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To Assess the Diversification Performance of Emerging Market Equity Portfolios

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Abstract

Portfolio diversification in respect of emerging equity markets is of major interest to academia and professionals alike. Central to this portfolio diversification interest is the choice between the different emerging markets as well as the respective weights of the constituents of the portfolio. In particular, this study focused on South Africa as the preferred emerging equity market source of investment diversification.

The estimated and implied returns of the individual indices were computed from monthly index prices in order to obtain optimal portfolio returns. By maximising the Sharpe ratio of a portfolio through different weights of the individual indices, a portfolio optimisation tool was used to obtain the optimal portfolio and the diversification benefits throughout the studied period.

The findings were that emerging equity markets provide significant diversification benefits and that Morocco and Jordan are the most dominant emerging equity markets. Additionally, although the South African market index does provide diversification benefits, it does not feature in the optimal portfolio and it is not the most ideal emerging equity market for diversification purposes. Moreover, the diversification benefits differ depending on the weights of the developed and emerging equity markets within the portfolio and throughout the studied period.

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I, Trevor Thabang Mokoena, declare that this research project is my own work. It is submitted in partial fulfillment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

_____ _____

Signature Date

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I would like to thank Max Mackenzie for the guidance and leadership he has provided me during the preparation of this research report.

To my dearest and lovely wife, Khuthi Mokoena, for your understanding, sacrifice and love you bring into my life.

To my wonderful family, for all the love and the support you gave me during my studies, I thank you.

Dedication

I dedicate this work to the memory of my late mother, Modiehi Mokoena, for the quest of knowledge you instilled in me from a young age and for still being the source of my inspiration.

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1 Introduction

Diversification is a major risk reduction tool in financial markets that investors make use of when allocating scarce capital. As a means to maximise this asset base through growth or returns, investors have the option to construct portfolios based on assets located in different geographical locations. Central to the construction of these portfolios is the selection of the portfolio constituents based on the risk the investor is willing to take for a particular amount of expected return.

The liberalisation and deregulation of the emerging equity markets as a result of globalisation brings with it complexity as well as opportunity as a diversification strategy for investors. The view held by policymakers in emerging economies regarding the increased volatility of emerging equity markets after deregulation was pointed out in the study by Hargis (2002), suggesting that less volatility in returns reduced the inherent risks associated with emerging market economies.

The composition of equity portfolios, as well as the performance thereof, is largely determined by whether investments are made locally or internationally and whether emerging equity markets are considered or not. Additionally, different emerging equity markets bring with them different attributes as well as risks and returns. The fundamental consideration for international emerging market diversification is

which emerging equity markets should be included in the investment portfolio and how much weight should the emerging equity market have in the portfolio.

This study serves to assess the different investment performances of portfolios that have emerging equity markets. Central to this, the performance of portfolios which have the South African equity market is studied in relation to other emerging equity markets as well as the developed equity markets of the United States of America (USA) and the United Kingdom (UK).

1.1 Purpose of the Study

The objective of this paper is two-fold. Firstly, this research study serves to obtain the optimal portfolio made up of equity indices, which include the South African market index. Secondly, the study serves the purpose of establishing how different emerging equity market portfolios perform when the South African equity market is included in the compositions compared to when the South African equity index is included in portfolios which include the developed equity markets of the United Kingdom (UK) and the United States of America (USA) equity indices. This in turn also shows whether the South African equity market is a suitable investment destination for the purposes of diversification.

Literature gathered around the benefits of portfolio diversification indicate that the appropriate levels required for specific performance measures suggests that under diversification and poor performance are portfolio management issues that need to be addressed (Cathcart, Phillips and Teale; 2007). Neaime (2006) states that the integration of the world equity markets has provided investors with new opportunities to optimise portfolios by including the emerging equity markets' volatile characteristics relative to the world equity markets.

According to Samouilhan and Shannon (2008), most studies on volatilities of the financial markets uses data from the USA, UK and Japanese markets. This study adds to the few available studies that provide deeper understanding of volatility in returns on additional, novel equity markets such as South Africa.

This study was performed specifically on South Africa as an emerging equity market and has set out to ascertain the emerging equity market optimal portfolio during the 13 year period, 31 December 1994 through to 31 December 2007. The composition of this optimal portfolio considered the equity index diversification within 25 emerging equity markets and the returns achieved when different portfolio constituents were used. The two developed equity markets serve as a benchmark with which the performance of the emerging equity markets was compared in terms of returns and volatility.

1.2 Problem Motivating the Study

Investors, business persons and governments are increasingly interested in the potential that emerging markets have recently been showing. According to Khamfula (2005), the world capitalisation by emerging markets has increased by 10 percent since the 1990s and the worlds exchanges have increased in the value of shares traded on emerging markets by 20 percent.

Funds under institutional management are massive and growing rapidly and pension fund pressures are amounting in various parts of the world (Walter; 1999). Although total worldwide flows of foreign investment were US$ 14.3 billion in 2003, only 3.5% of these capital flows were directed at sub-Saharan Africa, besides South Africa, despite global interest in investment opportunities within emerging markets (Hearn and Piesse; 2008).

Due to, in most part, the unavailability of data and the relative recent equity inflows, research in portfolio inflows into emerging markets is limited (Ahmed, Arezki & Funke; 2007). These findings also indicate that earlier research on equity inflows into emerging markets was driven by push factors such as low returns in developed countries, whereas emerging economies provided high and volatile returns.

Research undertaken by Neaime (2006) suggests that new, dynamic relationships exist in the volatility of returns in the Middle East and North Africa (MENA) regions. Samouilhan (2007) states that the Johannesburg Securities Exchange (JSE) of South Africa rewards investors who take investment risks in equities when they have higher returns associated with them. This research study adds to the existing literature that can be used when investment decisions have to be made concerning emerging equity markets, by focusing primarily on the volatility of returns when the South African equity market is included in a portfolio of emerging equity markets.

In order for South Africa to attract foreign direct investment and an increase in portfolio inflows, for South African investors to pursue other emerging market investments and for risk aversion and diversification purposes, this study serves as a critical investment tool for practitioners and academics alike. Meyer *et al*. (2008) developed a framework that shows the interaction between resources and institutional characteristics as a tool that can be used by foreign investors when entering emerging markets.

The recent demise of equity markets in the USA and other developed markets has prompted investors to seek investment opportunities and consider spreading their risk by investing in markets that are less correlated to those of the UK and the USA.

The primary motivation factors for this study are firstly to encourage foreign investment into emerging markets, especially when South African investment assets are considered, and secondly to add to the body of knowledge around the understanding of risks and returns that emerging markets have on investments.

The problem statement is thus to determine the performance of the optimal portfolio of investments in emerging markets by means of exploring the impact of the make up of the portfolio, using different risk and return measures over different time frames.

This study and its intended objectives of significantly contributing to the available literature for academia and practitioners explored the following sub-problems from a South African perspective:

1. To determine the diversification performance of the South African equity market portfolio in relation with:
    a. Other Emerging equity markets; and
    b. Developed equity markets.

2. To obtain the optimal portfolio as a result of the diversification of the emerging equity markets throughout the studied period.

2 Literature Review

The findings by Ferreira and Ferreira (2006) demonstrate that country diversification allows investors to reduce risk exposure and should thus be considered when portfolios are constructed. However, Hargis and Mei (2006) argue that global factors are much less important for return components, with emerging markets' movement of dividends and expected returns being somewhat misaligned possibly as a result of the low integration with the world's goods and financial markets.

2.1 Portfolio Composition

2.1.1 Equity Index Diversification

Recent research (Brands and Gallagher; 2005) into the performance and diversification benefits of equity funds indicates that the more the number of funds in a portfolio, the less the volatility and risk is experienced. In addition, these findings suggest that the diversified portfolio mimics the index as the number of funds become large. Moreover, making use of different asset styles assists with the avoidance of undiversified exposures as a risk management tool, whilst assisting with performance attribution (Baghai-Wadji, El-Berry, Klocker and Schwaiger; 2006).

Central to the findings by Walter (1999) are the linkages between the three principal sectors within the asset management industry, being the mutual funds, pension funds and private client assets as well as other large institutional pools, altogether positioned as collective investment vehicles.

2.1.2 Mean Variance Portfolio Theory

Alcock and Hatherly (2007) distinguish between the mean-variance and the asymmetric efficient frontiers, with the latter providing economic value as a result of a reduction in the erosion of return compared to the former. Moreover, the researchers argue that portfolio construction using the mean variance portfolio theory tends to lower the risks and the diversification capabilities of portfolios, thus lowering the potential returns, whereas using the copula theory to portfolio management separates the correlation structures and marginal returns and thus significantly improves the process.

The essence of the mean variance theory, as discussed by Ballestero and Pla`-Santamarı´a (2002), is that it is a normative or descriptive model that suggests that investors' appetite for risk is low and is compatible with the expected profitability based on past returns, mean values and variances. The authors further describe that obtaining the optimal portfolio along the efficient frontier from the feasible portfolios is quite a challenge as the variances and the means generally move

together, therefore through the investors' preferences, the optimal portfolio can be selected.

Further insight in the composition of portfolios is provided by the Generalised Autoregressive Conditional Heteroskedasticity (GARCH) model which has been widely used to reduce the time-varying characteristics of variances and correlations and improve the resultant portfolio optimisation process, especially when unrestricted diversification into emerging markets is to be achieved (Cha and Jithendranathan; 2007).

2.1.3 Performance Analysis

International diversification provides increased benefits when the correlations between the returns are low and when markets are many, Husain and Saidi (2000). Firer *et al* (2004) describe *correlation* as a measure of the extent to which the returns on two assets move together. Kim and Won (2004) state that an investor relies, for his portfolio decision making, on the expected return for each asset, and so tries to invest in effective assets that earn a higher expected return.

The findings by Gallagher and Pinnuck (2006) suggest that in the months when corporate earnings are announced, the performance of assets is the highest and lowest in the months preceding the tax year-end. Sharpe (1992) points out that the performance of a fund is largely dependent upon whether the investor chooses to

have a passive fund or an active fund and the returns are determined by the asset classes within these funds.

Greenwood and Li (2004) find in their study that diversification contributes to better performance and ultimately profitability. However, using the Jensen measure in their study of sufficient diversification benefits, de Roon, Gerard and Hillion (2002) find no significant performance differences between the portfolios of country and industry diversification strategies.

Standard deviation (or volatility), as defined by Kim and Won (2004), is a measure of risk as it represents variability in statistics. According to Hearn and Piesse (2008), the Sharpe ratio, which is a common measure of portfolio performance, is defined as the excess returns divided by portfolio standard deviation. Their study goes on to indicate that higher Sharpe ratios are preferred over lower ones, since they represent a measure of the return an investor makes relative to the risk the investor is subjected to. This then leads to the research question below:

2.1.4 Research Question

Research Question 1: *Which indices make up the optimal portfolio and what is the performance of the emerging equity market portfolio when compared to the developed equity market portfolio?*

2.2 Risk and Returns

Samouilhan and Shannon (2008) define the risk–return relationship as the heart of financial theory and practice, with higher, more certain returns being preferred over lower, less certain returns. Kim and Won (2004) explain that the way to construct a portfolio is to maximise the expected return on a desired risk level, or to minimise the total risk at the desired return level. Furthermore, they define risk as the variability of price or return for an asset and the expected return as the amount that an individual expects an asset to earn over a certain period of time.

The findings by Bouri, Martel and Chabchoub (2002) integrates Markowitz's mean-variance theory with other, non-conventional criterion to construct a portfolio that has the highest returns with minimum risk. This so-called multi-criterion approach considers the investor's attitude to liquidity and solvency to select the desired portfolio. Sabal (2004) states that the extent to which the investor is locally or globally diversified is more important than the segmentation of the market in order to obtain the discount rate for asset valuation.

Cathcart, Phillips and Teale (2007) distinguish between systematic risk and non-systematic, with the former being derived from a broad market index and cannot be diversified away, whereas the latter is derived from business sectors and can be diversified away. The researchers further state that the investor is rewarded for the systematic risk since it cannot be diversified away and a portfolio composed largely

of non-systematic risk is under diversified. Sabal (2004) argues that the country risk premium often used as a political risk differential is not appropriate as a valuation model as it does not fully incorporate all investment projects, nor is it systematic.

In order to determine the risk levels of financial service institutions in periods of financial stress and volatility within South Africa, Barnhill Jr., Papapanagiotou, and Schumacher (2002) find that taken individually, market risk, credit risk, portfolio concentration, asset and liabilities maturity mismatches are all important risk factors that should be considered for diversification.

Hargis and Mei (2006) decompose returns into cash flow, interest rate and discount rate in order to identify the drivers of country diversification.

In light of this, studies undertaken by Samoulhan (2007) indicate that the JSE rewards investors who take investment risks in equities when they have higher rewards associated with them. Interestingly, this means that the more diversified a portfolio, the less risky it is and the investor is likely to be rewarded less as the fundamental relationship between risk and reward exists among South African equities. Further to this, the findings reveal that the spillover coefficient is significant and positive, with increases in the foreign volatility level tending to be

associated with increases in the domestic volatility level. This leads to the resolution that the international diversification premium is quite substantial, with domestic investors able to achieve higher returns for the same risk on their internationally diversified portfolios.

This study combines these aspects of risk and return and investigates the trade-offs through the research question below:

2.2.1 Research Question

Research Question 2: *Does the estimation of future returns based on past average returns have better portfolio performance than when acceptable, desired returns are set?*

2.3 South African Equity Market

The JSE, the 17th largest exchange in the world measured by market capitalisation, has opened a world of possibility, providing opportunities to improve the quality of life of many Africans through increased capital flow in the region as a result of enhanced liquidity and investment in its products, Brijlal (2007). Although foreign investors have substantially increased their holdings of South African equities since 1994, the majority of JSE–listed companies is shareholder–controlled rather than manager–controlled as in the USA and the UK, Kantor (1998).

Ahmed, Arezki and Funke (2007) support this view by stating that between 1994 and 2002, portfolio flows in South Africa contributed 3.5% towards GDP, whereas capital flows only contributed 1.5%. Furthermore, since portfolio investors in emerging economies benefit from the higher yield caused by the currency volatility and eventual premium, investments in South Africa have an added benefit since the Rand has been one of the more volatile currencies in the emerging market asset class.

According to Makina and Negash (2005), the liberalisation of the JSE in the 1990s resulted with an increase in the number of analysts following local firms as the emerging market becomes more open to foreign portfolio investment, eventually allowing an improvement to the capital allocation decision. Lamba and Otchere (2001) indicate that the South African equity market has been influenced by the

developed markets, except Japan since the end of *Apartheid* and that this signals the high integration levels of the South African economical and financial markets.

2.3.1 Efficient South African Equity Market

The Johannesburg Securities Exchange of South Africa (JSE) was deregulated in 1995 when the relaxation of exchange controls and the introduction of dual capacity trading took place (Mkhize and Msweli-Mbanga; 2006). In addition to this, the research found that although the restructuring that took place during the studied 1994-2004 period improved the operations of the JSE, it compared unfavourably to the Chinese securities exchange, but better than the Russian and Mexican exchanges and was the best in Africa.

The findings by Jefferis and Smith (2004) indicate that the JSE is a weak–form exchange in that its current prices fully reflect all historical information. Brijlal (2007) further argues that the development of the Internet in South Africa provides an efficient and effective source of updated information for investors and a medium for corporate communication with shareholders and other stakeholders.

According to Brijlal (2007), the partnership between the JSE and the FTSE, a global index provider to many international exchanges, allows the JSE to provide enhanced, expanded and internationally recognised index products for the

domestic, African and international markets. Jefferis and Smith (2004) describe some of the JSE's indices, including the All Share 40, as following the random walk hypothesis and weak-form efficiency, in the sense that those price indices that have large capitalisation constituents are weak–form efficient and those with smaller capitalisation stocks are not, unless the number of constituents is small and easy to value.

Samouilhan and Shannon (2008) state that the JSE is relatively large, liquid and open, although its composition is different to that of the bourses of London, New York and Tokyo. Information regarding the behaviour of certain key variables, such as the interest rate, the exchange rate and the gold price, are some of the factors widely viewed as being influential to price determination on the JSE (Samouilhan; 2006).

2.3.2 Risk and Return characteristics of the South African Equity Market

According to Samouilhan (2006), positive correlation exists between the JSE domestic market returns and international market returns as well as domestic market volatility and international market volatility. This literature goes on to state that, foreign markets cannot be used as a signal of future JSE behavior, since the return and volatility positive associations with foreign markets were found to exist principally during the same concurrent trading period.

Investigations on the profitability and benefits of having the South African equity market in a diversified portfolio will be handled by providing solutions to the following research question:

2.3.3 Research Question

Research Question 3: *Does the inclusion of the South African equity market index improve the developed equity market diversification?*

2.4 Emerging Equity Market

Emerging equity markets have emerged and have been developed as a result of the formalisation of world economies. The findings by Yartey (2008) describe the factors that determine the equity market development in emerging markets to be those of income level, domestic investment, banking sector development, private capital flows and equity market liquidity. Emerging markets that have established reliable and stable economic and political environments will attract foreign investment and will be able to pursue their economic agendas successfully.

The motivation of many countries to establish stock exchanges was due to the involvement of international financial institutions in economic restructuring as well as to promote privatisation and attract foreign investment to supplement shortfalls in domestic savings (Hearn and Piesse; 2008).

Ahmed, Arezki and Funke (2007) find that the factors that attract portfolio flows for emerging economies are higher growth rates, better institutions and lower international interest rates. In addition, their findings suggest that the reason for the lack in foreign investment in African economies, compared to other emerging countries, is due to their lack of openness, their perceived increased risk levels and high incidence of regional conflict as well as their high and volatile inflation rates. However, Soydemir (2000) argues in his article that international patterns of stock

market movements are influenced largely by economic fundamentals instead of contagion.

2.4.1 Emerging Equity Market diversification

Hargis and Mei (2006) find that the returns for emerging markets have the lowest correlation with other markets, suggesting that it is more fruitful to diversify across these markets than across the more correlated developed countries. In his study of European Equity Markets, Rouwenhorst (1999) quotes data to show that the composition of the indexes differs amongst countries as more companies of different sectors exist in different countries, thus causing the country indexes to be imperfectly correlated.

The diversification of investments within the emerging markets is driven primarily by risk factors that are prevalent in both the region and the specific country, as pointed out by Hargis (2002). Neaime (2006) suggests that the lack of integration of the emerging equity markets is useful in providing diversification benefits for international investors, however, volatilities are easily transmitted between markets when they are closer to each other geographically. Furthermore, equity returns in emerging markets have low correlations, not only with developed markets, but also among themselves, Husain and Saidi (2000).

Using the Johansen and Juselius procedure, Defusco, Geppert and Tsetsekos (1996) find that the independence of emerging markets is an indication of effective diversification. Chukwuogor (2008) finds, however, that in his study of 11 African equity markets, that the annual closing index prices gain and lose momentum simultaneously, indicating that a high correlation of returns exists amongst most of these markets.

Aked, Brightman and Cavaglia (2000) demonstrate through a factor model of security returns that country factors are dominated by industry factors as a result of the decline in trade barriers and increase in economic integration.

2.4.2 Efficient Emerging Equity Markets

The study undertaken by Khamfula (2005) suggests that the African stock markets are illiquid (except for the JSE) and that the efficiency of operations in these markets is dependent on the macroeconomic environment, capital market infrastructure, regulatory and legal framework conditions that ensure public confidence and market discipline.

For equity markets to be efficient, the price of their equities should reflect the equity's intrinsic value, and more specifically, they should reflect all available information (Jefferis and Smith; 2004). This literature further describes that most

emerging equity exchanges are not efficient, except for the JSE which displays weak-form efficiency. However, a more recent analysis by Chukwuogor (2008) states that due to conflicting studies, the question of efficiency in emerging markets is still not resolved as the application of different models depict differing volatility and pricing processes.

In his study, Soydemir (2000) finds that the combined effect of emerging markets has a significant impact on the USA and other developed markets, but not individually. In addition, the findings suggest that the responses to the effect of events taking place in the USA markets lasts for about two weeks with the emerging markets and about a week with other developed markets. This lag effect in the emerging equity market poses an added advantage for investors who have a desire to prolong the effects and the gains from the occurrences of the developed equity markets.

2.4.3 Risk and Return characteristics of Emerging Equity Markets

In his literature, Khamfula (2005) states that due to the high volatility of the equity prices in the emerging markets, investors experience high–expected returns as well as risk exposures which induce time-variations in asset returns.

Emerging equity markets respond to international economic factors such that the fluctuations in returns achieved by emerging equities are influenced by the GDP, inflation, the money supply, interest rates, world industrial production and world inflation, although local variables are more important in some markets than others (Fifield, Power and Sinclair; 2002).

Chukwuogor (2008) uncovers a tendency of high volatility in the daily returns of African stock markets. Furthermore, he finds that some daily return seasonalities are not accompanied by any volatility seasonality, and investing on low or high return week day does not necessarily mean that risk is also low or high.

The issue of which indices should dominate the optimal diversified portfolio will be investigated further through providing solutions to the following research questions:

2.4.4 Research Questions

Research Question 4: *Does the portfolio composition between the developed and emerging equity market indices have an impact on the performance of the optimal portfolio?*

Research Question 5: *Does the investment period have diversification benefits for developed and emerging equity markets?*

3 Research Questions

The linkage between the performance of indices and the identification of the optimal portfolio is being investigated in this study in order to further develop solutions around the diversification of emerging markets in particular, South Africa.

The research questions were developed taking into account the descriptive nature of this study as it describes characteristics of a population or phenomenon. The portfolios developed in this study are analysed in detail and in relation to each other to provide a meaningful way of constructing diversification portfolios with emerging markets. Considering the literature review and the motivating factors of the research, the following questions were formed:

Research Question 1: *Which indices make up the optimal portfolio and what is the performance of the emerging equity market portfolio when compared to the developed equity market portfolio?*

Research Question 2: *Does the estimation of future returns based on past average returns have better portfolio performance than when acceptable, desired returns are set?*

Research Question 3: *Does the inclusion of the South African equity market index improve the developed equity market diversification?*

Research Question 4: *Does the portfolio composition between the developed and emerging equity market indices have an impact on the performance of the optimal portfolio?*

Research Question 5: *Does the investment period have diversification benefits for developed and emerging equity markets?*

4 Research Methodology

Methodology refers to the philosophical basis on which the research is founded (White; 2002). The research methodology used serves to describe the aspects, techniques and the methods which were employed by the research study.

The research study uses statistical analysis to identify the optimal portfolio composition of emerging equity markets. By defining the best possible combination of equity indices, this quantitative research identifies the correlation between the portfolio returns and the different portfolio constituents and thus obtains the diversification benefits of emerging equity markets. The portfolio with the highest returns and least volatility, with and without the South African equity index, is considered to be the optimal diversified portfolio for emerging equity markets. This study will be conducted as a randomised controlled trial, based on the suggested statistical design (Zikmund; 2003).

4.1 Research Population

According to Kruger and Welman (1999, p.46), the plan with which research subjects are obtained and information is collected from them is referred to as research design. This design is used to specify the population that should be used, how this population is to be drawn and what exactly should be done with this population. A population is a complete group of entities sharing some common set of characteristics (Zikmund; 2003).

The research is designed to study the entire population of all emerging market equity indices listed on all global stock exchanges. The suggested unit of analysis for this study is the constructed, optimal portfolio which is constituted by means of the selected emerging market indices.

4.2 Sample Size and Selection

The sampling frame used is the market indices for emerging equity markets obtained from the reliable public source of the MSCI database. The MSCI Price Indices measure only the price performance of markets, without the dividends. Each index measure the sum of the free float–weighted market capitalisation price returns of all its constituents on a given day.

All MSCI International Equity Indices are fully adjusted for free float, as defined in the MSCI Barra Methodology Book, and are constructed and managed with a view to being fully investable from the perspective of international institutional investors. MSCI Barra covers 23 developed, 25 emerging and 22 frontier markets.

The size of this sample is limited to the 25 emerging markets as described by MSCI, including South Africa, as well as the two developed equity markets of the USA and UK. White (2002) not only proposes that the simple random sampling technique is good where the sampling frame is not too large, but also that from a

statistical point of view, sampling without replacement is precise as it allows a studied item to be used more than once.

4.3 Data Collection and Analysis

Zikmund (2000) describes external data as not having been created, recorded or generated by the researcher and classifies the external sources as books and periodicals, government, trade associations, media and commercial sources. The emerging equity market data collected is from the publicly and commercially available database of MSCI Barra and was compared with the Inet Bridge database for confidence checking.

The closing monthly equity index values for the equity markets of the USA, UK, and emerging markets were computed to obtain the monthly returns achieved by the indices. Descriptive statistics on these returns for the indices were obtained and analysed over the 13-year period.

In order to provide solutions to the questions referred to in Chapter 3, two sets of returns were obtained, as follows:

1. The monthly past returns of the indices were averaged over the studied period in order to use the mean returns as the implied future returns. These returns were used in the portfolios based on which indices made up the optimal portfolio.

2. The monthly average past returns of the USA and the UK were used as estimates for future returns. Each portfolio calculated with these returns had the same estimated return of 0.7%.

These mean returns were then used as input into a portfolio optimisation tool for the entire data sample. Microsoft Excel's add-in program, Solver, was used as a portfolio optimisation tool to obtain the optimal portfolio by means of maximising the Sharpe ratio through changing the weights of the indices included in the sample. Based on the following general constraints made on the data manipulation, the Sharpe ratio and the standard deviation were obtained for all the optimal portfolios:

- Risk free rate of 14%.
- The individual weight of the constituents in the optimal portfolio should be positive.
- The total weight of the portfolio constituents should be 100%.
- The computation should solve for the Sharpe ratio.

In alignment with the propositions described above, controls for diversification were included in the constraints. Firstly, the performance of the equity indices according to the value of the Sharpe ratio was determined by means of using the combined effect of the past average individual index returns in some cases, as well as the target expected return in other cases. When comparing the effects of these returns, the same number of portfolios developed with the past returns was also constructed with the target return. This value became the expected return used in the computation of the Sharpe ratio as well as the Standard Deviation value for the portfolios.

Secondly, the inclusion of South Africa in the portfolios was controlled as the optimal portfolio did not, in many cases, include South Africa. The optimal portfolio for all emerging equity markets was constructed and a comparison was made between the portfolios that included South Africa and those which did not.

The performances of these different portfolios were further analysed against each other and the equity indices in order to obtain the emerging equity market optimal portfolio and its composition.

4.4 Validity and Reliability

The data obtained from the sources mentioned above is deemed to be valid and reliable.

4.5 Limitations

The potential limitations that could be experienced during this study are listed below:

- The availability of consistent index equity data from the emerging equity exchanges due to the reporting and presentation of financial information may be of different standards between the exchanges. The researcher has endeavoured to obtain the most reliable data from the MSCI database and has successfully compared it with other source databases such as the Inet-Bridge for emerging equity indices; and

- The classification of indices between the emerging equity exchanges may be different to the JSE's classification method. The researcher has sought the market index classified as such according to the MSCI database.

5 Interpretation and Analysis of Results

5.1 Data and sample

The monthly closing equity index prices data used in this study was obtained from the publicly available MSCI Barra database. Descriptive statistics on past returns for the indices were obtained and analysed over the studied period, 31 December 1994 through to 31 December 2007. **Appendix A** shows the monthly return figures achieved by the equity indices during the studied period. These figures were used as input in the computation of the correlation and covariance matrices used to calculate the optimal portfolio.

The equity market indices comprised 25 from the emerging markets including South Africa, and two from the developed equity markets i.e. USA and UK, primarily used for benchmarking and comparison purposes. **Table 1** below contains the index mean returns and the standard deviation of the individual indices.

Statistics	StdDev	Mean	Return Factor
UK	12.5%	0.6%	1.006
USA	14.1%	0.8%	1.008
JORDAN	17.9%	0.7%	1.007
MOROCCO	18.1%	1.1%	1.011
CHILE	22.8%	0.4%	1.004
ISRAEL	24.3%	0.8%	1.008
RSA	27.3%	0.5%	1.005
CZECH REPUBLIC	27.5%	1.4%	1.014
INDIA	28.0%	1.0%	1.010
PERU	28.5%	1.2%	1.012
TAIWAN	28.9%	-0.1%	0.999
EGYPT	29.6%	1.6%	1.016
MEXICO	29.7%	1.1%	1.011
PHILIPPINES	32.0%	-0.3%	0.997
MALAYSIA	32.3%	0.1%	1.001
COLOMBIA	32.6%	0.9%	1.009
HUNGARY	34.2%	1.6%	1.016
POLAND	34.8%	0.9%	1.009
CHINA	36.2%	0.1%	1.001
ARGENTINA	38.0%	0.6%	1.006
PAKISTAN	38.8%	0.1%	1.001
BRAZIL	39.4%	1.1%	1.011
KOREA	40.1%	0.6%	1.006
THAILAND	42.5%	-0.5%	0.995
INDONESIA	48.8%	0.2%	1.002
TURKEY	54.7%	1.2%	1.012
RUSSIA	59.3%	1.7%	1.017

Table 1: Mean and standard deviations of individual equity indices

The table above shows the ranked risk and return characteristics of the individual market equity indices for the period 31 December 1994 until 31 December 2007.

5.2 Correlations in Returns and Variances

In order to perform the statistical information on the data, the closing equity prices were manipulated to show the actual monthly returns that investors could have achieved if they had invested in the equity indices themselves. Statistical computations were done on the data in order to obtain the correlation and covariance of the returns. The mean and standard deviations were thus obtained for the individual indices.

Table 2 shows the correlation in return that the emerging equity markets have between each other and with the developed equity markets of the UK and the USA. The cells shaded in red are the equity markets whose returns have high correlations (above 50%) with each other. The cells shaded in green are the equity markets whose returns have low (less than 20%) correlations with each other and should be pursued for diversification purposes. The cells shaded in yellow have correlations between 21% and 49%.

The diagram shows that the returns from the South African market equity index have high correlations with Brazil, Chile, Mexico and Israel and low correlations with Pakistan, Colombia, Jordan and Morocco. All the other equity markets have correlations between 21% and 49% with that of South Africa. As discussed by Chukwuogor (2008), perhaps the annual index closing prices of these other equity markets gain and lose momentum simultaneously with South Africa, indicating that

a high correlation of returns exists amongst most of these markets. This aspect is out of the scope of this research study but is recommended for further investigation.

The findings on the correlation of returns agree with Hargis and Mei (2006) in that a majority of emerging equity markets have correlations between 21% and 49% with the UK and the USA. In addition, these results support findings by Rouwenhorst (1999) who showed that the composition of the indexes differs amongst the European equity markets, thus causing the country indexes to be imperfectly correlated. The indices of Russia, Chile, Czech Republic, Hungary, Peru, Poland and Turkey mainly have correlations with other equity markets which are between the 21% and 49% range.

Correlation	UK	USA	RSA	BRAZIL	CHINA	INDIA	RUSSIA	INDONESIA	KOREA	MALAYSIA	PAKISTAN	PHILIPPINES	ARGENTINA	CHILE	COLOMBIA	MEXICO	TAIWAN	THAILAND	CZECH REPUBLIC	HUNGARY	ISRAEL	JORDAN	PERU	POLAND	EGYPT	MOROCCO	TURKEY
UK	100.0%																										
USA	72.8%	100.0%																									
RSA	49.5%	47.3%	100.0%																								
BRAZIL	57.6%	57.0%	57.0%	100.0%																							
CHINA	36.0%	42.9%	53.7%	46.3%	100.0%																						
INDIA	21.0%	25.7%	38.2%	38.0%	30.1%	100.0%																					
RUSSIA	41.6%	43.1%	47.6%	52.7%	36.9%	27.3%	100.0%																				
INDONESIA	29.8%	32.5%	38.0%	35.0%	32.9%	33.4%	51.4%	100.0%																			
KOREA	35.4%	41.7%	45.6%	31.8%	30.1%	29.9%	26.1%	39.5%	100.0%																		
MALAYSIA	28.4%	31.5%	36.3%	32.8%	42.2%	33.3%	44.5%	59.5%	34.3%	100.0%																	
PAKISTAN	13.7%	12.6%	22.8%	35.0%	15.8%	41.3%	28.0%	17.8%	13.6%	21.0%	100.0%																
PHILIPPINES	29.6%	40.0%	45.1%	37.3%	44.5%	25.3%	39.4%	58.8%	35.7%	55.8%	10.2%	100.0%															
ARGENTINA	37.9%	36.8%	43.5%	55.1%	36.3%	30.1%	39.9%	24.7%	23.7%	29.2%	13.8%	34.2%	100.0%														
CHILE	49.6%	54.5%	57.7%	68.2%	49.7%	45.3%	58.2%	46.9%	39.7%	48.5%	27.5%	48.1%	53.3%	100.0%													
COLOMBIA	25.2%	18.8%	25.9%	35.7%	18.4%	23.5%	40.1%	33.3%	23.9%	25.8%	29.8%	22.8%	28.2%	39.1%	100.0%												
MEXICO	49.9%	59.7%	58.9%	68.9%	40.7%	34.8%	56.4%	34.6%	33.1%	33.7%	25.6%	43.1%	57.9%	58.9%	28.8%	100.0%											
TAIWAN	34.4%	46.3%	44.1%	47.0%	52.7%	39.2%	47.4%	32.2%	45.6%	52.1%	19.5%	40.3%	45.0%	57.1%	25.1%	46.3%	100.0%										
THAILAND	36.6%	44.2%	57.9%	41.3%	45.5%	28.5%	35.7%	54.5%	62.0%	53.7%	27.2%	65.3%	32.8%	46.2%	22.4%	41.9%	50.0%	100.0%									
CZECH REPUBLIC	31.0%	24.6%	40.3%	41.7%	37.8%	39.7%	36.0%	26.4%	27.5%	28.4%	29.1%	20.3%	33.2%	40.4%	29.3%	37.8%	32.9%	23.8%	100.0%								
HUNGARY	44.2%	47.9%	49.0%	53.7%	32.8%	31.2%	51.6%	32.7%	25.2%	37.0%	31.8%	34.3%	42.0%	48.5%	28.6%	55.9%	33.2%	28.2%	62.4%	100.0%							
ISRAEL	40.5%	54.5%	30.9%	40.7%	19.1%	36.3%	32.3%	18.3%	21.5%	17.8%	19.3%	22.0%	35.3%	40.6%	18.0%	48.2%	28.3%	12.2%	26.6%	33.4%	100.0%						
JORDAN	12.7%	4.4%	8.7%	6.3%	-2.1%	13.5%	7.0%	13.4%	12.2%	11.9%	13.8%	11.5%	-2.9%	15.5%	22.7%	8.1%	4.8%	15.3%	1.4%	4.7%	14.7%	100.0%					
PERU	27.4%	26.5%	56.3%	61.7%	35.1%	34.2%	43.2%	33.4%	24.4%	33.5%	23.0%	33.3%	47.0%	57.0%	31.9%	54.7%	34.9%	33.9%	36.3%	48.6%	25.9%	12.2%	100.0%				
POLAND	41.7%	45.5%	58.9%	52.4%	35.4%	36.5%	36.5%	26.3%	39.7%	36.6%	25.2%	34.1%	35.4%	49.4%	18.3%	54.3%	40.5%	39.9%	58.0%	69.1%	32.1%	1.8%	46.7%	100.0%			
EGYPT	18.2%	20.1%	29.8%	20.2%	17.4%	34.6%	19.5%	23.3%	19.3%	18.0%	17.9%	26.2%	24.4%	30.7%	27.0%	20.4%	23.5%	21.3%	22.7%	25.4%	21.3%	29.0%	20.3%	27.8%	100.0%		
MOROCCO	19.6%	7.7%	21.4%	6.6%	6.5%	19.0%	-4.3%	2.7%	4.2%	-1.5%	-4.4%	-2.5%	10.9%	8.5%	3.5%	-8.1%	11.3%	5.6%	3.7%	-2.5%	3.9%	3.3%	9.2%	5.9%	19.8%	100.0%	
TURKEY	47.4%	48.2%	39.4%	45.0%	23.0%	28.6%	47.2%	18.1%	25.7%	21.4%	27.1%	20.8%	39.6%	47.9%	36.2%	45.6%	30.9%	22.5%	35.0%	48.0%	48.1%	11.9%	37.7%	38.7%	30.9%	3.1%	100.0%

Table 2: Equity Market Correlations Matrix

The table above represents the correlation of monthly returns between the equity indices.

Covariance	UK	USA	RSA	BRAZIL	CHINA	INDIA	RUSSIA	INDONESIA	KOREA	MALAYSIA	PAKISTAN	PHILIPPINES	ARGENTINA	CHILE	COLOMBIA	MEXICO	TAIWAN	THAILAND	CZECH REPUBLIC	HUNGARY	ISRAEL	JORDAN	PERU	POLAND	EGYPT	MOROCCO	TURKEY
UK	0.00135	0.00111	0.00145	0.00245	0.00140	0.00063	0.00266	0.00157	0.00153	0.00099	0.00057	0.00102	0.00155	0.00122	0.00089	0.00160	0.00107	0.00168	0.00092	0.00163	0.00106	0.00025	0.00084	0.00156	0.00058	0.00038	0.00279
USA	0.00111	0.00172	0.00157	0.00273	0.00189	0.00087	0.00310	0.00193	0.00204	0.00124	0.00059	0.00156	0.00170	0.00151	0.00074	0.00215	0.00163	0.00228	0.00082	0.00199	0.00161	0.00010	0.00092	0.00192	0.00072	0.00017	0.00321
RSA	0.00145	0.00157	0.00640	0.00527	0.00455	0.00251	0.00662	0.00435	0.00429	0.00275	0.00207	0.00338	0.00387	0.00308	0.00198	0.00410	0.00299	0.00577	0.00260	0.00393	0.00176	0.00037	0.00377	0.00481	0.00207	0.00091	0.00505
BRAZIL	0.00245	0.00273	0.00527	0.01336	0.00568	0.00360	0.01059	0.00579	0.00433	0.00358	0.00461	0.00405	0.00709	0.00527	0.00394	0.00693	0.00460	0.00594	0.00389	0.00623	0.00335	0.00038	0.00596	0.00618	0.00203	0.00041	0.00835
CHINA	0.00140	0.00189	0.00455	0.00568	0.01124	0.00262	0.00680	0.00500	0.00375	0.00424	0.00190	0.00442	0.00428	0.00352	0.00187	0.00376	0.00474	0.00601	0.00323	0.00349	0.00144	-0.00012	0.00311	0.00383	0.00160	0.00037	0.00392
INDIA	0.00063	0.00087	0.00251	0.00360	0.00262	0.00673	0.00389	0.00392	0.00289	0.00258	0.00386	0.00195	0.00275	0.00248	0.00184	0.00249	0.00272	0.00291	0.00263	0.00257	0.00212	0.00058	0.00235	0.00306	0.00247	0.00083	0.00377
RUSSIA	0.00266	0.00310	0.00662	0.01059	0.00680	0.00389	0.03022	0.01279	0.00533	0.00732	0.00553	0.00642	0.00773	0.00676	0.00666	0.00853	0.00699	0.00772	0.00505	0.00899	0.00400	0.00064	0.00629	0.00649	0.00295	-0.00040	0.01315
INDONESIA	0.00157	0.00193	0.00435	0.00579	0.00500	0.00392	0.01279	0.02049	0.00666	0.00806	0.00289	0.00790	0.00393	0.00449	0.00456	0.00431	0.00391	0.00971	0.00304	0.00469	0.00187	0.00101	0.00399	0.00384	0.00289	0.00021	0.00416
KOREA	0.00153	0.00204	0.00429	0.00433	0.00375	0.00289	0.00533	0.00666	0.01385	0.00382	0.00182	0.00395	0.00310	0.00312	0.00269	0.00339	0.00455	0.00909	0.00261	0.00297	0.00180	0.00076	0.00241	0.00477	0.00197	0.00026	0.00484
MALAYSIA	0.00099	0.00124	0.00275	0.00358	0.00424	0.00258	0.00732	0.00806	0.00382	0.00895	0.00226	0.00495	0.00307	0.00306	0.00233	0.00277	0.00418	0.00632	0.00217	0.00351	0.00120	0.00059	0.00265	0.00354	0.00148	-0.00008	0.00325
PAKISTAN	0.00057	0.00059	0.00207	0.00461	0.00190	0.00386	0.00553	0.00289	0.00182	0.00226	0.01294	0.00109	0.00174	0.00209	0.00324	0.00253	0.00188	0.00386	0.00267	0.00363	0.00156	0.00083	0.00219	0.00293	0.00177	-0.00026	0.00495
PHILIPPINES	0.00102	0.00156	0.00338	0.00405	0.00442	0.00195	0.00642	0.00790	0.00395	0.00495	0.00109	0.00880	0.00357	0.00302	0.00204	0.00352	0.00321	0.00762	0.00154	0.00323	0.00147	0.00057	0.00261	0.00327	0.00214	-0.00012	0.00313
ARGENTINA	0.00155	0.00170	0.00387	0.00709	0.00428	0.00275	0.00773	0.00393	0.00310	0.00307	0.00174	0.00357	0.01240	0.00397	0.00300	0.00561	0.00425	0.00454	0.00299	0.00469	0.00279	-0.00017	0.00437	0.00403	0.00236	0.00065	0.00707
CHILE	0.00122	0.00151	0.00308	0.00527	0.00352	0.00248	0.00676	0.00449	0.00312	0.00306	0.00209	0.00302	0.00397	0.00446	0.00250	0.00343	0.00323	0.00384	0.00218	0.00325	0.00193	0.00054	0.00319	0.00337	0.00178	0.00030	0.00513
COLOMBIA	0.00089	0.00074	0.00198	0.00394	0.00187	0.00184	0.00666	0.00456	0.00269	0.00233	0.00324	0.00204	0.00300	0.00250	0.00914	0.00240	0.00203	0.00267	0.00226	0.00274	0.00123	0.00114	0.00255	0.00178	0.00224	0.00018	0.00555
MEXICO	0.00160	0.00215	0.00410	0.00693	0.00376	0.00249	0.00853	0.00431	0.00339	0.00277	0.00253	0.00352	0.00561	0.00343	0.00240	0.00757	0.00341	0.00454	0.00265	0.00488	0.00298	0.00037	0.00398	0.00482	0.00154	-0.00037	0.00637
TAIWAN	0.00107	0.00163	0.00299	0.00460	0.00474	0.00272	0.00699	0.00391	0.00455	0.00418	0.00188	0.00321	0.00425	0.00323	0.00203	0.00341	0.00718	0.00528	0.00225	0.00282	0.00171	0.00022	0.00248	0.00351	0.00173	0.00051	0.00421
THAILAND	0.00168	0.00228	0.00577	0.00594	0.00601	0.00291	0.00772	0.00971	0.00909	0.00632	0.00386	0.00762	0.00454	0.00384	0.00267	0.00454	0.00528	0.01549	0.00239	0.00353	0.00108	0.00100	0.00353	0.00507	0.00230	0.00037	0.00448
CZECH REPUBLIC	0.00092	0.00082	0.00260	0.00389	0.00323	0.00263	0.00505	0.00304	0.00261	0.00217	0.00267	0.00154	0.00299	0.00218	0.00226	0.00265	0.00225	0.00239	0.00650	0.00504	0.00153	0.00006	0.00245	0.00478	0.00159	0.00016	0.00453
HUNGARY	0.00163	0.00199	0.00393	0.00623	0.00349	0.00257	0.00899	0.00469	0.00297	0.00351	0.00363	0.00323	0.00469	0.00325	0.00274	0.00488	0.00282	0.00353	0.00504	0.01006	0.00239	0.00025	0.00408	0.00708	0.00221	-0.00013	0.00772
ISRAEL	0.00106	0.00161	0.00176	0.00335	0.00144	0.00212	0.00400	0.00187	0.00180	0.00120	0.00156	0.00147	0.00279	0.00193	0.00123	0.00298	0.00171	0.00108	0.00153	0.00239	0.00507	0.00055	0.00154	0.00233	0.00131	0.00015	0.00549
JORDAN	0.00025	0.00010	0.00037	0.00038	-0.00012	0.00058	0.00064	0.00101	0.00076	0.00059	0.00083	0.00057	-0.00017	0.00054	0.00114	0.00037	0.00022	0.00100	0.00006	0.00025	0.00055	0.00277	0.00054	0.00010	0.00132	0.00009	0.00101
PERU	0.00084	0.00092	0.00377	0.00596	0.00311	0.00235	0.00629	0.00399	0.00241	0.00265	0.00219	0.00261	0.00437	0.00319	0.00255	0.00398	0.00248	0.00353	0.00245	0.00408	0.00154	0.00054	0.00700	0.00399	0.00147	0.00041	0.00506
POLAND	0.00156	0.00192	0.00481	0.00618	0.00383	0.00306	0.00649	0.00384	0.00477	0.00354	0.00293	0.00327	0.00403	0.00337	0.00178	0.00482	0.00351	0.00507	0.00478	0.00708	0.00233	0.00010	0.00399	0.01043	0.00246	0.00032	0.00633
EGYPT	0.00058	0.00072	0.00207	0.00203	0.00160	0.00247	0.00295	0.00289	0.00197	0.00148	0.00177	0.00214	0.00236	0.00178	0.00224	0.00154	0.00173	0.00230	0.00159	0.00221	0.00131	0.00132	0.00147	0.00246	0.00753	0.00091	0.00431
MOROCCO	0.00038	0.00017	0.00091	0.00041	0.00037	0.00083	-0.00040	0.00021	0.00026	-0.00008	-0.00026	-0.00012	0.00065	0.00030	0.00018	-0.00037	0.00051	0.00037	0.00016	-0.00013	0.00015	0.00009	0.00041	0.00032	0.00091	0.00280	0.00026
TURKEY	0.00279	0.00321	0.00505	0.00835	0.00392	0.00377	0.01315	0.00416	0.00484	0.00325	0.00495	0.00313	0.00707	0.00513	0.00555	0.00637	0.00421	0.00448	0.00453	0.00772	0.00549	0.00101	0.00506	0.00633	0.00431	0.00026	0.02572

Table 3: Equity Market Covariance Matrix

The table above shows the analysis of variance between the monthly returns of the equity indices.

Table 3 above shows the covariance between the pairs of equity indices. The equity indices which have covariance values below 0.001 are highlighted in red and are the following: Morocco, Egypt, Peru, Jordan, Czech Republic, Colombia, Pakistan, Malaysia and India. South Africa, like most of the equity indices, has the lowest covariance with Jordan, and Morocco. This suggests that these equity indices have monthly price movements which are less related to the majority of these markets, including South Africa.

The covariance matrix shown above was used in the construction of the optimal portfolios. Based on the set constraints for the different research questions, the portfolio optimiser tool obtained the best-fitting, weight adjusted, combination of equity indices to maximize the Sharpe ratio and thus developed the optimal portfolios. These portfolios were analysed and their performance and diversification benefits were obtained. The remainder of this chapter discusses these optimal portfolios and obtains solutions to the research questions.

5.3 Question 1

Which indices make up the optimal portfolio and what is the performance of the emerging equity market portfolio when compared to the developed equity market portfolio?

A sample of 27 equity market indices was statistically computed to obtain the optimal portfolio. The optimal portfolio for emerging and developed equity markets has the highest returns at the lowest risk levels.

The performance of the developed equity market portfolio is shown below. During the 13-year period, the optimal portfolio for developed markets was dominated by the UK index, which constituted 71.6%, in relation to the USA index, which was a low 28.4%. This developed equity market portfolio had a standard deviation of 0.03580 and a Sharpe ratio of 0.15523.

Portfolio 1		**Developed Markets - Estimated return**
Number of indices	2	
Equity Markets	UK	USA
Index portfolio composition	71.60%	28.40%
Portfolio return	0.70%	
Portfolio standard deviation	0.03580	
Portfolio Sharpe ratio	0.15523	

Figure 1: Portfolio 1 - Developed Markets (Estimated Return)

The performance of the emerging equity market optimal portfolio during the same period was dominated by the equity indices of Morocco (36.5%) followed by Jordan (32.6%), as can be seen below. The lowest constituents of this portfolio were Taiwan (0.41%) followed by Chile (0.57%), with the equity index of China (0.77%) being the third lowest contributor of the portfolio.

Portfolio 2	Emerging Markets - Estimated return										
Number of indices	11										
Equity Markets	CHINA	MALAYSIA	PAKISTAN	PHILIPPINES	CHILE	MEXICO	TAIWAN	CZECH REPUBLIC	ISRAEL	JORDAN	MOROCCO
Index portfolio composition	0.77%	2.21%	2.42%	3.84%	0.57%	3.68%	0.41%	8.23%	8.73%	32.60%	36.56%
Portfolio return	0.70%										
Portfolio standard deviation	0.03256										
Portfolio Sharpe ratio	0.17067										

Figure 2: Portfolio 2 – Emerging Markets (Estimated Return)

This emerging equity market portfolio had a better performance compared to the developed equity market portfolio, since the former's standard deviation is marginally lower (0.03256) and its return for the level of risk exposed as expressed by the Sharpe ratio was also higher (0.17067) compared to the latter, 0.03580 and 0.15523 respectively.

The composition of the optimal portfolio when all the indices were included shows a different picture to the above portfolios, as shown in Portfolio 3 below. The highest constituents of the portfolio were the UK (24.14%) followed by Jordan (23.80%) and the USA (23.69%). The lowest contributor of the portfolio was Pakistan (2%), followed by the Czech Republic (4.04%).

Portfolio 3	All Markets - Estimated return					
Number of indices	6					
Equity Markets	UK	USA	PAKISTAN	CZECH REPUBLIC	JORDAN	MOROCCO
Index portfolio composition	24.14%	23.69%	2.00%	4.04%	23.80%	22.34%
Portfolio return	0.70%					
Portfolio standard deviation	0.02794					
Portfolio Sharpe ratio	0.19890					

Figure 3: Portfolio 3 - All Markets (Estimated Return)

This portfolio also had performances superior to both the developed and emerging equity portfolios discussed above. The standard deviation (0.02794) was significantly lower than the developed and emerging equity portfolios, 0.03256 and 0.03580 respectively. In addition, the Sharpe ratio (0.19890) was significantly higher than that achieved by the developed and emerging equity market portfolios, 0.15523 and 0.17067 respectively.

The inclusion of the entire portfolio during the studied period produced superior performance for investors compared to when investments in only developed or emerging equity markets were made. The risk levels were significantly lower and the return realised for the risk levels was also much higher when the entire population was included compared to when only the developed or emerging equity market indices were used to construct the portfolio.

During the studied period, the largest developed equity market constituent was the UK and largest emerging equity market constituents were Morocco and Jordan.

The lowest constituents of the emerging equity market portfolio were Taiwan, Chile, China and Pakistan, which were around 2% for Pakistan and less than 1% for the other indices. The optimal portfolio when all indices were considered consisted of only six indices, whereas the optimal emerging equity market portfolio consisted of 11 indices, the majority of which made up between 2% and 8% for the latter portfolio.

The evidence presented above shows that the dilution of the developed equity market portfolio by including emerging equity market indices reduces risks and increases the amount of returns for the level of risk exposed. The performance of the diversified equity market portfolio, which includes all indices, is much better than the performance of both the developed and that of the emerging equity market portfolios. These findings support the literature by Defusco, Geppert and Tsetsekos (1996) who stated that the independence of emerging markets is an indication of effective diversification.

Morocco and Jordan were the dominant emerging market indices in the portfolios which included emerging equity markets, whereas South Africa did not feature in any of the optimal portfolios. This supports the literature by Neaime (2006) which suggests that new, dynamic relationships exist in the volatility of returns in the (MENA) regions as most of these portfolios have constituents which are located in the MENA region.

5.4 Question 2

Does the estimation of future returns based on past average returns yield better portfolio performance than when target returns are set?

The optimal portfolios in Question 1 above were all based on the returns that an investor was aiming at achieving for a specific period, 0.7%. This section studied the performance of the same optimal portfolios, however, the optimal portfolio's returns were derived from the individual index average returns that were used in the optimal portfolio, instead of the investor setting their desired, target portfolio return. In addition, these portfolio performances were compared with each other in order to obtain the significance of the return component on the performance of the optimal portfolios. The average returns realized by the individual indices presented in **Table 1** were used to obtain the average return of the portfolios shown below.

Portfolio 4 shows the developed equity market optimal portfolio which achieved a return of 0.71% at a standard deviation of 0.03768 for a Sharpe ratio of 0.14959. The USA made up 68.7% of the portfolio and the UK made up the remaining 31.3%, whereas Portfolio 1 with the same indices had the UK making up 71.6% and the USA making up the remaining 28.4%.

Portfolio 4		Developed Markets - Past return
Number of indices	2	
Equity Markets	UK	USA
Index portfolio composition	31.3%	68.7%
Portfolio return	0.71%	
Portfolio standard deviation	0.03768	
Portfolio Sharpe ratio	0.14959	

Figure 4: Portfolio 4 - Developed Markets (Implied Return)

The performance of Portfolio 1 was better than that of Portfolio 4 in terms of the standard deviation and Sharpe ratio. Portfolio 4 exposed investors to 0.03768 standard deviation whereas the exposure in portfolio 1 was 0.03580 and the return for the risk exposed as measured by the Sharpe ratio was marginally higher at 0.15523 than in portfolio 4 (0.14959). The returns achieved by Portfolio 4 (0.71%) are marginally and insignificantly higher than the desired returns of Portfolio 1 (0.7%). **Table 4** below shows the variances in the performances of Portfolios 1 and 4 for the developed equity markets.

	Developed Markets		
Variances	**Estimated**	**Past**	**Variances**
Portfolio return	0.70%	0.71%	0.01%
Portfolio standard deviation	0.03580	0.03768	0.19%
Portfolio Sharpe ratio	0.15523	0.14959	-0.56%

Table 4: Developed market portfolio performance variances

According to these results, investors making use of past returns to obtain the performance of their developed equity market portfolio would realise higher risks and lower returns for those risks compared to investors who would set their desired returns. Moreover, the constituents of the portfolios would have changed significantly when the different return strategies are used.

The returns achieved by investments made only in the emerging equity market portfolio for the studied period were 1.15%, compared to the low 0.7% that the investor would have desired to obtain such as Portfolio 2. The standard deviation of portfolio 5 (0.03793) is much higher than that of Portfolio 2 (0.03256) and the Sharpe ratio (0.26594) is significantly higher than that of Portfolio 2 (0.17067).

Portfolio 5 was made up of nine emerging equity market indices, compared to 11 indices in Portfolio 2, shown in **Figure 5** below. Morocco (40.73%), had the highest contribution followed by Jordan (15.67%), which are significantly different portfolio compositions to those of Portfolio 2. Russia (0.1%) was the lowest contributor followed by Israel (1.21%) and Peru (5%). The inclusion of Russia, Hungary, Peru and Egypt in Portfolio 5 and the exclusion of Taiwan, Chile, China, Malaysia, Pakistan and the Philippines shows that different return strategies require different portfolio constituents and these result in differing optimal portfolio performances .

Portfolio 5	Emerging Markets - Past return								
Number of indices	9								
Equity Markets	RUSSIA	MEXICO	CZECH REPUBLIC	HUNGARY	ISRAEL	JORDAN	PERU	EGYPT	MOROCCO
Index portfolio composition	0.10%	3.72%	13.52%	6.12%	1.21%	15.67%	5.00%	13.94%	40.73%
Portfolio return	1.15%								
Portfolio standard deviation	0.03793								
Portfolio Sharpe ratio	0.26594								

Figure 5: Portfolio 5 - Emerging Markets (Implied Return)

These differences in performances are shown in the table below:

	Emerging Markets		
Variances	**Estimated**	**Past**	**Variances**
Portfolio return	0.70%	1.15%	0.45%
Portfolio standard deviation	0.03256	0.03793	0.54%
Portfolio Sharpe ratio	0.17067	0.26594	9.53%

Table 5: Emerging market portfolio performance variances

Although the standard deviation was higher for Portfolio 5, the return achieved for the risk exposed was compensated for at level 9.53% points higher than that of Portfolio 2. The returns based on past performance were also much higher than those which were desired, signalling that investors could potentially limit their investment benefits by stipulating the portfolio returns. These results clearly show that the average past returns of the individual indices have significantly higher performance benefits for investors compared to those of setting the desired portfolio return.

Portfolio 6 (**Figure 6** below) shows the optimal diversified portfolio when the entire sample of indices was used to construct a portfolio based on past returns. The portfolio had seven indices compared to the six constituents of Portfolio 3 and it obtained 1.05% in returns compared to the desired 0.7% of Portfolio 3. Portfolio 6 achieves returns which are higher than those of Portfolio 4 (0.71%) and lower than those of Portfolio 5 (1.15%), and it had a standard deviation of 0.03308, which is lower than when investments are made in only the developed (0.03768) or emerging (0.03793) equity markets, showing that diversification lowers the investment risks.

Portfolio 6	**All Markets - Past return**						
Number of indices	7						
Equity Markets	USA	CZECH REPUBLIC	HUNGARY	JORDAN	PERU	EGYPT	MOROCCO
Index portfolio composition	23.33%	12.85%	1.42%	13.55%	5.17%	11.22%	32.46%
Portfolio return	1.05%						
Portfolio standard deviation	0.03308						
Portfolio Sharpe ratio	0.27412						

Figure 6: Portfolio 6 – All Markets (Implied Return)

Table 6 below shows that the investor whose strategy used the past average returns would have achieved portfolio returns 0.35% points above the investor whose strategy was based on the desired portfolio return. Although the risks would have been higher for the past average return investor, the benefits achieved for the amount of risk exposure as shown by the Sharpe ratio would have been 7.52% points higher.

	All Markets		
Variances	**Estimated**	**Past**	**Variances**
Portfolio return	0.70%	1.05%	0.35%
Portfolio standard deviation	0.02794	0.03308	0.51%
Portfolio Sharpe ratio	0.19890	0.27412	7.52%

Table 6: All market portfolio performance variances

The results shown above illustrate that the portfolios constructed when the average past returns are used to predict future returns outperform the portfolios constructed when desired returns were used. In addition, based on the strategy chosen, the constituents of the portfolios differ to obtain the optimal diversified portfolio using emerging markets. These portfolio performances support the literature by Kim and Won (2004) since their construction minimised the known risk for acceptable returns.

5.5 Question 3

Does the inclusion of the South African equity market index improve portfolio diversification?

Portfolio 7 (**Figure 7** below) shows the optimal portfolio when the South African market index is included in the developed equity market portfolio. Using the average past return of 0.7% for the portfolio, the standard deviation (0.03825) is higher than that of both Portfolio 1 (0.03580) and Portfolio 4 (0.03768), signalling the added risk that including the South African index provides. The Sharpe ratio (0.14627) is lower than both Portfolio 1 (0.15523) and Portfolio 4 (0.14959), further suggesting that the inclusion of the South African index does not provide any superior return increases or risk reduction benefits for the developed equity market portfolio.

Portfolio 7		**Developed Markets - Past return**	
Number of indices	3		
Equity Markets	UK	USA	RSA
Index portfolio composition	26.88%	68.12%	5.00%
Portfolio return	0.70%		
Portfolio standard deviation	0.03825		
Portfolio Sharpe ratio	0.14627		

Figure 7: Portfolio 7 - Developed Markets with RSA (Implied Return)

Although the desired portfolio return (0.7%) and the past average return (0.7%) were the same for Portfolio 7 and Portfolio 8 (**Figure 8** below), the performance

and index compositions are different. Portfolio 8 had a lower standard deviation (0.03625) than Portfolio 7 (0.03825), suggesting that including the RSA index in a portfolio based on the desired return had risk reduction benefits for the studied period. In addition, Portfolio 8 had a marginally higher Sharpe ratio (0.15331) compared to Portfolio 7 (0.14627), further suggesting that the RSA inclusion into the portfolio had substantial return benefits for the risk exposure when the desired return levels are stipulated for the portfolio.

Portfolio 8		**Developed Markets - Estimated return**	
Number of indices	3		
Equity Markets	UK	USA	RSA
Index portfolio composition	68.69%	26.31%	5.00%
Portfolio return	0.70%		
Portfolio standard deviation	0.03625		
Portfolio Sharpe ratio	0.15331		

Figure 8: Portfolio 8 - Developed Markets with RSA (Estimated Return)

Shown below in **Figure 9** is Portfolio 9, depicting the performance of the emerging equity market when at least 5% of the portfolio is made up of the South African equity market index, and when using average past returns. As in previous emerging equity market portfolios, Morocco (39.57%) made up the bulk of the portfolio, followed by Jordan (14.59%) with South Africa being the 6th largest contributor of the portfolio which was made up of nine indices. The lowest contributor was Israel (0.76%), followed by Mexico (1.92%) and Peru (4.04%).

The portfolio return was 1.13%, marginally lower than Portfolio 5 (1.15%) when the RSA index was not required to be included in the portfolio. The inclusion of the RSA index, in Portfolio 9, had a standard deviation (0.03878) that was higher than that of Portfolio 5 (0.03793) and a Sharpe ratio (0.25517) that was lower than that of Portfolio 5 (0.26594). This suggests that the inclusion of South Africa in the emerging equity market portfolio did not have superior diversification benefits as both the risk and return components were not better than when the South African index was not required to be in the portfolio.

Portfolio 9	**Emerging Markets - Past return**								
Number of indices	9								
Equity Markets	RSA	MEXICO	CZECH REPUBLIC	HUNGARY	ISRAEL	JORDAN	PERU	EGYPT	MOROCCO
Index portfolio composition	5.00%	1.92%	13.32%	6.28%	0.76%	14.59%	4.04%	14.53%	39.57%
Portfolio return	1.13%								
Portfolio standard deviation	0.03878								
Portfolio Sharpe ratio	0.25517								

Figure 9: Portfolio 9 - Emerging Markets with RSA (Implied Return)

The inclusion of the South African index in the optimal portfolio constructed based on the desired return of 0.7% is shown in Portfolio 10 below. Contrary to the performance of Portfolio 9, Portfolio 10 showed lower standard deviation (0.03300) and Sharpe ratio (0.16840), whereas Portfolio 9 had 0.03878 and 0.25517 respectively. Moreover, Portfolio 10 underperforms both Portfolio 5 and Portfolio 9 in the return and Sharpe ratio components, however, as a risk reduction tool, by adding at least 5% of the RSA index, the investor would have a lower standard deviation for their desired return level.

Portfolio 10	Emerging Markets - Estimated return									
Number of indices	10									
Equity Markets	RSA	MALAYSIA	PAKISTAN	PHILIPPINES	MEXICO	TAIWAN	CZECH REPUBLIC	ISRAEL	JORDAN	MOROCCO
Index portfolio composition	5.00%	2.24%	2.29%	3.26%	2.01%	0.47%	7.78%	8.95%	32.77%	35.23%
Portfolio return	0.70%									
Portfolio standard deviation	0.03300									
Portfolio Sharpe ratio	0.16840									

Figure 10: Portfolio 10 - Developed Markets with RSA (Estimated Return)

The inclusion of at least 5% of the South African market index in the optimal portfolio composed of the entire sample, when past average returns were used, is shown in Portfolio 11 below. Of the eight indices that made up the optimal portfolio, RSA was the 5th largest contributor (5%), with Morocco and the USA being the largest contributors at 32.7% and 19.31% respectively.

Portfolio 11	All Markets - Past return							
Number of indices	8							
Equity Markets	USA	RSA	CZECH REPUBLIC	HUNGARY	JORDAN	PERU	EGYPT	MOROCCO
Index portfolio composition	19.31%	5.00%	12.62%	1.89%	12.76%	3.64%	12.08%	32.70%
Portfolio return	1.04%							
Portfolio standard deviation	0.03457							
Portfolio Sharpe ratio	0.26050							

Figure 11: Portfolio 11 - All Markets with RSA (Implied Return)

The returns achieved by this portfolio (1.04%) are marginally lower than those of Portfolio 6 (1.05%) when the RSA index was not required in the portfolio, whereas the standard deviation (0.03457) and the Sharpe ratio (0.26050) also suggest fewer benefits compared to Portfolio 6 which had 0.03308 and 0.27412 respectively.

Portfolio 12 below shows the performance of the optimal portfolio when the entire sample of developed and emerging equity market indices is considered for the desired portfolio return of 0.7% with the RSA index having at least 5% composition in the portfolio. The standard deviation (0.02879) and Sharpe ratio (0.19301) were significantly lower than those of Portfolio 9, 0.03457 and 0.26050 respectively. Although the number of constituent indices was lower in Portfolio 12 and the UK was included with a substantial portfolio contribution (22.66%), the diversification objectives of lowering risk were obtained.

Portfolio 12	**All Markets - Estimated return**						
Number of indices	7						
Equity Markets	UK	USA	RSA	PAKISTAN	ZECH REPUBL	JORDAN	MOROCCO
Index portfolio composition	22.66%	21.88%	5.00%	1.68%	2.90%	24.17%	21.71%
Portfolio return	0.70%						
Portfolio standard deviation	0.02879						
Portfolio Sharpe ratio	0.19301						

Figure 12: Portfolio 12 – All Markets with RSA (Estimated Return)

The results shown above suggest that the inclusion of RSA in the optimal portfolio has the impact of lowering the investment portfolio risk, and achieving the diversification objectives for developed and emerging equity market optimal portfolios. This evidence provides further support for Ferreira and Ferreira (2006), whose argument around country diversification allows investors to reduce their risk exposure has bearing on this study.

5.6 Question 4

What impact will varying the portfolio composition between developed and emerging market indices have on the performance of the portfolio?

Portfolio 13 shows the performance of the investment portfolio when 90% of the portfolio is comprised of developed equity market indices and the remaining 10% is comprised of the emerging equity market indices. The UK (62.46%) was the dominating index for the portfolio, with the USA (27.54%) making the remainder of the 90% for the developed equity market in the portfolio. For the emerging equity market to have 10% of the portfolio, the optimal portfolio comprised the Morocco (3.03%) and Jordan (6.97%) indices. The optimal portfolio had a standard deviation of 0.03313 and a Sharpe ratio of 0.16777, for the desired portfolio return of 0.7%.

Portfolio 13	**90 to 10**	**Developed to Emerging Markets - Estimated return**		
Number of indices	4			
Equity Markets	UK	USA	JORDAN	MOROCCO
Index portfolio composition	62.46%	27.54%	6.97%	3.03%
Portfolio return	0.70%			
Portfolio standard deviation	0.03313			
Portfolio Sharpe ratio	0.16777			
Developed market weight	90%			
Emerging market weight	10%			

Figure 13: Portfolio 13 – Developed to Emerging Markets 90:10 split (Estimated Return)

The changing of the portfolio constituents to comprise 80% of the developed equity market indices and the 20% to be made up of emerging equity market indices for the desired return of 0.7% is shown below in Portfolio 14. Again, the 4 indices of the UK (53.17%), USA (26.83%), Jordan (11.76%) and Morocco (8.24%) were included in the optimal portfolio. However, the composition of Morocco has more than doubled and that of Jordan has almost doubled as compared to Portfolio 13. Most of the weight has been shed from the UK index (about 9%) and less than 1% from the USA index weight has been shed to increase the weight of the emerging equity market composition.

The standard deviation of the optimal portfolio has dropped from 0.03313 in portfolio 13 to 0.03096 in Portfolio 14, whereas the Sharpe ratio has increased from 0.16777 to 0.17950 in Portfolio 14. This suggest that the more the emerging equity market composition increases the diversification benefits of increasing returns and lowering risks are being achieved.

Portfolio 14	**80 to 20**	**Developed to Emerging Markets - Estimated return**		
Number of indices	4			
Equity Markets	UK	USA	JORDAN	MOROCCO
Index portfolio composition	53.17%	26.83%	11.76%	8.24%
Portfolio return	0.70%			
Portfolio standard deviation	0.03096			
Portfolio Sharpe ratio	0.17950			
Developed market weight	80.0%			
Emerging market weight	20.0%			

Figure 14: Portfolio 14 – Developed to Emerging Markets 80:20 split (Estimated Return)

Portfolio 15 shows the effects of having 70% of the optimal portfolio comprising indices from the developed equity markets and the remaining 30% from the emerging equity market. Again, the UK (44.04%) has dropped a substantial amount of its weight in the portfolio compared to the USA (25.96%), whereas Jordan (16.05%) and Morocco (13.24%) have increased their weightings and Pakistan (0.72%) as an emerging equity market index has been included in the optimal portfolio.

The standard deviation has dropped from 0.03096 in Portfolio 14, when the developed equity market indices comprised 80% of the portfolio and the emerging equity market indices comprised 20% of the portfolio, to 0.02936 in Portfolio 15 when the ratio was 70:30 for the developed to emerging equity market indices. The Sharpe ratio has increased from 0.17950 in Portfolio 14 to 0.18927, suggesting that the more the portfolio comprises emerging equity market indices, the more the returns realised for the risk exposure.

Portfolio 15	**70 to 30**	**Developed to Emerging Markets - Estimated return**			
Number of indices	5				
Equity Markets	UK	USA	PAKISTAN	JORDAN	MOROCCO
Index portfolio composition	44.04%	25.96%	0.72%	16.05%	13.24%
Portfolio return	0.70%				
Portfolio standard deviation	0.02936				
Portfolio Sharpe ratio	0.18927				
Developed market weight	70%				
Emerging market weight	30%				

Figure 15: Portfolio 15 - Developed to Emerging Markets 70:30 split (Estimated Return)

As the contribution of the emerging equity market indices in the optimal portfolio is increased from 30% to 40% and the contribution of the developed equity market indices is decreased from 70% to 60% in Portfolio 16, the performance of the portfolio improves, as shown below. The standard deviation of Portfolio 16 has decreased from 0.02936 to 0.02837, whereas the portfolio Sharpe ratio has increased from 0.18927 to 0.19588.

Portfolio 16 shows the addition of the Czech Republic (1.23%) and the doubling of the Pakistan index composition from 0.72% to 1.45%. Morocco (17.59%) and Jordan (19.73%) continued to being the dominant indices for the emerging equity markets, whereas the UK (35.04%) was still the dominant index in the whole portfolio.

Portfolio 16	**60 to 40**	**Developed to Emerging Markets - Estimated return**				
Number of indices	6					
Equity Markets	UK	USA	PAKISTAN	CZECH REPUBLIC	JORDAN	MOROCCO
Index portfolio composition	35.04%	24.96%	1.45%	1.23%	19.73%	17.59%
Portfolio return	0.70%					
Portfolio standard deviation	0.02837					
Portfolio Sharpe ratio	0.19588					
Developed market weight	60%					
Emerging market weight	40%					

Figure 16: Portfolio 16 – Developed to Emerging Markets 60:40 split (Estimated Return)

The composition of Portfolio 17 was constructed to be equally developed equity market indices as well as emerging equity market indices, as shown below. The

performance of the portfolio showed marginal decreases in the standard deviation, from 0.02837 to 0.0796, and marginal increases in the Sharpe ratio, from 0.19588 to 0.19880, between Portfolio 16 and Portfolio 17 respectively.

The equity indices of the UK (26.06%), USA (23.94%), Jordan (23.08%) and Morocco (21.50%) made up 94.58% of the total portfolio, with the UK making up more than the other indices.

Portfolio 17	**50 to 50**	**Developed to Emerging Markets - Estimated return**				
Number of indices	6					
Equity Markets	UK	USA	PAKISTAN	CZECH REPUBLIC	JORDAN	MOROCCO
Index portfolio composition	26.06%	23.94%	1.90%	3.53%	23.08%	21.50%
Portfolio return	0.70%					
Portfolio standard deviation	0.02796					
Portfolio Sharpe ratio	0.19880					
Developed market weight	50%					
Emerging market weight	50%					

Figure 17: Portfolio 17 - Developed to Emerging Markets 50:50 split (Estimated Return)

The developed equity market indices made up 40% of the optimal portfolio, whereas the emerging equity market indices in the optimal portfolio made up 60% in Portfolio 18. There were nine indices with the inclusion of Malaysia (0.51%), Philippines (0.56%) and Peru (0.5%), with Jordan (25.87%) and Morocco (25.07%) being the dominant indices in the optimal portfolio.

The standard deviation of Portfolio 18 (0.02810) and the Sharpe ratio (0.19775) showed deterioration from Portfolio 17 which had a lower standard deviation (0.02796) and a higher Sharpe ratio (0.19880). This suggests that the diversification benefits were reached when equal weightings between the developed and emerging equity market indices were obtained.

However, the diversification benefits were superior in Portfolio 18 compared to Portfolio 16 which had a 60:40 developed to emerging equity market indices ratio, when the standard deviation (0.02837) was marginally higher than that of Portfolio 18 (0.02810) and the Sharpe ratio (0.19588) was marginally lower than that of Portfolio 18 (0.19775).

Portfolio 18	**40 to 60**	**Developed to Emerging Markets - Estimated return**							
Number of indices	9								
Equity Markets	UK	USA	MALAYSIA	PAKISTAN	PHILIPPINES	CZECH REPUBLIC	JORDAN	PERU	MOROCCO
Index portfolio composition	17.88%	22.12%	0.51%	2.20%	0.56%	5.29%	25.87%	0.50%	25.07%
Portfolio return	0.70%								
Portfolio standard deviation	0.02810389								
Portfolio Sharpe ratio	0.19775527								
Developed market weight	40%								
Emerging market weight	60%								

Figure 18: Portfolio 18 – Developed to Emerging Markets 40:60 split (Estimated Return)

Portfolio 19 below shows the composition of the optimal portfolio when 30% of the portfolio was made up of developed equity market indices and 70% was made up of the emerging equity market indices. The largest contributor became Morocco (28.06%) and the emerging equity market of Israel (1.94%) was introduced in the portfolio.

The standard deviation of Portfolio 19 increased from 0.028103 (Portfolio 18) to 0.02872. The Sharpe ratio decreased from 0.19775 (Portfolio 18) to 0.19350. However, when the ratio was 70:30 developed to emerging equity market ratio (Portfolio 15), the standard deviation was higher (0.02936) and the Sharpe ratio was lower (0.18927) than it was in Portfolio 19.

Portfolio 19	30 to 70	Developed to Emerging Markets - Estimated return									
Number of indices	10										
Equity Markets	UK	USA	MALAYSIA	PAKISTAN	PHILIPPINES	CZECH REPUBLIC	ISRAEL	JORDAN	PERU	MOROCCO
Index portfolio composition	11.61%	18.39%	1.03%	2.35%	1.63%	6.40%	1.94%	27.77%	0.81%	28.06%
Portfolio return	0.70%									
Portfolio standard deviation	0.028721035									
Portfolio Sharpe ratio	0.193505992									
Developed market weight	30%									
Emerging market weight	70%									

Figure 19: Portfolio 19 - Developed to Emerging Markets 30:70 split (Estimated Return)

Portfolio 20 had a standard deviation of 0.029708 and a Sharpe ratio of 0.18707, when 20% of the portfolio was made up of the developed equity market indices and 80% was made up of the emerging market indices. With ten indices, Morocco (30.92%) and Jordan (29.47%) dominated the portfolio composition and the UK had only 5.81% of the portfolio composition, whereas the USA was the dominant index for the developed equity market indices.

Compared to Portfolio 14, which had 80% of the portfolio made up of developed equity indices and the remaining 20% made up of the emerging equity indices,

Portfolio 20 had better diversification performance benefits. The standard deviation of Portfolio 20 (0.029708) was lower than that of portfolio 14 (0.03096) and the Sharpe ratio for Portfolio 20 (0.18707) was higher than that of Portfolio 14 (0.17950).

Portfolio 20	20 to 80	Developed to Emerging Markets - Estimated return								
Number of indices	10									
Equity Markets	UK	USA	MALAYSIA	PAKISTAN	PHILIPPINES	CZECH REPUBLIC	ISRAEL	JORDAN	PERU	MOROCCO
Index portfolio composition	5.81%	14.19%	1.55%	2.46%	2.63%	7.40%	4.52%	29.47%	1.06%	30.92%
Portfolio return	0.70%									
Portfolio standard deviation	0.02970803									
Portfolio Sharpe ratio	0.18707708									
Developed market weight	20%									
Emerging market weight	80%									

Figure 20: Portfolio 20 - Developed to Emerging Markets 20:80 split (Estimated Return)

Portfolio 21 had 12 indices, with 90% of the portfolio made up of emerging equity market indices and the remaining 10% made up of developed equity market indices. The emerging equity markets of China (0.12%) and Mexico (1.77%) indices were introduced and Morocco (33.99%) and Jordan (31.17%) were the dominant emerging equity market indices. The UK (0.47%) comprised the lowest developed equity market index, whereas the USA (9.33%) was the dominant develop equity market index.

The standard deviation of Portfolio 21 (0.03100) was higher than that of Portfolio 20 (0.029708) and lower than that of Portfolio 13 (0.03313), which had 90% of its constituents being the developed equity market indices and the remaining 10% being the emerging equity market indices. Similarly, the Sharpe ratio of Portfolio 21

(0.17924) was lower than that of Portfolio 20 (0.18707) and higher than that of Portfolio 13 (0.16777).

Portfolio 21	10 to 90	Developed to Emerging Markets - Estimated return										
Number of indices	12											
Equity Markets	UK	USA	CHINA	MALAYSIA	PAKISTAN	PHILIPPINES	MEXICO	CZECH REPUBLIC	ISRAEL	JORDAN	PERU	MOROCCO
Index portfolio composition	0.47%	9.53%	0.12%	2.04%	2.47%	3.27%	1.77%	8.09%	6.46%	31.17%	0.61%	33.99%
Portfolio return	0.70%											
Portfolio standard deviation	0.03100692											
Portfolio Sharpe ratio	0.17924039											
Developed market weight	10%											
Emerging market weight	90%											

Figure 21: Portfolio 21 - Developed to Emerging Markets 10:90 split (Estimated Return)

These findings suggest that the more the equity composition of index portfolios is weighted favourably towards the emerging equity markets, the more diversification benefits the portfolio produces. The evidence presented above illustrates that the risk components are reduced for the same returns when investment portfolios increase the percentage of emerging market indices and it supports the literature by Soydemir (2000) who stated that the combined effect of emerging markets has a significant impact on the USA and other developed markets.

However, as depicted in **Figure 1** below, the optimal portfolio is obtained when the split between the developed and emerging markets is equal in the portfolio. The more any of the two weighs more than the other, the more the risks exist and the less the returns are realised for the relative risk exposure. This suggests that an overbalance of one equity market over the other lowers diversification benefits.

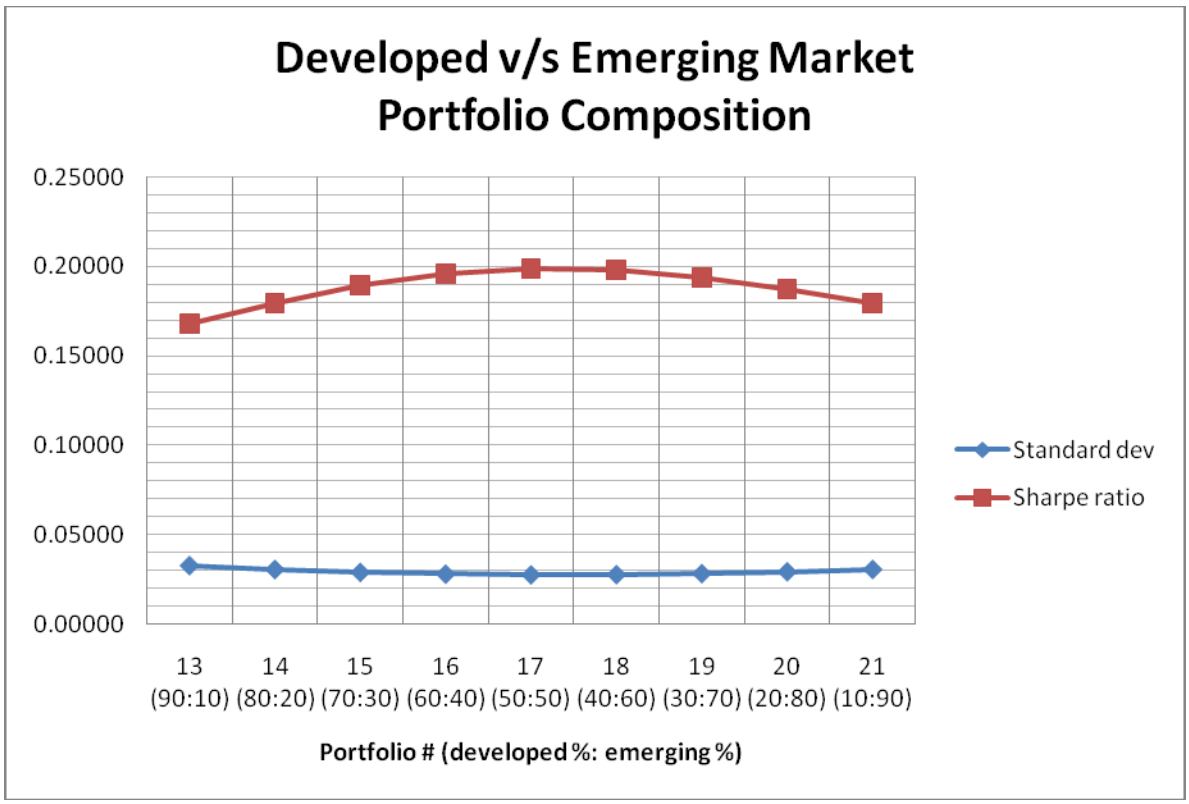

Figure 22: Split between the developed and emerging equity market composition

5.7 Question 5

How does portfolio performance and composition alter during the time frame of the study?

Portfolio 22 below shows the performance of the developed equity market using past average returns over the period 1995 to 1998. Over the 4-year period, the optimal portfolio comprised only the USA (100%) index. The portfolio return was 2.13% and the Sharpe ratio was 0.47793. The standard deviation was 0.04145, suggesting that due to no geographical diversification, the risk levels of the portfolio were substantially high. Moreover, investors in this portfolio would have been compensated for this risk exposure by means of the high expected returns.

Portfolio 22	**1995 to 1998**	**Developed Markets - Past return (4 yr)**
Number of indices	1	
Equity Markets	USA	
Index portfolio composition	100.0%	
Portfolio return	2.13%	
Portfolio standard deviation	0.041458	
Portfolio Sharpe ratio	0.477930	

Figure 23: Portfolio 22 - Developed Markets 1995 to 1998 (Implied Return)

Between 1999 and 2002, Portfolio 23 made a loss of 0.78%, when past average returns were used. Together with a high standard deviation of 0.041458 and negative returns for the risk exposure as measured by the Sharpe ratio, the optimal portfolio, which was 100% USA, did not provide any diversification benefits.

Portfolio 23	1999 to 2002	Developed Markets - Past return (4 yr)
Number of indices	1	
Equity Markets	USA	
Index portfolio composition	100.0%	
Portfolio return	-0.78%	
Portfolio standard deviation	0.041458	
Portfolio Sharpe ratio	-0.221798	

Figure 24: Portfolio 23 - Developed Markets 1999 to 2002 (Implied Return)

Portfolio 24 shows the optimal portfolio based on past average returns between 2003 and 2007 for developed equity markets. The portfolio returns were 1.17% and the return achieved for the risk exposed was 0.2783. However, as this portfolio had only the UK (100%) equity index, the standard deviation was high (0.036750) and the diversification benefits of risk reduction were not realised.

Portfolio 24	2003 to 2007	Developed Markets - Past return (5 yr)
Number of indices	1	
Equity Markets	UK	
Index portfolio composition	100%	
Portfolio return	1.17%	
Portfolio standard deviation	0.036750	
Portfolio Sharpe ratio	0.278302	

Figure 25: Portfolio 24 - Developed Markets 2003 to 2007 (Implied Return)

Portfolio 25, shown below, depicts the performance of the optimal portfolio when the past average returns of only emerging markets were used between the period 1995 to 1998. Morocco (75.32%) and Hungary (24.68%) were the constituents of this portfolio, which produced 2.03% returns, slightly lower than the developed equity market Portfolio 22 which had 2.13% returns. The standard deviation

(0.04641) was, however, higher than Portfolio 22 (0.041458) and the Sharpe ratio (0.40573) was lower than Portfolio 22 (0.477930), suggesting that it was better to invest in developed equity markets during this period since the risk and return components were favorable towards the developed equity market portfolio.

Portfolio 25	1995 to 1998	Emerging Markets - Past return (4 yr)
Number of indices	2	
Equity Markets	HUNGARY	MOROCCO
Index portfolio composition	24.68%	75.32%
Portfolio return	2.03%	
Portfolio standard deviation	0.04641565	
Portfolio Sharpe ratio	0.40573356	

Figure 26: Portfolio 25 - Emerging Markets 1995 to 1998 (Implied Return)

During the 1999 to 2002 investment period, the past average returns of emerging equity market indices that comprised the optimal portfolio are shown in Portfolio 26. Russia (47.8%) was the dominant index in the portfolio which produced 2.04% returns, contrary to the developed equity market index portfolio which only had the USA (100%) and produced a loss of 0.78%. The standard deviation of Portfolio 26 was substantially higher (0.10876) than that of Portfolio 23 (0.041458) over the same period, whereas the Sharpe ratio (0.17435) was significantly higher than the negative returns that were achieved by investors in Portfolio 23 (-0.22179).

Portfolio 26	1999 to 2002	Emerging Markets - Past return (4 yr)			
Number of indices	4				
Equity Markets	RUSSIA	KOREA	MALAYSIA	PAKISTAN	
Index portfolio composition	47.80%	1.80%	24.20%	26.20%	
Portfolio return	2.04%				
Portfolio standard deviation	0.10876425				
Portfolio Sharpe ratio	0.17435359				

Figure 27: Portfolio 26 - Emerging Markets 1999 to 2002 (Implied Return)

Portfolio 27 shows the performance of the emerging equity market optimal portfolio over the period 2003 to 2007, based on past average returns. The portfolio consisted of nine indices, dominated by Morocco (32.04%) followed by Jordan (21.58%) and it produced returns of 3.01%, with a standard deviation of 0.03773 and Sharpe ratio of 0.7589. Contrary to Portfolio 24 which produced lower returns of 1.17%, a marginally lower standard deviation of 0.036750 and substantially lower Sharpe ratio of 0.27832 when only the developed equity markets were included during the same period.

Portfolio 27	2003 to 2007	Emerging Markets - Past return (5 yr)							
Number of indices	9								
Equity Markets	CHINA	INDIA	PHILIPPINES	COLOMBIA	CZECH REPUBLIC	JORDAN	PERU	EGYPT	MOROCCO
Index portfolio composition	2.07%	0.74%	1.57%	5.88%	13.96%	21.58%	6.05%	16.11%	32.04%
Portfolio return	3.01%								
Portfolio standard deviation	0.03773204								
Portfolio Sharpe ratio	0.75897813								

Figure 28: Portfolio 27 - Emerging Markets 2003 to 2007 (Implied Return)

The dominant indices that made up Portfolio 28 during the 1995 to 1998 period when all the indices in the sample were considered were the USA (65.3%) and Morocco (34.7%). The past average returns of these indices produced a 2.07%

portfolio return, whereas the standard deviation was 0.03387 and the Sharpe ratio was 0.5681.

Portfolio 28 had a lower standard deviation to both Portfolio 22 (0.041458) and Portfolio 25 (0.046415), which had only the developed equity market and emerging equity market constituents respectively. The Sharpe ratio of Portfolio 28 was also higher than both Portfolio 22 (0.47793) and Portfolio 25 (0.40573).

Portfolio 28	**1995 to 1998**	**All Markets - Past return (4 yr)**
Number of indices	2	
Equity Markets	USA	MOROCCO
Index portfolio composition	65.3%	34.7%
Portfolio return	2.07%	
Portfolio standard deviation	0.03387296	
Portfolio Sharpe ratio	0.56816645	

Figure 29: Portfolio 28 - All Markets 1995 to 1998 (Implied Return)

The optimal portfolio based on past average returns for all equity markets, developed and emerging, during the period between 1999 and 2002 is shown in Portfolio 29. As can be seen, the index composition was similar to Portfolio 26, which only had emerging equity market indices. The portfolio returns were exactly the same (2.04%), however, insignificant differences between the index compositions as well as the standard deviations (0.10876) and Sharpe ratios (0.174355) existed.

Portfolio 29 suggests that during this period, no developed equity market diversification benefits existed, hence no inclusion of the UK and USA indices in the optimal portfolio which considered all equity indices in the sample data.

Portfolio 29	**1999 to 2002**	**All Markets - Past return (4 yr)**		
Number of indices	4			
Equity Markets	RUSSIA	KOREA	MALAYSIA	PAKISTAN
Index portfolio composition	47.82%	1.89%	24.06%	26.23%
Portfolio return	2.04%			
Portfolio standard deviation	0.10876274			
Portfolio Sharpe ratio	0.17435359			

Figure 30: Portfolio 29 - All Markets 1999 to 2002 (Implied Return)

During the last five years of the studied period, when the past average returns of both emerging and developed equity market indices were included, the constructed optimal portfolio is shown in Portfolio 30. The portfolio constituents are the same as Portfolio 27, which was only concerned about the optimal portfolio for emerging equity markets for this period. Similar to Portfolio 27, the portfolio returns were (3.01%), and insignificant differences existed between the standard deviations (0.03773) and the Sharpe ratios (0.7589).

Portfolio 30	2003 to 2007	All Markets - Past return (5 yr)							
Number of indices	9								
Equity Markets	CHINA	INDIA	PHILIPPINES	COLOMBIA	CZECH REPUBLIC	JORDAN	PERU	EGYPT	MOROCCO
Index portfolio composition	2.07%	0.74%	1.57%	5.88%	13.96%	21.58%	6.04%	16.11%	32.04%
Portfolio return	3.01%								
Portfolio standard deviation	0.03773189								
Portfolio Sharpe ratio	0.75897814								

Figure 31: Portfolio 30 - All Markets 2003 to 2007 (Implied Return)

Portfolio 30 also shows that during the period 2003 to 2007, the optimal portfolio does not include diversification benefits that give exposure to the developed equity markets of the UK and the USA.

The evidence presented above shows that the investment period is vital for diversification benefits for the developed and emerging equity market indices.

6 Conclusions and Recommendations

6.1 Summary

This study used monthly index prices to obtain the optimal portfolio of diversified indices. The emerging equity indices of Morocco and Jordan were dominant throughout the studied period and are the major components of the diversified optimal portfolio. These equity indices, together with Pakistan, have the lowest correlations and covariance values with the UK and the USA, whereas South Africa is amongst the highly correlated equity indices with the UK and the USA.

When the composition of the portfolio is split equally between the developed equity markets and the emerging equity markets, the optimal portfolio exists with the UK, USA, Morocco and Jordan having around 23% in weight and the remainder being made up of emerging equity markets. An overwhelming balance towards the emerging equity markets provides fewer returns for higher risks, however, an overwhelming balance towards the developed equity markets provides even worse diversification benefits.

The findings in this study indicate that the use of past, implied returns provide superior benefits for diversified investments, than estimated returns due to the performance levels being limited to the acceptable, target returns. These portfolio performances and compositions, however, tend to change throughout the studied

period. The performance of the portfolios had a tendency of having a few indices and biased towards the Morocco and USA indices prior to 2002. However, after 2003, the performance of the developed equity markets was based solely on the UK equity market and the emerging equity markets.

The most interesting outcome of this paper is that the inclusion of the South African equity index does provide diversification benefits, in terms of lowered risks and increased returns, to an equity market portfolio. However, when other emerging markets are considered, the diversified portfolio with other emerging markets performs much better.

The outcome of the tests performed on the indices and the portfolios indicates that emerging market diversification is a useful risk reduction tool for the studied period.

6.2 Recommendations

It is recommended that academia places greater emphasis on the education relating to investments in emerging markets. This will assist in making the investment professional more skillful in determining investment strategies and enhancing development in the respective emerging markets.

6.3 Suggestions for Further Research

It is recommended that further research be conducted on the reasons that can be attributed to Morocco, Jordan and Pakistan return correlations to the developed equity markets. These findings will shed some light on the reasons South Africa is not a highly suitable destination for diversification purposes.

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Appendix A: Equity Market Index Returns (1 January 1995 – 31 December 2007)

Returns	UK	USA	RSA	BRAZIL	CHINA	INDIA	RUSSIA	INDONESIA	KOREA	MALAYSIA	PAKISTAN	PHILIPPINES	ARGENTINA	CHILE	COLOMBIA	MEXICO	TAIWAN	THAILAND	CZECH REPUBLIC	HUNGARY	ISRAEL	JORDAN	PERU	POLAND	EGYPT	MOROCCO	TURKEY
31 January 1995	-1.82%	2.51%	-16.11%	-9.06%	-14.87%	-6.39%	-24.83%	-8.91%	-9.62%	-10.73%	-13.88%	-14.94%	-4.41%	-3.85%	7.18%	-24.67%	-13.08%	-12.61%	-10.66%	-25.80%	0.66%	0.75%	-21.12%	-20.19%	3.26%	4.63%	-12.76%
28 February 1995	0.28%	3.66%	7.21%	-16.29%	10.85%	-5.44%	-22.28%	8.03%	-2.16%	12.67%	4.98%	0.80%	-22.70%	-3.80%	-7.01%	-27.26%	3.04%	6.42%	0.68%	2.18%	-12.14%	-0.60%	-7.08%	5.21%	4.07%	4.93%	6.14%
31 March 1995	6.98%	2.44%	12.58%	-14.50%	0.16%	-3.86%	8.28%	-5.59%	8.01%	0.21%	-13.17%	-3.81%	16.99%	-0.09%	-11.02%	1.80%	0.76%	-5.29%	-13.34%	0.11%	13.16%	0.00%	4.27%	-2.83%	4.91%	7.25%	30.81%
28 April 1995	1.11%	2.89%	2.28%	17.71%	-11.32%	-5.19%	-27.88%	-4.58%	0.13%	-1.28%	-4.87%	1.13%	2.97%	8.40%	-8.46%	17.33%	-9.10%	0.48%	-0.23%	14.74%	5.01%	8.97%	30.44%	33.93%	0.26%	-0.70%	19.03%
31 May 1995	2.02%	3.64%	-2.73%	-0.27%	14.82%	3.88%	27.63%	14.78%	-1.31%	10.58%	-6.40%	15.15%	5.98%	8.83%	-0.47%	-3.11%	-2.80%	15.12%	-0.71%	0.66%	1.58%	7.69%	4.56%	-9.84%	-0.52%	-1.21%	-0.54%
30 June 1995	-0.17%	2.24%	0.13%	-2.62%	-1.39%	-3.65%	35.89%	3.95%	1.62%	-1.75%	6.66%	0.14%	-5.81%	2.20%	10.67%	9.02%	-5.35%	-0.88%	-4.31%	-3.39%	5.81%	-6.81%	-0.26%	6.71%	2.13%	-2.37%	-6.02%
31 July 1995	5.17%	3.16%	1.34%	3.47%	4.87%	3.79%	-0.03%	2.03%	3.83%	2.10%	9.74%	1.60%	4.88%	-6.11%	-4.93%	8.75%	-5.51%	-1.78%	3.95%	1.45%	0.91%	-3.26%	7.84%	-5.40%	-5.79%	-4.17%	6.15%
31 August 1995	-2.66%	-0.18%	0.60%	4.83%	-6.00%	-3.87%	-14.32%	-5.14%	-3.53%	-5.93%	-0.45%	-5.72%	-2.65%	-7.37%	-7.38%	3.35%	-10.17%	-5.72%	0.62%	0.04%	4.72%	-3.10%	1.17%	-4.03%	1.34%	-3.89%	-21.69%
29 September 1995	2.71%	4.21%	2.05%	4.89%	-4.67%	-3.21%	-5.05%	-2.83%	9.01%	-1.95%	-11.22%	-4.84%	-2.80%	-2.83%	-5.90%	-6.22%	4.91%	-0.61%	6.82%	-0.58%	1.65%	-1.06%	-3.10%	6.82%	0.98%	4.29%	-8.54%
31 October 1995	-0.38%	-0.23%	2.09%	-9.81%	-6.42%	-2.69%	-16.95%	1.31%	1.69%	-5.72%	-14.94%	-8.49%	-5.87%	-2.68%	-7.56%	-14.16%	-4.08%	-1.68%	-0.69%	-12.73%	-5.96%	-1.46%	-6.68%	-10.76%	-1.48%	4.37%	8.94%
30 November 1995	0.33%	4.13%	2.10%	-0.30%	-7.40%	-15.77%	-4.22%	-4.74%	-8.27%	0.13%	-14.05%	-0.48%	13.56%	-5.15%	-7.03%	8.30%	-2.28%	-6.21%	-8.27%	-1.86%	0.30%	-4.29%	2.93%	-2.18%	1.37%	0.72%	-24.09%
29 December 1995	2.35%	1.33%	4.43%	-1.98%	-4.74%	3.97%	10.91%	8.92%	-4.17%	5.55%	9.38%	6.91%	8.17%	6.09%	9.40%	2.61%	7.65%	6.92%	2.30%	3.84%	4.02%	8.43%	6.99%	-2.41%	0.13%	3.73%	-3.52%
31 January 1996	-0.41%	3.34%	8.45%	15.84%	14.24%	-10.11%	2.03%	12.38%	-2.39%	3.51%	5.06%	9.66%	11.26%	-4.19%	-2.54%	11.02%	-7.45%	8.77%	2.54%	37.95%	-1.32%	-2.96%	5.83%	28.34%	-8.00%	-3.15%	16.36%
29 February 1996	0.54%	0.87%	-8.35%	-4.70%	2.92%	19.89%	-10.86%	1.68%	-2.14%	3.63%	8.69%	-1.67%	-15.41%	-1.34%	5.52%	-9.60%	1.85%	-5.92%	6.48%	0.35%	3.99%	-1.26%	-2.53%	0.81%	3.35%	3.55%	11.06%
29 March 1996	-0.83%	0.84%	-2.22%	-1.74%	-4.71%	1.00%	4.48%	-1.59%	2.13%	6.18%	-8.62%	-1.99%	3.51%	-3.79%	-7.63%	7.71%	5.33%	-2.16%	7.61%	-0.80%	-8.74%	-3.58%	-1.96%	-1.04%	-4.05%	5.80%	2.15%
30 April 1996	1.66%	1.30%	-4.38%	1.04%	-5.44%	11.65%	33.29%	7.88%	11.02%	5.10%	1.07%	2.65%	9.56%	6.05%	12.19%	5.33%	22.31%	1.82%	5.54%	1.71%	5.69%	1.61%	7.23%	4.62%	-2.05%	5.64%	-5.14%
31 May 1996	0.88%	2.47%	-2.63%	7.33%	3.90%	-3.82%	31.33%	-3.05%	-12.78%	-4.21%	11.54%	10.57%	2.07%	-1.93%	-5.38%	0.53%	-3.55%	1.61%	3.53%	10.13%	-4.85%	-3.83%	-4.52%	-5.04%	1.75%	1.99%	-7.33%
28 June 1996	-0.87%	0.42%	0.62%	4.72%	1.18%	3.30%	35.23%	-2.34%	-11.96%	0.37%	-4.01%	1.71%	1.78%	4.78%	-0.85%	-1.52%	12.46%	-5.85%	-0.95%	6.51%	-3.08%	-8.42%	3.71%	13.21%	-0.07%	2.55%	10.42%
31 July 1996	0.41%	-4.67%	-8.63%	-1.23%	-4.08%	-8.96%	-29.77%	-12.27%	-3.70%	-6.38%	-17.76%	-7.80%	-14.81%	-1.72%	-1.03%	-6.76%	-8.41%	-15.52%	4.51%	-14.52%	-10.23%	-1.87%	1.95%	-4.74%	9.76%	3.20%	-15.98%
30 August 1996	4.77%	2.05%	0.95%	1.67%	-0.34%	-2.15%	21.04%	3.35%	-5.44%	5.24%	-4.04%	5.66%	-1.66%	-3.44%	-0.13%	8.83%	4.08%	1.24%	6.81%	18.34%	5.04%	3.53%	2.96%	8.27%	3.94%	0.25%	-1.73%
30 September 1996	2.02%	5.29%	0.73%	1.85%	-1.17%	-8.54%	-11.44%	6.40%	-1.23%	1.58%	-4.84%	-2.46%	8.64%	1.54%	6.09%	-0.16%	2.35%	-0.27%	-6.98%	-5.12%	2.10%	2.30%	-0.56%	4.03%	10.31%	4.36%	9.09%
31 October 1996	4.36%	2.37%	-2.12%	2.54%	-2.69%	-2.22%	8.86%	-0.73%	-6.49%	1.95%	-0.79%	-7.99%	-0.72%	-2.16%	3.37%	-6.21%	-3.21%	-21.47%	-11.10%	3.92%	-3.42%	-1.92%	-7.37%	-9.82%	1.90%	3.06%	4.39%
29 November 1996	5.28%	7.14%	-2.08%	0.07%	10.92%	-9.32%	2.74%	8.46%	-1.86%	4.00%	4.86%	4.84%	6.45%	-6.53%	-2.44%	3.80%	5.48%	2.36%	1.33%	3.96%	5.97%	-0.76%	-5.73%	3.42%	16.54%	-1.30%	5.49%
31 December 1996	3.14%	-2.06%	-2.76%	4.83%	15.33%	5.43%	5.13%	2.46%	-13.58%	0.96%	-12.70%	2.31%	4.90%	-5.21%	-0.75%	2.49%	1.61%	-12.34%	5.80%	8.97%	4.89%	5.07%	-1.80%	3.17%	4.62%	2.33%	-1.10%
31 January 1997	-3.24%	6.48%	3.18%	10.81%	-2.24%	8.63%	32.27%	5.89%	5.14%	1.40%	18.71%	9.21%	8.63%	9.78%	10.73%	8.26%	4.19%	-5.99%	3.70%	26.88%	12.94%	-1.05%	9.66%	8.70%	26.76%	3.58%	42.27%
28 February 1997	2.83%	0.56%	8.70%	9.69%	2.90%	6.64%	16.66%	1.15%	-4.93%	4.25%	5.34%	-3.64%	0.72%	5.15%	10.07%	3.51%	5.91%	-8.89%	2.92%	-3.02%	2.74%	2.26%	5.32%	6.39%	16.78%	6.09%	0.09%
31 March 1997	0.79%	-4.73%	0.84%	-1.47%	-2.92%	-8.43%	-8.13%	-7.67%	-3.54%	-5.80%	-6.62%	-3.13%	-2.20%	-3.10%	0.69%	-2.23%	-1.01%	-1.60%	-8.34%	-2.21%	-4.91%	-1.90%	2.58%	-8.05%	-1.90%	16.29%	-3.56%
30 April 1997	1.57%	6.24%	0.04%	6.69%	12.40%	11.92%	7.79%	-3.01%	3.42%	-11.97%	-3.77%	-18.58%	4.78%	3.18%	6.98%	0.36%	6.17%	-5.32%	-11.85%	7.36%	1.78%	-0.55%	5.93%	-6.22%	-1.06%	7.08%	-17.41%
30 May 1997	4.22%	5.38%	-2.57%	6.08%	-2.23%	-1.61%	11.68%	6.60%	7.52%	1.84%	-0.72%	3.79%	7.15%	8.09%	3.24%	5.60%	-4.23%	-12.65%	-13.30%	4.16%	8.01%	9.27%	9.60%	-3.45%	-10.00%	-8.44%	8.06%
30 June 1997	1.13%	4.33%	3.81%	9.52%	1.92%	13.91%	17.32%	2.32%	1.65%	-2.79%	5.55%	-0.67%	2.06%	2.92%	-2.84%	10.64%	12.56%	-9.16%	2.32%	11.58%	1.53%	1.10%	-0.68%	-7.19%	0.74%	1.67%	8.73%
31 July 1997	4.34%	7.49%	0.84%	2.64%	12.70%	1.23%	15.25%	-10.65%	-3.74%	-10.34%	25.98%	-13.13%	6.72%	0.68%	0.04%	13.91%	7.94%	9.21%	-0.44%	9.48%	7.68%	-1.10%	-7.06%	-6.55%	-5.25%	-2.20%	-3.15%
29 August 1997	-1.89%	-6.24%	-4.49%	-16.80%	5.71%	-11.53%	-5.52%	-52.47%	-3.30%	-36.11%	-15.42%	-34.65%	-3.03%	-5.47%	5.07%	-8.40%	-4.21%	-41.56%	10.64%	-6.62%	-6.09%	-1.80%	-1.01%	10.02%	5.77%	3.41%	-2.75%
30 September 1997	8.10%	4.97%	-2.28%	10.18%	-18.19%	1.59%	7.29%	7.07%	-10.42%	-7.76%	6.21%	-12.66%	3.59%	0.99%	4.64%	13.66%	-12.55%	11.16%	2.34%	6.50%	4.09%	-0.15%	0.21%	4.81%	3.41%	-0.34%	20.70%
31 October 1997	-4.11%	-2.89%	-11.71%	-27.67%	-17.71%	-3.49%	-15.48%	-16.06%	-37.48%	-23.69%	-5.64%	-13.17%	-20.74%	-10.78%	-1.05%	-20.55%	-24.68%	-41.63%	-8.60%	-6.03%	-9.02%	-6.86%	-10.51%	-16.88%	-3.76%	2.60%	5.59%
28 November 1997	0.25%	4.61%	-4.95%	2.91%	-19.98%	-11.43%	-23.95%	-27.30%	-28.81%	-24.02%	-5.83%	-2.05%	7.68%	-7.74%	-9.18%	9.26%	0.94%	-10.75%	-10.11%	-3.19%	2.01%	-1.03%	-0.35%	-11.26%	-7.97%	0.18%	-1.86%
31 December 1997	3.47%	1.35%	-2.59%	8.41%	-3.01%	1.72%	19.76%	-42.70%	-37.12%	-0.87%	-2.12%	-10.66%	4.42%	-1.70%	3.67%	7.61%	1.84%	-18.79%	3.08%	21.09%	-0.12%	0.01%	2.62%	2.83%	-1.10%	-1.72%	18.14%

Returns	UK	USA	RSA	BRAZIL	CHINA	INDIA	RUSSIA	INDONESIA	KOREA	MALAYSIA	PAKISTAN	PHILIPPINES	ARGENTINA	CHILE	COLOMBIA	MEXICO	TAIWAN	THAILAND	CZECH REPUBLIC	HUNGARY	ISRAEL	JORDAN	PERU	POLAND	EGYPT	MOROCCO	TURKEY
30 January 1998	4.53%	1.16%	4.14%	-9.03%	-29.36%	-10.97%	-35.72%	-42.25%	53.40%	-11.97%	-9.20%	-1.09%	-9.86%	-16.05%	-6.08%	-15.13%	-5.72%	29.45%	-10.88%	-9.62%	-8.97%	-0.86%	-12.10%	-1.52%	-8.06%	-0.10%	-4.78%
27 February 1998	6.50%	6.67%	4.71%	7.32%	30.37%	10.02%	16.02%	13.92%	-6.36%	40.52%	1.85%	24.58%	6.19%	9.58%	-15.29%	3.43%	19.27%	18.28%	10.96%	10.26%	4.34%	-4.08%	-4.20%	24.54%	0.68%	5.58%	-10.51%
31 March 1998	4.94%	4.95%	6.02%	7.99%	-2.80%	6.81%	5.48%	16.40%	-1.11%	-2.70%	-9.35%	6.33%	4.36%	6.56%	-4.66%	4.94%	-5.49%	-11.81%	6.04%	10.84%	6.80%	-0.91%	10.41%	-5.91%	5.10%	2.47%	-9.38%
30 April 1998	0.01%	1.06%	8.42%	-4.48%	-11.00%	2.05%	-2.43%	-13.33%	-3.31%	-17.16%	0.19%	-10.45%	-1.53%	-7.29%	3.56%	2.01%	-9.90%	-10.35%	4.28%	-3.09%	-0.09%	-0.19%	4.61%	9.30%	-4.06%	11.18%	20.56%
29 May 1998	-3.97%	-2.13%	-12.79%	-17.22%	-14.96%	-12.68%	-50.02%	-42.31%	-28.64%	-19.61%	-47.63%	-3.70%	-13.32%	-9.82%	-9.11%	-14.74%	-10.09%	-32.05%	-10.00%	-14.63%	6.76%	-1.70%	-2.93%	-13.01%	-10.81%	5.23%	-18.25%
30 June 1998	1.32%	4.10%	-27.00%	-3.94%	-17.46%	-13.96%	-24.18%	-19.28%	-10.00%	-25.89%	-28.49%	-20.21%	-5.25%	-8.93%	-6.10%	-6.41%	-6.64%	-32.38%	5.71%	6.11%	-1.36%	-8.47%	-7.10%	-0.21%	-4.96%	-2.70%	4.80%
31 July 1998	-2.23%	-1.10%	-1.72%	8.28%	-19.95%	-1.32%	1.97%	23.74%	26.87%	-11.43%	-2.03%	-10.16%	6.20%	5.92%	-6.43%	-1.31%	-1.78%	4.70%	8.80%	9.02%	-1.97%	-0.59%	0.88%	7.85%	-1.64%	0.05%	2.64%
31 August 1998	-7.75%	-15.11%	-36.88%	-49.44%	-32.42%	-8.88%	-93.08%	-26.91%	-18.06%	-32.80%	4.78%	-31.67%	-38.43%	-34.40%	-27.59%	-41.95%	-18.65%	-29.67%	-32.39%	-49.09%	-13.01%	-0.57%	-40.98%	-42.98%	-12.17%	6.82%	-49.68%
30 September 1998	-2.29%	6.25%	15.56%	3.59%	35.91%	4.77%	-48.30%	-30.31%	-2.54%	-7.09%	13.97%	12.24%	13.76%	6.08%	-14.64%	17.42%	8.04%	31.01%	3.28%	-1.55%	-3.29%	-4.76%	-1.68%	3.91%	7.26%	-0.47%	-17.23%
30 October 1998	5.70%	7.34%	17.72%	3.83%	9.48%	-7.98%	43.63%	44.20%	27.58%	9.66%	-34.99%	36.01%	12.85%	7.56%	-4.34%	11.33%	12.08%	32.65%	10.51%	16.02%	-6.36%	-5.98%	-1.03%	8.75%	-9.14%	-3.71%	-4.33%
30 November 1998	4.16%	6.47%	-4.07%	15.97%	3.13%	-1.82%	33.19%	43.14%	17.17%	22.97%	30.43%	13.19%	3.20%	14.98%	26.48%	-6.36%	6.14%	14.96%	-2.50%	8.33%	6.79%	5.06%	16.52%	-6.61%	-2.36%	-3.36%	11.03%
31 December 1998	2.91%	5.64%	-9.56%	-21.00%	-8.61%	7.99%	-24.70%	-6.18%	31.53%	16.45%	-12.57%	-3.20%	-10.07%	-10.80%	4.66%	4.46%	-11.40%	-4.13%	5.53%	8.31%	2.11%	7.67%	-17.06%	7.50%	2.03%	-0.90%	-1.52%
29 January 1999	-1.25%	4.13%	5.30%	-33.64%	-20.55%	11.27%	-5.47%	-3.20%	3.29%	1.52%	-8.91%	-0.99%	-5.00%	-2.67%	-27.18%	-1.29%	-3.00%	2.36%	-9.46%	5.30%	2.47%	6.08%	-2.39%	15.85%	28.04%	3.77%	-6.00%
26 February 1999	2.00%	-2.94%	-0.60%	6.89%	-4.34%	-3.40%	31.12%	-4.24%	-11.98%	9.61%	2.72%	0.17%	0.90%	4.44%	6.54%	9.36%	4.69%	-10.01%	-23.29%	-16.07%	2.23%	5.15%	2.68%	-22.23%	-5.74%	-4.33%	34.92%
31 March 1999	2.87%	3.97%	6.87%	31.12%	12.05%	15.41%	23.28%	2.49%	15.46%	-7.79%	19.88%	5.09%	8.20%	12.92%	3.10%	16.83%	9.25%	5.79%	12.85%	-5.67%	10.03%	-1.05%	4.92%	8.60%	-1.26%	-6.90%	11.86%
30 April 1999	3.61%	3.45%	11.22%	10.95%	22.30%	-13.45%	15.15%	33.36%	23.56%	32.85%	1.56%	21.47%	25.80%	7.05%	24.20%	11.06%	8.37%	35.90%	4.55%	5.26%	0.62%	-7.46%	12.47%	11.93%	-1.92%	-3.08%	11.38%
31 May 1999	-5.90%	-2.46%	-11.37%	-4.19%	-1.30%	17.12%	4.21%	18.75%	0.19%	10.85%	6.53%	-5.45%	-4.54%	-3.48%	-3.24%	-2.87%	-4.27%	-4.30%	20.93%	5.64%	3.14%	-2.32%	-1.36%	0.77%	-1.01%	-5.78%	-11.82%
30 June 1999	0.06%	5.14%	13.86%	3.94%	38.19%	3.42%	16.42%	26.99%	25.97%	9.97%	-17.15%	3.16%	-4.41%	5.57%	-26.48%	8.22%	19.90%	16.09%	-1.59%	-4.40%	3.16%	-0.89%	1.04%	11.56%	6.86%	3.21%	-5.31%
30 July 1999	1.30%	-3.40%	-3.36%	-10.62%	-13.35%	10.28%	-3.27%	-14.86%	3.92%	-4.83%	20.54%	-10.19%	-6.03%	-0.25%	-7.48%	-10.15%	-13.20%	-13.60%	10.71%	13.29%	-3.09%	0.38%	-1.08%	2.29%	-1.66%	4.00%	12.01%
31 August 1999	-0.60%	-0.74%	-1.35%	-3.98%	-0.88%	8.57%	-16.79%	-16.29%	1.88%	15.42%	-5.03%	-9.92%	4.25%	-1.72%	-7.72%	-3.33%	11.58%	-3.17%	-4.42%	-1.88%	-9.42%	-2.95%	-4.46%	-2.32%	-5.94%	2.30%	-18.63%
30 September 1999	-1.85%	-3.12%	0.93%	4.36%	-4.25%	-0.06%	-17.70%	-12.32%	-15.97%	-14.09%	-0.77%	-6.99%	3.09%	-4.39%	-0.91%	-1.33%	-6.82%	-21.90%	0.62%	-12.03%	2.26%	-2.92%	5.05%	-24.13%	5.63%	-1.32%	14.18%
29 October 1999	2.67%	6.24%	4.08%	3.35%	-8.64%	-7.34%	15.53%	29.56%	1.22%	12.22%	-1.15%	1.66%	-0.36%	-3.81%	2.37%	5.15%	3.37%	13.01%	-3.17%	3.61%	5.07%	-0.39%	-6.26%	3.16%	8.83%	-1.24%	6.08%
30 November 1999	1.02%	2.02%	4.75%	17.21%	-1.92%	6.05%	13.99%	-13.17%	19.74%	-1.19%	3.98%	-4.78%	-0.47%	9.03%	13.17%	13.13%	1.02%	4.46%	-6.02%	3.15%	11.11%	2.10%	3.37%	3.77%	11.50%	-3.69%	20.58%
31 December 1999	5.36%	6.65%	12.48%	22.58%	-7.83%	13.47%	47.71%	18.17%	-3.01%	10.40%	13.03%	9.06%	4.86%	8.37%	1.56%	13.14%	10.67%	13.74%	2.19%	14.06%	17.10%	6.24%	1.16%	17.39%	15.55%	-2.00%	54.41%
31 January 2000	-9.81%	-5.60%	-2.75%	-5.77%	-4.47%	10.21%	-8.62%	-13.28%	1.07%	13.81%	23.62%	-9.15%	4.71%	4.59%	11.74%	-10.71%	15.14%	-2.86%	12.16%	6.86%	0.32%	-4.47%	10.47%	3.74%	9.63%	-3.78%	4.74%
29 February 2000	-3.42%	-2.50%	-2.81%	4.06%	-20.28%	16.81%	-2.65%	-9.75%	-15.53%	7.07%	6.11%	-17.45%	12.50%	-3.06%	-16.70%	12.82%	-4.36%	-25.97%	12.97%	9.06%	23.86%	-5.69%	8.03%	14.05%	-9.71%	-7.86%	-4.89%
31 March 2000	6.91%	9.42%	-5.21%	3.62%	2.01%	-10.83%	31.89%	-0.91%	10.92%	-0.93%	4.89%	-1.18%	-11.12%	-0.48%	-2.38%	2.31%	3.81%	9.66%	1.00%	-3.50%	-10.03%	1.61%	-10.52%	-0.40%	-2.01%	2.40%	-6.36%
28 April 2000	-4.46%	-3.38%	-9.80%	-14.33%	8.43%	-17.49%	-2.10%	-14.19%	-12.20%	-8.15%	-5.21%	-7.65%	-9.52%	-7.49%	-6.98%	-11.69%	-12.14%	-6.56%	-12.31%	-20.32%	-2.85%	-2.20%	-5.15%	-16.85%	-12.75%	-9.54%	22.08%
31 May 2000	-3.63%	-2.78%	-2.92%	-1.60%	0.79%	-12.74%	-16.32%	-30.78%	-1.56%	2.96%	-24.20%	-10.26%	-6.70%	1.44%	-17.70%	-11.08%	2.04%	-23.56%	-2.14%	1.90%	3.97%	-6.31%	-10.82%	-0.31%	1.11%	5.72%	-14.65%
30 June 2000	0.73%	2.28%	5.87%	11.47%	12.37%	9.58%	-8.45%	10.99%	12.99%	-11.14%	-3.36%	0.84%	5.95%	-3.84%	-12.83%	11.49%	-7.77%	3.99%	-6.60%	-3.30%	6.86%	-2.93%	2.79%	0.96%	-15.11%	1.52%	-12.63%
31 July 2000	0.50%	-1.90%	-2.25%	-1.12%	-1.93%	-11.62%	11.26%	-6.82%	-17.54%	-4.94%	-0.33%	-15.56%	-4.54%	-4.52%	13.00%	-2.41%	-2.63%	-25.21%	7.71%	-5.35%	1.18%	-4.79%	-4.79%	-4.78%	-10.78%	-10.84%	-7.07%
31 August 2000	0.88%	4.98%	9.84%	2.24%	-4.16%	4.32%	17.51%	1.08%	-3.24%	-0.98%	-4.73%	7.90%	-3.36%	1.60%	-15.01%	4.57%	-6.60%	12.94%	-10.65%	-8.86%	13.27%	-3.78%	2.61%	-5.16%	-2.80%	3.57%	-9.30%
29 September 2000	-2.96%	-5.69%	-6.63%	-6.67%	-13.31%	-11.57%	-19.89%	-14.88%	-13.29%	-12.87%	-4.52%	-8.05%	-4.18%	-2.31%	-0.29%	-8.24%	-17.53%	-21.92%	-8.42%	-5.94%	2.62%	1.09%	-11.20%	-12.45%	-11.03%	-1.52%	-17.73%
31 October 2000	0.53%	-0.81%	-8.66%	-8.16%	-4.82%	-9.06%	-6.32%	-13.04%	-20.97%	6.26%	-3.92%	-18.83%	-7.43%	-4.19%	0.60%	2.09%	-13.89%	-3.33%	0.46%	-5.45%	-12.90%	1.82%	-6.05%	-11.54%	-9.76%	-5.17%	15.79%
30 November 2000	-6.25%	-8.33%	-7.24%	-11.93%	-14.30%	7.00%	-35.17%	2.26%	-6.78%	-2.61%	-19.36%	10.13%	-9.99%	-0.40%	-1.52%	-10.76%	-8.02%	4.02%	-19.76%	-19.58%	-14.54%	-0.41%	-7.83%	9.25%	5.70%	-4.32%	-41.22%
29 December 2000	6.43%	-0.26%	10.74%	12.86%	0.80%	-0.52%	2.62%	-10.20%	-3.88%	-7.42%	16.79%	8.95%	3.46%	0.05%	-5.00%	-2.62%	-8.48%	-4.90%	26.30%	22.10%	10.34%	-2.24%	1.38%	18.79%	-3.79%	2.58%	9.31%

Returns	UK	USA	RSA	BRAZIL	CHINA	INDIA	RUSSIA	INDONESIA	KOREA	MALAYSIA	PAKISTAN	PHILIPPINES	ARGENTINA	CHILE	COLOMBIA	MEXICO	TAIWAN	THAILAND	CZECH REPUBLIC	HUNGARY	ISRAEL	JORDAN	PERU	POLAND	EGYPT	MOROCCO	TURKEY
31 January 2001	-1.69%	3.50%	5.79%	11.05%	13.57%	8.42%	17.75%	9.81%	24.27%	7.53%	-5.80%	17.13%	25.64%	8.17%	14.59%	14.05%	25.65%	26.91%	6.40%	5.36%	-0.52%	3.34%	11.19%	-1.22%	3.23%	-4.72%	14.29%
28 February 2001	-7.18%	-9.49%	0.26%	-10.91%	-9.59%	-3.70%	-8.76%	-1.17%	-7.70%	-2.37%	-5.22%	-5.28%	-21.04%	-7.94%	2.45%	-7.42%	-7.52%	-3.86%	-10.56%	-19.83%	-15.65%	1.17%	0.26%	-12.64%	-12.44%	10.39%	-53.18%
30 March 2001	-5.10%	-6.68%	-15.99%	-12.97%	-17.75%	-19.53%	-0.78%	-20.65%	-15.88%	-9.34%	-8.82%	-13.23%	1.74%	-3.08%	-13.57%	-3.64%	-1.55%	-19.03%	-10.27%	-12.26%	-20.94%	0.67%	-0.83%	-7.87%	-8.89%	-4.74%	-20.01%
30 April 2001	5.95%	7.41%	10.91%	3.82%	9.57%	-2.30%	8.68%	-17.76%	13.09%	-11.02%	3.52%	-3.83%	-2.75%	4.98%	1.39%	8.93%	-7.32%	1.49%	-0.81%	5.39%	12.67%	-2.32%	-9.40%	4.84%	3.64%	-7.71%	36.90%
31 May 2001	-3.58%	0.45%	5.60%	-5.53%	1.92%	3.59%	15.80%	20.66%	7.30%	-2.59%	-4.15%	1.78%	1.04%	6.97%	22.01%	7.58%	-7.22%	0.83%	4.08%	2.39%	-4.98%	3.82%	6.67%	1.76%	4.85%	-3.67%	-14.12%
29 June 2001	-3.60%	-2.38%	-3.96%	-1.90%	3.16%	-5.66%	-1.70%	4.69%	-5.81%	3.53%	-4.59%	-0.91%	-6.81%	-6.83%	2.93%	1.36%	-3.62%	2.25%	-4.01%	-3.88%	-1.10%	0.69%	6.99%	-14.69%	-9.12%	-4.38%	-6.07%
31 July 2001	0.06%	-1.04%	-12.57%	-7.92%	-14.54%	-3.85%	-10.42%	18.71%	-7.50%	11.96%	-13.16%	-4.53%	-23.69%	-4.88%	-3.35%	-3.43%	-11.63%	-10.86%	-7.31%	-2.02%	-0.21%	3.56%	-3.02%	-12.57%	-11.56%	-4.59%	-16.64%
31 August 2001	-1.44%	-7.03%	4.11%	-9.20%	-24.44%	-1.89%	4.92%	4.53%	3.24%	4.80%	2.85%	-4.90%	0.21%	3.57%	1.95%	-2.64%	3.50%	17.88%	-2.23%	-3.47%	-11.45%	4.31%	4.98%	-4.77%	1.55%	7.96%	-4.07%
28 September 2001	-7.00%	-8.06%	-17.26%	-18.33%	-4.09%	-15.14%	-16.12%	-21.79%	-17.73%	-11.39%	-17.29%	-8.54%	-27.00%	-19.48%	-10.78%	-17.18%	-24.48%	-20.04%	-9.15%	-1.75%	-20.68%	-0.17%	-2.38%	-10.51%	-10.79%	-3.53%	-37.50%
31 October 2001	1.82%	1.35%	1.85%	5.36%	2.46%	6.42%	11.77%	-10.75%	14.56%	-2.97%	31.67%	-13.40%	-10.78%	0.52%	-7.39%	6.04%	10.06%	-4.15%	15.71%	11.30%	8.39%	8.22%	-5.09%	22.56%	-2.92%	-6.44%	19.06%
30 November 2001	1.95%	7.27%	2.63%	9.07%	9.23%	9.71%	11.66%	-3.85%	22.57%	5.87%	-6.22%	10.09%	-4.07%	8.99%	12.95%	3.40%	12.85%	13.52%	5.37%	5.75%	10.47%	3.89%	0.51%	2.23%	-8.96%	3.96%	21.14%
31 December 2001	2.30%	0.51%	-4.03%	12.91%	0.36%	0.13%	9.85%	6.05%	7.40%	8.20%	-15.86%	3.68%	42.47%	2.85%	8.34%	7.76%	19.70%	-2.09%	8.55%	1.96%	5.04%	-1.70%	4.34%	-0.93%	-6.74%	-1.16%	19.07%
31 January 2002	-4.36%	-1.52%	4.22%	-7.18%	-9.91%	1.71%	8.74%	19.99%	7.25%	5.12%	27.20%	15.54%	-25.46%	-5.12%	8.99%	8.37%	4.56%	17.34%	3.32%	10.73%	-5.08%	3.20%	8.40%	12.14%	-10.47%	-6.98%	6.71%
28 February 2002	-0.91%	-2.13%	5.08%	13.31%	0.85%	5.91%	-7.95%	1.17%	9.43%	-1.70%	12.84%	2.51%	-14.64%	0.45%	-13.63%	-2.58%	-4.87%	7.71%	-2.57%	-3.69%	-12.98%	-0.11%	5.71%	-7.65%	9.22%	-1.14%	-22.36%
29 March 2002	4.00%	3.58%	0.88%	-1.22%	5.35%	-0.99%	15.93%	11.48%	8.33%	7.79%	-0.02%	0.59%	-22.83%	3.42%	3.69%	9.98%	8.59%	-0.71%	7.87%	3.59%	0.07%	1.68%	3.45%	-1.18%	5.43%	0.23%	9.43%
30 April 2002	0.16%	-6.79%	8.18%	-1.52%	3.83%	-4.27%	8.67%	17.06%	-0.01%	5.18%	-0.86%	-8.84%	-13.44%	-0.91%	3.17%	-1.95%	-2.25%	-1.21%	9.53%	10.17%	-19.24%	-6.19%	-1.38%	2.89%	-7.10%	-2.34%	-2.75%
31 May 2002	-1.88%	-0.90%	9.56%	-8.00%	0.77%	-6.65%	0.65%	6.86%	0.24%	-7.24%	-17.58%	-5.09%	-35.05%	-6.43%	2.89%	-8.93%	-4.06%	12.04%	4.45%	-4.21%	4.83%	6.23%	5.17%	2.80%	-0.31%	0.17%	-16.73%
28 June 2002	-4.50%	-8.06%	-10.72%	-20.46%	-3.49%	2.85%	-10.91%	-6.49%	-3.94%	-1.51%	7.14%	-14.22%	7.20%	-10.21%	1.78%	-10.99%	-9.09%	-5.64%	-2.02%	-8.99%	-4.37%	7.31%	-10.67%	-15.16%	-2.84%	-1.33%	-23.84%
31 July 2002	-7.13%	-7.57%	-17.31%	-34.45%	-4.77%	-8.09%	-10.51%	-10.23%	-2.74%	-0.42%	3.98%	-3.42%	5.95%	-2.07%	-11.32%	-7.40%	-6.90%	-5.69%	6.58%	-2.64%	3.23%	-3.57%	-9.42%	-13.97%	-0.60%	-5.68%	3.00%
30 August 2002	-1.66%	0.32%	3.09%	20.50%	-1.95%	5.72%	3.21%	-3.48%	0.41%	-1.09%	16.04%	-3.94%	3.69%	-1.82%	-0.34%	2.49%	-5.14%	-3.77%	-0.58%	9.51%	0.19%	-3.29%	8.90%	7.70%	-0.83%	3.11%	-5.95%
30 September 2002	-11.12%	-12.13%	-0.67%	-36.08%	-8.91%	-5.09%	-0.75%	-6.70%	-15.30%	-10.93%	-3.43%	1.41%	-2.99%	-14.35%	4.49%	-11.65%	-16.42%	-9.58%	1.07%	-6.35%	-8.31%	-2.36%	-6.14%	-7.33%	1.97%	-5.30%	-9.03%
31 October 2002	7.40%	8.55%	3.90%	24.98%	0.43%	-0.44%	7.92%	-19.31%	4.99%	3.98%	12.79%	-12.26%	8.11%	5.45%	14.06%	6.30%	10.43%	8.49%	-2.62%	3.64%	2.56%	-3.11%	5.28%	16.65%	-3.69%	-2.11%	14.87%
29 November 2002	2.72%	5.67%	9.18%	0.09%	3.99%	9.88%	-0.16%	11.24%	12.01%	-4.34%	1.11%	-3.15%	4.34%	4.97%	1.79%	4.62%	2.09%	3.60%	10.77%	10.13%	12.49%	1.79%	7.54%	2.49%	-1.09%	4.14%	34.31%
31 December 2002	-2.30%	-6.40%	5.54%	8.80%	-3.85%	5.23%	-1.87%	10.69%	-13.51%	2.47%	20.70%	-5.48%	13.81%	2.21%	1.21%	-4.55%	-6.22%	-0.81%	-1.54%	3.47%	-11.31%	0.94%	6.87%	0.10%	4.67%	3.65%	-33.07%
31 January 2003	-7.38%	-2.58%	-3.84%	-4.23%	4.73%	-4.23%	-5.54%	-13.30%	-4.45%	3.80%	-8.70%	4.17%	8.09%	-2.39%	-3.32%	-5.42%	11.46%	6.95%	2.98%	-3.84%	-0.95%	3.13%	6.01%	-4.96%	6.43%	4.79%	7.21%
28 February 2003	-2.17%	-1.73%	0.70%	-4.16%	-2.27%	1.40%	9.74%	3.74%	-6.51%	-2.89%	-5.44%	-6.66%	10.64%	0.32%	-1.74%	-2.36%	-12.83%	-3.07%	1.84%	-1.84%	0.45%	-4.96%	-1.56%	-3.76%	-9.21%	4.95%	8.25%
31 March 2003	-0.84%	0.79%	-6.33%	12.05%	-3.97%	-7.76%	-6.51%	1.11%	-10.23%	-2.31%	11.34%	2.46%	-1.28%	2.19%	1.53%	1.19%	-1.48%	2.47%	3.45%	2.78%	7.29%	4.50%	-2.06%	-5.81%	-3.01%	-4.07%	-28.56%
30 April 2003	9.57%	7.90%	4.84%	18.20%	-1.38%	-4.72%	19.12%	18.01%	13.28%	-1.12%	1.32%	6.68%	11.56%	18.28%	7.38%	13.63%	-2.82%	1.52%	6.69%	12.32%	13.77%	5.76%	5.09%	10.24%	13.06%	7.99%	28.15%
30 May 2003	5.65%	5.05%	3.10%	2.16%	11.23%	7.49%	11.88%	15.85%	5.92%	6.42%	4.33%	-1.82%	-0.73%	2.27%	14.90%	2.04%	9.92%	11.62%	12.57%	5.03%	10.73%	4.13%	5.84%	8.56%	10.92%	6.07%	7.99%
30 June 2003	0.67%	1.09%	3.85%	0.10%	5.98%	13.06%	7.43%	2.55%	7.61%	3.52%	6.48%	15.20%	11.52%	2.29%	2.11%	3.55%	6.89%	10.04%	-9.93%	-17.01%	8.93%	4.71%	-0.44%	-0.07%	3.69%	4.10%	-1.92%
31 July 2003	0.47%	1.70%	6.46%	5.14%	9.31%	5.94%	-7.80%	-6.29%	10.26%	4.30%	12.56%	-0.36%	-5.02%	7.37%	1.88%	4.20%	10.84%	2.57%	3.11%	4.13%	-5.27%	6.97%	5.92%	11.04%	-7.39%	-2.61%	-2.41%
29 August 2003	-1.38%	1.70%	5.85%	9.53%	6.22%	11.53%	12.97%	1.79%	5.60%	2.75%	10.82%	-5.51%	-2.07%	4.52%	-0.66%	-1.70%	8.11%	9.76%	6.69%	10.11%	1.33%	2.69%	5.09%	12.75%	10.30%	2.10%	12.32%
30 September 2003	3.28%	-1.30%	0.88%	1.79%	0.05%	5.43%	6.36%	16.76%	-6.64%	-1.89%	-10.74%	9.10%	11.68%	9.58%	0.42%	1.73%	0.57%	8.48%	2.18%	5.41%	-0.85%	6.33%	5.93%	-10.70%	16.70%	3.16%	14.74%
31 October 2003	6.45%	5.40%	9.41%	9.62%	14.03%	9.92%	-6.94%	2.77%	10.81%	11.96%	-7.02%	6.59%	5.11%	10.41%	6.59%	2.49%	6.64%	5.88%	3.87%	4.53%	4.68%	-2.36%	12.58%	4.16%	10.23%	-1.72%	13.57%
28 November 2003	2.55%	0.80%	7.16%	4.68%	0.96%	2.39%	5.89%	-1.07%	-0.18%	-4.25%	5.89%	-7.59%	1.04%	-3.43%	7.03%	3.64%	-6.03%	1.92%	-1.50%	-2.96%	5.09%	8.56%	14.73%	-4.91%	1.20%	5.30%	-6.83%
31 December 2003	7.18%	4.90%	1.48%	15.87%	14.50%	14.89%	6.63%	11.13%	2.76%	0.51%	6.23%	10.66%	18.04%	7.21%	10.24%	3.09%	2.39%	26.97%	11.34%	8.29%	-0.94%	4.63%	6.23%	12.03%	6.35%	5.72%	27.41%

Returns	UK	USA	RSA	BRAZIL	CHINA	INDIA	RUSSIA	INDONESIA	KOREA	MALAYSIA	PAKISTAN	PHILIPPINES	ARGENTINA	CHILE	COLOMBIA	MEXICO	TAIWAN	THAILAND	CZECH REPUBLIC	HUNGARY	ISRAEL	JORDAN	PERU	POLAND	EGYPT	MOROCCO	TURKEY
30 January 2004	-0.35%	1.69%	-0.91%	-4.57%	-0.63%	-2.53%	6.12%	9.69%	8.91%	4.07%	4.99%	4.18%	6.16%	-2.08%	18.25%	8.17%	8.40%	-8.86%	-0.72%	5.23%	7.37%	7.95%	-12.51%	1.22%	16.88%	0.21%	-3.32%
27 February 2004	4.16%	1.04%	5.65%	3.61%	6.03%	-1.28%	8.33%	0.14%	3.19%	7.66%	-0.90%	-3.78%	2.90%	7.84%	6.68%	5.40%	3.87%	1.58%	15.14%	5.73%	3.99%	-1.92%	1.48%	4.06%	-3.84%	6.77%	9.04%
31 March 2004	-3.19%	-1.73%	2.99%	-0.94%	-8.80%	2.31%	11.33%	-4.38%	3.30%	1.40%	2.21%	-4.11%	1.22%	-8.42%	9.22%	4.37%	-2.59%	-7.14%	3.82%	10.51%	-1.24%	-1.16%	16.84%	2.81%	5.19%	0.51%	6.13%
30 April 2004	-0.90%	-1.66%	-14.77%	-16.53%	-14.85%	-1.68%	-17.48%	7.32%	-6.57%	-7.40%	1.32%	9.73%	-13.26%	-3.95%	9.97%	-7.56%	-6.95%	-1.61%	-3.28%	-2.34%	0.74%	-3.49%	-20.60%	-4.20%	7.86%	1.26%	-19.35%
31 May 2004	1.86%	1.16%	7.07%	-1.84%	6.05%	-17.69%	-5.68%	-11.53%	-6.89%	-4.64%	-2.22%	-2.80%	-8.15%	-1.69%	-13.97%	0.19%	-2.78%	-1.09%	-1.05%	3.62%	0.41%	1.83%	4.79%	0.91%	-8.72%	0.16%	-11.22%
30 June 2004	-0.24%	1.72%	0.96%	4.71%	-0.85%	0.15%	-0.61%	-1.29%	-2.49%	0.90%	-4.47%	4.48%	1.50%	3.36%	-0.66%	1.54%	-3.31%	0.59%	-0.37%	0.71%	5.65%	2.58%	-0.85%	4.99%	1.42%	-1.61%	7.94%
30 July 2004	-1.08%	-3.59%	0.99%	7.91%	0.31%	6.49%	-8.51%	6.37%	-8.69%	1.35%	-0.13%	-0.50%	3.85%	2.74%	2.91%	-1.73%	-9.23%	-2.42%	-1.98%	1.24%	-11.96%	5.18%	-0.26%	-2.00%	9.55%	0.12%	9.46%
31 August 2004	-0.14%	0.33%	3.31%	5.94%	0.45%	-0.24%	9.02%	-2.06%	9.04%	-0.90%	-1.48%	-2.17%	2.03%	7.06%	5.55%	1.26%	6.35%	-1.53%	4.47%	4.81%	-5.40%	-0.35%	3.78%	2.04%	9.90%	1.90%	1.43%
30 September 2004	3.00%	0.94%	7.70%	9.04%	6.21%	7.77%	7.30%	11.73%	3.55%	2.85%	-2.53%	11.87%	17.74%	3.51%	15.15%	5.47%	0.09%	3.48%	10.42%	6.45%	-1.26%	6.95%	6.27%	8.76%	19.39%	0.17%	7.41%
29 October 2004	2.33%	1.39%	3.87%	0.67%	-2.50%	3.61%	4.17%	5.92%	1.97%	0.97%	-5.01%	4.00%	1.04%	2.07%	4.52%	5.27%	-0.27%	-0.77%	6.09%	8.78%	1.99%	9.18%	2.97%	6.32%	8.94%	-16.49%	6.37%
30 November 2004	5.89%	3.85%	13.06%	9.84%	9.60%	11.50%	-6.38%	15.49%	10.16%	5.97%	7.92%	0.48%	3.48%	6.42%	21.02%	7.10%	6.19%	9.58%	17.09%	12.21%	8.40%	15.58%	-0.08%	8.47%	0.65%	9.50%	1.34%
31 December 2004	3.10%	3.29%	4.21%	8.79%	-1.81%	6.85%	-3.61%	-0.55%	2.71%	-1.08%	8.57%	0.21%	3.46%	5.11%	2.75%	7.67%	6.56%	4.05%	7.24%	5.91%	8.18%	4.13%	-2.04%	12.73%	11.08%	13.73%	17.30%
31 January 2005	-0.77%	-2.60%	-6.05%	-2.71%	-2.21%	-1.78%	2.96%	5.55%	6.06%	1.53%	9.86%	12.05%	-0.08%	-5.21%	-2.07%	0.14%	-3.10%	4.18%	4.51%	1.32%	-1.27%	14.66%	0.20%	-6.63%	35.08%	-3.22%	8.55%
28 February 2005	4.33%	1.85%	7.99%	16.04%	7.16%	2.70%	10.65%	0.78%	9.08%	-0.89%	19.64%	3.65%	21.96%	6.92%	12.13%	7.51%	5.76%	7.73%	12.41%	21.28%	2.62%	1.15%	8.12%	17.58%	9.98%	-1.60%	7.96%
31 March 2005	-3.40%	-1.76%	-10.21%	-9.21%	-5.31%	-3.37%	-8.83%	-1.14%	-5.87%	-4.78%	-6.42%	-7.44%	-9.49%	1.25%	-13.58%	-10.35%	-6.11%	-11.79%	-6.40%	-11.92%	-0.59%	7.30%	-4.75%	-11.10%	-0.92%	-3.12%	-16.30%
29 April 2005	-1.24%	-1.94%	-2.28%	-5.37%	-0.48%	-5.48%	0.90%	-4.75%	-4.99%	0.27%	-5.25%	-3.56%	-6.19%	-1.75%	5.78%	-2.33%	-1.35%	-4.10%	-4.36%	-6.58%	0.15%	18.14%	-2.65%	-12.47%	8.89%	1.26%	-10.71%
31 May 2005	-1.27%	3.04%	-3.98%	6.60%	-0.24%	8.23%	0.27%	6.69%	4.78%	-2.58%	-1.90%	2.71%	12.39%	0.93%	-4.05%	7.49%	3.98%	-1.29%	-1.80%	-3.46%	5.31%	-5.29%	-1.73%	2.21%	4.17%	0.17%	8.09%
30 June 2005	1.27%	0.10%	4.77%	3.73%	4.01%	7.80%	3.22%	1.57%	0.29%	3.01%	8.25%	-3.01%	2.82%	5.68%	14.26%	5.48%	2.26%	-0.29%	4.85%	9.66%	-8.30%	8.79%	2.64%	6.94%	13.10%	-1.61%	7.10%
29 July 2005	1.23%	3.57%	8.21%	3.26%	6.99%	5.26%	10.35%	6.07%	11.60%	7.02%	-5.30%	0.92%	14.38%	8.04%	14.33%	8.87%	0.02%	1.60%	5.64%	11.96%	5.84%	3.74%	6.74%	6.14%	0.44%	5.10%	10.61%
31 August 2005	2.29%	-1.14%	4.85%	10.38%	0.29%	0.13%	13.30%	-17.16%	-3.28%	-3.54%	8.62%	-2.87%	11.51%	0.12%	7.18%	-1.35%	-7.17%	4.21%	12.84%	6.12%	1.34%	8.40%	2.74%	4.83%	-1.27%	4.51%	2.95%
30 September 2005	1.61%	0.74%	10.13%	17.25%	5.03%	9.15%	15.61%	2.76%	11.47%	2.01%	4.37%	1.06%	14.23%	7.53%	1.59%	12.19%	0.61%	3.75%	8.95%	1.70%	4.44%	-0.13%	16.13%	11.72%	12.33%	1.22%	7.92%
31 October 2005	-3.16%	-1.76%	-10.24%	-6.54%	-10.40%	-10.82%	-8.11%	-2.91%	-6.13%	-2.25%	1.30%	3.47%	-15.28%	-7.42%	4.08%	-2.35%	-7.17%	-7.23%	-7.74%	-12.63%	3.00%	2.95%	-10.31%	-10.84%	-0.42%	2.40%	-5.58%
30 November 2005	-0.01%	3.71%	7.89%	8.36%	6.79%	9.41%	7.86%	5.86%	11.17%	-1.78%	7.20%	10.10%	-0.27%	3.07%	17.59%	7.96%	8.58%	-0.92%	2.19%	-1.09%	5.75%	7.73%	7.88%	5.46%	-0.38%	3.46%	17.85%
30 December 2005	2.78%	-0.08%	10.46%	-1.26%	3.16%	9.06%	4.58%	8.51%	9.18%	0.44%	4.39%	1.10%	0.83%	-2.28%	13.21%	4.03%	6.92%	8.88%	4.99%	-1.86%	4.05%	-13.37%	0.06%	5.20%	12.41%	-0.22%	3.17%
31 January 2006	5.75%	2.59%	14.71%	21.72%	13.16%	7.26%	17.14%	11.64%	7.71%	2.89%	8.25%	4.64%	21.81%	3.52%	11.49%	7.99%	3.02%	12.21%	11.32%	8.90%	-0.51%	1.08%	15.82%	7.19%	23.54%	21.46%	13.38%
28 February 2006	-1.00%	-0.12%	-5.80%	1.81%	3.10%	2.45%	6.85%	0.95%	-3.28%	3.39%	14.23%	0.02%	-4.75%	4.15%	3.90%	-1.47%	-0.56%	-3.39%	-1.39%	2.65%	-2.61%	-12.00%	-3.77%	0.24%	-10.33%	6.20%	6.13%
31 March 2006	2.08%	1.14%	7.11%	-5.15%	3.15%	9.46%	0.93%	10.15%	-0.54%	1.31%	-2.96%	5.33%	7.34%	-0.87%	0.39%	0.16%	0.12%	-3.04%	0.45%	-4.22%	-0.70%	-5.07%	-2.92%	-1.35%	-5.12%	5.45%	-13.46%
28 April 2006	5.59%	1.19%	3.22%	8.40%	4.65%	3.42%	10.96%	13.08%	6.57%	4.09%	-3.72%	0.04%	18.07%	1.50%	-2.40%	4.98%	9.56%	7.84%	0.29%	10.65%	3.65%	3.49%	14.91%	14.59%	-1.97%	12.83%	4.71%
31 May 2006	-2.34%	-3.22%	-16.54%	-17.81%	-6.27%	-15.52%	-11.33%	-15.34%	-7.99%	-2.94%	-17.53%	-0.02%	-19.98%	-7.62%	-21.49%	-12.19%	-6.94%	-9.63%	-9.42%	-13.37%	-6.97%	-1.74%	-12.43%	-13.68%	-18.90%	-13.88%	-33.96%
30 June 2006	0.72%	-0.02%	-3.60%	5.94%	1.87%	1.68%	2.39%	-0.92%	-1.70%	-3.08%	1.81%	-7.08%	6.19%	-1.65%	-14.52%	2.35%	-2.45%	-4.15%	4.82%	-7.80%	-9.90%	-14.94%	9.25%	-0.31%	-11.11%	1.76%	-7.49%
31 July 2006	2.19%	0.23%	-0.23%	0.93%	2.58%	-0.14%	2.91%	4.94%	-0.28%	2.53%	4.56%	13.67%	-0.84%	0.30%	13.19%	6.41%	-5.86%	3.41%	4.44%	7.90%	1.49%	-1.20%	6.06%	13.86%	15.04%	-2.99%	7.74%
31 August 2006	1.71%	2.15%	-0.40%	-0.67%	2.14%	8.85%	4.26%	5.73%	2.45%	2.18%	-4.15%	-1.57%	-4.45%	3.40%	6.80%	3.44%	2.04%	1.02%	1.24%	-4.70%	3.92%	4.79%	0.66%	-8.17%	8.92%	12.21%	5.96%
29 September 2006	-0.64%	2.40%	-7.01%	-1.98%	2.83%	7.50%	-6.94%	5.06%	3.04%	0.19%	4.68%	11.14%	-1.66%	4.00%	-2.51%	4.70%	4.00%	0.47%	-2.47%	-0.71%	0.77%	-4.37%	2.92%	-2.75%	3.98%	-0.45%	-4.73%
31 October 2006	4.80%	3.26%	10.18%	8.02%	6.61%	6.39%	2.47%	3.28%	-0.42%	3.57%	5.92%	6.42%	8.94%	6.87%	8.09%	6.57%	0.83%	7.52%	8.15%	9.16%	2.80%	1.17%	4.83%	8.77%	1.91%	1.03%	14.00%
30 November 2006	1.98%	1.72%	7.39%	5.10%	10.35%	5.53%	10.45%	9.23%	5.44%	10.28%	-5.54%	2.65%	14.75%	5.88%	-3.15%	4.34%	9.95%	4.65%	6.92%	8.23%	2.26%	-8.90%	4.70%	9.95%	0.89%	1.84%	-7.23%
29 December 2006	2.44%	1.06%	6.88%	7.71%	13.56%	2.97%	2.90%	5.01%	-0.37%	4.20%	-7.20%	8.82%	5.31%	3.96%	10.59%	5.68%	1.37%	-10.38%	1.62%	10.39%	-1.55%	-1.58%	1.92%	1.92%	6.99%	3.18%	5.29%
31 January 2007	-0.19%	1.69%	0.14%	0.70%	-4.32%	2.50%	-5.38%	-4.88%	-5.33%	9.78%	14.72%	9.41%	-1.48%	4.04%	-4.75%	2.46%	-2.78%	0.02%	-0.75%	-7.30%	5.25%	9.05%	8.66%	3.71%	-3.41%	10.50%	7.09%
28 February 2007	-0.44%	-2.07%	0.36%	-2.89%	-1.78%	-9.06%	-1.78%	-3.55%	4.18%	0.47%	-1.63%	-6.16%	-1.83%	-1.42%	-5.34%	-4.02%	1.75%	6.32%	-1.99%	-1.00%	0.94%	5.78%	8.76%	-6.17%	7.04%	3.30%	0.29%
30 March 2007	2.52%	0.95%	5.36%	7.51%	3.77%	2.84%	4.10%	6.33%	2.41%	6.09%	0.43%	4.58%	1.03%	3.88%	3.91%	7.22%	-2.23%	-3.83%	8.59%	5.07%	3.02%	-5.74%	3.57%	11.04%	-0.37%	8.27%	5.81%
30 April 2007	4.10%	4.10%	7.57%	5.52%	3.42%	11.39%	-1.70%	7.89%	5.83%	6.14%	9.37%	2.95%	2.67%	10.56%	3.94%	1.68%	-0.23%	4.38%	8.21%	10.39%	6.49%	-4.09%	13.63%	6.08%	3.24%	7.02%	4.96%
31 May 2007	1.33%	3.22%	-3.36%	10.94%	6.51%	6.68%	-7.50%	4.35%	7.87%	3.13%	4.39%	10.08%	7.16%	1.19%	7.66%	10.35%	3.84%	5.96%	0.82%	1.72%	3.27%	-4.55%	5.67%	-0.68%	5.20%	-3.78%	6.77%
29 June 2007	1.02%	-1.81%	-1.98%	4.12%	10.74%	0.48%	8.36%	1.25%	2.95%	-1.71%	6.05%	5.52%	-4.22%	5.44%	4.01%	-0.74%	8.91%	4.70%	1.48%	10.90%	-0.91%	0.96%	8.12%	4.31%	-0.19%	-3.39%	0.69%
31 July 2007	-2.58%	-3.25%	-0.50%	4.09%	9.76%	5.94%	4.51%	8.30%	10.38%	1.38%	-2.91%	-1.74%	-0.92%	-2.49%	7.11%	-4.42%	1.86%	13.38%	1.04%	0.03%	2.03%	-4.59%	12.68%	0.06%	5.31%	3.05%	14.01%
31 August 2007	-1.52%	1.30%	-0.69%	-4.01%	7.01%	-3.32%	-3.82%	-6.15%	-4.55%	-9.01%	-12.50%	-7.44%	-3.28%	-0.74%	-11.77%	-1.25%	-3.64%	-6.86%	1.62%	-9.65%	-1.57%	-2.21%	-8.44%	-5.45%	-6.84%	4.59%	-7.46%
28 September 2007	3.39%	3.58%	6.09%	18.21%	17.65%	15.49%	7.88%	11.45%	7.19%	7.63%	8.32%	7.93%	7.15%	0.51%	3.65%	0.87%	5.77%	4.84%	8.75%	8.78%	7.01%	2.73%	14.96%	5.86%	12.27%	4.94%	15.29%
31 October 2007	5.63%	1.57%	12.74%	14.32%	15.32%	15.66%	9.74%	15.15%	6.85%	7.60%	6.73%	8.03%	3.69%	9.59%	4.67%	3.64%	5.28%	10.13%	11.99%	-1.77%	4.01%	14.28%	11.99%	11.70%	9.05%	1.34%	10.66%
30 November 2007	-5.85%	-4.54%	-7.85%	-5.03%	-14.60%	-2.05%	1.78%	-0.22%	-10.01%	-2.59%	-4.03%	-4.76%	-10.49%	-9.92%	2.54%	-5.84%	-11.90%	-6.87%	-0.42%	-5.75%	-2.98%	2.82%	-15.82%	-8.00%	2.83%	0.42%	-7.89%
31 December 2007	-2.80%	-0.74%	-4.16%	2.68%	-4.57%	7.23%	4.41%	1.16%	-1.57%	5.84%	-0.80%	3.84%	-4.99%	-1.73%	-3.73%	-1.08%	-1.34%	2.15%	2.31%	1.16%	4.06%	4.55%	-1.73%	-1.98%	9.60%	0.21%	2.86%