GLOBAL EQUITY ALLOCATION WITH INDEX OF ECONOMIC FREEDOM -A BLACK-LITTERMAN EQUILIBRIUM APPROACH

by

SUBHRANSU SEKHAR MOHANTY, Ph.D.

PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF BUSINESS ADMINISTRATION
- GLOBAL ASSET AND WEALTH MANAGEMENT

In the
Faculty of Business Administration

SIMON FRASER UNIVERSITY

Spring 2006

APPROVAL

Name: **Subhransu Sekhar Mohanty**

Degree: **Master of Business Administration**

Title of Project: **Global Equity Allocation with Index of Economic Freedom – A Black-Litterman Equilibrium Approach**

Supervisory Committee:

Dr. Peter Klein
Senior Supervisor
Associate Professor

Dr. Chris Veld
Second Reader
Associate Professor

Date Approved: December 15, 2005

ABSTRACT

The **purpose of the present study** is to examine the impact of Index of Economic Freedom (IEF) in strategic equity allocation process, in terms of risk-return efficiency, across 49 countries using the Black-Litterman's Absolute View approach. We have attempted to carry an ex-post comparative risk-return performance analysis of traditional CAPM, the Black-Litterman Equilibrium model and our view based strategy based on Black-Litterman's Absolute View approach to analyse whether our view-based strategy adds significant value to asset allocation or not. Our study has particular relevance to asset allocation strategy, portfolio optimisation and risk minimization in the context of global equity markets.

Our findings support that the Black-Litterman model is a more reasonable approach to portfolio optimisation and asset allocation as compared to the traditional CAPM approach. Our asset allocation strategy based on recent changes in the IEF provides highly improved results as compared to the traditional capital asset pricing model and Black-Litterman's equilibriurn implied return model. The IEF contains information on the riskier aspects of markets. Our IEF-led strategy in asset allocation can significantly enhance portfolio return at reduced level of risk, and can be particularly useful in choppy markets or periods.

DEDICATION

For Odette

ACKNOWLEDGEMENTS

I would like to thank my project supervisors, Peter Klein and Chris Veld for their valuable suggestions and guidance. They along with Robert Grauer, Andrey Pavlov and all my SFU professors and mentors during the MBA (GAWM) Program, have enhanced my knowledge of the investment field.

Special thanks are due to Donald Fraser, former Executive Director- MBA (GAWM) Program who encouraged me to undertake this Program, as well as to my wife, Odette for motivating me to complete it. But for these two key people, I would have likely missed this opportunity.

While planning to work on this project, I was greatly encouraged by Robert Litterman's confidence that the Black-Litterman model has served them well in their investment business over the years. I gratefully acknowledge Steve Hardy's various clarifications on the technical and computational aspects of the Black-Litterman model. Of course, all errors and omissions are my responsibility.

I am thankful to Mike Ivanhof and Brian Chand who were always on hand to facilitate the administrative aspects of the Program. I also thank Baptist and Lydia Callaghan for providing moral support when I needed it most.

As always, The Almighty and my parents have been a guiding force in all my pursuits.

Subhransu Sekhar Mohanty
Simon Fraser University
Vancouver, B.C., Canada

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

GLOBAL EQUITY ALLOCATION WITH INDEX OF ECONOMIC FREEDOM A BLACK-LITTERMAN EQUILIBRIUM APPROACH

Introduction:

Managing an optimal equity allocation policy across different markets is the biggest challenge an equity fund manager faces in today's world. Whether it is rising oil prices or the predicament of rising US deficit or long-run interest rate conundrum or looming inflation by and large; or the impact of rejection of EU constitution by France and Netherlands, the Lisbon target and social safety net reforms on employment in the EU; or Chinese exchange rate reform or India becoming an engine for global growth, or increasing current account surpluses among emerging countries as against increasing current account deficits among industrialized countries; or historically high corporate profits in industrialized countries, or strong real GDP growth followed by strong consumption and robust employment growth as in Canada, fund managers are constantly challenged by the dynamism of the various economies and their markets[i]. Despite these challenges, a survey shows that an increasing number of fund managers are stepping up their foreign equity holdings. The foreign asset acceptance ratio

[i] For more discussion on these topics please refer to IMF's report "World Economic Outlook", September, 2005

(FAAR)[ii] for equities of major market economies in aggregate increased from 8 per cent to 30 per cent between 1990 and 2003[iii]. This is largely on account of fund mangers appetite for apparently unexploited potential gain in risk-adjusted returns derived out of relative performance, correlation and volatility characteristics of different markets. In the presence of regulatory relaxations[iv], shift in asset-liability matching[v], better access to information due to technological advancement, globalization and deregulation, ease of trading and falling transaction costs, foreign markets are far more accessible to investors now as compared to a decade ago. However, foreign asset allocation still varies widely across various institutional investors such as pension funds, endowment funds, insurance companies, mutual funds primarily on account of the difference in their investment policies and objectives, though increasingly renewed attention is being given to global asset allocation, particularly in the context of diversification, absolute performance, and the stability of performance. In this respect, working with an asset allocation and optimization model that is flexible enough to help fund managers implement their strategies and objectives attains paramount importance.

[ii] FAAR is measured as [(foreign assets held by domestic residents)/(domestic market capitalization + foreign assets held by domestic residents – domestic assets held by foreign residents)]/[(world market capitalization – domestic market capitalization)/(world market capitalization)]. This measure is also used, for example, in Bertaut and Griever (2004). Optimal portfolio allocation under the international capital asset pricing model entails an FAAR of 100 percent. Cited in IMF's "Global Financial Stability Report", September 2005.

[iii] Aggregate cross-country measures are market-weighted averages across six countries—the United States, Japan, the United Kingdom, Germany, France, and the Netherlands. For more details, please refer to IMF's "Global Financial Stability Report", September 2005.

[iv] As in Canada, the restrictions on foreign investment were completely withdrawn recently in 2005. Financial deregulation has played a key role in Japan where ceilings on holdings of certain types of foreign assets by insurance companies and pension funds were withdrawn in 1998. In India and many of the emerging markets, foreign portfolio investment regulations were relaxed to attract more foreign investments.

[v] Pension and endowment funds, defined benefit plans, are taking more active interest in meeting asset and liability as well as consumption targets.

While some fund managers rely on the Markowitz mean-variance optimization, Sharpe and Lintner's Capital Asset Pricing Model (CAPM), or some variants of them in their asset allocation decisions[vi], others try to optimize their asset allocation decisions based on Arbitrage Pricing Theory or the factor model[vii]. A few others use the utility theories (Quadratic Power Utility or Log Normal)[viii] to explain optimal asset allocation strategy, while some use the behavioral theory in their asset allocation strategy[ix].

The Markowitz formulation of mean-variance portfolio optimization (MVO) process is a good start for asset allocation as it is risk-return efficient for the asset universe. However in practice, investment managers cannot hold the universe asset portfolio as it is unknown. They need to allocate funds between various asset classes as well as within an asset class and need to define such asset or asset class in terms of its size (market capitalization). Unfortunately, the Markowitz formulation does not provide due weighting to size of the asset or asset class. Investment managers tend to think in terms of weights in a portfolio

---

[vi] The Capital Asset Pricing Model and some variants of it are the most widely used models in global asset allocation strategy.

[vii] The Factor Model is the second most commonly used model in global asset allocation strategy. The most widely used commercial model developed by BARRA uses a combination of currency factor and 730 different factors for different markets.

[viii] Some of the fund managers such as State Street Global are using some variant of the utility models in their asset allocation strategy to define different investor groups' risk preferences.

[ix] The behavior theory models are being increasingly used by fund managers, particularly by hedge fund managers in order to take advantage of market anomalies. (A fourth model, the Consumption-based CAPM which explains incentives to hedge shifts in consumption and portfolio opportunities with a one-factor relation (model) between expected returns and consumption, has largely been ignored by practicing fund managers as it is incompatible with reasonable levels of risk aversion and with the observed volatility of consumption growth.)

rather than balancing expected returns against the contribution to portfolio risk—the relevant margin in the Markowitz framework.

Secondly, MVO unrealistically requires expected returns to be specified for every component of the relevant universe. Usually, we do not know the expected return of any asset class with certainty, and in practice typically define it by a broad benchmark. The results of MVO can be very sensitive to small changes in the expected return of a given asset class, particularly when the asset has a high correlation to other assets. When managers try to optimize using the Markowitz approach, they usually find that the portfolio weights returned by the optimizer (when not overly constrained) tend to appear to be extreme, not particularly intuitive and with large estimation error.

Thirdly, past historical risk-return profile of an asset or asset class may not hold good in future due to the dynamic nature of the economic environment- interest rates, exchange rates, GDP growth and so on. Strategists and investment managers have their own views on different asset or asset class performance which are dynamic and they change over time. MVO does not provide that dynamism.

The Black-Litterman asset allocation model, created by Fischer Black and Robert Litterman, is a sophisticated portfolio construction method that overcomes the problem of unintuitive, highly-concentrated portfolios, input-sensitivity, and

estimation error maximization. The Black-Litterman model combines the subjective views of an investor regarding the expected returns of one or more assets, with the market equilibrium vector of expected returns (the prior distribution) to form a new, mixed estimate of expected returns. In this paper we intend to use Black-Litterman model for global equity allocation among 49 countries. As an innovation to the use of this model, we formulate country specific strategic investment views based on the Index of Economic Freedom (IEF) which uses 50 variables grouped under 10 broad categories- trade policy; fiscal burden of the government; government intervention in the economy; monetary policy; capital flows and foreign investment; banking and finance; wages and prices; property rights; regulations and informal market activity.

The **purpose of the present study** is to examine the impact of Index of Economic Freedom in strategic equity allocation process, in terms of risk-return efficiency, across 49 countries using the Black-Litterman's Absolute View approach. Since the Black-Litterman model provides us an option to incorporate our view-based strategy and deviate from the equilibrium state, we intend to carry an ex-post comparative risk-return performance analysis of traditional CAPM, the Black-Litterman Equilibrium model and our view based strategy based on Black-Litterman's Absolute View approach to analyse whether our view-based strategy adds significant value to asset allocation or not. Our study has particular relevance to asset allocation strategy, portfolio optimisation and risk minimization in the context of global equity markets.

We present our discussion in seven sections.

Section I: Literature Review

Section II: Research Methodology and Data: A brief description of the Black-Litterman model; data and their limitations; and research methodology,.

Section III: Portfolio Optimization and Asset Allocation with traditional Mean-Variance Model (CAPM)

Section IV: Portfolio Optimization and Asset Allocation with Black-Litterman Equilibrium Model

Section V: Portfolio Optimization and Asset Allocation with Index of Economic Freedom led View-based Strategy

Section VI: Comparative Performance Analysis of MVP and GEAF portfolios under the various models (Ex-post)

Section VII: Summary and Conclusion

SECTION I: LITERATURE REVIEW

Capital asset pricing under conditions of uncertainty will always remain an intriguing and interesting topic. Markowitz's pioneering work[1] in 1952 on portfolio selection was based on the mean-variance preference of investors over a single period. While trying to establish investors' risk-return trade-off based on mean and variance of assets, Markowitz assumed that:

a) all investors select among alternative assets/portfolios of assets based on their mean and variance (or standard deviation) of return in order to maximize expected utility of terminal wealth over a single period;
b) all investors have identical preference over means, variances and covariances of return of all assets;
c) all investors can borrow or lend unlimitedly at a given risk-free rate and can short sale any asset;
d) all assets are marketable and their quantities are known; and
e) there are no transaction costs, taxes.

Taking a cue from Markowitz's portfolio theory, Sharpe[2] and Lintner[3] developed a market model that explains an asset's risk-return profile relative to that of the market and pioneered the concept of Securities Market Line and the mean-variance Capital Asset Pricing Model (MV CAPM). Much of the scholarly works

that evolved around this period and during the next few decades, were either an extension of MV CAPM, or focused on its empirical testing and anomalies.

Early tests of the Mean Variance CAPM goes back to Douglas[4] when he reported that the estimated slope (β) of the security market line is too flat and the intercept (α) is too large, contrary to what the mean-variance CAPM had propounded that return of a security will be linear to its covariance with variance of a market portfolio and the intercept should be zero. Later on, time series and cross-sectional studies conducted by Miller, Jenson and Scholes[5] concluded that the intercepts (α's) are non-zero, they are directly related to the risk level (β). Moreover, the intercepts and slopes fluctuate randomly from period to period and are often negative.

Series of empirical tests conducted by different academicians brought out a number of anomalies in the CAPM model. Fama E. F. and French K. R.[6], Black F., Jensen M. C. and Scholes M.[7]; and Carhart M. M.[8] conducted empirical time series testing of the MV CAPM and established abnormal return situations explaining pricing anomalies or tracking error or additional factors that better explained asset pricing behavior. Banz[9] concluded that return disparities are because of size effect, i.e., small stocks, often losers, have higher expected returns than large stocks while Basu[10] found out that return disparities are due to stocks price-earnings ratios. Studies by Rosenberg, Reid and Lanstein[11] and by Lakonishok, Shleifer and Vishny[12] detected return disparities among stocks to be

related to their cash flow and past sales growth. DeBondt and Thaler[13] identified that over a 3 to 5-year period, stocks having extreme higher returns (winners) tend to have relatively weaker returns during the following periods, while stocks having poor returns (losers) tend to have relatively higher returns during the following periods.

DeBondt and Thaler's[14] findings that winner-loser effect could not be explained by CAPM based risk, is also acknowledged by the efficient markets proponents. Similar evidence documented by Ou and Penman[15] shows that an arbitrage strategy (buying winners, selling losers) of zero net investment earned significantly higher return of 12.5 per cent. Stan and Vlad[16] in a study of Australian stocks over 25 years (1973-1998) find strong medium-term momentum. Contrary to what was propounded by DeBondt and Thaler, Jegadeesh and Titman[17] found out that returns continue in the same direction in the short-term, i.e., stocks with higher returns in the past three to twelve months tend to have higher returns in the next three to twelve months. Numerous other studies such as the 'Monday Effect', 'Weekend Effect', 'Holiday Effect', 'Turn of the Month Effects', 'Intraday Effects', have found out other abnormal return behavior of stock prices not in conformity with the CAPM model. Rouwenhorst[18] corroborates these findings in an international setting with 2,190 sample stocks from 12 European countries where he finds that past winners outperform past losers by about 1 per cent per month. Moskowitz and Grinblatt[19] show that momentum exists in industry-based portfolios, while Grundy and Martin[20] indicate

the presence of momentum effect in the US since the 1920s. Llewellyn[21] demonstrates that momentum is also present in size and book-market sorted portfolios. Interestingly, Llewellyn says that the existence of momentum effect can be explained by the fact that lead-lag correlations among stocks are stronger than autocorrelations.

Strong contenders of CAPM argue that, in reality, no such efficient market exists and as such we have a double moral hazard problem with Efficient Market Hypothesis and CAPM. Richard Roll[22] rightly pointed out that for the market portfolio to be mean-variance efficient, rests on strong assumptions of perfect capital markets, and to test the empirical efficiency of CAPM, such a market should be in existence. Looking at the supply side of pricing explanation, Ross (1976)[23] and Ross and Roll (1980)[24] proposed a multi-factor model which they called the arbitrage pricing theory or the APT. The Arbitrage Pricing Theory (APT) or the factor model explains that expected return of an asset conforms to a factor model of economic variables, where the variables are known in advance but they need not be observable.

The behavioral finance proponents provide behavioral explanation to such persistent anomalies as well as the existence of economically exploitable trading opportunities. The influence of human nature on trade and goods has always existed and has been passed on because human motivations are immutable. There's no difference between Adam Smith's 'invisible hand', John Maynard

Keynes' 'animal spirits', and the concept of Warren Buffet's 'Mr. Market'. These are all descriptions of the same mysterious motivations of man and the marketplace. Kahneman and Tversky[25] say that return anomalies are due to misjudgement or the representativeness bias. Lakonishok, Shleifer and Vishny[26]; Chan, Jegadeesh and Lakonishok[27]; Barberis, Shleifer and Vishny[28]; Daniel, Hirshleifer and Subrahmanyam[29]; Vineet and Richard[30]; Hong and Stein[31], and Hong, Lim and Stein[32]; Llewellyn[33] in their studies have assigned variations in stock prices to various human behavior such as overreaction or under reaction, biased self attribution, distress risk factor, or mistaken beliefs. Fama[34] observes that instances of overreaction appear as often as instances of under-reaction and this feature is consistent with market efficiency as price and fundamental value coincide on average with any deviations due solely to chance.

The most publicized and popular explanation for return anomalies was captured by Fama and French[35], who, after a series of tests on various anomalies, advocate that most of the market anomalies are captured in size (small minus big) and value versus growth (high book-to-market minus low book-to-market) factors, except the momentum effect propounded by Jegadeesh and Titman. While there is no theoretical rationale behind their findings, they developed an extended model to the original CAPM by including these two anomalies.

Stock price movements are closely linked to dissemination of material information in the markets and how investors react to such information. As early

as the beginning of the 19th century, behavioral impact on asset prices was recognized when Bachelier (1900)[1] pointed out that "Contradictory opinions diverge so much that at the same instant buyers believe in a price increase and sellers in a price decrease." Asset prices vary when economic agents differ in taste, endowment, or beliefs and thus the primary driving forces behind financial assets trading are heterogeneous beliefs and risk preferences. In a dynamic world with continuous flow of information, economic agents may never reach total agreement.

To summarize what we reviewed so far, in reality markets are not efficient and they witness price aberrations as well as cyclical movements. I am sure both academicians and practitioners would agree that various capital market theories are conceptually appealing under the given assumptions they hold. However, there are practical difficulties as to how they can be used in real world situations. The three most interesting and intriguing features that we often come across both in academic and real world situations are, (a) whether the efficient market exists (observable) or not; (b) whether the factor loadings of APT can be skillfully discerned for further guidance on managing asset allocation; (c) whether investors' behavior can be objectively measured and applied in predicting stock market returns. We still don't have a definitive answer to all these questions.

However, the efficient market and CAPM concept is extremely valuable as it provides an excellent starting point for empirical research. If we assume that in a

theoretically idealistic situation, the efficient market exists and so does the efficient market portfolio, but the markets we operate in are sub-sets of that efficient market, it will be a lot easier to explain why price anomalies occur in the real world markets. Further, if we extend the concept to include the size of various tradable assets in the market, we can visualize the capital markets as a hypothetical equilibrium situation in which all investors would ideally like to hold the efficient portfolio but in reality don't, resulting in temporary but continuous disequilibria. In this respect, Black-Litterman's equilibrium approach to asset allocation and portfolio optimization may be more pragmatic as it takes into consideration historical risk-returns of different asset classes within the CAPM framework and incorporates implied return based on asset class weights as well as current views on risk-return profile of different asset classes to generate various asset allocations and optimal portfolios.

In a global asset allocation context, in as much as earnings announcement or other fundamental information such as growth in GDP, industrial production, changes in interest and exchange rates affects stock prices; trade policy; fiscal burden of the government; government intervention in the economy; monetary policy; capital flows and foreign investment; banking and finance; wages and prices; property rights; regulations and informal market activity may also contain information about expected returns. Several studies have indicated that factors such as host country GDP, industrial production, inflation, employment, savings and investment, market size, production scale economies, shifting comparative

advantages, foreign direct investments, trade and investment barriers and tax rates play some role in defining the stock market returns.[36] Shefrin and Statman[37] demonstrate how return on the overall market is driven by both fundamental and sentimental impact of changes in term structure of interest rates. Similarly, stock prices of different countries may react to changes in exchange rates. Typically, appreciation in domestic currency may induce foreign portfolio investments leading to appreciation in stock prices, assuming that a country's economy is self-reliant. On the other hand, if a country's economy is highly export-oriented, appreciation in a domestic currency may adversely affect stock prices as it may hurt domestic industries and therefore expected return. Some academicians and practitioners[38] argue that stock returns in US dollars are significantly affected by exchange rate fluctuations. Karolyi and Stulz[39] examine the impact of a foreign exchange shock on the volatility and US/Japanese stock market correlation and find that a foreign exchange shock has a significantly positive impact on the volatility and US/Japanese market correlation. Bodart and Reding[40] examine the impact of German exchange rate fluctuations on the stock market volatility and the correlation between the German stock market and a selected group of European markets (France, Belgium, UK, Sweden, and Italy). They find that sample markets' correlation with the German market declined when exchange rates were volatile, suggesting that a higher exchange rate variability for the German mark contributed to a lower cross-market correlation. Harald and Helene[41] find that higher returns in the home equity market relative to the foreign equity market are associated with a home currency depreciation and

net equity flows into the foreign market are positively correlated with a foreign currency depreciation.

However, the impact of macro-economic changes may vary from country to country depending upon the robustness of its information dissemination system. In an international investment setting, Brennan and Cao[42] say home and foreign investors are separated by information asymmetries. These information asymmetries can occur due to a number of non-economic factors such as property rights; regulations and informal market activity.

SECTION II: RESEARCH METHODOLOGY, DATA AND ASSUMPTIONS

A: The Black Litterman Model:

The Black-Litterman asset allocation model named after its two authors[43], was introduced in 1990 and was further expanded by them[44] in 1991 and 1992. The practical application and implementation of the model in the context of portfolio optimisation, asset allocation and risk management was further discussed by Bevan and Winkelmann[45], He and Litterman[46], and Litterman[47]. The Black-Litterman model combines the CAPM (see Sharpe (1964)), reverse optimization (see Sharpe (1974)), mixed estimation (see Theil[48] (1971, 1978)), the universal hedge ratio / Black's global CAPM (see Black[49] (1989a, 1989b) and Litterman (2003)), and mean-variance optimization (see Markowitz (1952)). The Black-Litterman model creates stable, mean-variance efficient portfolios, based on an investor's unique insights, which overcome the problem of input-sensitivity. According to Lee[50], the Black-Litterman model also "largely mitigates" the problem of estimation error-maximization (see Michaud[51] (1989)) by spreading the errors throughout the vector of expected returns. The most important input in mean-variance optimization is the vector of expected returns; however, Best and Grauer[52] (1991) demonstrate that a small increase in the expected return of one of the portfolio's assets can force half of the assets from the portfolio. In the

search for a reasonable starting point for expected returns, Black and Litterman (1992), He and Litterman (1999), and Litterman (2003) explore several alternative forecasts: historical returns, equal "mean" returns for all assets, and risk adjusted equal mean returns. They demonstrate that these alternative forecasts lead to extreme portfolios – when unconstrained, portfolios with large long and short positions; and, when subject to a long only constraint, portfolios that are concentrated in a relatively small number of assets.

The Black-Litterman (BL) model uses a piece of market information that MVO does not- the expected return for each asset class is partly dependent upon its size or market capitalization. Assuming that the global market is close to equilibrium, the BL model provides a mechanism for calculating an implied return for every asset class as a function of its size and covariance with other assets. This set of market implied returns constitutes an *equilibrium return vector*. The BL model also offers a consistent framework for implementing strategic views. In the absence of any views, market implied returns are used. When a view is taken, BL returns are simultaneously chosen so that strategic views are expressed and optimal portfolio weights are close to the market. If a portfolio manager does not have a view about a particular asset class, its equilibrium and optimal BL weights are identical.

We provide below the Black-Litterman formula[53] and also a brief description of each of its elements and how the model is implemented. Throughout this article,

K is used to represent the number of views and *N* is used to express the number of assets in the formula.

$$E[R] = [(\tau\Sigma)^{-1} + P'\Omega^{-1}P]^{-1} [(\tau\Sigma)^{-1}\Pi + P'\Omega^{-1} Q] \quad (1)$$

where,

E [R] is the new (posterior) Combined Return Vector (*N x 1* column vector);

τ is a scalar;

Σ is the covariance matrix of excess returns (*N x N* matrix);

P is a matrix that identifies the assets involved in the views (*K x N* matrix or *1 x N* row vector in the special case of view);

Ω is a diagonal covariance matrix of error terms from the expressed views representing the uncertainty in each view (*K x K* matrix);

Π is the Implied Equilibrium Return Vector (*N x 1* column vector); and,

Q is the View Vector (*K x 1* column vector).

The Black-Litterman model uses "equilibrium" returns as a neutral starting point. Equilibrium returns are the set of returns that clear the market. The equilibrium returns are derived using a reverse optimization method in which the vector of implied excess equilibrium returns is extracted from known information using the following formula:-

$$\Pi = \lambda \Sigma w_{mkt} \qquad (1)\ (i)$$

Where,

Π is the Implied Excess Equilibrium Return Vector (*N x 1* column vector);

λ is the risk aversion coefficient;

Σ is the covariance matrix of excess returns (*N x N* matrix); and,

w_{mkt} is the market capitalization weight (*N x 1* column vector) of the assets.

The risk-aversion coefficient (λ) characterizes the expected risk-return trade-off. It is the rate at which an investor will forego expected return for less variance. In the reverse optimization process, the risk aversion coefficient acts as a scaling factor for the reverse optimization estimate of excess returns; the weighted reverse optimized excess returns equal the specified market risk premium. More excess return per unit of risk (a larger lambda) increases the estimated excess returns. In our case we used the variance (σ^2) of MSCI World Index to calculate λ, where $\lambda = [E(r) - r_f)]/\sigma^2$.

The formula (1) (i) can be rearranged in the following manner

$$W = (\lambda \Sigma)^{-1} \mu \qquad (1)\ (ii)$$

Where μ (representing any vector of excess return) substitutes for Π (representing the vector of Implied Excess Equilibrium Returns) and solves for the unconstrained maximization problem- $max\ w'\mu - \lambda\, w'\Sigma w/2$. If μ does not equal Π, w will not equal w_{mkt} .

When investment managers have specific views regarding the expected return of some of the assets in a portfolio, which differ from the Implied Equilibrium return, The Black-Litterman model allows such views to be expressed in either absolute or relative terms. First the BL equilibrium returns for each asset class are calculated as a function of the covariance matrix Ω and the market weight vector $w_{mkt.}$ In the absence of an opinion about any asset, the vector Π is used as a default and then vector Π is calibrated relative to a set of market views. The views may be either absolute or relative.

The number of views (k) is the View Vector (Q) which is a k x 1 vector. The uncertainty of views results in a random, unknown, independent, normally distributed Error Term Vector (ε) with a mean of 0 and covariance matrix Ω Thus, a view has the form $Q+\varepsilon$.

$$Q+\varepsilon = \begin{pmatrix} Q_1 \\ : \\ : \\ Q_k \end{pmatrix} + \begin{pmatrix} \varepsilon_1 \\ : \\ : \\ \varepsilon_\kappa \end{pmatrix}$$

When an investor has views with 100% confidence, the error term (ε) has zero value, otherwise it has a positive or negative value other than 0. The Error Term Vector (ε) does not directly enter the Black-Litterman formula. However, the variance of each error term (ω), which is the absolute difference from the error term's (ε) expected value of 0, does enter the formula. The variances of the error terms (ω) form Ω, where Ω is a diagonal covariance matrix with 0's in all the off-

diagonal positions. The off-diagonal elements of Ω.are 0's because the model assumes that the views are independent of one another. The variances of the error terms (ω) represent the uncertainty of the views. The larger the variance of the error term (ω), the greater is the uncertainty of the view.

$$\Omega = \begin{pmatrix} \omega_1 & 0 & 0 \\ 0 & \ddots & 0 \\ 0 & 0 & \omega_k \end{pmatrix}$$

Conceptually, the Black-Litterman model is a complex, weighted average of the Implied Equilibrium Return Vector (Π) and the View Vector (Q), in which the relative weightings are a function of the scalar (τ) and the uncertainty of the views (Ω). Unfortunately the scalar and the uncertainty in the views are the most abstract and difficult to specify parameters of the model.

We use the following methodology to calculate the scalar (τ) and the uncertainty of the views (Ω). In the absence of constraints, the Black-Litterman model only recommends a departure from an asset's market capitalization weight if it is the subject of a view. The scalar (τ) is inversely proportional to the relative weight given to the Implied Equilibrium Return Vector (Π). For assets that are the subject of a view, the magnitude of their departure from their market capitalization weight is controlled by the ratio of the scalar (τ) to the variance of the error term (ω) of the view in question. The variance of the error term (ω) of a

view is inversely related to the investor's confidence in that particular view, i.e., variance of error term ε is 0 at the equilibrium level. Hence, to incorporate our views, we calculate the variance ω of views (error term ε in equation Q) by creating a Matrix of P. P Matrix contains relative weighting of individual assets to the total market cap weights at equilibrium level. Once Matrix P is defined, it calculates the variance of individual portfolios as $p_k \Sigma p_k'$, where p_k is a single 1 x N row vector from Matrix P that corresponds to the kth view and Σ is the covariance matrix of excess returns.

Since variance of error term ε is 0 at the equilibrium level and the scalar τ is inversely proportional to the relative weight given to the Implied Equilibrium Return Vector Π, Ω is derived as

$$\Omega = \begin{pmatrix} p_1 \Sigma p_1' * \tau & 0 & 0 \\ 0 & \ddots & 0 \\ 0 & 0 & p_k \Sigma p_k' * \tau \end{pmatrix}$$

This creates the view distribution $N \sim (Q, \Omega)$

Once this is done, for the new combined return distribution, we solve for the unconstrained optimization problem, again by running $N \sim (E[R],[(\tau\Sigma)^{-1} + (P'\Omega^{-1}P)]^{-1})$ to obtain the new combined return distribution and portfolio weights.

B: Data:

We used the S&P/Citigroup Broad Market Index Universe (US Dollar denominated total return) for 49 countries for the maximum available period since 1989, for the purpose of this study. The Broad Market Index covers 27 Developed World countries and 26 Emerging Markets countries. On a top-down basis, all equity share classes of every company with a free float of at least USD 100 million as of the annual index reconstitution date and a minimum value traded of USD 25 million for the preceding twelve months are included in their respective country BMI, within index-eligible countries. All issues in the S&P/Citigroup Global Equity Index Series are assigned a free float factor, called an Investable Weight Factor (IWF). The IWF ranges between 0 and 1, and is an adjustment factor that accounts for the publicly available shares of a company. The company's adjusted market capitalization, determines an equity issue's weight in the index.

We used the MSCI World Index as the benchmark The MSCI World Index is a free float-adjusted market capitalization index that is designed to measure global developed market equity performance. As of May 2005 the MSCI World Index consisted of the following 23 developed market country indices: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hong

Kong, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, the United Kingdom and the United States.

Data Limitations and Assumptions:

We ran the portfolio optimisation and asset allocation based on the index data provided by S&P/Citigroup, Morgan Stanley Capital International, and the Heritage Foundation. Further details on the data, their computation methodology and limitations can be obtained from the above sources. For this study for 2001 and 2002, we have to omit index data on Iceland due to non-availability/insufficiency of data.

We used 3% as risk-free rate based on the average of 1-year US treasury yield of 2.5% and 5-Year US treasury yield of 3.5% and 9% as the default equity premium based on MSCI Index's excess average return on equities during 1970 to June 30, 2005 to run the Black-Litterman Equilibrium as well as Absolute Views Optimization.

Finally we used percentage variation in the Index of Economic Freedom (IEF) during each year over its previous year as our input to form strategic return views. The IEF is calculated based on 50 variables, the details of which are presented in Appendix I.

C. Research Methodology

We start our study initially by optimising portfolios for 2001 to 2004 with the CAPM, based on historical risk-return of different equity markets. At the beginning of each year, we form two portfolios, the Minimum Variance Portfolio (MVP), and a hypothetical portfolio called the Global Equity Allocation Fund (GEAF) which tracks the benchmark MSCI World Index closely with a target expected return of 12 per cent. We then calibrate implied return through reverse optimisation using the Black-Litterman equilibrium approach by incorporating market capitalization weights and generate the MVP and GEAF portfolios for 2001 to 2004. Based on the changes in IEF of different countries over the previous years, we form IEF-led view based strategy and incorporate changes in the implied return obtained through Black-Litterman equilibrium approach and optimise similar MVP and GEAF portfolios. We invest a notional amount of US$ 1 million in both the MVP and GEAF portfolios generated by the three different models each year starting 2001 and reinvest the following year based on the fresh asset allocation obtained through the three different models. We carry out a comparative analysis of the. ex-post risk-return performance of the portfolios generated by the various models in the following year, starting 2002.

SECTION III: PORTFOLIO OPTIMIZATION AND ASSET ALLOCATION WITH TRADITIONAL MEAN-VARIANCE MODEL (CAPM)

Each year between 2001 and 2004, we optimised portfolios based on the CAPM using the historical return, standard deviation and correlation data (input data provided in Appendix II & III) available for various countries during the period between August 1989 and June of the corresponding year. The detailed asset allocation of each of the MVP and GEAF portfolios for 2001 to 2004 along with their forecasted risk, return and probabilistic measures are presented in Table 1A and B.

Table 1A: CAPM Allocation Case (Historical): Minimum Variance Portfolio
Case Target Return: 12.00%, 1.96% Standard Deviation Return Distribution

Asset Allocations	2001	2002	2003	2004
Argentina Equity	0.00%	0.00%	0.00%	0.00%
Australia Equity	9.20%	2.00%	0.00%	0.10%
Austria Equity	0.00%	0.00%	0.00%	0.00%
Belgium Equity	0.00%	0.00%	0.00%	0.00%
Brazil Equity	0.00%	0.00%	0.00%	0.00%
Canada Equity	0.00%	2.50%	0.00%	0.00%
Chile Equity	0.00%	0.00%	0.00%	0.00%
China Equity	0.40%	0.70%	0.00%	0.00%
Colombia Equity	5.70%	6.20%	0.00%	0.00%
Czech Rep. Equity	3.60%	2.30%	0.00%	0.00%
Denmark Equity	3.70%	5.50%	0.00%	0.60%
Egypt Equity	0.00%	0.00%	0.00%	0.00%
Finland Equity	0.00%	0.00%	0.00%	0.00%
France Equity	0.00%	0.00%	0.00%	0.00%
Germany Equity	0.00%	0.00%	0.00%	0.00%
Greece Equity	0.00%	0.00%	0.00%	0.00%
Hong Kong Equity	0.00%	0.00%	0.00%	0.00%
Hungary Equity	0.00%	0.00%	0.00%	0.00%
Iceland Equity			13.10%	5.20%
India Equity	0.00%	0.00%	0.00%	0.00%
Indonesia Equity	0.00%	0.00%	0.00%	0.00%
Ireland Equity	0.00%	0.00%	0.00%	0.00%
Italy Equity	0.00%	0.00%	0.00%	0.00%
Japan Equity	7.60%	7.30%	4.50%	4.80%
Jordan Equity	24.70%	24.00%	28.10%	26.90%
Malaysia Equity	0.00%	0.00%	0.00%	0.00%
Mexico Equity	0.00%	0.00%	0.00%	0.00%
Morocco Equity	25.50%	27.80%	20.40%	25.60%
Netherlands Equity	0.00%	0.00%	0.00%	0.00%
New Zealand Equity	0.00%	0.00%	0.00%	0.00%
Norway Equity	0.00%	0.00%	0.00%	0.00%
Pakistan Equity	0.00%	0.00%	1.40%	1.40%
Peru Equity	0.40%	3.90%	8.30%	7.20%
Philippines Equity	0.00%	0.00%	0.00%	0.00%
Poland Equity	0.00%	0.00%	0.00%	0.00%
Portugal Equity	0.00%	0.00%	0.00%	0.00%
Russia Equity	0.00%	0.00%	0.00%	0.00%
S. Korea Equity	0.00%	0.00%	0.00%	0.00%
Singapore Equity	0.00%	0.00%	0.00%	0.00%
South Africa Equity	0.00%	0.00%	0.00%	0.00%
Spain Equity	0.00%	0.00%	0.00%	0.00%
Sweden Equity	0.00%	0.00%	0.00%	0.00%
Switzerland Equity	0.00%	0.10%	0.00%	0.60%
Taiwan Equity	0.00%	0.00%	0.00%	0.00%
Thailand Equity	0.00%	0.00%	0.00%	0.00%
Turkey Equity	0.00%	0.00%	0.00%	0.00%
UK Equity	0.00%	0.50%	0.00%	0.30%
US Equity	19.20%	16.70%	23.80%	26.30%
Venezuela Equity	0.00%	0.60%	0.50%	0.90%
Portfolio Statistics				
Expected Return (Annualized)	6.10%	5.70%	10.90%	13.40%
Expected Risk	8.10%	8.20%	8.80%	9.00%
Best Case Return (Annualized)	22.90%	22.70%	29.20%	31.90%
Worst Case Return (Annualized)	-8.90%	-9.50%	-5.40%	-3.10%
Probability of Target Return	22.90%	21.50%	43.50%	54.80%
Probability of Negative Return	23.00%	25.20%	10.30%	6.00%
Benchmark Tracking				
R-Squared	42%	39%	27%	33%
Tracking Error	11.74%	12.08%	12.87%	12.09%

Table 1B: CAPM Allocation Case (Historical): Global Equity Allocation Fund
Case Target Return: 12.00%, 1.96% Standard Deviation Return Distribution

Asset Allocations	2001	2002	2003	2004
Argentina Equity	0.00%	0.00%	0.00%	0.00%
Australia Equity	0.00%	0.00%	0.00%	0.00%
Austria Equity	0.00%	0.00%	0.00%	0.00%
Belgium Equity	0.00%	0.00%	0.00%	0.00%
Brazil Equity	0.00%	0.00%	0.00%	0.00%
Canada Equity	0.00%	0.00%	0.00%	0.00%
Chile Equity	0.00%	0.00%	0.00%	0.00%
China Equity	0.00%	0.00%	0.00%	0.00%
Colombia Equity	0.00%	0.00%	0.00%	0.00%
Czech Rep. Equity	0.00%	0.00%	0.00%	0.00%
Denmark Equity	1.40%	0.00%	0.00%	0.00%
Egypt Equity	0.00%	0.00%	0.00%	0.00%
Finland Equity	2.90%	3.10%	0.00%	0.00%
France Equity	0.00%	0.00%	0.00%	0.00%
Germany Equity	0.00%	0.00%	0.00%	0.00%
Greece Equity	1.30%	5.70%	0.00%	0.00%
Hong Kong Equity	5.60%	9.50%	0.00%	0.00%
Hungary Equity	0.00%	0.00%	0.00%	0.00%
Iceland Equity			17.80%	8.60%
India Equity	0.00%	0.00%	0.00%	0.00%
Indonesia Equity	0.00%	0.00%	0.00%	0.00%
Ireland Equity	1.70%	0.00%	0.00%	0.00%
Italy Equity	0.00%	0.00%	0.00%	0.00%
Japan Equity	0.00%	0.00%	2.30%	4.00%
Jordan Equity	11.40%	21.20%	26.80%	26.40%
Malaysia Equity	0.00%	0.00%	0.00%	0.00%
Mexico Equity	0.00%	0.00%	0.00%	0.00%
Morocco Equity	22.90%	7.00%	18.20%	24.00%
Netherlands Equity	4.50%	5.20%	0.00%	0.00%
New Zealand Equity	0.00%	0.00%	0.00%	0.00%
Norway Equity	0.00%	0.00%	0.00%	0.00%
Pakistan Equity	0.00%	0.00%	1.60%	1.60%
Peru Equity	0.00%	0.00%	8.60%	7.60%
Philippines Equity	0.00%	0.00%	0.00%	0.00%
Poland Equity	0.00%	0.00%	0.00%	0.00%
Portugal Equity	0.90%	1.00%	0.00%	0.00%
Russia Equity	0.00%	0.20%	0.00%	0.00%
S. Korea Equity	0.00%	0.00%	0.00%	0.00%
Singapore Equity	0.00%	0.00%	0.00%	0.00%
South Africa Equity	0.00%	0.00%	0.00%	0.00%
Spain Equity	0.00%	0.00%	0.00%	0.00%
Sweden Equity	0.00%	0.00%	0.00%	0.00%
Switzerland Equity	5.70%	19.30%	0.20%	0.80%
Taiwan Equity	0.00%	0.00%	0.00%	0.00%
Thailand Equity	0.00%	0.00%	0.00%	0.00%
Turkey Equity	0.00%	0.00%	0.00%	0.00%
UK Equity	0.00%	0.00%	0.00%	0.00%
US Equity	38.00%	26.20%	23.90%	26.20%
Venezuela Equity	3.70%	1.60%	0.50%	0.80%
Portfolio Statistics				
Expected Return (Annualized)	12.00%	12.00%	12.00%	15.00%
Expected Risk	10.00%	11.60%	8.90%	9.00%
Best Case Return (Annualized)	33.00%	36.50%	30.40%	33.60%
Worst Case Return (Annualized)	-6.40%	-9.10%	-4.40%	-1.60%
Probability of Target Return	48.30%	47.90%	48.60%	61.80%
Probability of Negative Return	11.00%	14.90%	8.10%	4.00%
Benchmark Tracking				
R-Squared	80%	74%	27%	32%
Tracking Error	7.06%	7.78%	12.84%	12.15%

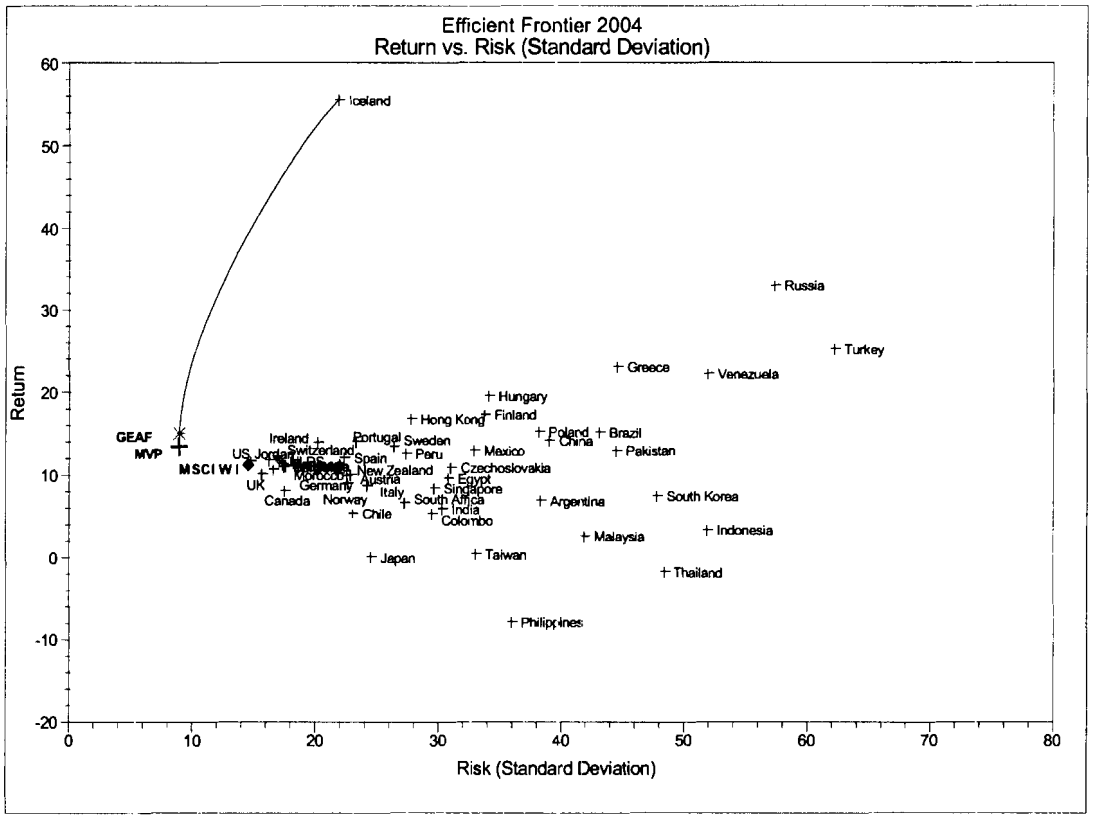
As it may be observed from Table 1A and Table 1B, the Minimum Variance Portfolio's (MVP) as well as the Global Equity Allocation Fund (GEAF) for the year 2001 to 2004, show high concentration in a few countries. Morocco has a share of 25.5 per cent, 27.80 per cent, 20.40 per cent and 25.6 per cent in the MVP portfolios and a share of 22.9 per cent, 7.00 per cent, 18.20 per cent and 24.00 per cent in the GEAF portfolios, during the year 2001, 2002, 2003 and 2004, respectively. Similar is the case with Jordan and Iceland. These countries' market sizes are comparatively smaller than some of the other developed as well as developing countries.

Our results also showed extremely high return as compared to the minimum level of risk during each of these years both for the MVP and GEAF portfolios. As you may observe, expected returns to standard deviations ratio of the MVP portfolios varies between 69.51 per cent (2002) and 148.89 per cent (2004) whereas it varies between 103.4 per cent (2002) and 166.7 per cent (2004) for the GEAF portfolios. This appears a bit unreasonable given the long-term risk characteristics of various assets such as bonds and equities[x]. Moreover, we noticed that in the case of CAPM optimisation, the efficient frontier is highly tilted. For the purpose of demonstration we have presented the efficient frontier for the year 2005 which shows it is highly tilted towards the equities of Iceland which has an expected return 55.5% and a standard deviation 21.9% for the year 2004 as

[x] Historically between 1926 and 2004, total return and capital appreciation on stocks were 12.39 per cent and 7.85 per cent with a standard deviation of 20.31 per cent. For further details, please refer to Stocks, Bonds and Inflation, 2005 Yearbook, Ibbotson Associates, Chicago and "History and the Equity Risk Premium", Goetzmann W. N. and Ibbotson R. G., Yale ICF Working Paper No. 05-04, April 2005

evident from Exhibit 1. These are some of the shortcomings of the CAPM approach, which are commonly cited by various academicians and practitioners.

Exhibit 1: Global Equity Allocation: CAPM Model



SECTION IV: PORTFOLIO OPTIMIZATION AND ASSET ALLOCATION WITH BLACK-LITTERMAN EQUILIBRIUM MODEL

The Black-Litterman Equilibrium Implied Return model incorporates size of an asset or asset class into the traditional CAPM model and generates implied return through reverse optimisation process. A comparison of implied returns, using market capitalization weights[xi] of different countries, generated by the Black-Litterman model, with the expected returns of traditional CAPM is presented in Table 2.

[xi]Details of market capitalization weights are as of June 30, 2005 and are presented in Appendix IV

Table 2: COMPARISON OF CAPM BASED HISTORICAL FORECASTED RETURNS AND BLACK-LITTERMAN IMPLIED EQUILIBRIUM RETURNS

	2001			2002			2003			2004		
ASSETS	CAPM	BLIMPLIED	RETURN DIFF.	CAPM	BLIMPLIED	RETURN DIFF	CAPM	BLIMPLIED	RETURN DIFF	CAPM	BLIMPLIED	RETURN DIFF.
Argentina Equity	10.30%	16.20%	5.90%	-4.10%	16.00%	20.10%	4.50%	13.90%	9.40%	6.90%	14.00%	7.10%
Australia Equity	9.70%	10.50%	0.80%	9.60%	10.60%	1.00%	10.10%	10.50%	0.40%	11.10%	10.50%	-0.60%
Austria Equity	5.10%	9.60%	4.50%	6.30%	9.20%	2.90%	7.60%	9.20%	1.60%	10.10%	9.20%	-0.90%
Belgium Equity	11.00%	9.20%	-1.80%	10.20%	9.00%	-1.20%	9.30%	10.30%	1.00%	11.00%	10.40%	-0.60%
Brazil Equity	13.40%	20.70%	7.30%	8.70%	20.80%	12.10%	11.80%	21.90%	10.10%	15.20%	21.70%	6.50%
Canada Equity	7.20%	12.20%	5.00%	6.40%	12.00%	5.60%	6.80%	11.70%	4.90%	8.10%	11.80%	3.70%
Chile Equity	0.30%	11.40%	11.10%	-1.70%	12.00%	13.70%	1.60%	12.10%	10.50%	5.40%	12.20%	6.80%
China Equity	14.20%	11.30%	-2.90%	11.20%	10.90%	-0.30%	11.30%	10.80%	-0.50%	14.20%	10.80%	-3.40%
Colombia Equity	-7.80%	6.40%	14.20%	-4.80%	6.20%	11.00%	-0.10%	7.60%	7.70%	5.30%	7.70%	2.40%
Czech Rep. Equity	-2.30%	10.10%	12.40%	2.60%	10.30%	7.70%	6.80%	10.30%	3.50%	10.90%	10.20%	-0.70%
Denmark Equity	10.90%	9.20%	-1.70%	9.50%	9.10%	-0.40%	9.70%	9.70%	0.00%	11.40%	9.80%	-1.60%
Egypt Equity	-1.10%	8.70%	9.80%	-6.60%	8.50%	15.10%	1.10%	6.90%	5.80%	9.60%	7.00%	-2.60%
Finland Equity	20.50%	15.70%	-4.80%	17.80%	15.50%	-2.30%	17.60%	15.80%	-1.80%	17.30%	15.90%	-1.40%
France Equity	11.90%	11.40%	-0.50%	10.40%	11.50%	1.10%	9.60%	12.20%	2.60%	10.90%	12.20%	1.30%
Germany Equity	11.30%	11.60%	0.30%	9.70%	12.10%	2.40%	8.80%	13.30%	4.50%	10.30%	13.40%	3.10%
Greece Equity	25.90%	20.80%	-5.10%	23.60%	18.30%	-5.30%	22.00%	16.70%	-5.30%	23.10%	16.30%	-6.80%
Hong Kong Equity	19.80%	15.10%	-4.70%	17.30%	15.10%	-2.20%	15.60%	14.20%	-1.40%	16.80%	14.20%	-2.60%
Hungary Equity	9.30%	10.30%	1.00%	12.50%	10.60%	-1.90%	13.50%	11.70%	-1.80%	19.60%	11.60%	-8.00%
Iceland Equity							26.70%	5.60%	-21.10%	55.50%	6.30%	-49.20%
India Equity	-0.80%	8.80%	9.60%	-0.90%	9.30%	10.20%	1.80%	9.80%	8.00%	5.90%	10.00%	4.10%
Indonesia Equity	-11.40%	22.50%	33.90%	-3.20%	19.60%	22.80%	0.10%	17.70%	17.60%	3.40%	17.40%	14.00%
Ireland Equity	14.70%	11.60%	-3.10%	12.50%	11.80%	-0.70%	12.40%	12.10%	-0.30%	14.00%	12.10%	-1.90%
Italy Equity	8.30%	10.90%	2.60%	7.40%	11.00%	3.60%	7.60%	11.60%	4.00%	8.80%	11.50%	2.70%
Japan Equity	-1.20%	13.00%	14.20%	-2.30%	12.50%	14.80%	-3.00%	11.50%	14.50%	0.00%	11.70%	11.70%
Jordan Equity	4.90%	3.50%	-1.40%	7.70%	3.50%	-4.20%	8.10%	3.50%	-4.60%	11.80%	3.60%	-8.20%
Malaysia Equity	-4.20%	14.90%	19.10%	0.50%	13.50%	13.00%	0.50%	12.50%	12.00%	2.60%	12.30%	9.70%
Mexico Equity	14.40%	18.70%	4.30%	11.40%	18.40%	7.00%	11.10%	17.50%	6.40%	13.00%	17.10%	4.10%
Morocco Equity	5.70%	1.20%	-4.50%	3.50%	1.80%	-1.70%	7.80%	3.50%	-4.30%	10.70%	3.40%	-7.30%
Netherlands Equity	14.00%	10.60%	-3.40%	12.60%	10.80%	-1.80%	10.70%	11.70%	1.00%	11.70%	11.80%	0.10%
New Zealand Equity	5.40%	11.60%	6.20%	6.90%	11.40%	4.50%	8.80%	10.90%	2.10%	10.00%	10.90%	0.90%
Norway Equity	7.40%	12.40%	5.00%	7.00%	12.30%	5.30%	6.30%	12.80%	6.50%	9.10%	12.90%	3.80%
Pakistan Equity	-6.70%	9.20%	15.90%	1.00%	8.70%	7.70%	10.50%	8.00%	-2.50%	13.00%	7.90%	-5.10%
Peru Equity	3.30%	9.00%	5.70%	4.70%	8.20%	3.50%	9.10%	8.00%	-1.10%	12.60%	8.30%	-4.30%
Philippines Equity	-14.50%	18.00%	32.50%	-14.20%	16.80%	31.00%	-12.00%	13.90%	25.90%	-7.80%	13.80%	21.60%
Poland Equity	13.80%	16.80%	3.00%	12.70%	16.20%	3.50%	12.50%	16.40%	3.90%	15.20%	16.20%	1.00%
Portugal Equity	14.00%	10.00%	-4.00%	13.10%	9.50%	-3.60%	12.50%	10.30%	-2.20%	14.00%	10.30%	-3.70%
Russia Equity	27.60%	33.50%	5.90%	31.80%	30.60%	-1.20%	33.40%	25.70%	-7.70%	33.00%	25.00%	-8.00%
S. Korea Equity	0.70%	21.00%	20.30%	6.70%	20.50%	13.80%	5.50%	19.90%	14.40%	7.50%	19.60%	12.10%
Singapore Equity	8.40%	16.40%	8.00%	7.30%	16.40%	9.10%	6.90%	15.30%	8.40%	8.40%	15.30%	6.90%
South Africa Equity	1.80%	15.60%	13.80%	1.10%	15.00%	13.90%	2.60%	14.10%	11.50%	6.70%	14.10%	7.40%
Spain Equity	11.50%	13.30%	1.80%	10.30%	13.10%	2.80%	11.10%	13.40%	2.30%	12.10%	13.50%	1.40%
Sweden Equity	13.40%	14.90%	1.50%	11.50%	15.10%	3.60%	11.40%	15.70%	4.30%	13.50%	15.70%	2.20%
Switzerland Equity	13.40%	10.30%	-3.10%	12.60%	10.10%	-2.50%	11.20%	10.40%	-0.80%	12.30%	10.40%	-1.90%
Taiwan Equity	-4.20%	12.30%	16.50%	-1.90%	13.40%	15.30%	-2.40%	13.40%	15.80%	0.40%	13.30%	12.90%
Thailand Equity	-16.80%	23.50%	40.30%	-11.00%	21.00%	32.00%	-6.70%	19.30%	26.00%	-1.70%	19.20%	20.90%
Turkey Equity	22.50%	22.20%	-0.30%	18.00%	24.00%	6.00%	21.40%	24.00%	2.60%	25.20%	23.90%	-1.30%
UK Equity	11.10%	10.90%	-0.20%	9.70%	10.70%	1.00%	9.00%	10.90%	1.90%	10.20%	10.90%	0.70%
US Equity	14.20%	11.60%	-2.60%	11.70%	11.70%	0.00%	11.10%	11.70%	0.60%	11.70%	11.70%	0.00%
Venezuela Equity	22.40%	14.00%	-8.40%	14.30%	12.90%	-1.40%	22.10%	13.50%	-8.60%	22.20%	13.60%	-8.60%
MSCI World Index	8.80%	11.90%		7.00%	11.90%		10.70%	11.80%		11.00%	11.90%	

As it can be observed from the expected returns variations, the Black-Litterman implied return model scales down very high-expected returns for countries according to the size of their markets. For example, in the case of Morocco, the return expectation has been scaled down to 1.2 per cent, 1.8 per cent, 3.5 per cent and 3.4 per cent for 2001, 2002, 2003 and 2004, respectively. Similarly, for Jordan, the return expectation has been scaled down to 3.5 per cent, 3.5 per cent, 3.5 per cent for the years 2001 to 2003 and 3.6 per cent for the year 2004, while for Iceland, they have been scaled down to 5.6 per cent and 6.3 per cent for 2003 and 2004, respectively.

Based on the implied returns generated by the Black-Litterman equilibrium approach, for each year between 2001 and 2004, we optimised asset allocation and generated the MVP and GEAF portfolios. The detailed asset allocation of each of the MVP and GEAF portfolios for 2001 to 2004 along with their forecasted risk, return and probabilistic measures are presented in Table 3A and 3B.

Table 3A: BLACK-LITTERMAN IMPLIED EQUILIBRIUM RETURN CASE: Minimum Variance Portfolio
Case Target Return: 12.00%, 1.96% Standard Deviation Return Distribution

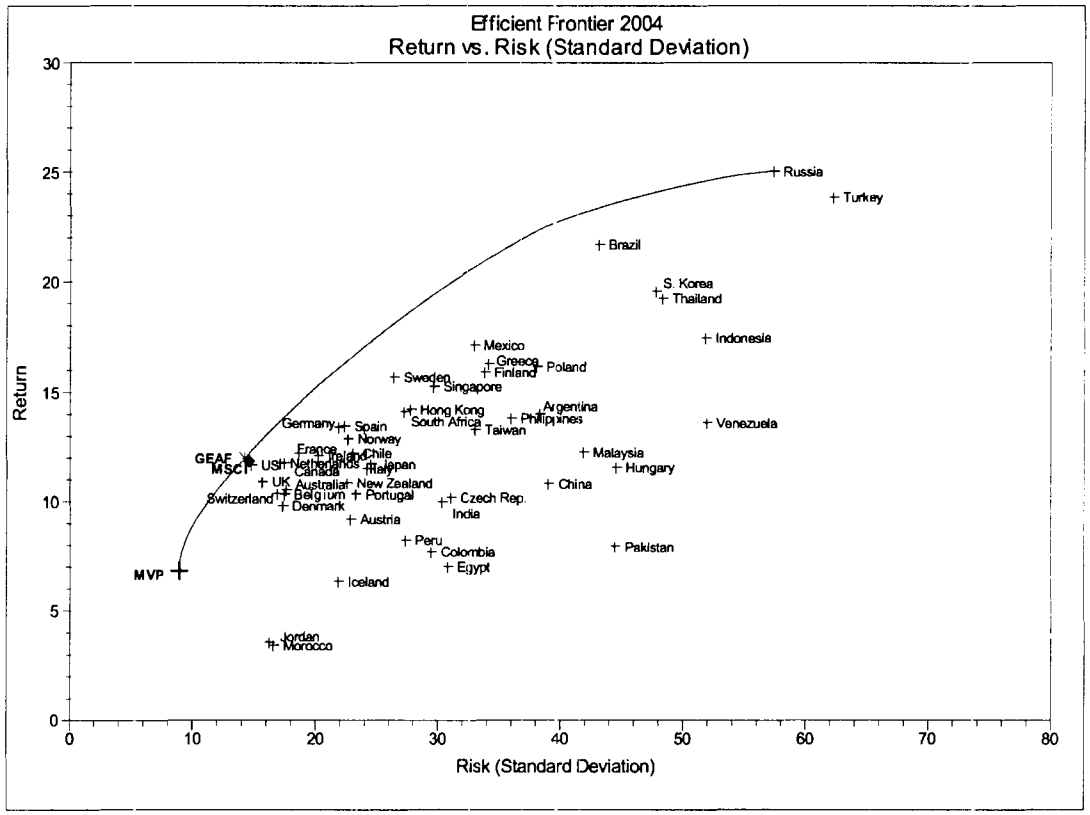
Asset Allocations	2001	2002	2003	2004
Argentina Equity	0.00%	0.00%	0.00%	0.00%
Australia Equity	9.20%	2.00%	0.00%	0.30%
Austria Equity	0.00%	0.00%	0.00%	0.00%
Belgium Equity	0.00%	0.00%	0.00%	0.00%
Brazil Equity	0.00%	0.00%	0.00%	0.00%
Canada Equity	0.00%	2.50%	0.00%	0.00%
Chile Equity	0.00%	0.00%	0.00%	0.00%
China Equity	0.30%	0.70%	0.00%	0.00%
Colombia Equity	6.10%	6.20%	0.00%	0.00%
Czech Rep. Equity	3.90%	2.30%	0.00%	0.00%
Denmark Equity	3.10%	5.50%	0.00%	1.20%
Egypt Equity	0.00%	0.00%	0.00%	0.00%
Finland Equity	0.00%	0.00%	0.00%	0.00%
France Equity	0.00%	0.00%	0.00%	0.00%
Germany Equity	0.00%	0.00%	0.00%	0.00%
Greece Equity	0.00%	0.00%	0.00%	0.00%
Hong Kong Equity	0.00%	0.00%	0.00%	0.00%
Hungary Equity	0.00%	0.00%	0.00%	0.00%
Iceland Equity			12.10%	4.30%
India Equity	0.00%	0.00%	0.00%	0.00%
Indonesia Equity	0.00%	0.00%	0.00%	0.00%
Ireland Equity	0.00%	0.00%	0.00%	0.00%
Italy Equity	0.00%	0.00%	0.00%	0.00%
Japan Equity	8.20%	7.30%	4.90%	4.90%
Jordan Equity	25.00%	24.00%	28.40%	27.00%
Malaysia Equity	0.00%	0.00%	0.00%	0.00%
Mexico Equity	0.00%	0.00%	0.00%	0.00%
Morocco Equity	25.60%	27.80%	20.80%	25.90%
Netherlands Equity	0.00%	0.00%	0.00%	0.00%
New Zealand Equity	0.00%	0.00%	0.00%	0.00%
Norway Equity	0.00%	0.00%	0.00%	0.00%
Pakistan Equity	0.00%	0.00%	1.30%	1.30%
Peru Equity	0.30%	3.90%	8.20%	7.10%
Philippines Equity	0.00%	0.00%	0.00%	0.00%
Poland Equity	0.00%	0.00%	0.00%	0.00%
Portugal Equity	0.00%	0.00%	0.00%	0.00%
Russia Equity	0.00%	0.00%	0.00%	0.00%
S. Korea Equity	0.00%	0.00%	0.00%	0.00%
Singapore Equity	0.00%	0.00%	0.00%	0.00%
South Africa Equity	0.00%	0.00%	0.00%	0.00%
Spain Equity	0.00%	0.00%	0.00%	0.00%
Sweden Equity	0.00%	0.00%	0.00%	0.00%
Switzerland Equity	0.00%	0.10%	0.00%	0.50%
Taiwan Equity	0.00%	0.00%	0.00%	0.00%
Thailand Equity	0.00%	0.00%	0.00%	0.00%
Turkey Equity	0.00%	0.00%	0.00%	0.00%
UK Equity	0.00%	0.50%	0.00%	0.20%
US Equity	18.30%	16.70%	23.80%	26.30%
Venezuela Equity	0.00%	0.60%	0.50%	0.90%
Portfolio Statistics				
Expected Return (Annualized)	6.50%	6.40%	6.60%	6.80%
Expected Risk	8.10%	8.20%	8.80%	8.90%
Best Case Return (Annualized)	23.20%	23.40%	24.90%	25.40%
Worst Case Return (Annualized)	-8.60%	-8.80%	-9.60%	-9.60%
Probability of Target Return	24.10%	24.10%	26.10%	27.20%
Probability of Negative Return	21.60%	22.20%	23.20%	22.70%
Benchmark Tracking				
R-Squared	41%	39%	27%	33%
Tracking Error	11.89%	12.08%	12.88%	12.05%

Table 3B: BLACK-LITTERMAN IMPLIED EQUILIBRIUM RETURN CASE: Global Equity Allocation Fund
Case Target Return: 12.00%, 1.96% Standard Deviation Return Distribution

Asset Allocations	2001	2002	2003	2004
Argentina Equity	0.20%	0.10%	0.00%	0.00%
Australia Equity	0.60%	3.10%	1.90%	1.50%
Austria Equity	0.00%	0.40%	0.00%	0.00%
Belgium Equity	1.40%	0.00%	0.00%	0.60%
Brazil Equity	0.70%	0.50%	0.70%	0.60%
Canada Equity	3.70%	3.40%	3.20%	3.40%
Chile Equity	0.40%	0.00%	0.20%	0.20%
China Equity	0.60%	0.00%	0.00%	0.40%
Colombia Equity	0.00%	0.00%	0.00%	0.00%
Czech Rep. Equity	0.00%	0.10%	0.00%	0.00%
Denmark Equity	0.50%	0.30%	0.00%	0.30%
Egypt Equity	0.10%	0.00%	0.00%	0.10%
Finland Equity	0.60%	0.50%	0.50%	0.60%
France Equity	3.30%	3.70%	3.50%	3.50%
Germany Equity	2.10%	3.10%	3.30%	2.40%
Greece Equity	0.00%	0.20%	0.70%	0.30%
Hong Kong Equity	0.40%	1.20%	0.00%	1.00%
Hungary Equity	0.00%	0.30%	0.00%	0.00%
Iceland Equity			1.90%	0.00%
India Equity	0.40%	0.40%	0.20%	0.30%
Indonesia Equity	0.30%	0.00%	0.00%	0.20%
Ireland Equity	0.60%	0.10%	0.40%	0.70%
Italy Equity	1.80%	1.60%	1.10%	1.70%
Japan Equity	8.10%	9.40%	8.90%	8.70%
Jordan Equity	0.00%	0.00%	0.20%	0.20%
Malaysia Equity	0.20%	0.10%	0.00%	0.20%
Mexico Equity	0.90%	0.00%	0.50%	0.70%
Morocco Equity	0.10%	0.00%	0.00%	0.40%
Netherlands Equity	1.90%	2.00%	3.20%	2.10%
New Zealand Equity	0.30%	0.00%	0.00%	0.20%
Norway Equity	0.00%	0.50%	0.00%	0.10%
Pakistan Equity	0.10%	0.00%	0.00%	0.10%
Peru Equity	0.00%	0.00%	0.00%	0.10%
Philippines Equity	0.00%	0.00%	0.10%	0.10%
Poland Equity	0.20%	0.10%	0.10%	0.10%
Portugal Equity	0.00%	0.10%	0.00%	0.00%
Russia Equity	0.00%	0.60%	0.30%	0.10%
S. Korea Equity	1.20%	1.00%	1.30%	1.20%
Singapore Equity	0.00%	0.90%	1.10%	0.10%
South Africa Equity	0.90%	0.00%	0.90%	0.70%
Spain Equity	1.50%	1.90%	2.40%	1.60%
Sweden Equity	1.60%	0.50%	0.80%	1.30%
Switzerland Equity	3.50%	2.00%	1.70%	2.90%
Taiwan Equity	1.30%	1.20%	1.20%	1.30%
Thailand Equity	0.40%	0.00%	0.00%	0.20%
Turkey Equity	0.20%	0.00%	0.00%	0.20%
UK Equity	10.60%	9.60%	9.30%	9.90%
US Equity	49.30%	51.10%	50.20%	49.90%
Venezuela Equity	0.00%	0.00%	0.10%	0.10%
Portfolio Statistics				
Expected Return (Annualized)	12.00%	12.00%	12.00%	12.00%
Expected Risk	13.80%	14.00%	14.60%	14.20%
Best Case Return (Annualized)	41.30%	41.90%	43.10%	42.40%
Worst Case Return (Annualized)	-12.60%	-12.90%	-13.80%	-13.30%
Probability of Target Return	47.60%	47.50%	47.40%	47.50%
Probability of Negative Return	19.40%	19.80%	20.90%	20.30%
Benchmark Tracking				
R-Squared	98%	98%	99%	99%
Tracking Erro	2.47%	2.45%	1.43%	1.43%

As it may be observed from Table 3A and 3B, in both the MVP and GEAF portfolios, assets are more evenly distributed as compared to the traditional CAPM based MVP and GEAF portfolios. For the purpose of demonstration, we have presented the efficient frontier of the Black-Litterman Implied Equilibrium Return process in Exhibit 2 for 2004.

Exhibit 2: Global Equity Allocation with Black-Litterman Implied Equilibrium Return Model



For the purpose of comparison, we have presented in Table 4, the detailed risk-return profiles of MVP and GEAF portfolios generated by both the CAPM and Black-Litterman Equilibrium Implied Return model.

Table 4: Risk-Return Profiles of MVP and GEAF Portfolios (CAPM Vs. B/L Implied)

Risk-Return Profile	Expected Return (Annualized)	Expected Risk	Tracking to Market Benchmark R-Squared	Tracking Error
Minimum Variance Portfolio				
2001				
CAPM CASE	6.10%	8.10%	42%	11.74%
BL IMPLIED RETURN	6.50%	8.10%	41%	11.89%
2002				
CAPM CASE	5.70%	8.20%	39%	12.08%
BL IMPLIED RETURN	6.40%	8.20%	39%	12.08%
2003				
CAPM CASE	10.90%	8.80%	27%	12.87%
BL IMPLIED RETURN	6.60%	8.80%	27%	12.88%
2004				
CAPM CASE	13.40%	9.00%	33%	12.09%
BL IMPLIED RETURN	6.80%	8.90%	33%	12.05%
Global Asset Allocation Fund				
2001				
CAPM CASE	12.00%	10.00%	80%	7.06%
BL IMPLIED RETURN	12.00%	13.80%	98%	2.47%
2002				
CAPM CASE	12.00%	11.60%	74%	7.78%
BL IMPLIED RETURN	12.00%	14.00%	98%	2.45%
2003				
CAPM CASE	12.00%	8.90%	27%	12.84%
BL IMPLIED RETURN	12.00%	14.60%	99%	1.43%
2004				
CAPM CASE	15.00%	9.00%	32%	12.15%
BL IMPLIED RETURN	12.00%	14.20%	99%	1.43%

As it may be observed from Table 4, the MVP portfolios generated through Black-Litterman Equilibrium Implied Return model have more reasonable returns compared to the CAPM model at the respective levels of risk, R^2 and tracking error to benchmark MSCI World Index. This is also true in the case of GEAF portfolios in which case we kept our target return at 12 per cent level for generating portfolios by both the CAPM and Black-Litterman Implied Equilibrium

models. For the year 2004, we had to increase the expected return to 15 per cent level as the CAPM model failed to generate a GEAF portfolio with 12 per cent expected return since its MVP has an expected return of 13.4 per cent. This is another difficulty we face with CAPM as it may force us to increase our expected return even if such return is not feasible with a reasonable level of risk. It may be observed that for 2003 and 2004, the CAPM MVP portfolio's have a very high return to risk ratio of 123.86 per cent and 148.89 per cent as compared to 75 per cent and 76.4 per cent in the case of MVP portfolios generated by the Black-Litterman equilibrium model. Similarly, in the case of GEAF, the CAPM generated portfolios have a very high return-risk ratio of 120 per cent, 103.4 per cent, 134.8 per cent and 166.7 per cent as compared to 86.96 per cent, 85.71 per cent, 82.19 per cent and 84.51 per cent in the case of Black-Litterman Equilibrium model. While no one is sure what is an acceptable level of return-to-risk ratio for global equity markets, as we mentioned in the previous section, long term historical return-risk ratio of US stocks is much lower compared to what we observed in our sample data. We believe that by smoothing expected returns based on market capitalization weights, the Black-Litterman model provides a more acceptable platform to asset allocation and optimisation solutions.

SECTION V: PORTFOLIO OPTIMIZATION AND ASSET ALLOCATION WITH INDEX OF ECONOMIC FREEDOM LED VIEW-BASED STRATEGY

We incorporated our strategic asset allocation views into the Black-Litterman model to generate revised return expectations for the different markets under study. As mentioned before, our views are based on percentage changes in the Index of Economic Freedom (IEF) during the year under study over the previous year. The details of percentage change in the Index of Economic Freedom for various countries over the period 2001 to 2004 over their respective previous years are presented in Table 5.

Table 5: INDEX OF ECONOMIC FREEDOM
(percentage change over previous year)

Country	2001	2002	2003	2004
Argentina	-2.81%	-12.57%	-17.96%	-14.57%
Australia	-0.66%	0.00%	0.65%	1.05%
Austria	-2.53%	-2.47%	0.00%	-0.24%
Belgium	1.75%	0.00%	0.00%	-4.29%
Brazil	7.22%	4.67%	1.63%	-2.90%
Canada	2.42%	5.59%	-5.26%	1.00%
Chile	0.61%	7.41%	-7.33%	5.09%
China	-1.79%	-0.35%	0.70%	-2.90%
Colombia	4.38%	2.08%	-5.53%	-0.97%
Czech Republic	4.55%	-8.93%	-2.73%	-1.70%
Denmark	8.20%	14.88%	4.20%	-5.11%
Egypt	1.40%	0.00%	3.90%	3.17%
Finland	1.21%	7.36%	1.99%	-5.41%
France	-2.05%	-14.57%	3.95%	3.93%
Germany	8.94%	1.84%	-1.25%	-0.25%
Greece	0.00%	-5.58%	1.76%	-0.45%
Hong Kong	8.04%	-7.77%	-3.60%	6.78%
Hungary	2.06%	6.32%	-14.61%	-1.96%
Iceland			11.49%	-3.90%
India	0.32%	7.67%	1.04%	1.26%
Indonesia	0.00%	3.13%	1.79%	-9.78%
Ireland	11.72%	-7.81%	0.00%	-0.87%
Italy	0.00%	-2.82%	-1.65%	2.27%
Japan	1.21%	-14.72%	-1.07%	-7.09%
Jordan	3.39%	4.39%	-2.75%	2.50%
Korea	6.00%	-5.85%	-10.55%	2.18%
Malaysia	-10.41%	-5.74%	2.71%	-0.72%
Mexico	1.21%	2.87%	5.06%	-3.11%
Morocco	8.20%	-12.50%	5.95%	1.10%
Netherlands	9.26%	-10.20%	1.23%	-2.00%
New Zealand	2.14%	2.19%	0.00%	-1.49%
Norway	-8.33%	1.54%	5.21%	-3.30%
Pakistan	0.00%	1.79%	0.00%	1.09%
Peru	0.95%	-10.05%	0.43%	1.14%
Philippines	-5.42%	3.56%	3.28%	-3.39%
Poland	7.05%	1.42%	-8.65%	0.53%
Portugal	0.53%	1.08%	-4.35%	0.83%
Russia	-1.00%	1.32%	5.35%	2.19%
Singapore	-4.72%	-1.50%	4.44%	0.16%
South Africa	0.41%	7.08%	7.62%	-8.35%
Spain	1.00%	3.02%	4.15%	0.11%
Sweden	5.81%	7.41%	0.00%	-1.33%
Switzerland	1.31%	4.64%	-4.17%	1.87%
Taiwan	-10.13%	-9.20%	3.68%	-6.23%
Thailand	17.19%	-7.65%	-10.15%	-5.44%
Turkey	-7.34%	-13.68%	-5.26%	3.14%
United Kingdom	4.05%	-2.82%	-2.74%	4.53%
United States	3.40%	-3.52%	-1.36%	0.67%
Venezuela	-10.22%	-2.65%	4.19%	-12.59%
Source: The Heritage Foundation and Dow Jones & Cc				

The detailed methodology and the 50 variables used for calculating the IEF are presented in Appendix I. Assuming that the world has a single currency (a comparison can be drawn to European single currency regime), the return expectations or cost of capital can only get blurred by the degree of economic freedom prevalent in a country, i.e., the institutional set up governing trade and businesses, fiscal health of countries, wages and prices, property rights, regulations and informal markets. These are the key ingredients of the Index of Economic Freedom. Studies in the past such as 'The Opacity Index'[xii] show that for every 1-point increase in the opacity index, stock market capitalization and trading volume as a percentage of GDP is lower by 0.9 per cent. While the Opacity Index is drawn upon 65 variables, its methodology and composition is similar to the IEF, though IEF provides a positive outlook, i.e., improvement in IEF is an indication of better economic climate. As such, we make an assumption here that 1 per cent positive change in the IEF will have a 0.9 per cent positive change in our expected strategic view based returns and vice versa .

A comparison of our view-based expected returns and the Black-Litterman implied returns are presented in Table 6.

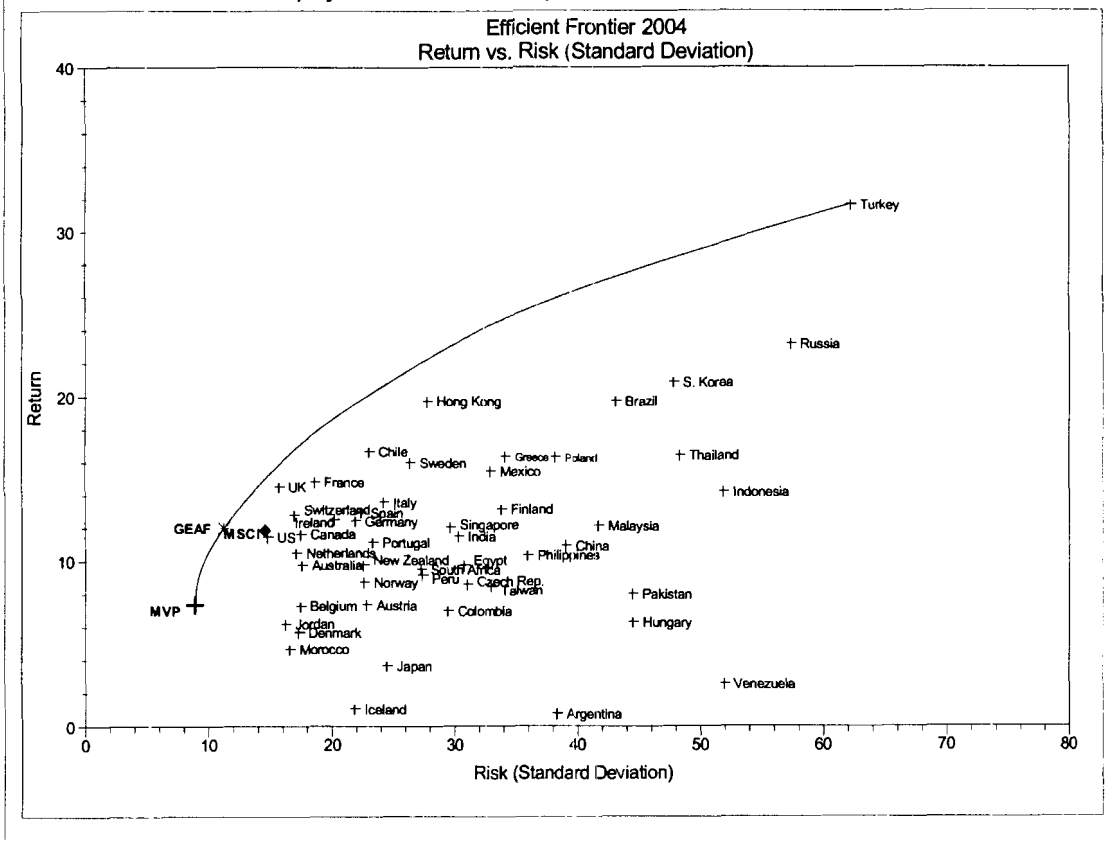
[xii] The Opacity Index 2004, The Kurtzman Group, p. 16

Table 6: COMPARISON OF BLACK-LITTERMAN IMPLIED EQUILIBRIUM RETURNS AND IEF-LED VIEW BASED FORECASTED RETURNS

ASSETS	2001 BLIMPLIED	2001 B/L IEF VIEW	2001 RETURN DIFF	2002 BLIMPLIED	2002 B/L IEF VIEW	2002 RETURN DIFF	2003 BLIMPLIED	2003 B/L IEF VIEW	2003 RETURN DIFF	2004 BLIMPLIED	2004 B/L IEF VIEW	2004 RETURN DIFF.
Argentina Equity	16.19%	13.39%	-2.80%	15.95%	3.43%	-12.52%	13.86%	-4.06%	-17.92%	14.03%	-0.57%	-14.60%
Australia Equity	10.49%	9.84%	-0.65%	10.64%	10.60%	-0.04%	10.48%	11.15%	0.67%	10.55%	11.55%	1.00%
Austria Equity	9.64%	7.07%	-2.57%	9.19%	6.73%	-2.46%	9.19%	9.20%	0.01%	9.20%	8.96%	-0.24%
Belgium Equity	9.22%	10.95%	1.73%	8.98%	9.00%	0.02%	10.29%	10.30%	0.01%	10.36%	6.11%	-4.25%
Brazil Equity	20.69%	27.92%	7.23%	20.77%	25.47%	4.70%	21.93%	23.53%	1.60%	21.70%	18.80%	-2.90%
Canada Equity	12.15%	14.62%	2.47%	12.04%	17.59%	5.55%	11.73%	6.44%	-5.29%	11.81%	12.80%	0.99%
Chile Equity	11.40%	12.01%	0.61%	11.96%	19.41%	7.45%	12.06%	4.77%	-7.29%	12.24%	17.29%	5.05%
China Equity	11.30%	9.51%	-1.79%	10.86%	10.55%	-0.31%	10.79%	11.50%	0.71%	10.79%	7.90%	-2.89%
Colombia Equity	6.35%	10.78%	4.43%	6.23%	8.28%	2.05%	7.61%	2.07%	-5.54%	7.71%	6.73%	-0.98%
Czech Rep. Equity	10.10%	14.65%	4.55%	10.27%	1.37%	-8.90%	10.25%	7.57%	-2.68%	10.20%	8.50%	-1.70%
Denmark Equity	9.19%	17.40%	8.21%	9.11%	23.98%	14.87%	9.72%	13.90%	4.18%	9.84%	4.69%	-5.15%
Egypt Equity	8.74%	10.10%	1.36%	8.50%	8.50%	0.00%	6.85%	10.80%	3.95%	7.02%	10.17%	3.15%
Finland Equity	15.72%	16.91%	1.19%	15.53%	22.86%	7.33%	15.77%	17.79%	2.02%	15.90%	10.49%	-5.41%
France Equity	11.39%	9.35%	-2.04%	11.47%	-3.07%	-14.54%	12.22%	16.15%	3.93%	12.23%	16.13%	3.90%
Germany Equity	11.64%	20.54%	8.90%	12.06%	13.94%	1.88%	13.34%	12.05%	-1.29%	13.43%	13.15%	-0.28%
Greece Equity	20.82%	20.80%	-0.02%	18.27%	12.72%	-5.55%	16.70%	18.46%	1.76%	16.29%	15.85%	-0.44%
Hong Kong Equity	15.10%	23.14%	8.04%	15.06%	7.33%	-7.73%	14.20%	10.60%	-3.60%	14.22%	20.98%	6.76%
Hungary Equity	10.32%	12.36%	2.04%	10.64%	16.92%	6.28%	11.65%	-2.91%	-14.56%	11.59%	9.64%	-1.95%
Iceland Equity							5.65%	17.09%	11.44%	6.35%	2.40%	-3.95%
India Equity	8.84%	9.12%	0.28%	9.33%	16.97%	7.64%	9.77%	10.84%	1.07%	9.98%	11.26%	1.28%
Indonesia Equity	22.54%	22.50%	-0.04%	19.59%	22.73%	3.14%	17.64%	19.49%	1.85%	17.44%	7.62%	-9.82%
Ireland Equity	11.59%	23.32%	11.73%	11.82%	3.99%	-7.83%	12.13%	12.10%	-0.03%	12.12%	11.23%	-0.89%
Italy Equity	10.92%	10.90%	-0.02%	10.97%	8.18%	-2.79%	11.55%	9.95%	-1.60%	11.51%	13.77%	2.26%
Japan Equity	12.98%	14.21%	1.23%	12.48%	-2.22%	-14.70%	11.53%	10.43%	-1.10%	11.72%	4.61%	-7.11%
Jordan Equity	3.50%	6.89%	3.39%	3.51%	7.89%	4.38%	3.54%	0.75%	-2.79%	3.58%	6.10%	2.52%
Malaysia Equity	14.86%	4.49%	-10.37%	13.50%	7.76%	-5.74%	12.51%	15.21%	2.70%	12.23%	11.58%	-0.65%
Mexico Equity	18.74%	19.91%	1.17%	18.41%	21.27%	2.86%	17.49%	22.56%	5.07%	17.12%	13.99%	-3.13%
Morocco Equity	1.22%	9.40%	8.18%	1.83%	-10.70%	-12.53%	3.45%	9.45%	6.00%	3.44%	4.50%	1.06%
Netherlands Equity	10.61%	19.86%	9.25%	10.76%	0.60%	-10.16%	11.74%	12.93%	1.19%	11.78%	9.80%	-1.98%
New Zealand Equity	11.56%	13.74%	2.18%	11.43%	13.59%	2.16%	10.86%	10.90%	0.04%	10.85%	9.41%	-1.44%
Norway Equity	12.35%	4.07%	-8.28%	12.32%	13.84%	1.52%	12.79%	18.01%	5.22%	12.90%	9.60%	-3.30%
Pakistan Equity	9.23%	9.20%	-0.03%	8.72%	10.49%	1.77%	8.04%	8.00%	-0.04%	7.93%	8.99%	1.06%
Peru Equity	9.04%	9.95%	0.91%	8.25%	-1.85%	-10.10%	7.96%	8.43%	0.47%	8.25%	9.44%	1.19%
Philippines Equity	18.04%	12.58%	-5.46%	16.77%	20.36%	3.59%	13.93%	17.18%	3.25%	13.81%	10.41%	-3.40%
Poland Equity	16.77%	23.85%	7.08%	16.24%	17.62%	1.38%	16.41%	7.75%	-8.66%	16.22%	16.73%	0.51%
Portugal Equity	10.00%	10.53%	0.53%	9.54%	10.58%	1.04%	10.29%	5.95%	-4.34%	10.33%	11.13%	0.80%
Russia Equity	33.46%	32.50%	-0.96%	30.59%	31.92%	1.33%	25.74%	31.05%	5.31%	25.04%	27.19%	2.15%
S. Korea Equity	20.97%	27.00%	6.03%	20.52%	14.65%	-5.87%	19.93%	9.35%	-10.58%	19.56%	21.78%	2.22%
Singapore Equity	16.41%	11.68%	-4.73%	16.37%	14.90%	-1.47%	15.35%	19.74%	4.39%	15.26%	15.46%	0.20%
South Africa Equity	15.63%	16.01%	0.38%	14.96%	22.08%	7.12%	14.06%	21.72%	7.66%	14.10%	5.75%	-8.35%
Spain Equity	13.26%	14.30%	1.04%	13.12%	16.12%	3.00%	13.45%	17.55%	4.10%	13.47%	13.61%	0.14%
Sweden Equity	14.91%	20.71%	5.80%	15.09%	22.51%	7.42%	15.73%	15.70%	-0.03%	15.68%	14.37%	-1.31%
Switzerland Equity	10.32%	11.61%	1.29%	10.13%	14.74%	4.61%	10.38%	6.23%	-4.15%	10.38%	12.27%	1.89%
Taiwan Equity	12.27%	2.17%	-10.10%	13.40%	4.20%	-9.20%	13.43%	17.08%	3.65%	13.31%	7.07%	-6.24%
Thailand Equity	23.49%	40.69%	17.20%	20.98%	13.35%	-7.63%	19.35%	9.15%	-10.20%	19.25%	13.76%	-5.49%
Turkey Equity	22.16%	14.96%	-7.20%	24.00%	10.32%	-13.68%	23.96%	18.74%	-5.22%	23.86%	27.04%	3.18%
UK Equity	10.87%	14.95%	4.08%	10.71%	7.88%	-2.83%	10.89%	8.16%	-2.73%	10.93%	15.43%	4.50%
US Equity	11.59%	15.00%	3.41%	11.72%	8.18%	-3.54%	11.73%	10.34%	-1.39%	11.69%	12.37%	0.68%
Venezuela Equity	14.03%	3.78%	-10.25%	12.91%	10.25%	-2.66%	13.50%	17.69%	4.19%	13.61%	1.01%	-12.60%
MSCI World Index		11.90%			11.90%			11.80%			11.90%	

We incorporate our view-based expected returns into the Black-Litterman equilibrium model with a 95 per cent confidence level. For the purpose of demonstration, we have presented the efficient frontier in Exhibit 3 for the year 2004, which shows that the frontier evenly encompasses most of the assets under the study.

Exhibit 3 : Global Equity Allocation with IEF (Black-Litterman Absolute View Approach)



Details of both MVP and GEAF portfolio compositions for the period 2001 to 2004 based on view-based strategy are presented in Table 7A and 7B, respectively.

Table 7A: IEF-LED VIEW BASED STRATEGY CASE: Minimum Variance Portfolio
(BLACK-LITTERMAN ABSOLUTE VIEW APPROACH)
Case Target Return: 12.00%, 1.96% Standard Deviation Return Distribution

Asset Allocations	2001	2002	2003	2004
Argentina Equity	0.00%	0.00%	0.00%	0.00%
Australia Equity	13.80%	1.30%	0.00%	0.00%
Austria Equity	0.00%	0.00%	0.00%	0.00%
Belgium Equity	0.00%	0.00%	0.00%	0.00%
Brazil Equity	0.00%	0.00%	0.00%	0.00%
Canada Equity	0.00%	3.40%	0.00%	0.80%
Chile Equity	0.00%	0.00%	0.00%	0.00%
China Equity	0.00%	1.00%	0.00%	0.00%
Colombia Equity	4.60%	6.20%	0.00%	0.00%
Czech Rep. Equity	3.80%	1.90%	0.00%	0.00%
Denmark Equity	4.70%	5.90%	0.00%	0.20%
Egypt Equity	0.00%	0.00%	0.00%	0.00%
Finland Equity	0.00%	0.00%	0.00%	0.00%
France Equity	0.00%	0.00%	0.00%	0.00%
Germany Equity	0.00%	0.00%	0.00%	0.00%
Greece Equity	0.00%	0.00%	0.00%	0.00%
Hong Kong Equity	0.30%	0.00%	0.00%	0.00%
Hungary Equity	0.00%	0.00%	0.00%	0.00%
Iceland Equity			13.70%	3.90%
India Equity	0.00%	0.00%	0.00%	0.00%
Indonesia Equity	0.00%	0.00%	0.00%	0.00%
Ireland Equity	0.20%	0.00%	0.00%	0.00%
Italy Equity	0.00%	0.00%	0.00%	0.00%
Japan Equity	9.20%	6.70%	4.90%	4.30%
Jordan Equity	27.20%	24.20%	27.10%	26.80%
Malaysia Equity	0.00%	0.00%	0.00%	0.00%
Mexico Equity	0.00%	0.00%	0.00%	0.00%
Morocco Equity	22.80%	27.40%	20.40%	25.70%
Netherlands Equity	0.00%	0.00%	0.00%	0.00%
New Zealand Equity	0.00%	0.00%	0.00%	0.00%
Norway Equity	0.00%	0.00%	0.00%	0.00%
Pakistan Equity	0.00%	0.00%	1.50%	1.30%
Peru Equity	0.00%	4.10%	8.10%	7.20%
Philippines Equity	0.00%	0.00%	0.00%	0.00%
Poland Equity	0.00%	0.00%	0.00%	0.00%
Portugal Equity	0.00%	0.00%	0.00%	0.00%
Russia Equity	0.00%	0.00%	0.00%	0.00%
S. Korea Equity	0.00%	0.00%	0.00%	0.00%
Singapore Equity	0.00%	0.00%	0.00%	0.00%
South Africa Equity	0.00%	0.00%	0.00%	0.00%
Spain Equity	0.00%	0.00%	0.00%	0.00%
Sweden Equity	0.00%	0.00%	0.00%	0.00%
Switzerland Equity	0.00%	1.20%	0.00%	1.10%
Taiwan Equity	0.00%	0.00%	0.00%	0.00%
Thailand Equity	0.00%	0.00%	0.00%	0.00%
Turkey Equity	0.00%	0.00%	0.00%	0.00%
UK Equity	0.00%	1.00%	0.00%	2.00%
US Equity	13.40%	15.10%	23.80%	25.80%
Venezuela Equity	0.00%	0.60%	0.50%	0.80%
Portfolio Statistics				
Expected Return (Annualized)	10.50%	1.10%	8.60%	7.40%
Expected Risk	8.20%	8.20%	8.80%	9.00%
Best Case Return (Annualized)	27.40%	18.20%	26.90%	25.90%
Worst Case Return (Annualized)	-4.70%	-14.00%	-7.70%	-9.10%
Probability of Target Return	41.20%	9.70%	33.50%	29.10%
Probability of Negative Return	9.60%	46.10%	16.60%	20.90%
Benchmark Tracking				
R-Squared	40%	38%	28%	34%
Tracking Error	12.00%	12.11%	12.70%	11.93%

Table 7B: IEF-LED VIEW BASED STRATEGY CASE: Global Equity Allocation Fund
(BLACK-LITTERMAN ABSOLUTE VIEW APPROACH)
Case Target Return: 12.00%, 1.96% Standard Deviation Return Distribution

Asset Allocations	2001	2002	2003	2004
Argentina Equity	0.00%	0.00%	0.00%	0.00%
Australia Equity	15.10%	0.00%	0.00%	0.00%
Austria Equity	0.00%	0.00%	0.00%	0.00%
Belgium Equity	0.00%	0.00%	0.00%	0.00%
Brazil Equity	0.00%	0.00%	0.00%	0.00%
Canada Equity	0.00%	7.10%	0.00%	0.00%
Chile Equity	0.00%	0.00%	0.00%	7.10%
China Equity	0.00%	4.00%	0.00%	0.00%
Colombia Equity	3.60%	6.60%	0.00%	0.00%
Czech Rep. Equity	3.50%	0.00%	0.00%	0.00%
Denmark Equity	2.10%	10.60%	0.00%	0.00%
Egypt Equity	0.00%	0.00%	0.00%	0.80%
Finland Equity	0.00%	1.70%	0.00%	0.00%
France Equity	0.00%	0.00%	2.70%	0.50%
Germany Equity	0.00%	0.00%	0.00%	0.00%
Greece Equity	0.00%	0.00%	0.00%	0.00%
Hong Kong Equity	0.70%	0.00%	0.00%	9.80%
Hungary Equity	0.00%	0.00%	0.00%	0.00%
Iceland Equity			31.30%	0.00%
India Equity	0.00%	0.30%	0.00%	0.00%
Indonesia Equity	0.00%	0.00%	0.00%	0.00%
Ireland Equity	5.10%	0.00%	0.00%	0.00%
Italy Equity	0.00%	0.00%	0.00%	1.50%
Japan Equity	8.60%	0.00%	4.20%	0.00%
Jordan Equity	28.10%	25.40%	12.90%	17.60%
Malaysia Equity	0.00%	0.00%	0.00%	0.00%
Mexico Equity	0.00%	0.00%	0.00%	0.00%
Morocco Equity	21.60%	24.00%	15.00%	12.40%
Netherlands Equity	4.20%	0.00%	0.50%	0.00%
New Zealand Equity	0.00%	0.00%	0.00%	0.00%
Norway Equity	0.00%	0.00%	0.00%	0.00%
Pakistan Equity	0.00%	0.00%	3.30%	0.00%
Peru Equity	0.00%	4.70%	6.90%	2.60%
Philippines Equity	0.00%	0.00%	0.00%	0.00%
Poland Equity	0.00%	0.00%	0.00%	0.00%
Portugal Equity	0.00%	0.00%	0.00%	0.00%
Russia Equity	0.60%	0.00%	0.00%	0.00%
S. Korea Equity	0.00%	0.00%	0.00%	0.00%
Singapore Equity	0.00%	0.00%	0.00%	0.00%
South Africa Equity	0.00%	1.20%	0.00%	0.00%
Spain Equity	0.00%	0.00%	5.20%	0.00%
Sweden Equity	0.00%	0.00%	0.00%	0.00%
Switzerland Equity	0.00%	12.40%	0.00%	3.60%
Taiwan Equity	0.00%	0.00%	0.00%	0.00%
Thailand Equity	0.00%	0.00%	0.00%	0.00%
Turkey Equity	0.00%	0.00%	0.00%	0.10%
UK Equity	0.00%	1.60%	0.00%	34.80%
US Equity	6.90%	0.00%	17.80%	9.20%
Venezuela Equity	0.00%	0.50%	0.20%	0.00%
Portfolio Statistics				
Expected Return (Annualized)	12.00%	12.00%	12.00%	12.00%
Expected Risk	8.60%	8.70%	9.80%	11.30%
Best Case Return (Annualized)	29.90%	30.00%	32.30%	35.60%
Worst Case Return (Annualized)	-4.00%	-4.10%	-5.90%	-8.40%
Probability of Target Return	48.50%	48.50%	48.30%	48.00%
Probability of Negative Return	7.60%	7.70%	10.40%	14.00%
Benchmark Tracking				
R-Squared	41%	36%	39%	65%
Tracking Error	11.95%	12.48%	11.29%	8.44%

As it may be observed from the MVP and GEAF portfolios presented in Table 7A and 7B, the asset compositions are far more diversified compared to the traditional CAPM model, though the portfolios still have higher weights on countries such as Morocco, Jordan and Iceland.

The risk-return profiles of both the MVP and GEAF portfolios under the Black-Litterman Implied Return and IEF-led View-based returns are presented in Table 8.

Table 8:

Risk-Return Profiles of MVP and GEAF portfolios:
Black-Litterman Implied Return Vs. IEF-led View-based return

Risk-Return Profile	Expected Return (Annualized) One Year	Expected Risk One Year	Tracking to Market Benchmark R-Squared	Tracking Error
MVP Portfolios				
2001				
BL IMPLIED RETURN	6.50%	8.10%	41%	11.89%
IEF VIEW CASE	10.50%	8.20%	40%	12.00%
2002				
BL IMPLIED RETURN	6.40%	8.20%	39%	12.08%
IEF VIEW CASE	1.10%	8.20%	38%	12.11%
2003				
BL IMPLIED RETURN	6.60%	8.80%	27%	12.88%
IEF VIEW CASE	8.60%	8.80%	28%	12.70%
2004				
BL IMPLIED RETURN	6.80%	8.90%	33%	12.05%
IEF VIEW CASE	7.40%	9.00%	34%	11.93%
GEAF Portfolios				
2001				
BL IMPLIED RETURN	12.00%	13.80%	98%	2.47%
IEF VIEW CASE	12.00%	8.60%	41%	11.95%
2002				
BL IMPLIED RETURN	12.00%	14.00%	98%	2.45%
IEF VIEW CASE	12.00%	8.70%	36%	12.48%
2003				
BL IMPLIED RETURN	12.00%	14.60%	99%	1.43%
IEF VIEW CASE	12.00%	9.80%	39%	11.29%
2004				
BL IMPLIED RETURN	12.00%	14.20%	99%	1.43%
IEF VIEW CASE	12.00%	11.30%	65%	8.44%

As you may observe, both the MVP and GEAF portfolios generated with our view-based strategy has improved expected returns without significant increase in the levels of risk as compared to their corresponding portfolios generated with the Black-Litterman equilibrium model. The expected return-risk ratio of MVP

portfolios generated by the IEF-led view based strategy are 128.05 per cent, 13.41 per cent, 97.73 per cent and 82.22 per cent as compared to 80.25 per cent, 78.05 per cent, 75 per cent and 76.40 per cent for corresponding portfolios generated by the Black-Litterman equilibrium model for the year 2001, 2002, 2003 and 2004, respectively. While the expected return-risk ratio of GEAF portfolios generated by the IEF-led view based strategy are 139.53 per cent, 137.93 per cent, 122.45 per cent and 106.19 per cent as compared to 86.96 per cent, 85.71 per cent, 82.19 per cent and 84.51 per cent of corresponding portfolios generated by the Black-Litterman equilibrium model for the year 2001, 2002, 2003 and 2004, respectively. It is particularly interesting to note that our MVP portfolio for the year 2002 has an expected return of only 1.10 per cent against a standard deviation of 8.20 per cent possibly because 2002 was an exceptionally bad year for most of the markets and particularly the US markets after the technology bubble burst. On a comparative note, for the US equities during 2002, the MVP and GEAF portfolios based on CAPM approach have weights of 16.7 per cent and 26.20 per cent; and corresponding portfolios under the Black-Litterman equilibrium model have weights of 16.70 per cent and 51.10 per cent, while our IEF-led view based corresponding portfolios have 15.10 per cent weight and zero weight, respectively. This brings out a clear case in point that our IEF-led view-based strategy is quite risk sensitive.

SECTION VI: COMPARATIVE PERFORMANCE ANALYSIS OF MVP AND GEAF PORTFOLIOS UNDER THE VARIOUS MODELS (EX-POST)

As we mentioned earlier under research methodology, we invest a notional US$ 1 million in the MVP and GEAF portfolios generated by the various models for a period of one year starting 2001. For example, we optimise portfolios based on historical return data available up to June 2001 by the CAMP approach and invest in such a portfolio for a period of one year till the end of June 2002. At the end of June 2002, we take historical return data available up to June 2002, optimise new portfolios and invest and hold those portfolios till June 2003. We repeat this process till the year 2004 for portfolios which mature in June 2005. We follow a similar process with Black-Litterman Equilibrium approach as well as our IEF-led view based approach and form corresponding portfolios.

The comparative performance of the MVP and GEAF portfolios vis-à-vis the benchmark MSCI World Index are presented in Table 9A and 9B respectively (The comparative MVP portfolios are also depicted in Exhibit 4A and 4B, whereas the comparative GEAF portfolios are depicted in Exhibit 5A and 5B).

Table 9A: MINIMUM VARIANCE PORTFOLIOS
Comparison of Performance

(Value in USD)

	2001	2002	2003	2004	2005
MSCI WORLD INDEX	1,000,000.00	836,854.76	802,982.70	979,466.96	1,059,020.75
CAPM	1,000,000.00	989,574.96	1,139,240.98	1,633,392.73	2,502,128.40
BL IMPLIED RETURN	1,000,000.00	992,529.60	1,142,642.49	1,627,643.79	2,491,438.17
BL VIEW	1,000,000.00	1,004,500.62	1,153,991.47	1,658,514.61	2,531,805.32

	Percentage change in value y-o-y			
	2002	2003	2004	2005
MSCI WORLD INDEX	-16.31%	-4.05%	21.98%	8.12%
CAPM	-1.04%	15.12%	43.38%	53.19%
BL IMPLIED RETURN	-0.75%	15.12%	42.45%	53.07%
BL VIEW	0.45%	14.88%	43.72%	52.65%

	Average Monthly Loss*			
	2002	2003	2004	2005
MSCI WORLD INDEX	-3.46%	-4.56%	-1.80%	-2.80%
CAPM	-2.39%	-2.73%	-1.80%	-0.90%
BL IMPLIED RETURN	-2.08%	-2.73%	-1.76%	-0.90%
BL VIEW	-2.07%	-2.77%	-1.78%	-0.85%

EXHIBIT 4A: MVP PORTFOLIO PERFORMANCE (ABSOLUTE VALUES)

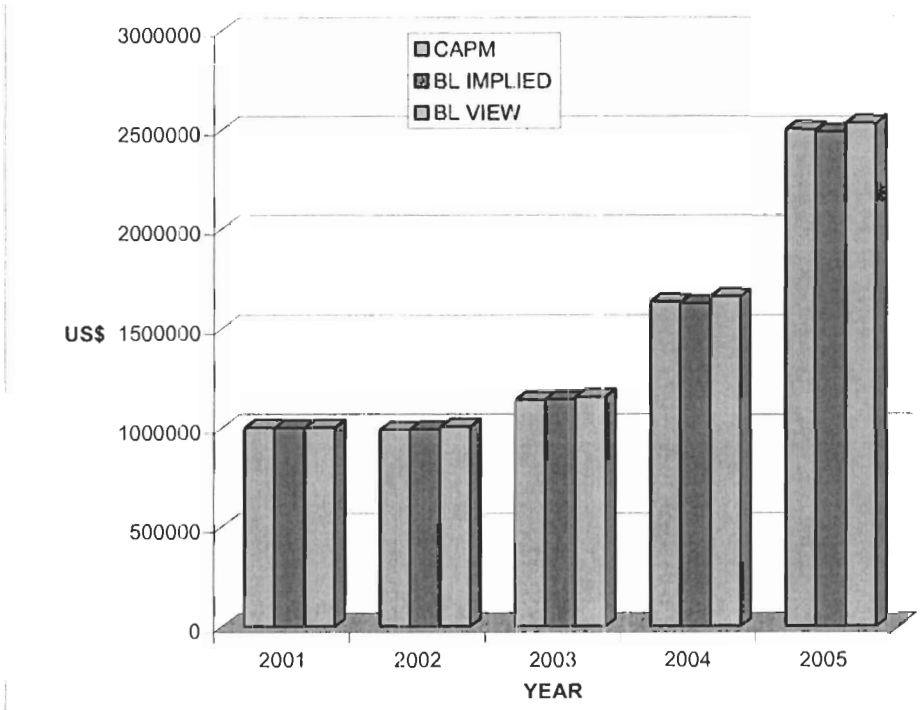
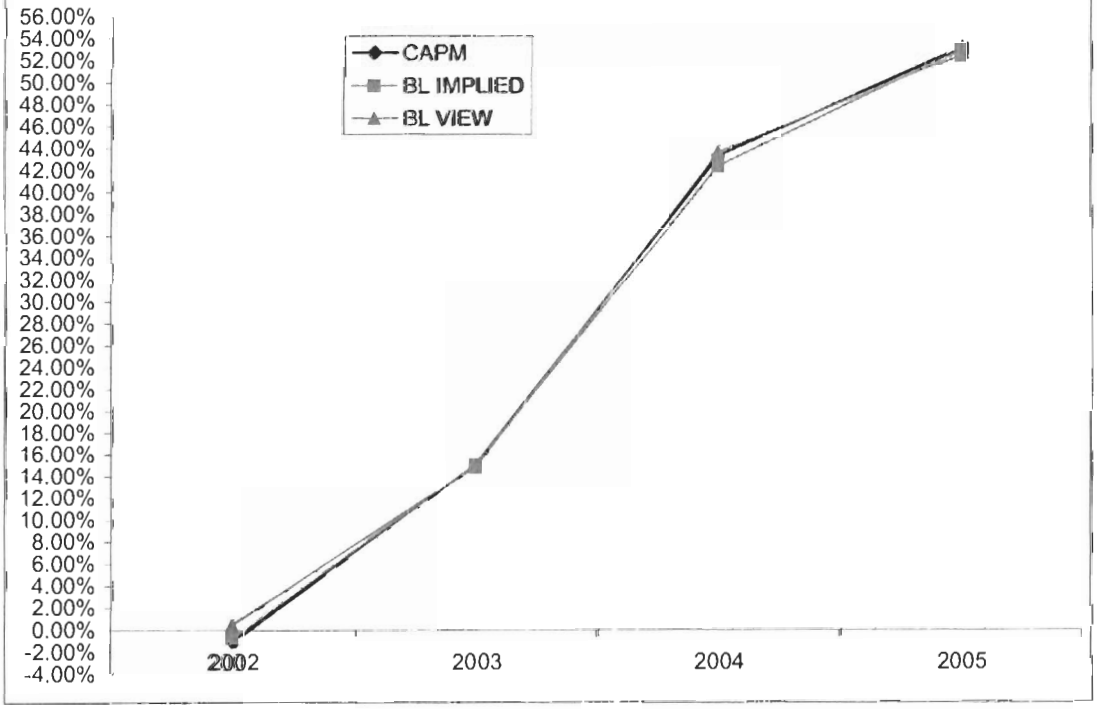


EXHIBIT 4B: MVP PORTFOLIO PERFORMANCE (CHANGE IN VALUES, Y-O-Y)



As it can be observed from Table 9A, and Exhibit 4A and 4B, the MVP portfolios generated by our IEF-led view based strategy have performed better than the traditional CAPM and Black-Litterman equilibrium models. Our IEF-led view based portfolio has grown to US$ 2.53 million as compared to US$ 2.49 million in case of the Black-Litterman equilibrium model portfolio and US$ 2.50 million in the case of traditional CAPM model. While all the models performed well as compared to the benchmark MSCI World Index which grew to US$1.06 million only over this 4-year period, our IEF-led view based approach has consistently provided positive returns over the four annual periods. Absolute return changes are higher compared to the CAPM and Black-Litterman equilibrium portfolios in two out of the four years. Our IEF-led view based strategic MVP portfolios also have lower average monthly loss in three out of the four years as compared to CAPM MVP portfolios, and in two out of the four years as compared to the Black-Litterman equilibrium portfolios. Though the results are not startlingly different in the case of the three models, we find that our IEF-led view based strategy's Minimum Variance Portfolios are robust in a sense that they have been able to protect the capital invested and generated positive returns during all the four years. Since the Minimum Variance Portfolio is expected to minimize risk, our IEF-led strategy provides better results compared to the traditional CAPM and Black-Litterman equilibrium approaches.

Table 9B: GLOBAL EQUITY ALLOCATION FUND

Comparison of Performance

(Value in USD)

	2001	2002	2003	2004	2005
MSCI WORLD INDEX	1,000,000.00	836,854.76	802,982.70	979,466.96	1,059,020.75
CAPM	1,000,000.00	889,054.01	894,812.84	1,313,716.75	2,023,857.78
BL IMPLIED RETURN	1,000,000.00	869,929.90	851,542.90	1,078,505.32	1,208,594.64
BL VIEW	1,000,000.00	1,013,520.63	1,160,703.87	1,834,110.78	2,651,545.11

Percentage change in value y-o-y

	2002	2003	2004	2005
MSCI WORLD INDEX	-16.31%	-4.05%	21.98%	8.12%
CAPM	-11.09%	0.65%	46.81%	54.06%
BL IMPLIED RETURN	-13.01%	-2.11%	26.65%	12.06%
BL VIEW	1.35%	14.52%	58.02%	44.57%

Average Monthly Loss*

	2002	2003	2004	2005
MSCI WORLD INDEX	-3.46%	-4.56%	-1.80%	-2.80%
CAPM	-2.67%	-3.55%	-2.06%	-0.88%
BL IMPLIED RETURN	-3.75%	-4.21%	-1.86%	-2.84%
BL VIEW	-1.90%	-2.52%	-2.18%	-0.98%

EXHIBIT 5A: GEAF PORTFOLIO PERFORMANCE (ABSOLUTE VALUES)

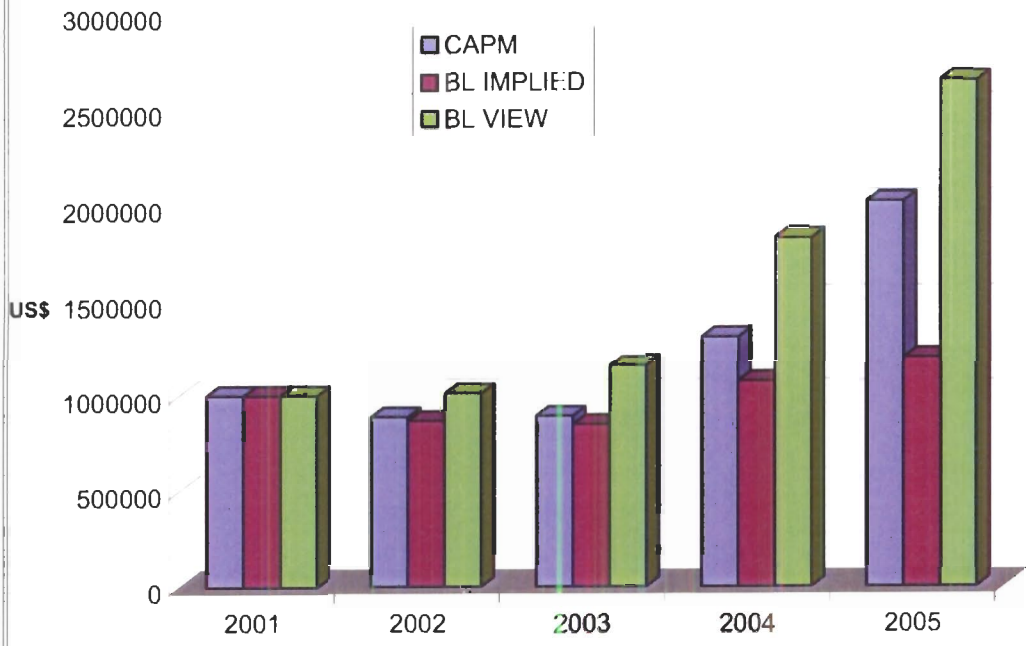
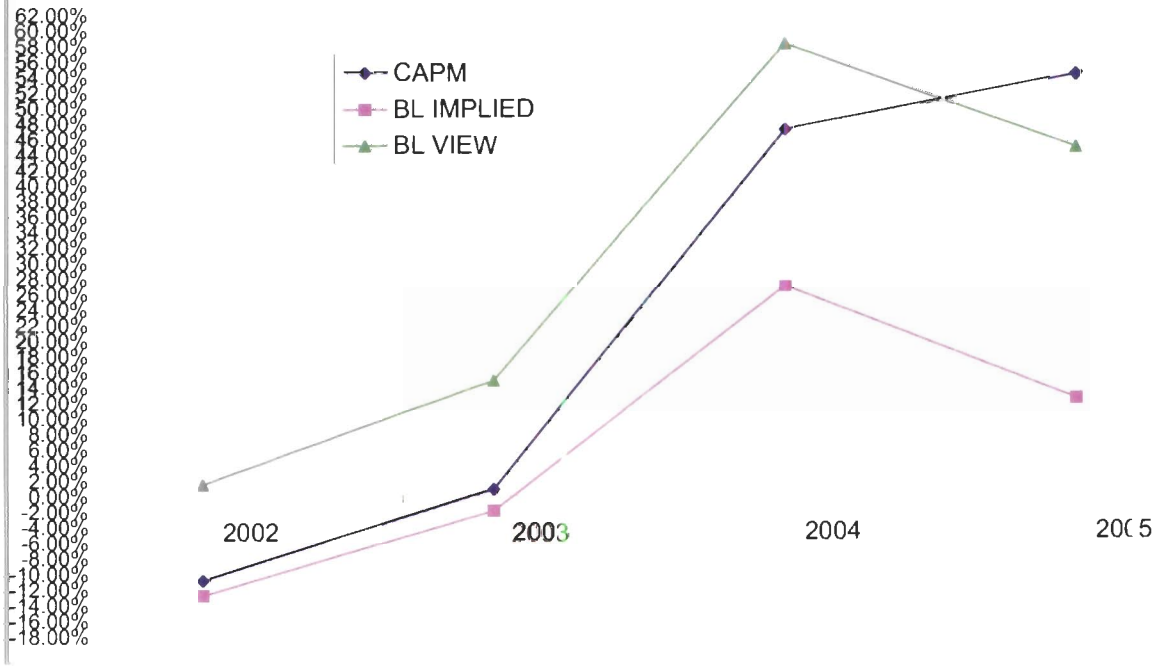


EXHIBIT 5B: GEAF PORTFOLIO PERFORMANCE (CHANGE IN VALUES, Y-O-Y)



As it can be observed from Table 9B, and Exhibit 5A and 5B, the GEAF portfolios generated by our IEF-led view based strategy have performed extremely well compared to the traditional CAPM and Black-Litterman equilibrium models. The value of our IEF-led strategic portfolios has grown to US$2.65 million as compared to US$2.02 million in the case of CAPM portfolios and to US$ 1.21 million in the case of Black-Litterman equilibrium portfolios. Our IEF-led GEAF portfolios have also consistently provided positive returns over the 4 annual periods we studied, beating the Black-Litterman equilibrium portfolios in all the four years and the CAPM portfolios in three out of four years in terms of year-on-year percentage change in the value of the portfolios. The IEF-led strategic portfolios also have lower average monthly loss in three out of the four years as compared to the equilibrium portfolios, and in two out of four years as compared to the CAPM portfolios.

We also looked at risk-return matrices of the MVP and GEAF portfolios generated through the various models in terms of their compounded annual growth rate (CAGR), standard deviation, Sharpe ratio, and their tracking error, beta and Treynor ratio as compared to the benchmark MSCI World Index. The details of these indicators are presented in Table 10A for the MVP portfolios and in Table 10B for the GEAF portfolios.

Table 10A: MINIMUM VARIANCE PORTFOLIO

Risk - Return Comparison

	CAGR				STANDARD DEVIATION				TRACKING ERROR			
	2002	2003	2004	2005	2002	2003	2004	2005	2002	2003	2004	2005
MSCI WORLD INDEX	-17.59%	-3.76%	20.63%	7.86%	48.97%	71.11%	27.29%	31.32%				
CAPM	-1.04%	12.95%	38.88%	42.05%	33.68%	43.11%	34.66%	55.48%	3.21%	3.90%	3.17%	6.35%
BLIMPLIED	-0.74%	12.95%	38.26%	41.95%	33.70%	43.11%	34.37%	55.67%	3.25%	3.90%	3.15%	6.35%
BLVIEW	0.45%	12.84%	39.23%	41.69%	35.55%	43.41%	34.47%	55.18%	3.39%	3.91%	3.15%	6.30%
	BETA				SHARPE RATIO				TREYNOR RATIO			
	2002	2003	2004	2005	2002	2003	2004	2005	2002	2003	2004	2005
MSCI WORLD INDEX	1.00	1.00	1.00	1.00								
CAPM	0.69	0.61	1.27	1.77	-0.12	0.23	1.04	0.70	-0.06	0.16	0.28	0.22
BLIMPLIED	0.69	0.61	1.26	1.78	-0.11	0.23	1.03	0.70	-0.05	0.16	0.28	0.22
BLVIEW	0.73	0.61	1.26	1.76	-0.07	0.23	1.05	0.70	-0.04	0.16	0.29	0.22

Table 10B: GLOBAL ASSET ALLOCATION FUND

Risk - Return Comparison

	CAGR				STANDARD DEVIATION				TRACKING ERROR			
	2002	2003	2004	2005	2002	2003	2004	2005	2002	2003	2004	2005
MSCI WORLD INDEX	-17.59%	-3.76%	20.63%	7.86%	48.97%	71.11%	27.29%	31.32%				
CAPM	-11.70%	0.59%	41.75%	42.64%	36.04%	57.10%	36.39%	54.24%	1.79%	2.07%	3.31%	6.31%
BLIMPLIED	-13.68%	-1.94%	24.90%	11.17%	52.22%	67.56%	28.39%	34.13%	0.89%	0.59%	0.55%	0.48%
BLVIEW	1.23%	12.39%	49.54%	36.89%	37.59%	46.54%	40.12%	39.92%	3.41%	3.89%	3.60%	4.59%
	BETA				**SHARPE RATIO**				**TREYNOR RATIO**			
	2002	2003	2004	2005	2002	2003	2004	2005	2002	2003	2004	2005
MSCI WORLD INDEX	1.00	1.00	1.00	1.00								
CAPM	0.74	0.80	1.33	1.73	-0.41	-0.04	1.06	0.73	-0.20	-0.03	0.29	0.23
BLIMPLIED	1.07	0.95	1.04	1.09	-0.32	-0.07	0.77	0.24	-0.16	-0.05	0.21	0.08
BLVIEW	0.77	0.65	1.47	1.27	-0.05	0.20	1.16	0.85	-0.02	0.14	0.32	0.27

The IEF-led strategy has positive returns during all the years. MVP portfolios generated by the three different methods are more or less identical on all the above counts, except that the IEF-led strategic MVP portfolio has a lower standard deviation during 2002.

However, in terms of the various risk-return parameters that we mentioned above, the GEAF portfolios generated by our IEF-led strategy are highly efficient compared to the corresponding portfolios generated by CAPM and the Black-Litterman equilibrium approaches. Our IEF-led strategic portfolios have performed well and have higher Sharpe and Treynor ratios compared to the traditional CAPM and equilibrium portfolios in all the four years. Hence both from the point of total risk as well as systematic risk; the IEF-led strategic portfolios are superior to the CAPM and equilibrium portfolios.

SECTION VII: SUMMARY AND CONCLUSION

Our findings support that the Black-Litterman model is a more reasonable approach to portfolio optimisation and asset allocation as compared to the traditional CAPM approach. By incorporating size of different assets into the risk-return matrix, it generates a more representative efficient frontier of the underlying assets and greatly minimizes estimation error by spreading the errors throughout the vector of expected returns. The Black-Litterman model also provides an opportunity for the investors to incorporate their views on different markets and assets and as such, can be used more effectively for strategic asset allocation. It is a forward-looking dynamic model as compared to the single period and static mean-variance capital asset pricing model.

Our asset allocation strategy based on recent changes in the Index of Economic Freedom provides highly improved results as compared to the traditional capital asset pricing model and Black-Litterman's equilibrium implied return model. This explains that markets are not in equilibrium, which is the very basis of the Black-Litterman approach. Higher portfolio performance can be achieved by incorporating expected returns of assets based on latest views such as ours. The Index of Economic Freedom contains information on the riskier aspects of markets which are not captured by historical or the implied equilibrium return-risk

matrices. Our IEF-led strategy in asset allocation can significantly enhance portfolio return at reduced level of risk, and can be particularly useful in choppy markets or periods.

REFERENCES

[1] Markowitz H. M., "Portfolio Selection", *Journal of Finance*, Vol. 7, No. 1, (March 1952), pp. 77-91

[2] William F. Sharpe, "Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk," *Journal of Finance* 19, No. 3 (September 1964), pp. 425-442.

[3] Lintner, J. ,1965 'The Valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets', *Review of Economics and Statistics*, No. 47, pp. 13-37.

[4] Douglas, George W. (1969), 'Risk in the equity markets: An empirical appraisal of market efficiency', *Yale Economic Essays*, Vol.9, pp.3-45.

[5] Black, Fischer (1972), 'Capital market equilibrium with restricted borrowings', *Journal of Business*, Vol. 45, pp.444-455; Jensen, Michael C. (1968) 'The performance of mutual funds in the period of 1945-1964', *Journal of Finance*, Vol. 23, pp. 389-416; Jensen, Michael C. (1972) 'Capital markets: Theory and Evidence', *Bell Journal of Economics and Management Science*, Vol. 3, pp.357-398; Black, F., Jensen M. C. and Scholes M.(1972), 'The capital asset pricing model: Some empirical evidence' in Michael C. Jensen, ed. '*Studies in the theory of capital markets* (Praeger Publishers, New York).

[6] Fama, E. F. "Efficient Capital Markets: A Review of Theory and Empirical Work", *Journal of Finance*, Vol.25, No. 2 (may 1970), pp.383-417. Fama, E. F. and French, K. R., "The Cross-Section of Expected Stock Returns", *The Journal of Finance* Vol. XLVII, NO.2 (June 1992) pp. 427-465 and Ibid "Multifactor Explanations of Asset Pricing Anomalies", *The Journal of Finance*, Vol. LI, No. 1(March 1996), pp. 55-84.

[7] Black, F., Jensen, M. C., and Scholes, M. "The Capital Asset Pricing Model: Some Empirical Tests", in M. C. Jensen, Ed., Studies in the Theory of Capital Markets (36), Jensen M. C., "The Performance of Mutual Funds in the Period 1945-1964", *Journal of Finance,* Vol. 23, No. 2 (May 1968), pp.389-416 and Jensen M. C., "Risk, the Pricing of Capital Assets, and the Evaluation of Investment Portfolios", *Journal of Business*, Vol. 42, No. 2. (April 1969), pp. 167-247.

[8] Carhart, M., "On Persistence in Mutual Fund Performance", *Journal of Finance,* Vol. 52, (1997), pp. 57-82.

[9] Banz, Rolf W. (1981), 'The relationship between return and market value of common stocks', *Journal of Financial Economics*, Vol.9, pp. 3-18.

[10] Basu, Sanjay (1977) 'Investment performance of common stocks in relation to their price-earnings ratios: A test of the efficient market hypothesis', *Journal of Finance*, Vol. 32, pp. 663-682.

[11] Rosenberg, Barr, Kenneth Reid and Ronald Lanstein (1985), 'Persuasive evidence of market inefficiency', *Journal of Portfolio Management*, Vol. 11, pp.9-17.

[12] Lakonishok, Josef, Andrei Shleifer and Robert W. Vishny (1994), 'Contrarian investment, extrapolation and risk', *Journal of Finance*, Vol. 49, pp-1541-1578.

[13] DeBondt, W. F. M. and Thaler, R. H. (1985), 'Does the stock market overreact', *Journal of Finance*, Vol. 40, pp.793-805; DeBondt, W. F. M. and Thaler, R. H. (1987), 'Further evidence on investor overreaction and stock market seasonality', *Journal of Finance* , Vol. 42, pp. 557-581.

[14] Ibid, p. 5.

[15] Ou, Jane and Stephen Penman (1989), 'Financial Statement Analysis and the Prediction of Stock Returns', *Journal of Accounting and Economics*, Vol. 11, pp. 295-329.

[16] Stan H. and Vlad P.(2003), 'Momentum in Australian Stock Return', *Australian Journal of Management*, Vol. 28, pp.141-156.

[17] Jegadeesh, Narasimhan and Sheridan Titman (1993), 'Returns to buying winners and selling losers: Implications for stock market efficiency' *Journal of Finance*, Vol. 48, pp. 65-91.

[18] Rouwenhorst, K. Geert (1998), ' International Momentum Strategies', *Journal of Finance*, Vol.53, No. 1, pp. 267-284.

[19] Moskowitz, T. & Grinblatt, M. 1999, 'Do industries explain momentum', *Journal of Finance*, vol. 54, pp. 1249–90.

[20] Grundy, B.D. & Martin, J.S. 2001, 'Understanding the nature of the risks and the source of the rewards to momentum investing', *Review of Financial Studies*, vol. 14, pp. 29–78.

[21] Llewellyn, J. 2002, 'Momentum and autocorrelation in stock returns', *Review of Financial Studies*, vol. 15, pp. 533–63.

[22] Roll, Richard (1977), 'A critique of the asset pricing theory's tests, Part I: On the past and potential testability of the theory', *Journal of Financial Economics*, Vol. 4, pp. 129-176.

[23] Ross, Stephen, The arbitrage theory of capital pricing, *Journal of Economic Theory*, v13, p341, 1976

[24] Roll, Richard and Stephen Ross, An empirical investigation of the arbitrage pricing theory, *Journal of Finance*, Dec 1980, p1073

[25] Kahneman, D. and Tversky, A. (1979): "Prospect Theory: An Analysis of Decision Making Under Risk", *Econometrica* 47, No.2: 263-291.

[26] Lakonishok, J., Shleifer A. and Vishny R. (1994), 'Contrarian investment, extrapolation and risk', *Journal of Finance*, Vol. 49, pp. 1541-1578.

[27] Chan, K.C., Jegadeesh, N. & Lakonishok, J. 1996, 'Momentum strategies', *Journal of Finance*, Vol. 51, pp. 1681–713.

[28] Barberis, Nicholas, Andrei Shleifer and Robert Vishny (1998), 'A model of investor sentiment', *Journal of Financial Economics*, Vol. 49, pp. 307-343.

[29] Daniel K., Hirshleifer D., and Subrahmanyam (1998), " Investor psychology and security market under and overreaction', *Journal of Finance*, Vol. 53, pp. 921-965.

[30] Vineet A. and Richard T., (2005), 'Does the Financial Distress Factor Drive the Anomaly', *Working Paper,* Cranfield School of Management.

[31] Hong, Harrison, and Jeremy C. Stein (1999), 'A unified theory of under reaction, momentum trading and overreaction in asset markets', *Journal of Finance*, Vol. 54, pp. 2143-2184.

[32] Hong, Harrison, Terence Lim and Jeremy C. Stein (2000), 'Bad news travels slowly: size, analyst coverage and the profitability of momentum strategies', *Journal of Finance*, Vol. 55, pp. 265-295

[33] Ibid, p. 7.

[34] Fama Eugene F. (1991), 'Efficient Capital Markets: II' *Journal of Finance*, Vol. 66, pp.1575-1617.

35 Fama Eugene F., and Kenneth R. French (1992)' The cross section of expected stock returns', *Journal of Finance*, Vol.47, pp.427-465; Ibid (1995) 'size and boo-to-market factors in earnings and returns', *Journal of Finance*, Vol.50, pp.131-155; Ibid (1996), 'Multifactor Explanations of Asset Pricing Anomalies', *Journal of Finance*, Vol. LI, pp.55-84.

36 Bekaert, Geert, and Campbell R. Harvey, 1995, Time-varying world market integration, *Journal of Finance* 50, 403-444; Bernanke, Ben S., and Mark Gertler, 1995, Inside the black box: The credit channel of monetary transmission, *Journal of Economic Perspectives* 9, 27-48; Brune, Nancy, Geoffrey Garrett, Alexandra Guisinger, and Jason Sorens, 2001, The political economy of capital account liberalization, *Yale University working paper*; Desai, Mihir, C. Fritz Foley, and James R. Hines, Jr., 2004, Foreign direct investment in a world of multiple taxes, *Journal of Public Economics* 88, 2727-2744; Dewenter, Kathryn, 1995, Do exchange rate changes drive foreign direct investment? *Journal of Business* 68, 405-33; Fama, Eugene F., and Kenneth R. French, 1998, Value versus growth: The international evidence, *Journal of Finance* 53, 1975-1999; Feenstra, Robert C., 1999, Facts and fallacies about foreign direct investment, in Martin Feldstein, ed.: *International Capital Flows*, (University

of Chicago Press, Chicago, Ill.); Froot, Kenneth A., and Emil M. Dabora, 1999, How are stock prices affected by the location of trade? *Journal of Financial Economics* 53, 189-216; Froot, Kenneth A., and Jeremy C. Stein, 1991, Exchange rates and foreign direct investment: An imperfect capital markets approach, *Quarterly Journal of Economics* 106, 1191-1217; Graham, John R., and Campbell R. Harvey, 2001, The theory and practice of corporate finance: Evidence from the field, *Journal of Financial Economics* 60, 187-243; Henry, Peter, 2000, Do stock market liberalizations cause investment booms? *Journal of Financial Economics* 58, 529-64; La Porta, Rafael, 1996, Expectations and the cross-section of stock returns, *Journal of Finance* 51 1715-1742; La Porta, Rafael, Josef Lakonishok, Andrei Shleifer, and Robert Vishny, 1997, Good news for value stocks: Further evidence on market efficiency, *Journal of Finance* 52, 859-874; Stein, Jeremy C., 1996, Rational capital budgeting in an irrational world, *Journal of Business* 69 429-455; United Nations Center for Transnational Corporations, 1999, *World Investment Report*; Yeaple, Stephen, 2003, The complex integration strategies of multinationals and cross-country dependencies in the structure of foreign direct investment, *Journal of International Economics* 60, 293-314.

[37] Shefrin, Hersh and Meir Statman (1994). "Behavioral Capital Asset Pricing Theory." *Journal of Financial and Quantitative Analysis*, vol. 29, is. 3: 323-349.

[38] Roll, R. (1992). "Industrial structure and the comparative behavior of international stock market indices." *Journal of Finance*, 47, pp. 3-41; Ferson, W.E., and C.R. Harvey. (1993). "The risk and predictability of international equity returns." *Review of Financial Studies*, 6, pp. 527-566; Chow, E., W. Lee, and M. Solt. (1997). "The exchange-rate risk exposure of asset returns." *Journal of Business*, 70, pp. 105-123; Choi, J.J., T. Hiraki, and N. Takezawa. (1998). "Is foreign exchange risk priced in the Japanese stock market?" *Journal of Financial and Quantitative Analysis*, 33, pp. 361-382; De Santis G., and B. Gerard. (1998). "How big is the premium for currency risk?"*Journal of Financial Economics*, 49, pp. 375-412; Doukas, J., P. Hall, and L. Lang. (1999). "The pricing of currency risk in Japan." *Journal of Banking and Finance*, 23, pp. 1-20; Patro, D.K., J.K. Wald, and Y. Wu. (2002). "Explaining exchange rate risk in world stock markets: A panel approach." *Journal of Banking and Finance,* 26, pp. 1951-1972.

[39] Karolyi, G.A., and R. Stulz. (1996). "Why do markets move together? An investigation of U.S.-Japan stock return comovements." *Journal of Finance*, 51, pp. 951-986.

[40] Bodart, V., and P. Reding (1999), "Exchange rate regimes, volatility and international correlations on bond and stock markets." *Journal of International Money and Finance*, 18, pp.133-151.

[41] Harald Hau and Helene Rey (2004), "Exchange Rates, Equity Prices and Capital Flows", Forthcoming in the *Review of Financial Studies*, NBER

[42] Brennan, M. J., and H. H. Cao (1997), "International Portfolio Investment Flows", *Journal of Finance*, Vol. 52, PP. 1851-1880.

[43] Black, F. and Litterman R. (1990), " Asst Allocation: Combining Investors Views with Market Equilibrium", Fixed Income Research, Goldman, Sachs & Company October.

[44] Black F. and Litterman R. (1991), "Global Asset Allocation with Equities, Bonds and Currencies", Fixed Income Research, Goldman, Sachs & Company, October.

[45] Beven, A., and Winkelmann K. (1998), " Using the Black-Litterman Global Asset Allocation Model: Three Years of Practical Experience", " Fixed Income Research, Goldman, Sachs & Company, December

46 He G., and Litterman R (1999), " The Intuition Behind Black-Litterman Model Portfolios", December

47 Litterman R., (2003) Modern Investment Management: An Equilibrium Approach, New Jersey: John Wiley & Sons.

48 Theil, H. (1971), Principles of Econometrics, New York, Wiley & Sons and Theil, H. (1978), Introduction to Econometrics, New Jersey, Prentice-Hall, Inc.

49 Black, F. (1989a), "Equilibrium Exchange Rate Hedging" *NBER Working Paper Series*: Working Paper No. 2947, April and Black, F. (1989b), "Universal Hedging: Optimizing Currency Risk and Reward in International Equity Portfolios", *Financial Analysts Journal*, July/august, 16-22

[50] Lee, W. (2000), Advanced theory and Methodology of Tactical Asset Allocation. New York, John Wiley & Sons.

[51] Michaud, R. O. (1989), "The Markowitz Optimization Enigma: Is Optimzed Optimal?" *Financial Analysts Journal*, March/April, 44-51.

[52] Best, M. J., and Grauer, R. R. (1991), " On the Sensitivity of Mean-Variance-Efficient Portfolios to Changes in Asset Means: Some Analytical and Computational Results." *The Review of Financial Studies*, January, 315-342.

[53] Thomas M. Idzorek (2004), " A Step-by-Step guide to the Black-Litterman Model", Zephyr Associates, Inc.

APPENDIX I: The Methodology and Factors Explaining Index of Economic Freedom

Economic freedom is defined as *the absence of government coercion or constraint on the production, distribution, or consumption of goods and services beyond the extent necessary for citizens to protect and maintain liberty itself.* In other words, people are free to work, produce, consume, and invest in the ways they feel are most productive. To measure economic freedom and rate each country, the authors of the *Index* study 50 independent economic variables. These variables fall into 10 broad categories, or factors, of economic freedom:-: Trade policy; Fiscal burden of government; Government intervention in the economy; Monetary policy; Capital flows and foreign investment; Banking and finance; Wages and prices; Property rights; Regulation; and Informal market activity.

Weighting: In the *Index of Economic Freedom*, all 10 factors are equally important to the level of economic freedom in any country. Thus, to determine a country's overall score, the factors are weighted equally. *Index* identifies institutional factors that, taken together, determine the degree to which economies are free to respond to changing world market conditions. It is this institutional environment that allows economies to grow and prosper. Professor Richard Roll illustrated that equally weighting the *Index* factors reveals as true a picture of economic freedom in a country as the best weighting system that statistics can devise.

The Grading Scale: Each country receives its overall economic freedom score based on the simple average of the 10 individual factor scores. Each factor is graded according to a unique scale. The scales run from 1 to 5: A score of 1 signifies an economic environment or set of policies that are most conducive to economic freedom, while a score of 5 signifies a set of policies that are least conducive to economic freedom. In addition, following each factor score is a description—"better," "worse," or "stable"-- to indicate, respectively, whether that factor of economic freedom has improved, worsened, or stayed the same compared with the country's score last year. Finally, the 10 factors are added and averaged, and an overall score is assigned to the country. The four broad categories of economic freedom in the *Index* are: **Free**—countries with an average overall score of 1.99 or less; **Mostly Free**—countries with an average overall score of 2.00 to 2.99; **Mostly Unfree**—countries with an average overall score of 3.00 to 3.99; and **Repressed**—countries with an average overall score of 4.00 or higher.

Period of Study: For the *2005 Index of Economic Freedom*, the authors generally examined data for the period covering the second half of 2003 through the first half of 2004. To the extent possible, the information considered for each factor was current as of June 30, 2004. It is important to understand, however, that some factors are based on historical information. For example, the monetary policy factor is a 10-year weighted average inflation rate from January 1, 1994, to December 31, 2003. Other factors are current for the year in which the *Index* is

published. For example, the taxation variable for this *Index* considers tax rates that apply to the taxable year 2004.

Factors and Variables of Index of Economic Freedom

Factors	Variables
1. **Trade Policy**	➢ Weighted average tariff rate ➢ Non-tariff barriers ➢ Corruption in the customs service
2. **Fiscal Burden of Government**	➢ Top marginal income tax rate ➢ Top marginal corporate tax rate ➢ Year-to-year change in government expenditures as a percent of GDP
3. **Government Intervention in the Economy**	➢ Government consumption as a percentage of the economy ➢ Government ownership of businesses and industries ➢ Share of government revenues from state-owned enterprises and government ownership of property ➢ Economic output produced by the government
4. **Monetary Policy**	➢ Average inflation rate from 1993 to 2002
5. **Capital Flows and Foreign Investment**	➢ Foreign investment code ➢ Restrictions on foreign ownership of business ➢ Restrictions on industries and companies open to foreign investors ➢ Restrictions and performance requirements on foreign companies ➢ Foreign ownership of land ➢ Equal treatment under the law for both foreign and domestic companies ➢ Restrictions on repatriation of earnings ➢ Restrictions on capital transactions ➢ Availability of local financing for foreign companies
6. **Banking and Finance**	➢ Government ownership of financial institutions ➢ Restrictions on the ability of foreign banks to open branches and subsidiaries ➢ Government influence over the allocation of credit Government regulations ➢ Freedom to offer all types of financial services, securities, and insurance policies
7. **Wages and Prices**	➢ Minimum wage laws ➢ Freedom to set prices privately without government influence ➢ Government price controls ➢ Extent to which government price controls are used ➢ Government subsidies to businesses that affect

	prices
8. Property Rights	➢ Freedom from government influence over the judicial system ➢ Commercial code defining contracts ➢ Sanctioning of foreign arbitration of contract disputes ➢ Government expropriation of property ➢ Corruption within the judiciary ➢ Delays in receiving judicial decisions ➢ Legally granted and protected private property
9. Regulation	➢ Licensing requirements to operate a business ➢ Ease of obtaining a business license ➢ Corruption within the bureaucracy ➢ Labor regulations, such as established workweeks, paid vacations, and parental leave, as well as selected labor regulations ➢ Environmental, consumer safety, and worker health regulations ➢ Regulations that impose a burden on business
10. Informal Market	➢ Smuggling ➢ Piracy of intellectual property in the informal market ➢ Agricultural production supplied on the informal market ➢ Manufacturing supplied on the informal market ➢ Services supplied on the informal market ➢ Transportation supplied on the informal market ➢ Labor supplied on the informal market

(Source: The Heritage Foundation and Dow Jones & Company, Inc. 2005)

APPENDIX II: FORECAST RETURN AND STANDARD DEVIATION BASED ON HISTORICAL DATA FOR CAPM

Assets	Date Start	Jun-01 Forecast Return	Jun-01 Standard Deviation	Jun-02 Forecast Return	Jun-02 Standard Deviation	Jun-03 Forecast Return	Jun-03 Standard Deviation	Jun-04 Forecast Return	Jun-04 Standard Deviation
Argentina Equity	Jan-95	10.30%	33.50%	-4.10%	39.90%	4.50%	38.50%	6.90%	38.30%
Australia Equity	Aug-89	9.70%	17.80%	9.60%	18.00%	10.10%	17.80%	11.10%	17.60%
Austria Equity	Aug-89	5.10%	24.30%	6.30%	23.70%	7.60%	23.30%	10.10%	22.80%
Belgium Equity	Aug-89	11.00%	15.70%	10.20%	15.50%	9.30%	17.70%	11.00%	17.50%
Brazil Equity	Jan-95	13.40%	42.30%	8.70%	41.90%	11.80%	44.60%	15.20%	43.10%
Canada Equity	Aug-89	7.20%	17.70%	6.40%	17.60%	6.80%	17.70%	8.10%	17.50%
Chile Equity	Jan-95	0.30%	22.80%	-1.70%	22.80%	1.60%	23.10%	5.40%	23.00%
China Equity	Jan-95	14.20%	44.30%	11.20%	41.80%	11.30%	39.70%	14.20%	39.00%
Colombia Equity	Jan-95	-7.80%	31.20%	-4.80%	29.80%	-0.10%	29.40%	5.30%	29.40%
Czech Rep. Equity	Jan-95	-2.30%	33.60%	2.60%	32.90%	6.80%	31.90%	10.90%	31.00%
Denmark Equity	Aug-89	10.90%	16.70%	9.50%	16.50%	9.70%	17.40%	11.40%	17.30%
Egypt Equity	Jan-97	-1.10%	32.50%	-6.60%	30.80%	1.10%	30.10%	9.60%	30.80%
Finland Equity	Aug-89	20.50%	33.30%	17.80%	33.80%	17.60%	34.10%	17.30%	33.80%
France Equity	Aug-89	11.90%	17.70%	10.40%	17.70%	9.60%	19.00%	10.90%	18.60%
Germany Equity	Aug-89	11.30%	19.60%	9.70%	19.90%	8.80%	22.20%	10.30%	21.90%
Greece Equity	Aug-89	25.90%	47.90%	23.60%	46.70%	22.00%	45.80%	23.10%	44.50%
Hong Kong Equity	Aug-89	19.80%	29.30%	17.30%	28.90%	15.60%	28.30%	16.80%	27.70%
Hungary Equity	Jan-97	9.30%	40.10%	12.50%	37.30%	13.50%	35.90%	19.60%	34.10%
Iceland Equity	Jul-02					26.70%	17.70%	55.50%	21.90%
India Equity	Jan-95	-0.80%	31.60%	-0.90%	30.70%	1.80%	30.00%	5.90%	30.30%
Indonesia Equity	Jan-95	-11.40%	57.40%	-3.20%	55.70%	0.10%	54.00%	3.40%	51.90%
Ireland Equity	Aug-89	14.70%	19.80%	12.50%	20.20%	12.40%	20.70%	14.00%	20.20%
Italy Equity	Aug-89	8.30%	25.00%	7.40%	24.60%	7.60%	24.80%	8.80%	24.20%
Japan Equity	Aug-89	-1.20%	25.60%	-2.30%	25.20%	-3.00%	24.60%	0.00%	24.50%
Jordan Equity	Jan-97	4.90%	15.30%	7.70%	16.10%	8.10%	15.60%	11.80%	16.30%
Malaysia Equity	Jan-95	-4.20%	48.90%	0.50%	46.30%	0.50%	43.80%	2.60%	41.90%
Mexico Equity	Jan-95	14.40%	36.80%	11.40%	35.80%	11.10%	34.50%	13.00%	32.90%
Morocco Equity	Jan-97	5.70%	18.30%	3.50%	17.60%	7.80%	17.30%	10.70%	16.60%
Netherlands Equity	Aug-89	14.00%	15.20%	12.60%	15.50%	10.70%	17.40%	11.70%	17.10%
New Zealand Equity	Aug-89	5.40%	23.30%	6.90%	23.40%	8.80%	23.10%	10.00%	22.60%
Norway Equity	Aug-89	7.40%	22.50%	7.00%	22.20%	6.30%	22.90%	9.10%	22.60%
Pakistan Equity	Jan-95	-6.70%	44.80%	1.00%	46.90%	10.50%	46.50%	13.00%	44.50%
Peru Equity	Jan-95	3.30%	28.60%	4.70%	27.50%	9.10%	26.40%	12.60%	27.30%
Philippines Equity	Jan-95	-14.50%	39.20%	-14.20%	38.40%	-12.00%	37.10%	-7.80%	35.90%
Poland Equity	Jan-95	13.80%	41.70%	12.70%	40.90%	12.50%	39.60%	15.20%	38.20%
Portugal Equity	Aug-89	14.00%	23.90%	13.10%	23.20%	12.50%	23.70%	14.00%	23.30%
Russia Equity	Jan-97	27.60%	69.40%	31.80%	64.60%	33.40%	60.40%	33.00%	57.30%
S. Korea Equity	Oct-94	0.70%	53.40%	6.70%	51.80%	5.50%	50.00%	7.50%	47.80%
Singapore Equity	Aug-89	8.40%	31.20%	7.30%	31.10%	6.90%	30.50%	8.40%	29.60%
South Africa Equity	Jan-95	1.80%	28.50%	1.10%	28.40%	2.60%	27.70%	6.70%	27.20%
Spain Equity	Aug-89	11.50%	22.50%	10.30%	22.30%	11.10%	22.80%	12.10%	22.30%
Sweden Equity	Aug-89	13.40%	25.90%	11.50%	26.00%	11.40%	27.10%	13.50%	26.40%
Switzerland Equity	Aug-89	13.40%	17.20%	12.60%	16.90%	11.20%	17.30%	12.30%	16.90%
Taiwan Equity	Jan-95	-4.20%	33.50%	-1.90%	34.60%	-2.40%	34.10%	0.40%	33.00%
Thailand Equity	Jan-95	-16.80%	53.80%	-11.00%	52.20%	-6.70%	49.70%	-1.70%	48.30%
Turkey Equity	Jan-95	22.50%	63.40%	18.00%	63.60%	21.40%	63.90%	25.20%	62.20%
UK Equity	Aug-89	11.10%	15.70%	9.70%	15.50%	9.00%	15.90%	10.20%	15.70%
US Equity	Aug-89	14.20%	14.30%	11.70%	14.70%	11.10%	15.10%	11.70%	14.80%
Venezuela Equity	Jan-95	22.40%	52.10%	14.30%	49.50%	22.10%	52.50%	22.20%	51.90%
Benchmark									
MSCI World Index	Aug-89	8.80%	14.30%	7.00%	14.40%	10.70%	14.70%	11.00%	14.60%

Source: S&P/Citigroup BMI for country equities and MSCI for MSCI World Index

APPENDIX III A: HISTORICAL CORRELATION DATA FOR CAPM- 2001

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1. China Equity	1																								
2. India Equity	0.03	1																							
3. Indonesia Equity	0.32	0.19	1																						
4. Malaysia Equity	0.44	0.36	0.42	1																					
5. Philippines Equity	0.42	0.17	0.72	0.5	1																				
6. Pakistan Equity	0.07	0.4	0.17	0.36	0.1	1																			
7. Taiwan Equity	0.41	0.34	0.34	0.46	0.44	0.16	1																		
8. Thailand Equity	0.32	0.15	0.56	0.52	0.7	0.2	0.44	1																	
9. Argentina Equity	0.28	0.19	0.4	0.35	0.51	0.19	0.54	0.45	1																
10. Brazil Equity	0.25	0.28	0.43	0.25	0.44	0.41	0.38	0.36	0.6	1															
11. Colombia Equity	0.1	0.08	0.31	0.16	0.2	0.34	0.23	0.14	0.3	0.32	1														
12. Chile Equity	0.34	0.38	0.52	0.44	0.56	0.35	0.49	0.4	0.57	0.65	0.45	1													
13. Mexico Equity	0.28	0.28	0.34	0.28	0.44	0.26	0.37	0.41	0.72	0.69	0.16	0.49	1												
14. Peru Equity	0.1	0.24	0.34	0.23	0.35	0.26	0.25	0.19	0.56	0.59	0.33	0.63	0.56	1											
15. Venezuela Equity	0.25	0.26	0.16	0.34	0.29	0.2	0.29	0.22	0.36	0.31	0.3	0.36	0.27	0.24	1										
16. Poland Equity	0.2	0.27	0.25	0.34	0.39	0.18	0.26	0.32	0.37	0.45	0.01	0.4	0.49	0.39	0.12	1									
17. Russia Equity	0.39	0.27	0.55	0.37	0.49	0.37	0.53	0.4	0.54	0.69	0.42	0.75	0.69	0.48	0.28	0.43	1								
18. Egypt Equity	0.01	0.41	0.14	0.26	0.18	0.2	0.3	0.22	0.21	0.14	0.18	0.42	0.25	0.19	0.18	0.42	0.39	1							
19. Morocco Equity	0.01	0.08	-0.11	-0.11	-0.18	-0.11	0	-0.1	-0.27	-0.24	-0.25	-0.26	-0.28	-0.15	-0.25	-0.05	-0.21	0.18	1						
20. Jordan Equity	-0.14	0.05	-0.06	-0.02	-0.19	0.15	0.01	-0.04	0.03	0	0.12	0.11	0.07	-0.01	-0.03	0.03	0.02	0.12	0.12	1					
21. South Africa Equity	0.42	0.24	0.44	0.33	0.62	0.19	0.38	0.64	0.58	0.58	0.12	0.55	0.63	0.44	0.31	0.52	0.61	0.38	0.03	-0.11	1				
22. Turkey Equity	-0.08	0.17	0.16	0.07	0.16	0.33	0.11	0.11	0.33	0.44	0.27	0.42	0.37	0.31	0.18	0.26	0.56	0.28	-0.32	0.08	0.32	1			
23. Australia Equity	0.27	0.25	0.43	0.3	0.54	0.2	0.26	0.83	0.45	0.58	0.15	0.41	0.56	0.43	0.34	0.43	0.39	0.27	-0.12	-0.06	0.88	0.28	1		
24. Hong Kong Equity	0.56	0.22	0.63	0.47	0.66	0.21	0.49	0.55	0.57	0.58	0.16	0.54	0.56	0.29	0.26	0.4	0.58	0.08	-0.2	-0.06	0.6	0.22	0.51	1	
25. Japan Equity	0.07	0.2	0.35	0.15	0.38	0.03	0.29	0.47	0.35	0.35	0.02	0.33	0.39	0.24	0.12	0.25	0.3	0.08	-0.15	-0.17	0.47	0.19	0.4	0.3	1
26. New Zealand Equity	0.14	0.08	0.55	0.17	0.52	0.02	0.28	0.49	0.41	0.41	0.18	0.43	0.39	0.33	0.27	0.4	0.51	0.19	-0.16	-0.01	0.53	0.36	0.7	0.44	0.36
27. Singapore Equity	0.54	0.19	0.76	0.58	0.79	0.21	0.4	0.69	0.56	0.49	0.18	0.53	0.52	0.34	0.26	0.34	0.55	0.09	-0.18	-0.15	0.63	0.21	0.54	0.78	0.4
28. S. Korea Equity	0.13	0.18	0.43	0.2	0.38	0.02	0.32	0.65	0.27	0.26	0.18	0.31	0.23	0.13	0.16	0.29	0.23	0.15	-0.1	-0.03	0.44	0.14	0.49	0.33	0.61
29. Austria Equity	0.29	-0.05	0.32	0.07	0.46	0	0.21	0.31	0.3	0.41	0.14	0.32	0.32	0.19	0.13	0.33	0.38	-0.13	0.07	0.2	0.52	0.29	0.3	0.38	0.24
30. Belgium Equity	-0.01	0.08	0.25	0.02	0.3	-0.1	0.02	0.17	0.18	0.29	-0.08	0.13	0.24	0.15	0.09	0.32	0.13	-0.11	0.22	0.19	0.29	0.2	0.36	0.33	0.33
31. Czech Rep. Equity	0.21	0.35	0.21	0.31	0.22	0.26	0.25	0.08	0.33	0.38	0.14	0.32	0.32	0.3	0.34	0.55	0.35	0.14	-0.13	-0.07	0.31	0.2	0.13	0.27	0.04
32. Denmark Equity	0.03	0.12	0.23	0.08	0.31	0.04	0.12	0.2	0.34	0.36	0.12	0.29	0.34	0.19	0.31	0.3	0.33	0.1	-0.02	0.14	0.34	0.28	0.31	0.33	0.36
33. Finland Equity	0.06	0.2	0.22	0.17	0.24	0.2	0.07	0.26	0.17	0.39	-0.03	0.29	0.4	0.06	0.06	0.47	0.34	0.35	-0.14	0.09	0.33	0.44	0.41	0.32	0.35
34. France Equity	0.07	0.23	0.35	0.2	0.39	0.09	0.26	0.27	0.41	0.45	-0.01	0.36	0.4	0.22	0.26	0.43	0.39	0.17	0	0.11	0.47	0.48	0.43	0.44	0.41
35. Germany Equity	0.1	0.17	0.32	0.26	0.37	0.18	0.26	0.32	0.42	0.52	0.1	0.35	0.45	0.29	0.25	0.47	0.42	0.13	-0.03	0.22	0.47	0.42	0.41	0.46	0.3
36. Greece Equity	0.12	0.38	0.38	0.27	0.35	0.31	0.32	0.22	0.54	0.5	0.26	0.58	0.51	0.38	0.3	0.63	0.58	0.35	-0.05	0.06	0.44	0.47	0.35	0.43	0.17
37. Hungary Equity	0.04	0.21	0.25	0.15	0.19	0.19	0.02	0.05	0.25	0.24	0.12	0.36	0.21	0.29	0.19	0.31	0.13	0.27	0.24	0.25	0.32	0.27	0.14	0.12	0.07
38. Ireland Equity	0.12	0.15	0.15	0.2	0.37	0.18	0.12	0.29	0.26	0.31	0.1	0.31	0.38	0.13	0.15	0.35	0.34	0.1	0.02	0.08	0.42	0.21	0.42	0.33	0.45
39. Netherlands Equity	0.12	0.21	0.36	0.26	0.41	0.14	0.22	0.29	0.4	0.5	0.1	0.36	0.42	0.19	0.29	0.37	0.4	-0.03	-0.01	0.28	0.4	0.36	0.5	0.49	0.44
40. Norway Equity	0.18	0.31	0.37	0.15	0.42	0.1	0.22	0.27	0.46	0.5	0.16	0.51	0.5	0.37	0.28	0.5	0.57	0.29	-0.01	-0.04	0.61	0.39	0.5	0.39	0.34
41. Portugal Equity	-0.11	0.35	0.27	0.06	0.34	0.13	0.23	0.22	0.34	0.33	-0.07	0.25	0.29	0.23	0.14	0.47	0.21	0.16	0.1	0.12	0.41	0.32	0.27	0.3	0.25
42. Spain Equity	0.06	0.25	0.34	0.18	0.45	0.02	0.33	0.32	0.51	0.52	0.13	0.4	0.45	0.36	0.21	0.42	0.35	0.06	-0.06	0.07	0.43	0.29	0.43	0.47	0.45
43. Sweden Equity	-0.02	0.35	0.34	0.26	0.33	0.23	0.28	0.27	0.38	0.5	0.12	0.39	0.42	0.31	0.21	0.47	0.45	0.27	-0.14	0.14	0.41	0.47	0.51	0.45	0.45
44. Switzerland Equity	0	0.09	0.35	0.03	0.37	-0.09	0.15	0.23	0.18	0.31	-0.01	0.31	0.21	0.11	0.18	0.26	0.3	-0.02	0.04	0.12	0.34	0.25	0.4	0.39	0.44
45. Canada Equity	0.32	0.29	0.43	0.42	0.53	0.24	0.33	0.45	0.6	0.56	0.17	0.53	0.61	0.38	0.39	0.5	0.64	0.33	-0.22	-0.02	0.66	0.43	0.62	0.61	0.35
46. US Equity	0.3	0.21	0.43	0.35	0.49	0.2	0.34	0.5	0.53	0.53	0.14	0.47	0.58	0.22	0.28	0.42	0.63	0.28	-0.15	0.06	0.55	0.4	0.51	0.53	0.34
47. UK Equity	0.16	0.09	0.3	0.14	0.38	0.14	0.18	0.33	0.35	0.46	0.14	0.3	0.42	0.13	0.2	0.29	0.48	0.09	-0.03	0.1	0.47	0.44	0.54	0.44	0.47
48. Italy Equity	-0.14	0.32	0.22	0.04	0.24	0.18	0.18	0.2	0.4	0.49	0.09	0.35	0.37	0.3	0.27	0.34	0.27	0.08	-0.13	0.2	0.23	0.33	0.28	0.26	0.31

APPENDIX III A: HISTORICAL CORRELATION DATA FOR CAPM- 2001 (CONTD...)

	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
1. China Equity																							
2. India Equity																							
3. Indonesia Equity																							
4. Malaysia Equity																							
5. Philippines Equity																							
6. Pakistan Equity																							
7. Taiwan Equity																							
8. Thailand Equity																							
9. Argentina Equity																							
10. Brazil Equity																							
11. Colombia Equity																							
12. Chile Equity																							
13. Mexico Equity																							
14. Peru Equity																							
15. Venezuela Equity																							
16. Poland Equity																							
17. Russia Equity																							
18. Egypt Equity																							
19. Morocco Equity																							
20. Jordan Equity																							
21. South Africa Equity																							
22. Turkey Equity																							
23. Australia Equity																							
24. Hong Kong Equity																							
25. Japan Equity																							
26. New Zealand Equity	1																						
27. Singapore Equity	0.53	1																					
28. S. Korea Equity	0.5	0.35	1																				
29. Austria Equity	0.33	0.38	0.28	1																			
30. Belgium Equity	0.33	0.36	0.23	0.44	1																		
31. Czech Rep. Equity	0.09	0.22	0.15	0.17	0.15	1																	
32. Denmark Equity	0.28	0.34	0.25	0.41	0.62	0.32	1																
33. Finland Equity	0.39	0.35	0.3	0.28	0.29	0.21	0.32	1															
34. France Equity	0.4	0.42	0.3	0.49	0.73	0.35	0.58	0.45	1														
35. Germany Equity	0.36	0.48	0.2	0.63	0.68	0.37	0.63	0.46	0.79	1													
36. Greece Equity	0.41	0.37	0.28	0.37	0.44	0.64	0.58	0.4	0.61	0.6	1												
37. Hungary Equity	0.15	0.11	0.18	0.3	0.31	0.33	0.24	0.2	0.34	0.24	0.48	1											
38. Ireland Equity	0.33	0.43	0.24	0.44	0.63	0.21	0.62	0.38	0.55	0.54	0.47	0.27	1										
39. Netherlands Equity	0.46	0.49	0.28	0.51	0.78	0.23	0.64	0.46	0.8	0.79	0.51	0.24	0.64	1									
40. Norway Equity	0.49	0.44	0.26	0.47	0.45	0.42	0.57	0.5	0.55	0.53	0.62	0.24	0.52	0.55	1								
41. Portugal Equity	0.35	0.24	0.27	0.34	0.51	0.37	0.43	0.24	0.6	0.49	0.59	0.51	0.39	0.54	0.38	1							
42. Spain Equity	0.48	0.44	0.33	0.41	0.56	0.32	0.59	0.42	0.68	0.62	0.58	0.36	0.56	0.63	0.51	0.62	1						
43. Sweden Equity	0.5	0.46	0.29	0.33	0.43	0.36	0.5	0.61	0.64	0.67	0.51	0.26	0.45	0.65	0.57	0.45	0.68	1					
44. Switzerland Equity	0.46	0.43	0.26	0.47	0.67	0.22	0.57	0.33	0.64	0.57	0.56	0.23	0.58	0.72	0.48	0.49	0.55	0.53	1				
45. Canada Equity	0.48	0.54	0.33	0.26	0.39	0.38	0.42	0.49	0.5	0.49	0.63	0.14	0.43	0.55	0.55	0.33	0.46	0.55	0.42	1			
46. US Equity	0.43	0.55	0.36	0.24	0.49	0.27	0.41	0.5	0.55	0.52	0.64	0.16	0.54	0.61	0.51	0.3	0.54	0.56	0.5	0.77	1		
47. UK Equity	0.45	0.48	0.32	0.47	0.59	0.22	0.59	0.48	0.68	0.63	0.47	0.2	0.71	0.74	0.59	0.36	0.59	0.56	0.66	0.48	0.6	1	
48. Italy Equity	0.28	0.3	0.27	0.32	0.45	0.2	0.46	0.43	0.51	0.53	0.51	0.27	0.33	0.47	0.41	0.43	0.57	0.51	0.34	0.39	0.33	0.36	1

APPENDIX III B: HISTORICAL CORRELATION DATA FOR CAPM- 2002

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1. China Equity	1																								
2. India Equity	0.05	1																							
3. Indonesia Equity	0.28	0.18	1																						
4. Malaysia Equity	0.41	0.36	0.44	1																					
5. Philippines Equity	0.39	0.19	0.7	0.49	1																				
6. Pakistan Equity	0.09	0.42	0.16	0.33	0.11	1																			
7. Taiwan Equity	0.39	0.37	0.32	0.45	0.45	0.18	1																		
8. Thailand Equity	0.3	0.18	0.55	0.51	0.69	0.21	0.43	1																	
9. Argentina Equity	0.25	0.19	0.24	0.27	0.38	0.07	0.52	0.32	1																
10. Brazil Equity	0.25	0.32	0.38	0.25	0.45	0.36	0.42	0.34	0.54	1															
11. Colombia Equity	0.09	0.09	0.32	0.18	0.22	0.28	0.26	0.17	0.25	0.3	1														
12. Chile Equity	0.33	0.41	0.49	0.43	0.55	0.31	0.54	0.41	0.5	0.66	0.44	1													
13. Mexico Equity	0.27	0.3	0.34	0.29	0.45	0.27	0.42	0.39	0.6	0.69	0.17	0.52	1												
14. Peru Equity	0.09	0.22	0.35	0.23	0.38	0.22	0.26	0.21	0.41	0.56	0.33	0.59	0.54	1											
15. Venezuela Equity	0.24	0.22	0.15	0.33	0.28	0.14	0.25	0.18	0.29	0.29	0.28	0.34	0.28	0.24	1										
16. Poland Equity	0.21	0.27	0.23	0.32	0.37	0.22	0.3	0.32	0.26	0.43	0.02	0.4	0.5	0.38	0.13	1									
17. Russia Equity	0.39	0.28	0.53	0.38	0.49	0.35	0.55	0.41	0.41	0.68	0.43	0.73	0.69	0.47	0.28	0.45	1								
18. Egypt Equity	0.04	0.39	0.11	0.22	0.13	0.18	0.24	0.21	0.16	0.15	0.14	0.41	0.23	0.17	0.17	0.36	0.36	1							
19. Morocco Equity	0	0.09	-0.12	-0.1	-0.16	-0.18	0.02	-0.05	-0.1	-0.2	-0.21	-0.17	-0.25	-0.13	-0.24	-0.1	-0.19	0.21	1						
20. Jordan Equity	-0.1	0.09	-0.1	-0.04	-0.22	0.24	-0.01	-0.04	-0.1	-0.04	0.07	0.06	0.04	-0.06	-0.07	0.08	0.02	0.1	0.07	1					
21. South Africa Equity	0.4	0.25	0.43	0.31	0.59	0.21	0.37	0.65	0.39	0.56	0.13	0.55	0.6	0.44	0.28	0.52	0.6	0.39	0.05	-0.12	1				
22. Turkey Equity	-0.05	0.21	0.14	0.09	0.18	0.32	0.24	0.13	0.34	0.47	0.28	0.46	0.42	0.29	0.18	0.31	0.58	0.24	-0.28	0.09	0.32	1			
23. Australia Equity	0.27	0.29	0.39	0.28	0.5	0.24	0.34	0.62	0.34	0.57	0.16	0.46	0.57	0.4	0.29	0.47	0.42	0.27	-0.08	0.02	0.69	0.34	1		
24. Hong Kong Equity	0.56	0.24	0.58	0.46	0.63	0.18	0.5	0.52	0.48	0.6	0.17	0.56	0.57	0.26	0.26	0.41	0.6	0.08	-0.18	-0.07	0.58	0.28	0.51	1	
25. Japan Equity	0.1	0.2	0.32	0.13	0.34	0.03	0.26	0.45	0.22	0.34	0.01	0.35	0.37	0.23	0.12	0.25	0.3	0.16	-0.1	-0.15	0.51	0.18	0.41	0.31	1
26. New Zealand Equity	0.13	0.12	0.54	0.19	0.49	0.07	0.32	0.5	0.24	0.37	0.21	0.45	0.39	0.31	0.21	0.41	0.5	0.17	-0.12	0.06	0.55	0.37	0.72	0.43	0.36
27. Singapore Equity	0.51	0.22	0.73	0.58	0.78	0.21	0.46	0.67	0.46	0.49	0.21	0.56	0.56	0.34	0.25	0.37	0.57	0.07	-0.15	-0.11	0.6	0.29	0.56	0.77	0.38
28. S. Korea Equity	0.14	0.23	0.41	0.21	0.39	0.09	0.38	0.65	0.22	0.3	0.2	0.35	0.26	0.14	0.13	0.31	0.27	0.14	-0.09	0.02	0.44	0.2	0.52	0.35	0.58
29. Austria Equity	0.26	-0.02	0.36	0.11	0.44	-0.01	0.22	0.32	0.2	0.38	0.16	0.34	0.31	0.18	0.11	0.28	0.37	-0.1	0.09	0.11	0.5	0.26	0.29	0.38	0.24
30. Belgium Equity	-0.01	0.09	0.26	0.05	0.28	-0.12	0.08	0.17	0.22	0.3	-0.05	0.19	0.25	0.14	0.09	0.29	0.14	-0.08	0.25	0.09	0.3	0.21	0.37	0.34	0.33
31. Czech Rep. Equity	0.22	0.36	0.22	0.31	0.21	0.3	0.31	0.1	0.25	0.38	0.15	0.34	0.35	0.28	0.31	0.57	0.38	0.13	-0.14	-0.02	0.33	0.26	0.21	0.3	0.08
32. Denmark Equity	0.06	0.15	0.2	0.07	0.27	0.02	0.13	0.18	0.3	0.38	0.1	0.31	0.34	0.15	0.29	0.27	0.31	0.15	-0.01	0.13	0.32	0.28	0.32	0.35	0.37
33. Finland Equity	0.09	0.22	0.14	0.13	0.19	0.19	0.11	0.19	0.2	0.39	-0.04	0.28	0.39	0.02	0.05	0.46	0.32	0.29	-0.15	0.18	0.25	0.46	0.4	0.33	0.32
34. France Equity	0.09	0.27	0.32	0.2	0.35	0.09	0.31	0.25	0.38	0.48	0	0.43	0.44	0.19	0.24	0.42	0.4	0.2	0.03	0.11	0.46	0.51	0.46	0.46	0.42
35. Germany Equity	0.12	0.23	0.29	0.26	0.36	0.17	0.33	0.29	0.36	0.54	0.12	0.42	0.48	0.25	0.23	0.46	0.43	0.14	-0.01	0.2	0.48	0.47	0.45	0.49	0.31
36. Greece Equity	0.11	0.37	0.39	0.28	0.36	0.32	0.33	0.22	0.36	0.48	0.27	0.54	0.51	0.37	0.3	0.64	0.59	0.3	-0.09	0.05	0.43	0.48	0.35	0.44	0.16
37. Hungary Equity	0.05	0.23	0.24	0.15	0.17	0.17	0.07	0.08	0.21	0.23	0.13	0.38	0.23	0.25	0.17	0.32	0.15	0.26	0.25	0.25	0.34	0.3	0.17	0.13	0.08
38. Ireland Equity	0.14	0.16	0.13	0.18	0.3	0.07	0.2	0.25	0.29	0.34	0.11	0.38	0.39	0.1	0.15	0.33	0.35	0.13	0.08	0.04	0.42	0.28	0.45	0.36	0.46
39. Netherlands Equity	0.13	0.25	0.35	0.27	0.4	0.11	0.29	0.29	0.36	0.52	0.12	0.44	0.46	0.18	0.27	0.35	0.42	0.03	0.03	0.2	0.42	0.41	0.53	0.51	0.45
40. Norway Equity	0.19	0.33	0.36	0.16	0.41	0.1	0.28	0.27	0.39	0.52	0.17	0.54	0.53	0.35	0.27	0.48	0.58	0.31	0.01	-0.05	0.6	0.41	0.52	0.41	0.35
41. Portugal Equity	-0.1	0.33	0.24	0.05	0.28	0.09	0.2	0.18	0.27	0.31	-0.08	0.24	0.28	0.2	0.15	0.44	0.21	0.16	0.08	0.13	0.37	0.31	0.27	0.31	0.26
42. Spain Equity	0.07	0.28	0.32	0.18	0.42	0.03	0.35	0.32	0.43	0.54	0.13	0.46	0.47	0.33	0.21	0.42	0.37	0.09	-0.01	0.07	0.45	0.33	0.46	0.48	0.46
43. Sweden Equity	0.01	0.4	0.29	0.25	0.31	0.21	0.33	0.25	0.36	0.53	0.13	0.45	0.44	0.27	0.18	0.44	0.45	0.26	-0.09	0.17	0.39	0.5	0.53	0.47	0.44
44. Switzerland Equity	0.02	0.1	0.33	0.03	0.34	-0.11	0.18	0.22	0.17	0.34	0	0.35	0.23	0.11	0.16	0.26	0.32	0.04	0.07	0.07	0.37	0.26	0.41	0.41	0.46
45. Canada Equity	0.31	0.32	0.41	0.41	0.53	0.2	0.37	0.44	0.49	0.58	0.19	0.56	0.62	0.37	0.38	0.49	0.64	0.31	-0.18	-0.04	0.65	0.46	0.62	0.62	0.35
46. US Equity	0.29	0.25	0.37	0.33	0.47	0.17	0.39	0.44	0.45	0.55	0.14	0.52	0.6	0.2	0.27	0.42	0.61	0.27	-0.11	0.07	0.52	0.46	0.52	0.55	0.34
47. UK Equity	0.17	0.13	0.27	0.15	0.34	0.11	0.25	0.3	0.35	0.49	0.14	0.38	0.45	0.12	0.21	0.28	0.49	0.12	0.01	0.06	0.47	0.48	0.54	0.46	0.47
48. Italy Equity	-0.11	0.34	0.23	0.07	0.24	0.17	0.23	0.2	0.35	0.5	0.11	0.4	0.4	0.27	0.26	0.33	0.29	0.11	-0.09	0.16	0.25	0.37	0.3	0.28	0.32

APPENDIX III B: HISTORICAL CORRELATION DATA FOR CAPM- 2002 (CONTD...)

	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
1. China Equity																							
2. India Equity																							
3. Indonesia Equity																							
4. Malaysia Equity																							
5. Philippines Equity																							
6. Pakistan Equity																							
7. Taiwan Equity																							
8. Thailand Equity																							
9. Argentina Equity																							
10. Brazil Equity																							
11. Colombia Equity																							
12. Chile Equity																							
13. Mexico Equity																							
14. Peru Equity																							
15. Venezuela Equity																							
16. Poland Equity																							
17. Russia Equity																							
18. Egypt Equity																							
19. Morocco Equity																							
20. Jordan Equity																							
21. South Africa Equity																							
22. Turkey Equity																							
23. Australia Equity																							
24. Hong Kong Equity																							
25. Japan Equity																							
26. New Zealand Equity	1																						
27. Singapore Equity	0.54	1																					
28. S. Korea Equity	0.51	0.38	1																				
29. Austria Equity	0.34	0.35	0.29	1																			
30. Belgium Equity	0.34	0.36	0.22	0.45	1																		
31. Czech Rep. Equity	0.15	0.25	0.2	0.18	0.16	1																	
32. Denmark Equity	0.29	0.34	0.25	0.41	0.61	0.3	1																
33. Finland Equity	0.36	0.34	0.3	0.24	0.25	0.22	0.33	1															
34. France Equity	0.42	0.44	0.33	0.48	0.73	0.36	0.59	0.45	1														
35. Germany Equity	0.39	0.49	0.25	0.61	0.68	0.38	0.64	0.47	0.81	1													
36. Greece Equity	0.39	0.38	0.28	0.35	0.41	0.65	0.51	0.36	0.56	0.55	1												
37. Hungary Equity	0.18	0.13	0.2	0.3	0.33	0.34	0.25	0.2	0.35	0.26	0.45	1											
38. Ireland Equity	0.36	0.44	0.24	0.43	0.64	0.24	0.62	0.37	0.58	0.57	0.41	0.29	1										
39. Netherlands Equity	0.47	0.51	0.3	0.51	0.77	0.26	0.64	0.44	0.81	0.8	0.47	0.26	0.66	1									
40. Norway Equity	0.5	0.45	0.29	0.47	0.47	0.43	0.58	0.48	0.57	0.56	0.59	0.25	0.54	0.58	1								
41. Portugal Equity	0.33	0.23	0.26	0.34	0.5	0.36	0.43	0.25	0.6	0.48	0.56	0.5	0.39	0.53	0.38	1							
42. Spain Equity	0.49	0.45	0.35	0.41	0.57	0.33	0.58	0.41	0.69	0.63	0.55	0.37	0.58	0.64	0.53	0.61	1						
43. Sweden Equity	0.5	0.47	0.33	0.33	0.44	0.36	0.52	0.62	0.66	0.69	0.46	0.28	0.47	0.66	0.59	0.45	0.69	1					
44. Switzerland Equity	0.46	0.43	0.27	0.47	0.68	0.23	0.57	0.31	0.65	0.57	0.52	0.24	0.6	0.73	0.5	0.49	0.56	0.54	1				
45. Canada Equity	0.49	0.55	0.36	0.27	0.4	0.38	0.43	0.48	0.52	0.52	0.61	0.16	0.46	0.57	0.57	0.33	0.48	0.57	0.44	1			
46. US Equity	0.42	0.57	0.38	0.23	0.48	0.27	0.43	0.52	0.58	0.56	0.6	0.18	0.56	0.63	0.52	0.3	0.55	0.59	0.51	0.77	1		
47. UK Equity	0.44	0.49	0.33	0.47	0.6	0.25	0.59	0.47	0.7	0.64	0.45	0.21	0.72	0.75	0.6	0.37	0.61	0.57	0.67	0.49	0.62	1	
48. Italy Equity	0.3	0.32	0.29	0.33	0.47	0.23	0.48	0.42	0.53	0.56	0.49	0.29	0.36	0.5	0.43	0.43	0.58	0.52	0.36	0.4	0.35	0.39	1

APPENDIX III C: HISTORICAL CORRELATION DATA FOR CAPM- 2003

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1. China Equity	1																								
2. India Equity	0.12	1																							
3. Indonesia Equity	0.27	0.24	1																						
4. Malaysia Equity	0.41	0.35	0.42	1																					
5. Philippines Equity	0.37	0.21	0.68	0.46	1																				
6. Pakistan Equity	0.08	0.39	0.15	0.31	0.09	1																			
7. Taiwan Equity	0.4	0.37	0.28	0.46	0.4	0.18	1																		
8. Thailand Equity	0.34	0.24	0.53	0.5	0.67	0.21	0.44	1																	
9. Argentina Equity	0.27	0.26	0.28	0.27	0.39	0.11	0.47	0.34	1																
10. Brazil Equity	0.26	0.35	0.35	0.25	0.36	0.38	0.41	0.36	0.51	1															
11. Colombia Equity	0.11	0.2	0.34	0.2	0.23	0.31	0.29	0.2	0.31	0.34	1														
12. Chile Equity	0.34	0.43	0.48	0.41	0.49	0.28	0.51	0.42	0.5	0.66	0.43	1													
13. Mexico Equity	0.27	0.31	0.35	0.29	0.42	0.27	0.43	0.39	0.57	0.67	0.24	0.52	1												
14. Peru Equity	0.15	0.24	0.29	0.23	0.28	0.23	0.24	0.23	0.41	0.54	0.29	0.53	0.5	1											
15. Venezuela Equity	0.22	0.24	0.19	0.3	0.26	0.1	0.26	0.19	0.26	0.22	0.3	0.32	0.25	0.16	1										
16. Poland Equity	0.24	0.32	0.23	0.32	0.32	0.26	0.33	0.34	0.27	0.48	0.13	0.42	0.52	0.36	0.16	1									
17. Russia Equity	0.37	0.26	0.5	0.36	0.43	0.31	0.5	0.39	0.4	0.6	0.4	0.63	0.67	0.43	0.27	0.44	1								
18. Egypt Equity	0.04	0.35	0.2	0.19	0.26	0.15	0.21	0.21	0.25	0.14	0.29	0.34	0.2	0.13	0.18	0.26	0.28	1							
19. Morocco Equity	0.05	0.18	-0.01	-0.05	-0.09	-0.07	0.08	0.03	0.01	-0.04	-0.05	0	-0.12	-0.06	-0.12	-0.01	-0.12	0.14	1						
20. Jordan Equity	-0.03	0.08	0.03	0.01	-0.04	0.11	0.03	0.02	-0.05	-0.01	0.2	0.08	0.05	-0.02	-0.08	-0.03	-0.01	0.29	0.08	1					
21. South Africa Equity	0.41	0.3	0.41	0.31	0.5	0.22	0.36	0.6	0.37	0.56	0.23	0.54	0.6	0.47	0.25	0.54	0.56	0.27	0.11	0	1				
22. Turkey Equity	0.01	0.26	0.17	0.1	0.19	0.24	0.25	0.18	0.38	0.44	0.28	0.47	0.43	0.29	0.19	0.34	0.56	0.24	-0.12	0.04	0.32	1			
23. Australia Equity	0.32	0.35	0.39	0.3	0.47	0.23	0.37	0.62	0.38	0.61	0.26	0.52	0.59	0.42	0.28	0.5	0.41	0.28	0.01	0.09	0.7	0.39	1		
24. Hong Kong Equity	0.56	0.27	0.55	0.46	0.56	0.16	0.53	0.51	0.44	0.54	0.21	0.54	0.56	0.24	0.26	0.41	0.56	0.1	-0.06	0.04	0.57	0.29	0.51	1	
25. Japan Equity	0.13	0.28	0.32	0.14	0.33	0.04	0.28	0.44	0.22	0.32	0.08	0.34	0.36	0.25	0.17	0.27	0.31	0.16	0.01	-0.03	0.49	0.22	0.41	0.31	1
26. New Zealand Equity	0.18	0.21	0.52	0.21	0.46	0.11	0.34	0.52	0.3	0.43	0.32	0.44	0.41	0.33	0.23	0.43	0.48	0.22	0.03	0.12	0.57	0.36	0.72	0.43	0.36
27. Singapore Equity	0.49	0.25	0.69	0.58	0.72	0.21	0.48	0.66	0.43	0.48	0.23	0.53	0.56	0.32	0.27	0.38	0.54	0.1	-0.07	-0.01	0.56	0.29	0.55	0.77	0.36
28. S. Korea Equity	0.16	0.26	0.4	0.22	0.37	0.1	0.4	0.62	0.22	0.31	0.23	0.36	0.31	0.15	0.14	0.34	0.28	0.13	-0.03	0.03	0.44	0.25	0.52	0.36	0.56
29. Austria Equity	0.28	0.13	0.39	0.13	0.42	0.07	0.25	0.34	0.29	0.44	0.34	0.4	0.36	0.23	0.14	0.33	0.34	0.08	0.21	0.14	0.54	0.27	0.34	0.37	0.26
30. Belgium Equity	0.07	0.18	0.3	0.09	0.25	-0.03	0.18	0.23	0.24	0.45	0.16	0.36	0.34	0.16	0.17	0.36	0.17	0.07	0.28	0.12	0.37	0.28	0.43	0.36	0.3
31. Czech Rep. Equity	0.26	0.38	0.25	0.31	0.22	0.28	0.32	0.16	0.29	0.36	0.25	0.38	0.36	0.3	0.3	0.56	0.36	0.19	-0.02	0.06	0.37	0.32	0.29	0.32	0.13
32. Denmark Equity	0.13	0.23	0.26	0.12	0.25	0.08	0.21	0.22	0.3	0.5	0.23	0.45	0.38	0.17	0.3	0.34	0.29	0.19	0.14	0.1	0.36	0.29	0.39	0.37	0.36
33. Finland Equity	0.11	0.2	0.13	0.14	0.13	0.16	0.15	0.19	0.2	0.43	0.07	0.31	0.43	0.07	0.1	0.47	0.34	0.18	-0.12	0.11	0.31	0.46	0.43	0.35	0.3
34. France Equity	0.14	0.3	0.31	0.21	0.29	0.09	0.35	0.3	0.34	0.56	0.14	0.5	0.47	0.21	0.24	0.47	0.37	0.15	0.13	0.08	0.48	0.51	0.5	0.46	0.39
35. Germany Equity	0.17	0.27	0.28	0.25	0.3	0.14	0.36	0.32	0.32	0.6	0.21	0.5	0.5	0.24	0.22	0.48	0.36	0.11	0.12	0.13	0.45	0.47	0.49	0.47	0.29
36. Greece Equity	0.14	0.35	0.36	0.27	0.3	0.34	0.33	0.23	0.36	0.5	0.36	0.54	0.53	0.39	0.27	0.66	0.55	0.28	-0.03	0.02	0.47	0.47	0.41	0.43	0.2
37. Hungary Equity	0.1	0.27	0.27	0.17	0.2	0.18	0.13	0.13	0.22	0.28	0.21	0.41	0.29	0.23	0.16	0.37	0.16	0.22	0.26	0.19	0.37	0.32	0.21	0.16	0.1
38. Ireland Equity	0.16	0.23	0.16	0.2	0.27	0.08	0.27	0.3	0.28	0.47	0.22	0.43	0.44	0.13	0.17	0.39	0.33	0.14	0.15	0.07	0.43	0.33	0.5	0.37	0.44
39. Netherlands Equity	0.17	0.29	0.31	0.25	0.31	0.13	0.34	0.32	0.29	0.6	0.23	0.49	0.48	0.19	0.25	0.44	0.36	0.06	0.11	0.12	0.45	0.41	0.55	0.49	0.4
40. Norway Equity	0.26	0.36	0.37	0.19	0.36	0.12	0.33	0.31	0.37	0.56	0.3	0.6	0.55	0.35	0.27	0.52	0.49	0.26	0.11	0.04	0.61	0.42	0.56	0.43	0.34
41. Portugal Equity	-0.03	0.34	0.27	0.09	0.25	0.09	0.25	0.23	0.27	0.4	0.07	0.32	0.33	0.22	0.17	0.43	0.22	0.15	0.18	0.14	0.39	0.33	0.32	0.32	0.26
42. Spain Equity	0.13	0.32	0.31	0.19	0.36	0.05	0.38	0.36	0.41	0.6	0.22	0.51	0.5	0.32	0.2	0.46	0.35	0.08	0.1	0.07	0.47	0.39	0.51	0.46	0.43
43. Sweden Equity	0.07	0.39	0.3	0.25	0.27	0.17	0.36	0.29	0.34	0.57	0.22	0.51	0.48	0.26	0.2	0.47	0.41	0.18	0.05	0.12	0.43	0.53	0.56	0.48	0.42
44. Switzerland Equity	0.08	0.15	0.34	0.05	0.32	-0.06	0.22	0.26	0.18	0.41	0.12	0.4	0.3	0.12	0.18	0.32	0.31	0.06	0.17	0.12	0.4	0.29	0.45	0.42	0.44
45. Canada Equity	0.35	0.37	0.41	0.4	0.47	0.17	0.39	0.44	0.48	0.6	0.25	0.57	0.62	0.4	0.36	0.52	0.61	0.24	-0.06	-0.02	0.66	0.47	0.65	0.61	0.36
46. US Equity	0.3	0.27	0.35	0.32	0.4	0.15	0.42	0.44	0.39	0.59	0.19	0.53	0.62	0.2	0.28	0.47	0.56	0.16	0	0.03	0.51	0.47	0.55	0.56	0.34
47. UK Equity	0.21	0.2	0.3	0.17	0.29	0.12	0.28	0.34	0.34	0.56	0.25	0.48	0.49	0.17	0.25	0.37	0.44	0.14	0.13	0.1	0.49	0.48	0.58	0.47	0.44
48. Italy Equity	-0.05	0.35	0.26	0.09	0.21	0.15	0.25	0.23	0.34	0.52	0.19	0.44	0.43	0.26	0.27	0.37	0.29	0.09	0.05	0.11	0.31	0.4	0.35	0.3	0.31
49. Iceland Equity	0.4	0.24	0.39	0.24	0.2	-0.13	0.22	0.35	0.17	0.08	0.29	0.24	0.05	-0.07	0.17	0.06	0.17	0.37	0.34	0.1	0.17	0.14	0.21	0.49	0.1

APPENDIX III C: HISTORICAL CORRELATION DATA FOR CAPM- 2003 (CONTD...)

	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
1. China Equity																								
2. India Equity																								
3. Indonesia Equity																								
4. Malaysia Equity																								
5. Philippines Equity																								
6. Pakistan Equity																								
7. Taiwan Equity																								
8. Thailand Equity																								
9. Argentina Equity																								
10. Brazil Equity																								
11. Colombia Equity																								
12. Chile Equity																								
13. Mexico Equity																								
14. Peru Equity																								
15. Venezuela Equity																								
16. Poland Equity																								
17. Russia Equity																								
18. Egypt Equity																								
19. Morocco Equity																								
20. Jordan Equity																								
21. South Africa Equity																								
22. Turkey Equity																								
23. Australia Equity																								
24. Hong Kong Equity																								
25. Japan Equity																								
26. New Zealand Equity	1																							
27. Singapore Equity	0.53	1																						
28. S. Korea Equity	0.48	0.39	1																					
29. Austria Equity	0.39	0.35	0.28	1																				
30. Belgium Equity	0.36	0.37	0.28	0.47	1																			
31. Czech Rep. Equity	0.2	0.25	0.23	0.27	0.23	1																		
32. Denmark Equity	0.32	0.35	0.28	0.45	0.67	0.34	1																	
33. Finland Equity	0.36	0.35	0.34	0.25	0.34	0.23	0.38	1																
34. France Equity	0.43	0.44	0.37	0.49	0.78	0.35	0.63	0.49	1															
35. Germany Equity	0.38	0.47	0.31	0.56	0.75	0.35	0.67	0.5	0.85	1														
36. Greece Equity	0.4	0.36	0.3	0.41	0.44	0.66	0.52	0.38	0.52	0.49	1													
37. Hungary Equity	0.2	0.15	0.26	0.32	0.37	0.35	0.27	0.22	0.39	0.32	0.45	1												
38. Ireland Equity	0.39	0.45	0.28	0.45	0.66	0.27	0.64	0.41	0.63	0.62	0.44	0.32	1											
39. Netherlands Equity	0.45	0.49	0.35	0.49	0.82	0.27	0.67	0.49	0.85	0.85	0.48	0.31	0.69	1										
40. Norway Equity	0.5	0.45	0.35	0.5	0.57	0.48	0.63	0.51	0.63	0.62	0.6	0.29	0.57	0.64	1									
41. Portugal Equity	0.35	0.25	0.28	0.36	0.56	0.37	0.48	0.3	0.63	0.53	0.52	0.5	0.45	0.57	0.43	1								
42. Spain Equity	0.5	0.46	0.38	0.44	0.62	0.35	0.6	0.45	0.73	0.69	0.53	0.4	0.63	0.69	0.57	0.64	1							
43. Sweden Equity	0.49	0.47	0.38	0.35	0.54	0.38	0.56	0.64	0.71	0.74	0.47	0.32	0.53	0.7	0.63	0.5	0.72	1						
44. Switzerland Equity	0.46	0.43	0.3	0.49	0.71	0.25	0.6	0.36	0.69	0.63	0.51	0.29	0.62	0.75	0.55	0.53	0.6	0.59	1					
45. Canada Equity	0.51	0.54	0.37	0.32	0.46	0.4	0.49	0.5	0.56	0.55	0.59	0.19	0.49	0.59	0.6	0.37	0.52	0.59	0.46	1				
46. US Equity	0.42	0.57	0.42	0.26	0.56	0.28	0.49	0.56	0.64	0.63	0.56	0.22	0.61	0.69	0.57	0.37	0.61	0.64	0.56	0.77	1			
47. UK Equity	0.45	0.5	0.36	0.48	0.67	0.3	0.63	0.5	0.74	0.69	0.48	0.26	0.73	0.78	0.65	0.44	0.65	0.63	0.7	0.53	0.66	1		
48. Italy Equity	0.32	0.34	0.33	0.37	0.53	0.26	0.5	0.45	0.59	0.6	0.47	0.32	0.42	0.55	0.48	0.48	0.62	0.57	0.42	0.45	0.42	0.45	1	
49. Iceland Equity	0.29	0.25	0.11	0.31	0.29	0.33	0.46	0.2	0.2	0.13	0.12	0.09	0.18	0.17	0.31	0.38	0.1	0.22	0.3	0.29	0.17	0.26	0.21	1

APPENDIX III D: HISTORICAL CORRELATION DATA FOR CAPM- 2004

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1. China Equity	1																								
2. India Equity	0.12	1																							
3. Indonesia Equity	0.27	0.24	1																						
4. Malaysia Equity	0.41	0.35	0.42	1																					
5. Philippines Equity	0.37	0.21	0.68	0.46	1																				
6. Pakistan Equity	0.08	0.39	0.15	0.31	0.09	1																			
7. Taiwan Equity	0.4	0.37	0.28	0.46	0.4	0.18	1																		
8. Thailand Equity	0.34	0.24	0.53	0.5	0.67	0.21	0.44	1																	
9. Argentina Equity	0.27	0.26	0.28	0.27	0.39	0.11	0.47	0.34	1																
10. Brazil Equity	0.26	0.35	0.35	0.25	0.36	0.38	0.41	0.36	0.51	1															
11. Colombia Equity	0.11	0.2	0.34	0.2	0.23	0.31	0.29	0.2	0.31	0.34	1														
12. Chile Equity	0.34	0.43	0.48	0.41	0.49	0.28	0.51	0.42	0.5	0.66	0.43	1													
13. Mexico Equity	0.27	0.31	0.35	0.29	0.42	0.27	0.43	0.39	0.57	0.67	0.24	0.52	1												
14. Peru Equity	0.15	0.24	0.29	0.23	0.29	0.23	0.24	0.23	0.41	0.54	0.29	0.53	0.5	1											
15. Venezuela Equity	0.22	0.24	0.19	0.3	0.26	0.1	0.26	0.19	0.26	0.22	0.3	0.32	0.25	0.16	1										
16. Poland Equity	0.24	0.32	0.23	0.32	0.32	0.26	0.33	0.34	0.27	0.48	0.13	0.42	0.52	0.36	0.16	1									
17. Russia Equity	0.37	0.26	0.5	0.36	0.43	0.31	0.5	0.39	0.4	0.6	0.4	0.63	0.67	0.43	0.27	0.44	1								
18. Egypt Equity	0.04	0.35	0.2	0.19	0.26	0.15	0.21	0.21	0.25	0.14	0.29	0.34	0.2	0.13	0.18	0.26	0.28	1							
19. Morocco Equity	0.05	0.18	-0.01	-0.05	-0.09	-0.07	0.08	0.03	0.01	-0.04	-0.05	0	-0.12	-0.06	-0.12	-0.01	-0.12	0.14	1						
20. Jordan Equity	-0.03	0.08	0.03	0.01	-0.04	0.11	0.03	0.02	-0.05	-0.01	0.2	0.08	0.05	-0.02	-0.08	-0.03	-0.01	0.29	0.08	1					
21. South Africa Equity	0.41	0.3	0.41	0.31	0.5	0.22	0.36	0.6	0.37	0.56	0.23	0.54	0.6	0.47	0.25	0.54	0.56	0.27	0.11	0	1				
22. Turkey Equity	0.01	0.26	0.17	0.1	0.19	0.24	0.25	0.18	0.38	0.44	0.28	0.47	0.43	0.29	0.19	0.34	0.56	0.24	-0.12	0.04	0.32	1			
23. Australia Equity	0.32	0.35	0.39	0.3	0.47	0.23	0.37	0.62	0.38	0.61	0.26	0.52	0.59	0.42	0.28	0.5	0.41	0.28	0.01	0.09	0.7	0.39	1		
24. Hong Kong Equity	0.56	0.27	0.55	0.46	0.56	0.16	0.53	0.51	0.44	0.54	0.21	0.54	0.56	0.24	0.28	0.41	0.56	0.1	-0.06	0.04	0.57	0.29	0.51	1	
25. Japan Equity	0.13	0.28	0.32	0.14	0.33	0.04	0.28	0.44	0.22	0.32	0.08	0.34	0.36	0.25	0.17	0.27	0.31	0.16	0.01	-0.03	0.49	0.22	0.41	0.31	1
26. New Zealand Equity	0.18	0.21	0.52	0.21	0.45	0.11	0.34	0.52	0.3	0.43	0.32	0.41	0.41	0.33	0.23	0.43	0.49	0.22	0.03	0.12	0.57	0.36	0.72	0.43	0.35
27. Singapore Equity	0.49	0.25	0.69	0.58	0.72	0.21	0.48	0.66	0.43	0.48	0.23	0.53	0.56	0.32	0.27	0.38	0.54	0.1	-0.07	-0.01	0.56	0.29	0.55	0.77	0.38
28. S. Korea Equity	0.16	0.26	0.4	0.22	0.37	0.1	0.4	0.62	0.22	0.31	0.23	0.36	0.31	0.15	0.14	0.34	0.28	0.13	-0.03	0.03	0.44	0.25	0.52	0.38	0.56
29. Austria Equity	0.28	0.13	0.39	0.13	0.42	0.07	0.25	0.34	0.29	0.44	0.34	0.4	0.36	0.23	0.14	0.33	0.34	0.08	0.21	0.14	0.54	0.27	0.34	0.37	0.26
30. Belgium Equity	0.07	0.18	0.3	0.09	0.25	-0.03	0.18	0.23	0.24	0.45	0.16	0.38	0.34	0.16	0.17	0.36	0.17	0.07	0.28	0.12	0.37	0.28	0.43	0.36	0.3
31. Czech Rep. Equity	0.26	0.38	0.25	0.31	0.22	0.28	0.32	0.16	0.29	0.36	0.25	0.38	0.36	0.3	0.3	0.56	0.36	0.19	-0.02	0.06	0.37	0.32	0.29	0.32	0.13
32. Denmark Equity	0.13	0.23	0.26	0.12	0.25	0.08	0.21	0.22	0.3	0.5	0.23	0.45	0.38	0.17	0.3	0.34	0.29	0.19	0.14	0.1	0.36	0.29	0.39	0.37	0.36
33. Finland Equity	0.11	0.2	0.13	0.14	0.13	0.16	0.15	0.19	0.2	0.43	0.07	0.31	0.43	0.07	0.1	0.47	0.34	0.18	-0.12	0.11	0.31	0.46	0.43	0.35	0.3
34. France Equity	0.14	0.3	0.31	0.21	0.29	0.09	0.35	0.3	0.34	0.56	0.14	0.5	0.47	0.21	0.24	0.47	0.37	0.15	0.13	0.08	0.48	0.51	0.5	0.46	0.39
35. Germany Equity	0.17	0.27	0.28	0.25	0.3	0.14	0.36	0.32	0.32	0.6	0.21	0.5	0.5	0.24	0.22	0.48	0.36	0.11	0.12	0.13	0.45	0.47	0.49	0.47	0.29
36. Greece Equity	0.14	0.35	0.38	0.27	0.3	0.34	0.33	0.23	0.36	0.5	0.36	0.54	0.53	0.39	0.27	0.66	0.55	0.28	-0.03	0.02	0.47	0.47	0.41	0.43	0.2
37. Hungary Equity	0.1	0.27	0.27	0.17	0.2	0.18	0.13	0.13	0.22	0.28	0.21	0.41	0.29	0.23	0.16	0.37	0.16	0.22	0.26	0.19	0.37	0.32	0.21	0.16	0.1
38. Ireland Equity	0.16	0.23	0.16	0.2	0.27	0.08	0.27	0.3	0.28	0.47	0.22	0.43	0.44	0.13	0.17	0.39	0.33	0.14	0.15	0.07	0.43	0.33	0.5	0.37	0.44
39. Netherlands Equity	0.17	0.29	0.31	0.25	0.31	0.13	0.34	0.32	0.29	0.6	0.23	0.49	0.48	0.19	0.25	0.44	0.36	0.06	0.11	0.12	0.45	0.41	0.55	0.49	0.4
40. Norway Equity	0.26	0.36	0.37	0.19	0.36	0.12	0.33	0.31	0.37	0.56	0.3	0.6	0.55	0.35	0.27	0.52	0.49	0.26	0.11	0.04	0.61	0.42	0.56	0.43	0.34
41. Portugal Equity	-0.03	0.34	0.27	0.09	0.25	0.09	0.25	0.23	0.27	0.4	0.07	0.32	0.33	0.22	0.17	0.43	0.22	0.15	0.18	0.14	0.39	0.33	0.32	0.32	0.26
42. Spain Equity	0.13	0.32	0.31	0.19	0.36	0.05	0.38	0.36	0.41	0.6	0.22	0.51	0.5	0.32	0.2	0.46	0.35	0.08	0.1	0.07	0.47	0.39	0.51	0.48	0.43
43. Sweden Equity	0.07	0.39	0.3	0.25	0.27	0.17	0.36	0.29	0.34	0.57	0.22	0.51	0.48	0.26	0.2	0.47	0.41	0.18	0.05	0.12	0.43	0.53	0.56	0.48	0.42
44. Switzerland Equity	0.08	0.15	0.34	0.05	0.32	-0.06	0.22	0.26	0.18	0.41	0.12	0.4	0.3	0.12	0.18	0.32	0.31	0.06	0.17	0.12	0.4	0.29	0.45	0.42	0.44
45. Canada Equity	0.35	0.37	0.41	0.4	0.47	0.17	0.39	0.44	0.48	0.6	0.25	0.57	0.62	0.4	0.36	0.52	0.61	0.24	-0.06	-0.02	0.66	0.47	0.65	0.61	0.36
46. US Equity	0.3	0.27	0.35	0.32	0.4	0.15	0.42	0.44	0.39	0.59	0.19	0.53	0.62	0.2	0.28	0.47	0.56	0.16	0	0.03	0.51	0.47	0.55	0.56	0.34
47. UK Equity	0.21	0.2	0.3	0.17	0.29	0.12	0.28	0.34	0.34	0.56	0.25	0.48	0.49	0.17	0.25	0.37	0.44	0.14	0.13	0.1	0.49	0.48	0.58	0.47	0.44
48. Italy Equity	-0.05	0.35	0.26	0.09	0.21	0.15	0.25	0.23	0.34	0.52	0.19	0.44	0.43	0.25	0.27	0.37	0.29	0.09	0.05	0.11	0.31	0.4	0.35	0.3	0.31
49. Iceland Equity	0.4	0.24	0.39	0.24	0.2	-0.13	0.22	0.35	0.17	0.08	0.29	0.24	0.05	-0.07	0.17	0.06	0.17	0.37	0.34	0.1	0.17	0.14	0.21	0.49	0.1

APPENDIX III D: HISTORICAL CORRELATION DATA FOR CAPM- 2004 (CONTD.,)

	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
1. China Equity																								
2. India Equity																								
3. Indonesia Equity																								
4. Malaysia Equity																								
5. Philippines Equity																								
6. Pakistan Equity																								
7. Taiwan Equity																								
8. Thailand Equity																								
9. Argentina Equity																								
10. Brazil Equity																								
11. Colombia Equity																								
12. Chile Equity																								
13. Mexico Equity																								
14. Peru Equity																								
15. Venezuela Equity																								
16. Poland Equity																								
17. Russia Equity																								
18. Egypt Equity																								
19. Morocco Equity																								
20. Jordan Equity																								
21. South Africa Equity																								
22. Turkey Equity																								
23. Australia Equity																								
24. Hong Kong Equity																								
25. Japan Equity																								
26. New Zealand Equity	1																							
27. Singapore Equity	0.53	1																						
28. S. Korea Equity	0.48	0.39	1																					
29. Austria Equity	0.39	0.35	0.28	1																				
30. Belgium Equity	0.36	0.37	0.28	0.47	1																			
31. Czech Rep. Equity	0.2	0.25	0.23	0.27	0.23	1																		
32. Denmark Equity	0.32	0.35	0.28	0.45	0.67	0.34	1																	
33. Finland Equity	0.36	0.35	0.34	0.25	0.34	0.23	0.38	1																
34. France Equity	0.43	0.44	0.37	0.49	0.78	0.35	0.63	0.49	1															
35. Germany Equity	0.39	0.47	0.31	0.58	0.75	0.35	0.67	0.5	0.85	1														
36. Greece Equity	0.4	0.36	0.3	0.41	0.44	0.66	0.52	0.38	0.52	0.49	1													
37. Hungary Equity	0.2	0.15	0.26	0.32	0.37	0.35	0.27	0.22	0.39	0.32	0.45	1												
38. Ireland Equity	0.39	0.45	0.28	0.45	0.66	0.27	0.64	0.41	0.63	0.62	0.44	0.32	1											
39. Netherlands Equity	0.45	0.49	0.35	0.49	0.82	0.27	0.67	0.49	0.85	0.85	0.48	0.31	0.69	1										
40. Norway Equity	0.5	0.45	0.35	0.5	0.57	0.48	0.63	0.51	0.63	0.62	0.6	0.29	0.57	0.64	1									
41. Portugal Equity	0.35	0.25	0.28	0.36	0.56	0.37	0.48	0.3	0.63	0.53	0.52	0.5	0.45	0.57	0.43	1								
42. Spain Equity	0.5	0.46	0.38	0.44	0.62	0.35	0.6	0.45	0.73	0.69	0.53	0.4	0.63	0.69	0.57	0.64	1							
43. Sweden Equity	0.49	0.47	0.38	0.35	0.54	0.38	0.56	0.64	0.71	0.74	0.47	0.32	0.53	0.7	0.63	0.5	0.72	1						
44. Switzerland Equity	0.46	0.43	0.3	0.49	0.71	0.25	0.6	0.36	0.69	0.63	0.51	0.29	0.62	0.75	0.55	0.53	0.6	0.59	1					
45. Canada Equity	0.51	0.54	0.37	0.32	0.46	0.4	0.49	0.5	0.56	0.55	0.59	0.19	0.49	0.59	0.6	0.37	0.52	0.59	0.46	1				
46. US Equity	0.42	0.57	0.42	0.26	0.56	0.28	0.49	0.56	0.64	0.63	0.56	0.22	0.61	0.69	0.57	0.37	0.61	0.64	0.56	0.77	1			
47. UK Equity	0.45	0.5	0.36	0.48	0.67	0.3	0.63	0.5	0.74	0.69	0.48	0.26	0.73	0.78	0.65	0.44	0.65	0.63	0.7	0.53	0.66	1		
48. Italy Equity	0.32	0.34	0.33	0.37	0.53	0.26	0.5	0.45	0.59	0.6	0.47	0.32	0.42	0.55	0.48	0.48	0.62	0.57	0.42	0.45	0.42	0.45	1	
49. Iceland Equity	0.29	0.25	0.11	0.31	0.29	0.33	0.46	0.2	0.2	0.13	0.12	0.09	0.18	0.17	0.31	0.38	0.1	0.22	0.3	0.29	0.17	0.26	0.21	1

APPENDIX IV: MARKET CAPITALIZATION WIEGHTS
(Black-Litterman Implied Equilibrium Return Model)

Equity Risk Premium	**9.00%**
Risk-free Rate	**3.00%**

	Market Cap (millions)	Date	Weight
US Equity	$12,951,379	Jun-05	50.48%
UK Equity	$2,550,820	Jun-05	9.94%
Japan Equity	$2,273,503	Jun-05	8.86%
France Equity	$901,471	Jun-05	3.51%
Canada Equity	$841,216	Jun-05	3.28%
Germany Equity	$682,305	Jun-05	2.66%
Switzerland Equity	$669,253	Jun-05	2.61%
Australia Equity	$570,772	Jun-05	2.22%
Netherlands Equity	$499,304	Jun-05	1.95%
Italy Equity	$446,816	Jun-05	1.74%
Spain Equity	$432,721	Jun-05	1.69%
Taiwan Equity	$317,261	Jun-05	1.24%
S. Korea Equity	$281,927	Jun-05	1.10%
Hong Kong Equity	$253,385	Jun-05	0.99%
Sweden Equity	$245,962	Jun-05	0.96%
Belgium Equity	$154,125	Jun-05	0.60%
Finland Equity	$149,134	Jun-05	0.58%
Brazil Equity	$141,629	Jun-05	0.55%
South Africa Equity	$141,083	Jun-05	0.55%
Singapore Equity	$100,756	Jun-05	0.39%
Denmark Equity	$96,535	Jun-05	0.38%
India Equity	$93,112	Jun-05	0.36%
Ireland Equity	$92,181	Jun-05	0.36%
Mexico Equity	$93,427	Jun-05	0.36%
Russia Equity	$78,776	Jun-05	0.31%
Norway Equity	$70,633	Jun-05	0.28%
China Equity	$69,984	Jun-05	0.27%
Greece Equity	$60,982	Jun-05	0.24%
Malaysia Equity	$51,340	Jun-05	0.20%
Austria Equity	$47,164	Jun-05	0.18%
Portugal Equity	$41,023	Jun-05	0.16%
Chile Equity	$30,408	Jun-05	0.12%
Thailand Equity	$31,199	Jun-05	0.12%
Turkey Equity	$24,457	Jun-05	0.10%
Poland Equity	$23,620	Jun-05	0.09%
Hungary Equity	$21,133	Jun-05	0.08%
Indonesia Equity	$21,134	Jun-05	0.08%
New Zealand Equity	$19,617	Jun-05	0.08%
Egypt Equity	$16,906	Jun-05	0.07%
Argentina Equity	$9,509	Jun-05	0.04%
Czech Rep. Equity	$9,849	Jun-05	0.04%
Iceland Equity	$10,174	Jun-05	0.04%
Jordan Equity	$9,969	Jun-05	0.04%
Colombia Equity	$6,427	Jun-05	0.03%
Philippines Equity	$7,842	Jun-05	0.03%
Morocco Equity	$5,609	Jun-05	0.02%
Peru Equity	$4,668	Jun-05	0.02%
Pakistan Equity	$3,360	Jun-05	0.01%
Venezuela Equity	$1,508	Jun-05	0.01%