28/05/2010	-0.01203254	-0.0012277	-0.01691	-0.02252	-0.05327038
04/06/2010	0.00735076	0.0183452	0.028912	0.025092	0.071531031
11/06/2010	0.01687943	0.0279687	0.037038	0.023736	0.042889863
18/06/2010	-0.03892139	-0.0235452	-0.04542	-0.03646	-0.04380353
25/06/2010	-0.04129223	-0.0389500	-0.04869	-0.05032	-0.02980598

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23/07/2010	-0.01027741	-0.0029791	0.010005	-0.00096	0.010742958
30/07/2010	0.01414411	0.0181621	0.020013	0.018192	0.014409798
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13/08/2010	-0.01519494	-0.0172247	-0.02348	-0.007	-0.01766286
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27/08/2010	0.04356193	0.0308259	0.046974	0.037498	0.044461087
03/09/2010	0.01353868	0.0130652	0.014602	0.004563	0.008509916
10/09/2010	0.00123781	-0.0008061	-0.00102	0.014456	-0.00944844
17/09/2010	0.01634398	0.0142582	0.016244	0.020505	0.013127326
24/09/2010	-0.00099670	-0.0138069	-0.0239	-0.00212	-0.02586785
01/10/2010	0.01157003	0.0129328	0.019255	0.016497	0.025904058
08/10/2010	0.00808822	0.0318882	0.017057	0.009475	0.013748974
15/10/2010	0.00666273	0.0174884	0.010757	0.005858	0.005207854
22/10/2010	-0.01153209	-0.0006767	-0.00906	0.000152	-0.01024275
29/10/2010	0.03527478	0.0231513	0.021711	0.035994	-0.03558712
05/11/2010	-0.01335750	-0.0029004	-0.02186	-0.02173	-0.01930361
12/11/2010	-0.01104734	0.0161761	0.00758	0.000434	0.004390425
19/11/2010	-0.01118645	0.0007934	-0.03407	-0.00861	-0.0705336
26/11/2010	0.01351633	0.0144167	0.005873	0.029687	0.048977711
03/12/2010	0.01177132	0.0084128	0.028476	0.012811	0.010694173
10/12/2010	0.01011535	-0.0033856	0.002592	0.00283	-0.02211047
17/12/2010	0.02336101	0.0107756	0.008543	0.010338	0.021094958
24/12/2010	-0.01813637	-0.0203324	-0.02451	0.000692	-0.0245179
31/12/2010	0.01430354	0.0048668	0.01598	0.011021	-0.03026645
07/01/2011	0.00296441	0.0184028	0.030448	0.017098	0.086227996
14/01/2011	-0.01763058	-0.0018768	0.008578	-0.00765	0.04275356
21/01/2011	-0.00252364	0.0057176	-0.00377	-0.00546	-0.00758142
28/01/2011	0.01972500	0.0159669	0.011216	0.027054	0.010021401
04/02/2011	0.01092477	0.0214780	0.013367	0.013945	-0.00470764

11/02/2011	0.00331360	0.0075442	0.013613	0.010428	0.02448258
18/02/2011	-0.01344569	-0.0325362	-0.02087	-0.01722	-0.02217183
25/02/2011	-0.00180131	-0.0008726	-0.01233	0.000962	-0.02993708
04/03/2011	-0.02699657	-0.0274986	-0.02277	-0.01277	-0.00955356
11/03/2011	-0.01896488	-0.0454187	-0.03015	-0.01923	-0.0067318
18/03/2011	0.03193876	0.0423084	0.042559	0.027048	0.036985399
25/03/2011	0.01849931	0.0336075	0.020738	0.014165	0.00182066
01/04/2011	0.00762573	0.0051826	0.001763	-0.00318	0.017083104
08/04/2011	-0.00986500	-0.0053665	-0.02152	-0.00639	-0.03249276
15/04/2011	0.00371747	0.0163270	0.011926	0.013412	0.002415093
22/04/2011	0.00857385	0.0300144	0.021144	0.019613	0.0278531
29/04/2011	-0.01534292	-0.0029556	-0.01191	-0.01717	-0.02467161
06/05/2011	-0.00851631	-0.0118709	-0.00965	-0.00181	-0.02393855
13/05/2011	0.00381716	-0.0184363	-0.00697	-0.00336	-0.01254285
20/05/2011	-0.00161722	-0.0142222	-0.00999	-0.00163	0.003383334
27/05/2011	-0.01412053	-0.0075997	-0.01526	-0.02324	0.002387635
03/06/2011	-0.01523652	-0.0055043	-0.022	-0.02244	-0.03255977
10/06/2011	-0.00882098	0.0133170	0.004901	0.000409	0.018531173
17/06/2011	-0.00301315	-0.0059561	-0.01018	-0.0024	-0.0318198
24/06/2011	0.05125559	0.0418542	0.058801	0.056147	0.069226614
01/07/2011	0.00013690	-0.0022522	-0.02341	0.003083	-0.05278307
08/07/2011	-0.02452517	-0.0246679	-0.04777	-0.02058	-0.04568232
15/07/2011	0.01563404	0.0147186	0.031157	0.021943	0.060637692
22/07/2011	-0.02019033	-0.0228789	-0.04461	-0.03921	-0.04260734
29/07/2011	-0.09770962	-0.1288783	-0.10697	-0.07189	-0.09962931
05/08/2011	0.01392036	-0.0382319	-0.01973	-0.01715	-0.00275625
12/08/2011	-0.05249406	-0.0863225	-0.06126	-0.04689	-0.05844599
19/08/2011	0.01768781	0.0104891	0.023417	0.047413	0.005355015
26/08/2011	0.03160088	0.0001535	0.019721	-0.0024	0.033962495

02/09/2011	-0.01462199	-0.0629070	-0.05524	-0.01681	-0.06537484
09/09/2011	0.02948616	0.0739085	0.018991	0.053525	0.060453592
16/09/2011	-0.05618051	-0.0676324	-0.0729	-0.06544	-0.04667159
23/09/2011	0.01217137	0.0587812	0.061154	-0.00441	0.068739136
30/09/2011	0.03410757	0.0315666	0.038096	0.021248	0.029462008
07/10/2011	0.03072746	0.0513593	0.039518	0.05982	0.02012866
14/10/2011	0.00407767	0.0006301	-0.01447	0.011163	-0.01364826
21/10/2011	0.03891485	0.0628425	0.055904	0.037828	0.041951881
28/10/2011	-0.03070372	-0.0598832	-0.06722	-0.02479	-0.06808031
04/11/2011	0.00329645	0.0152309	0.008269	0.008474	-0.00468801
11/11/2011	-0.03289946	-0.0423954	-0.04838	-0.03814	-0.02875142
18/11/2011	-0.03697412	-0.0529926	-0.04673	-0.04687	-0.06577538
25/11/2011	0.07505639	0.1070133	0.1078	0.073886	0.102415148
02/12/2011	-0.00415684	-0.0154539	0.002338	0.008768	0.010644264
09/12/2011	-0.02565828	-0.0475938	-0.06306	-0.02831	-0.05159717
16/12/2011	0.02326937	0.0310692	0.043667	0.037445	0.041360899
23/12/2011	0.01080777	0.0033033	0.018607	-0.00611	0.002762593
30/12/2011	0.01389018	0.0270533	-0.0071	0.01607	-0.03235936
06/01/2012	-0.00230810	0.0140576	0.018847	0.008828	0.019483418
13/01/2012	0.01630581	0.0425373	0.039109	0.020394	0.013170662
20/01/2012	0.00085536	0.0167994	-0.00082	0.000722	0.011142387
27/01/2012	0.02923545	0.0391110	0.032892	0.021704	0.023552378
03/02/2012	-0.00824935	-0.0108931	-0.01598	-0.00168	-0.00723378
10/02/2012	0.00900145	0.0231691	0.019709	0.013846	-0.0159257
17/02/2012	0.00509054	0.0023948	0.007969	0.003313	-0.01493589
24/02/2012	-0.00404372	0.0082949	0.009847	0.002848	0.004186357
02/03/2012	-0.00399924	-0.0059468	-0.00391	0.000905	-0.03277904
09/03/2012	0.01326372	0.0403491	0.030782	0.024291	0.024581356
16/03/2012	-0.01855478	-0.0226605	-0.03301	-0.00503	-0.02409766
23/03/2012	-0.01476373	-0.0069744	-0.01507	0.008131	-0.03306045
30/03/2012	-0.00776292	-0.0246976	-0.03038	-0.00738	-0.04339411
06/04/2012	-0.01255838	-0.0282439	-0.03938	-0.0199	-0.05350826

13/04/2012	0.02129591	0.0252464	-0.00016	0.006035	-0.02896312
20/04/2012	0.00085930	0.0075851	0.024365	0.018012	0.014941908
27/04/2012	-0.02112648	-0.0352652	-0.03193	-0.02441	-0.03775644
04/05/2012	-0.01406528	0.0028134	-0.01018	-0.01147	0.017393834
11/05/2012	-0.05522355	-0.0469169	-0.03891	-0.04298	-0.06130997
18/05/2012	0.01592940	0.0109580	0.013278	0.017449	-0.00360912
25/05/2012	-0.01706802	-0.0456866	-0.03198	-0.03019	-0.07305517
01/06/2012	0.03324785	0.0133101	0.034306	0.03726	0.080296785
08/06/2012	0.00804588	0.0160810	0.011774	0.01296	0.0254884
15/06/2012	0.00636635	0.0054323	0.001062	-0.00582	0.023411222
22/06/2012	0.01042133	0.0244330	0.034213	0.020329	0.03285197
29/06/2012	0.01642031	-0.0009616	-0.00872	-0.00549	-0.05115316
06/07/2012	0.00061809	0.0229310	0.003793	0.00155	-0.01102554
13/07/2012	-0.00253436	0.0111208	0.004112	0.004334	-0.06276446
20/07/2012	-0.00434554	0.0089562	0.02702	0.017106	0.05944319
27/07/2012	0.02844571	0.0263491	0.028657	0.003622	0.020868593
03/08/2012	0.01033819	0.0114920	0.018206	0.010697	0.04322276
10/08/2012	0.00090814	0.0138698	0.015357	0.008742	0.072832272
17/08/2012	-0.01295532	-0.0099150	-0.01582	-0.00496	-0.03315699
24/08/2012	-0.01127307	-0.0000402	-0.00587	-0.00322	0.015074621
31/08/2012	0.01458816	0.0349616	0.031051	0.022281	0.062300384
07/09/2012	0.02083765	0.0273934	0.017769	0.019368	0.034467448
14/09/2012	-0.01063806	0.0053278	-0.0142	-0.00383	0.009344534
21/09/2012	-0.01888898	-0.0315998	-0.04982	-0.01334	-0.06344539
28/09/2012	0.02245706	0.0251824	0.03047	0.014063	0.031899851
05/10/2012	-0.01323450	-0.0223551	-0.01966	-0.02214	-0.03796641
12/10/2012	0.01774975	0.0204840	0.034074	0.00322	0.034106947
19/10/2012	-0.01516922	-0.0201595	-0.01982	-0.01483	-0.0174135
26/10/2012	0.01064975	0.0182526	0.016701	0.001601	0.024859818
02/11/2012	-0.01684743	-0.0272072	-0.01973	-0.02429	-0.04169961
09/11/2012	-0.02844005	-0.0297299	-0.02397	-0.01447	-0.0063379
16/11/2012	0.03809590	0.0515932	0.056046	0.036231	0.042355236

23/11/2012	0.00819365	0.0131849	0.008071	0.004989	0.003160716
30/11/2012	0.00811002	0.0151644	0.013586	0.001335	-0.01085121
07/12/2012	0.00124442	0.0104645	0.010448	-0.00317	0.022373702
14/12/2012	0.00307848	0.0052340	0.004974	0.011722	0.033262297
21/12/2012	-0.00246128	-0.0031220	-0.01124	-0.01938	-0.01929803

Jan.2004-Dec.2014					
	UKX Index	**DAX Index**	**CAC Index**	**SPX Index**	**Ibex Index**
Mean Returns	-0.00067	-0.00158	-0.00031	-0.00111	-0.0005
Standard Deviation	0.025115	0.030698	0.02998	0.024715	0.032741
Variance	0.000631	0.000942	0.000899	0.000611	0.001072

	Pre-Crisis 2004-2006				
	UKX Index	DAX Index	CAC Index	SPX Index	IBEX Index
Mean Returns	0.002218318	-1.003177527	-0.00277095	-0.00158	-0.00375154
std	0.013681292	0.019457126	0.016665439	0.013894	0.01605304
Variance	0.000187178	0.00037858	0.000277737	0.000193	0.0002577

	During the Crisis 2007-2009				
	UKX Index	DAX Index	CAC Index	SPX Index	IBEX Index
Mean Returns	0.000394434	-1.000224751	0.001799301	0.0005752	0.00172762
std	0.033682867	0.038570992	0.038903012	0.0336835	0.03996271
Variance	0.001134536	0.001487721	0.001513444	0.0011346	0.00159702

	Post-Crisis 2011-2014				
	UKX Index	DAX Index	CAC Index	SPX Index	IBEX Index
Mean Returns	0.000476585	-0.996928797	-0.00058361	-0.002439	-0.00029445
std	0.033587729	0.074255374	0.027308247	0.0199624	0.03393429
Variance	0.000203539	0.005513861	0.00074574	0.0003985	0.00115154

Covariances	2004-2012	**100%**
Cov(UKX, DAX)	0.002879	0.287853
Cov(UKX, CAC)	0.002886	0.288615
Cov(UKX, SPX)	0.002723	0.272315
Cov(UKX, IBEX)	0.002825	0.282486
Cov(DAX, CAC)	0.003057	0.305687
Cov(DAX, SPX)	0.002849	0.284908
Cov(DAX, IBEX)	0.003005	0.300453
Cov(CAC, SPX)	0.002827	0.282725
Cov(CAC, IBEX)	0.003031	0.303098
Cov(SPX, IBEX)	0.002794	0.27935
Average cov	0.002887	0.288749

Pre cricis Covariances	2004-2006	**100%**
Cov(UKX, DAX)	0.000212	0.021161
Cov(UKX, CAC)	0.000197	0.019667
Cov(UKX, SPX)	0.000131	0.013128
Cov(UKX, IBEX)	0.000171	0.017137
Cov(DAX, CAC)	0.000299	0.029936
Cov(DAX, SPX)	0.000202	0.020174
Cov(DAX, IBEX)	0.00026	0.026032
Cov(CAC, SPX)	0.00017	0.017033
Cov(CAC, IBEX)	0.000221	0.022136
Cov(SPX, IBEX)	0.000155	0.015515
Average cov	0.000202	0.020192

During crisis Covariances	2007-2009	**100%**
Cov(UKX, DAX)	0.001393	0.139295
Cov(UKX, CAC)	0.001384	0.138365
Cov(UKX, SPX)	0.001142	0.114225
Cov(UKX, IBEX)	0.00123	0.123015
Cov(DAX, CAC)	0.001571	0.157085
Cov(DAX, SPX)	0.001318	0.131752
Cov(DAX, IBEX)	0.001449	0.144946
Cov(CAC, SPX)	0.001249	0.124948
Cov(CAC, IBEX)	0.001396	0.139599
Cov(SPX, IBEX)	0.001143	0.114284
Average COV	0.001328	0.132751

After cricis Covariances	2010-2012	**100%**
Cov(UKX, DAX)	0.006974	0.697418
Cov(UKX, CAC)	0.001384	0.138365
Cov(UKX, SPX)	0.006845	0.684484
Cov(UKX, IBEX)	0.006998	0.69983
Cov(DAX, CAC)	0.007237	0.723739
Cov(DAX, SPX)	0.006977	0.697727
Cov(DAX, IBEX)	0.00723	0.722968
Cov(CAC, SPX)	0.007006	0.700607
Cov(CAC, IBEX)	0.007391	0.739133
Cov(SPX, IBEX)	0.007018	0.701756
Average COV	0.006506	0.650603

Appendix 2

(A)

Covariance Analysis: Ordinary
Date: 01/09/15 Time: 18:07
Sample: 9/01/2004 21/12/2012
Included observations: 468

Correlation	CAC	DAX	IBEX	SPX	UKX
CAC	1				
DAX	0.935487	1			
IBEX	0.87003	0.824028	1		
SPX	0.858078	0.8629	0.76235	1	
UKX	0.928185	0.896052	0.796305	0.866009	1

(b)

Covariance Analysis: Ordinary
Date: 01/09/15 Time: 18:41
Sample (adjusted): 9/01/2004 29/12/2006
Included observations: 156 after adjustments

Correlation	CAC	DAX	IBEX	SPX	UKX
CAC	1				
DAX	0.9273	1			
IBEX	0.82984	0.836308	1		
SPX	0.73964	0.750737	0.698717	1	
UKX	0.867045	0.799456	0.783565	0.695258	1

(c)

Covariance Analysis: Ordinary
Date: 01/09/15 Time: 18:49
Sample (adjusted): 5/01/2007 25/12/2009
Included observations: 156 after adjustments

Correlation	CAC	DAX	IBEX	SPX	UKX
CAC	1				
DAX	0.949579	1			
IBEX	0.902612	0.902447	1		
SPX	0.874457	0.887894	0.823786	1	
UKX	0.957458	0.928163	0.876735	0.881176	1

(d)

Covariance Analysis: Ordinary
Date: 01/09/15 Time: 18:52
Sample (adjusted): 1/01/2010 21/12/2012
Included observations: 156 after adjustments

Correlation	CAC	DAX	IBEX	SPX	UKX
CAC	1				
DAX	0.919871	1			
IBEX	0.853522	0.749878	1		
SPX	0.874235	0.859729	0.733914	1	
UKX	0.904043	0.873398	0.727828	0.889019	1