ISCTE Business School
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INVESTING OVER MARKET CRASHES

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Project submitted as partial requirement for the conferral of

Master in Finance

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April 2013

Abstract

The mutual fund industry has registered an exponential growth all over the world. One of traits of the competitive environment of the mutual fund industry has been the proliferation of investment strategies. Despite the attention that funds have in media and in academic research, not much emphasis has been given to the long-term performance of mutual funds. This thesis analyses the long-term performance of mutual fund strategies. In order to investigate that it is used a set of 190 Lipper subclasses from January 1976 to December 2010. The subclasses were divided in several asset classes (such as alternative, bond, commodity, equity, mixed assets, money market and real estate) and risk by risk-adjusted performance measures. The thesis has in particular centred on the performance of the strategies during periods of crisis. The results show that none of the strategies were consistently at the top quartile of all of the crises periods considered. Lipper Global Bond HKD exhibited, however, the strongest performance with one of the best risk adjusted performance results on four out of six crises periods. Also Lipper Global Mixed Asset THB Conservative and Lipper Global Equity Real Estate North America have evidenced strong performance on three out of six crisis periods. The results are in line with absence of performance persistence in the mutual fund industry and of safe havens.

Keywords: Risk Adjusted Performance Metrics, Lipper Indexes, Investment Strategies

JEL Classification: G11, G15

Sumário

A indústria de fundos de investimentos tem registado um crescimento exponential por todo o mundo. Uma das características da competição desta indústria é o crescente número de estratégias de investimento. Apesar da importância que os fundos têm tido nos meios de comunicação e a nível de investigação académica não tem sido dada muita ênfase à performance de fundos de investimentos no longo prazo. Esta tese tem por como objetivo analisar a performance de longo prazo na indústria dos fundos de investimentos. Para concretizar este fim foi usado um conjunto de 190 índices que representam estratégias dos fundos em subclasses de ativos da Lipper desde Janeiro de 1976 até Dezembro de 2010. As subclasses foram divididas por classes de ativos (alternativo, obrigações, mercadorias, ações, ativos mistos, mercado monetário e mercado imobiliário) e calculadas medidas de desempenho ajustadas ao risco para cada uma delas. Esta tese em particular centra-se na performance das estratégias durante períodos de crise. Os resultados mostram que nenhuma das estratégias revela consistentemente boa performance, ou seja, estão consecutivamente no quarto quartil, em todos os períodos de crise considerados. Lipper Global Bond HKD evidenciou a mais forte performance com um dos melhores resultados de desempenho ajustado ao risco em quatro dos seis períodos considerados. Também Lipper Global Mixed Asset THB Conservative e Lipper Global Equity Real Estate North America evidenciaram uma forte performance em três dos seis períodos de crise. Os resultados obtidos estão em consonância com a falta de persistência na performance dos fundos de investimentos e a de ausência de *safe havens*.

Palavras-Chave: Medidas de Performance Ajustadas ao Risco, Lipper subclasses, Estratégias de Investimento

Classificação JEL: G11, G15

Acknowledgements: Financial support from Fundação para a Ciência e Tecnologia is greatly acknowledged (FCT/PTDC/EGE-GES/112820/2009).

Contents

Executive Summary

The mutual fund industry has registered an exponential growth all over the world. One of traits of the competitive environment of the mutual fund industry has been the proliferation of investment strategies. Despite the attention that funds have in media and in academic research, not much emphasis has been given to the long-term performance of mutual funds. This thesis analyses the long-term performance of mutual fund strategies. It breaks the analysis furthermore into six different stages on which the stock markets returns plunged at least 20% during six consecutive months.

This thesis is motivated by two questions. How do I invest during market crashes? Which are the asset classes offering favourable opportunities or conditions during those market crashes? The main reason for studying investment strategies by financial experts is investor's inability to analyse the available information and lack of expertise in capital markets. Many managers seek to outperform the benchmarks but during crises stages know where, when and how to invest is a hard task. During these periods managers also look for what is called the safe havens. According to Baur and McDermott (2010) a safe haven asset is some asset that holds its value during adverse market conditions.

One of the main contributions is that the thesis do not uses only one risk-adjusted measure. It is used a metric that either treats deviations above and below the mean equally but also another metric which penalize only deviations under a pre-specified target. In this way it tries to overcome an unsatisfactory feature of mean-variance models (variance treats upside and downside deviations equally) using alternative risk measures once they penalise only downside deviations. It is also furthermore taken into account other items such as the maximum drawdown and potential opportunity of expected loss. As a result this thesis embraces not only one metric but a set of metrics to accurately appraise the subclasses performance.

Baur and McDermott (2010) defined safe haven as an asset that is negatively correlated with another asset in certain periods only (e.g. in times of falling stock markets). This thesis aims therefore to investigate the best investment strategies/asset classes/subclasses which ought to be seen as refuge from losses in financial markets. Summing up the goal is defined as where to find protection to investors against losses in financial markets.

In order to investigate that it is used a set of 190 Lipper subclasses from January 1976 to December 2010. The subclasses were divided in several asset classes (such as alternative, bond, commodity, equity, mixed assets, money market and real estate) and by risk-adjusted performance measures. The risk-adjusted metrics includes Sharpe and Sortino ratio, Information ratio, Upside Potential ratio and Calmar ratio. After computing each one of the metrics to each of the subclasses the goal was analysing the top quartile figures aiming to have a general overview until December 2010. Defined the crises periods the risk-adjusted performance metrics were recomputed for each period and again the focus relied at the top quartile. Then it was assigned an equal weight to each metric used and computed a final ranking (the goal was penalise the subclasses which exhibited only one top quartile metric over the subclasses which exhibited all top quartile metrics, for instance). A second table with the top quartile figures of the final ranking was then generated. Having the top quartile of the top quartile on each of the predetermined crises stages it was sought the subclass or subclasses which have evidenced continuously robust risk-adjusted performances.

Only three out of 190 subclasses evidenced solid performances. Lipper Global Mixed Assets THB Conservative and Lipper Global Equity Sector Real Estate North America evidenced displayed vigorous performance on three out of the six crises periods whereas Lipper Global Bond HKD evidenced strong performance on four out of the six crises stages. All of the remaining 187 funds performed poorly either because their risk adjusted performance results were robust on two or less out of six periods or because evidenced poor risk adjusted performance figures

1. Introduction

Performance measurement is an important step in portfolio management. It can briefly be described as the ex-post evaluation of investment behaviour and works as a quality control of the investment process, providing the necessary information to portfolio managers and investors to know how the money was invested and what was the outcome of the investment. Portfolio performance measurement provides then important information which enables asset managers and clients to assess both how the capital has been invested and the results of the investment process. According to Bacon, performance measures provide real value by advising into investment decision processes and analysis of potential problems.[1]

The issue is particularly relevant because currently investors have a multiplicity of funds and the information of past performance is crucial for future decision. As Nobel Prize William Sharpe refer: *"There is a well known tendency for future risks and correlations to be more like those of the recent past than like those of the distant past"*[2].

This thesis analyses the long-term performance of investment strategies of mutual funds. To tackle this issue, Lipper mutual fund indexes have been used for a period ranging from January 1976 to December 2010. The indexes represent feasible strategies as they are based upon true mutual funds. Each index covers the 10 or 30 biggest funds in each fund class. Moreover the strategies encompass all Lipper available subclasses such as: alternative, bond commodity, equity, mixed asset, money market and real estate.

The first purpose of this thesis is to compare the performance of investment strategies through risk-adjusted metrics from 1976 to 2010. Because in the past 20 years many financial crises have arisen, it is also investigated the investment strategies that have performed better during crises periods i.e., it attempts to identify safe havens.

An accurate performance measurement of an investment strategy encompasses not only the return measurement but also the level of risk incurred by an investor. Defining the status of a particular investment strategy involves as a result a wide range of return risk-adjusted performance measures. As stated by Platinga and Groot (2001) using risk-adjusted metrics constitutes an alternative to the investor's utility function which is not easily feasible for a

[1] Bacon (2008, page 2) writes "performance measurement is essentially a three-stage process: (1) Measurement: calculation of returns, benchmarks, peer groups and distribution of information; (2) Attribution: return attribution and risk analysis (ex post and ex ante); (3) Evaluation: feedback and control."

[2] Managing Investment Portfolios: A Dynamic Process, Second Edition 1990William F. Sharpe, Chapter 7.

regular investor. The ranking provided by other specialised sources such Morningstar may save effort and time to an individual, however, Morningstar only provides an analysis of up to 10- year performance.

The analysis embraces six important crises periods: "the Black Monday" occurred in 1987, "the Asian crisis" occurred in 1998, "the dot com bubble" and "the Twin towers attacks" which occurred in 2000 and 2001, "the subprime crises" in 2008 and finally "the European debt crisis" in 2010. The thesis objective is to verify which strategies have repeatedly exhibiting a stronger risk-adjusted performance during those crises periods.

The main results show that Lipper Global Bond HKD, Mixed Asset THB Conservative and Equity Sector Real Estate are the subclasses exhibiting stronger performance on at least three out of six crisis episodes. It must be stated furthermore each crises have their own features thereof the outcome interpretation must be carefully observed. For example during the 2008 subprime crises the real estate sector suffered enormous losses because it was the centre of the crisis nevertheless on 2001 displayed a robust return risk-adjusted performance. In addition the money market and the bond asset classes seem to be the safest asset classes to invest during market crashes. It must be noticed furthermore the bond asset class returns did not beat the benchmark returns most of the times. The equity and mixed assets asset class evidenced to be the riskiest ones however their returns beat more easily the benchmark returns and the opportunity of gains is sometimes higher than any other asset class.

Providing important insights by identifying the investment strategies which exhibited robust performance during market crashes and strategies which can facilitate investors' decisions during those periods is moreover the thesis purpose. It has to be stated, however, past performance is not a guarantee of future returns.

This thesis is structured as follows. The second chapter describes the literature review on the subject. The chapter three involves furthermore the methodology description featuring the risk-adjusted metrics. It is identified their scope, advantages and disadvantages. On the chapter four it is given a brief data description and moreover benchmark fundamentals. The fifth chapter describes an overview of the entire period return on all asset classes. The chapter six is about the data interpretation and crises periods comparison. The seventh chapter describes the methodology followed to achieve the top 25% best subclasses of the best 25% subclasses on each crisis periods and finally the eighth chapter concludes on the results.

2. Literature review

The literature that analyses asset performance in the long run is very scarce and it tends to focuses on traditional asset classes.

Dimson et al. (2000) compare the performance of the equity market, long term sovereign bonds and treasury bills in 12 countries during the 20th century and conclude that equity was the asset class with the highest return, but also the one with the highest risk whereas bonds had a unsatisfactory performance as real returns are very low.

Ibbotson (1999) performs a similar study for the period between 1925 and 1998 and obtains similar results, highlighting the strong performance of the small market capitalization stocks.

Regarding the performance of fund's investment strategies, some studies perform analysis similar to the one on this thesis, focusing not only on mutual funds but also on hedge funds. Focusing on the equity asset class strategies Shukla and Singh (1997), for instance, compare investment strategies followed by mutual funds domiciled in the USA concluding that North-American equity funds have better absolute and risk-adjusted performances than global equity funds. Rao (2006) also focus on equity mutual funds, but domiciled in India, comparing their different investment styles and concludes that growth plans outperform dividend plans with lower risk.

This thesis also relates with the literature on safe haven assets as it intends to find which investment strategies have performed better during the crisis.

Baur and Mcdermott (2010) analyse the properties of gold as safe haven. They find that gold was a strong safe haven for most developed markets during the peak of the recent financial crisis.

Ranaldo and Söderlind (2007) analyse the safe haven status of various currencies. Upper (2000) examines the role of a specific safe haven asset, i.e. German government bonds, during a specific period of market stress. Baur and Lucey (2010) find that gold is a hedge against stocks, gold is a safe haven in extreme stock market conditions and gold is a safe haven for stocks only for 15 trading days after an extreme shock occurred.

Capocci and Hubner (2004) analyse a hedge funds data base and conclude the best performing hedge funds are the ones that follow momentum strategies, i.e., investment strategies which select assets based on their recent performance, with the expectation that good past returns will result in good future returns.

Berteli (2005), on the other hand, compares market timing (return generation through the prediction of future market moves) and market neutral strategies (generation of positive absolute returns, irrespectively of the market trend), concluding, for example, that long-short market neutral strategies (that use both long and short positions) generate superior returns than long-only market neutral strategies (that use long positions only), carrying also a higher level of risk, and that market timing strategies are riskier than market neutral strategies.

As it was referred before, the existing literature on the risk-adjusted performance of the whole universe of strategies (and their numerous underlying asset classes) followed by mutual funds in the long run is relatively limited.

This thesis approach to the risk-adjusted performance, as described on the next chapter, is very similar to the approach followed by Capoccu and Hubner (2004), Shukla and Singh (1997) and Berteli (2007).

3. Performance measures

Aiming to carry on with the analysis it is going to be described commonly used finance text book measures.

3.1 Traditional performance measures

3.1.1. The Sharpe Ratio

The Sharpe ratio is often defined as reward to variability ratio. The ratio defines excess returns as the return above the risk-free rate, i.e. asset's return is compared against T-Bills return (Israelsen, 2005).

The Sharpe ratio is regularly employed to assess mutual fund performance. Scholz (2007, p.347) in his work write accordingly with "McLeod and Van Vuuren (2004) … the highest Sharpe Ratio is the fund with the highest probability of outperforming the risk free-asset in each market climate". Higher excess returns and lower standard deviation of returns produce both a robust Sharpe ratio (Israelsen, 2005).

$$\boldsymbol{Sharpe\ Ratio} = \frac{\boldsymbol{Excess\ Return}}{\boldsymbol{Standard\ Deviation\ of\ Excess\ Return}} \quad (\boldsymbol{I})$$

$$\boldsymbol{where\ ER = Asset\ Return - Risk\ Free\ Rate} \quad (\boldsymbol{II})$$

The Sharpe ratio of a fund corresponds in return/standard deviation space to the slope of the line connecting the positions of the fund and the risk-free interest rate. The higher the Sharpe ratio, the steeper the gradient is and therefore the better combination of risk and return (Scholz, 2007).

When investors are drawing conclusions about the Sharpe ratio figures two important assumptions are taken into account: returns are normally distributed and preferences are defined in terms of mean and variance. Investors must therefore take special attention when excess returns are negative. Aiming to overcome this Sharpe Ratio's downside Israelsen (2005) proposes the follow refinement:

$$\boldsymbol{Modified\ Sharpe\ Ratio} = \frac{\boldsymbol{Excess\ Return\ (ER)}}{\boldsymbol{Standard\ Deviation\ of\ Excess\ Return}^{\frac{\boldsymbol{ER}}{|\boldsymbol{ER}|}}} \quad (\boldsymbol{III})$$

$$\boldsymbol{where\ ER = Asset\ Return - Risk\ Free\ Rate} \quad (\boldsymbol{IV})$$

As a result Israelsen's improvement stands by adding an exponent to the denominator. It results in the quotient between excess return and its absolute value (Israelsen, 2005). When excess return is positive the Sharpe Ratio and the modified Sharpe Ratio produce identical outcomes. When excess return is negative Sharpe ratio and modified Sharpe ratio produce distinctive results, though (Israelsen, 2005).

Israelsen (2005, p.427) concluded that "modified … Sharpe Ratio correctly rank funds according to residual return over residual risk, whether or not the excess return is positive or negative". According to Scholz (2007) an important drawback embedded on this refinement is it penalised higher systematic risk in declining markets whereas it does not reward higher systematic risk in rising markets.

3.1.2. The Information Ratio

Primarily defined as appraisal ratio, information ratio is another risk-adjusted measure. The core difference with the Sharpe ratio is how excess return is defined. Information ratio defines excess return as the return in excess to a relevant benchmark index, i.e. information ratio measures excess return in comparison with the most relevant equity (or debt) benchmark index (Israelsen, 2005).

Information ratio also attempts to identify whether the investor is able consistently beating the benchmark index. The higher the information ratio, the higher is the return over the benchmark.

$$\boldsymbol{Information\ ratio} = \frac{\boldsymbol{Excess\ Return}}{\boldsymbol{Standard\ Deviation\ of\ Excess\ Return}} \quad (\boldsymbol{VII})$$

$$\boldsymbol{where\ ER = Asset\ Return - Benchmark\ Index\ return} \quad (\boldsymbol{VIII})$$

Information ratio is interpreted as the slope of the efficient line or return per unit of risk. (Pedersen and Rudholm-Alfvin, n.d.). It is important to remark furthermore mean variance preferences do not always give a fair description of the financial markets. Mean-variance preferences hinge on either or both of the following conditions being satisfied: **condition 1:** portfolio returns may be characterised completely by the first two moments of the return distribution; **condition 2:** investors take into account only about the two first moments of the return distribution.

Israelsen (2005) proposes a similar refinement to the Information Ratio as the Sharpe Ratio refinement:

$$\boldsymbol{Modified\ Information\ ratio} = \frac{\boldsymbol{Excess\ Return}}{\boldsymbol{Standard\ Deviation\ of\ Excess\ Return}^{\frac{ER}{|ER|}}} \quad (IX)$$

$$\boldsymbol{where\ \ ER = Asset\ Return - Benchmark\ Index\ Return} \quad (X)$$

When investor is dealing with positive excess return both the information ratio and the modified information ratio produces identical outcomes. When excess return is negative both the information ratio and the modified information ratio may produce dissimilar conclusions, though. Both with positive and negative excess return the ranking of funds based upon the modified information ratio rewards higher excess return and lower tracking error. When the modified information ratio is applied as the tacking error increases and excess return depreciate, funds receive systematically a worse information ratio ranking (Israelsen, 2005).

3.2 Downside risk measures

Downside risk is generally defined as either when the returns lying below a pre-specified target or where risk notably decreases for large positive returns. Defined as the maximum sustained percentage decline (peak to trough) which has occurred in the stock within the period studied, maximum drawdown risk measure is popular amongst several authors. It is used to track futures and hedge fund performance. Maximum drawdown is distribution dependent. Lower maximum drawdown, ceteris paribus, signals that manager is disciplined and good at implementing stop-losses whereas large maximum drawdown reflect higher propensity to ride losers. This metric however lose some of the information contained in other measures once ignores individual 'tick-by-tick' or daily volatility performance yet focuses on a fixed time horizon (Pedersen, n.d.).

Lower Partial Moment is furthermore other downside risk measure. It measure risk by negative deviations of the returns realised in relation to a minimal acceptable return τ.

$$\boldsymbol{LPM_{2i}(\tau) = \frac{1}{T}\sum_{t=1}^{T} \max[\tau, r_{it}, 0]^2} \quad (XI)$$

One of the major standard deviation disadvantages lies how the proxy treats a fluctuation either above or below the mean. The standard deviation treats that fluctuation in the same way whilst investors do not. Lower Partial Moment risk measure attempts to overcome the standard deviation's abovementioned drawback. Lower Partial Moment risk measure considers only negative deviations of returns from a minimal acceptable return (either zero or the risk-free rate or the average return) (Elling and Schuhmacher, 2006).

The Sortino ratio and the Upside Potential Ratio are two of those alternative risk-adjusted performance measures which use downside risk measures.

3.2.1. The Sortino Ratio

The Sortino ratio is suitable for investor's with intermediate and high degree of risk aversion. The first important refinement with respect to the abovementioned ratios is the replacement of standard deviation by a downside risk measure whilst excess return prevails in the numerator which is used as a measure of the potential reward of an investment opportunity. The Sortino ratio considers in this sense that deviations from the mean are not accepted similarly. Considered as a downside risk measure accordingly the Sortino ratio is studied with respect to a reference point, usually entitled as the minimal acceptable rate of return. The minimal acceptable rate of return enables therefore to differentiate risk and volatility perception. Accordingly, realizations below this reference point are regarded as "bad volatility" whereas realizations above this reference point are regarded as "good volatility" (Platinga and Groot, 2001).

Sortino ratio is a widely downside risk performance used and it was introduced by Sortino and Price (Platinga and Groot, 2001).

$$\boldsymbol{SoR} = \frac{\bar{\boldsymbol{r}}_{\boldsymbol{p}} - \boldsymbol{r}_{\boldsymbol{f}}}{\sqrt{\boldsymbol{LPM}_{\boldsymbol{2}}(\tilde{\boldsymbol{r}}_{\boldsymbol{p}})}} \quad (\boldsymbol{XII})$$

The standard deviation in the Sharpe ratio is replaced by the equivalent downside risk measure. The Sharpe ratio and the Sortino ratio produce the same result when distribution is normal and the target in Lower Partial Moment is expected returns. The rankings produced will substantially differ as skew increases (Pedersen, n.d.).

The Sortino ratio relies on the use of expected return which is used as a measure of the potential reward of an investment opportunity.

3.2.2. The Upside Potential Ratio

The Upside Potential Ratio constitutes an alternative for expect return. Upside Potential Ratio gives the probability weighted average of return above the reference rate. This makes sense if the ranking for mutual funds is considered. The Upside Potential Ratio measures the reward for investors as the return in excess of the average return for the asset class; this is divided by the downside risk (semi-variance) to arrive at the Upside Potential Ratio (Leggio and Donald, 2003).

Return might also be measured through High Partial Moment. High Partial Moment measures positive deviations from the minimal acceptable return τ. The advantages of Upside Potential Ratio is the combination of the High Partial Moment of order 1 with the Lower Partial Moment of order 2 and the consistent application of the minimal acceptable return in the numerator as well as in the denominator (Elling and Schuhmacher, 2006).

$$\boldsymbol{Upside\ potential\ ratio} = \frac{\boldsymbol{HPM_{1i}(\tau)}}{\sqrt{\boldsymbol{LMP_{2i}(\tau)}}} \quad (\boldsymbol{XIII})$$

3.3 Drawdown risk measures

3.3.1. The Calmar Ratio

Following the path of Lower Partial Moment and related downside risk measures there are other maximum drawdown risk measures. Maximum drawdown and Calmar ratios are two related return risk-adjusted measures (Steiner, 2011).

$$\boldsymbol{CR} = \frac{\boldsymbol{return\ over}[\mathbf{0}, \boldsymbol{T}]}{\boldsymbol{MDD\ over}[\mathbf{0}, \boldsymbol{T}]} \quad (\boldsymbol{XIV})$$

Calmar ratio is driven exclusively by below target or negative returns. Along with Lower Partial Moment and related downside risk measures, a special emphasis lies frequently on the maximum drawdown. Calmar ratio differs from the Sharpe ratio in the numerator once Calmar ratio's numerator considers total return rather than excess return. For domestic comparisons both the Sharpe ratio and the Calmar ratio have the same advantages and disadvantages with the additional lack o theoretical foundations. For international comparisons, however, these 'market favourites' lack a particular quality (Pedersen and Rudholm-Alfvin, n.d.).

"The Calmar ratio … use the maximum drawdown, an average above the N largest drawdown (which does not react too sensitively to outliers), and a type of variance above the N largest drawdown (which takes into account that a number of very large losses might represent a greater risk than several small declines) as risk measures…" (Eling and Schuhmacher, 2006, 2636)

3.3.2. The Hurst Index

Hurst index is a statistic for detecting if a portfolio's manager returns are mean reverting, totally random or persistent. It is calculated as follows:

$$\boldsymbol{H = \frac{\log(m)}{\log(n)}} \quad (\boldsymbol{XV})$$

$$\boldsymbol{where\ m = \frac{[\max(r_i) - \min(r_i)]}{\sigma_P}\ and\ n = number\ of\ observations}$$

When the Hurst ratio result range through 0 to 0.5 this would suggest a portfolio manager's series of returns are mean reverting or anti-persistent. A Hurst index of 0.5 would suggest the series of returns was totally random. Finally when the Hurst ratio figures range from 0.5 to 1 this would suggest the series of returns are persistent, i.e. there is memory in the return series. Clearly, persistent positive returns or excess returns would be a desirable property for an asset manager (Bacon, 2008).

4. Data

4.1 Methodology

The empirical analysis is done using traditional mean variance performance measures, but also downside risk measures and measures that consider risk below a target. The mean-variance variance models premise is variance treats upside and downside deviations from a predetermined target equally. One of the assumptions of portfolio theory is furthermore that the variance measures the risk of an investment. It is recognised however that investors do not understand risk as the returns above the minimum set as the target for investment. Another assumption is that returns follow a normal distribution which most of the times does not happen. Considering only traditional risk measures might lead to misinterpretation of the results. One of the main contributions is that the thesis do not uses only one risk-adjusted measure or only traditional risk-adjusted measures. It is used a metric that either treats

deviations above and below the mean equally but also another metric which penalize only deviations under a pre-specified target. It is also furthermore taken into account other items such as the maximum drawdown and potential opportunity of expected loss. As a result this thesis embraces not only one metric but a set of metrics to accurately appraise the subclasses performance.

4.2 Indexes

In order to appraise the investment strategies followed by investment funds Lipper's index fund tracking is used, according with Lipper Global fund classification. The available data ranges from October 31st of 1976 December 31st of 2010, on a monthly basis. The data is dollar denominated and embraces one hundred and ninety investment strategies.

The bond asset class encompasses funds which strategically invests in fixed income securities with average maturity above 1 year. Funds are classified according to currency exposure, emerging markets exposure, credit quality and maturity exposure. Aggregate bond funds with government and corporate exposure will by classified in the respective currency classification. High Yield funds primarily invest in bonds with a speculative grade (i.e. bonds with a credit rating below BBB). Currency hedged funds have their own separate classifications according to currency and regional focus (Lipperweb, 2013).

Regarding the equity asset class the fund strategically invests in variable income securities with ancillary liquid assets. Funds are classified according to their local or regional equity exposure. Funds focusing more than 75% on a specific industry will be classified according to relevant industry. Funds without a typical and prevalent exposure to a specific industry sector will be classified according to the geographical stock market exposure. Funds focusing on equities of small and/or middle capitalization companies will be classified the appropriate Small & Mid Cap sector. Finally funds investing in single emerging countries should be classified in a regional Emerging Markets sector, unless the relevant country sector is available (e.g. Equity Peru would belong to Emerging Markets Latin America etc) (Lipperweb, 2013).

The mixed asset funds strategically invest in fixed income and equity securities by over weighting a specific currency or market. The fund aims to optimise returns in the reference currency by over-weighting this currency and/or its respective market (within the fund portfolio or versus the global market capitalisation). Over-weighting makes reference to the

prevalent currency exposure of the invested portfolio or, in absence of any prevalence, to the currency of denomination of the fund under the assumption that the fund aims at maximising returns in the investment currency of the investor. It embraces three risk levels: Conservative, Balanced, Aggressive and Flexible (Lipperweb, 2013).

The money market funds strategically invest in Money Market and Cash instruments or Bonds with a residual life to maturity of less than 12 months. Funds will be classified according to their currency exposure whereas the real estate funds strategically invest the prevalence of its total assets in direct, tangible buildings and/or land. Funds are classified according to their local or regional market exposure (Lipperweb, 2013).

Regarding alternative and commodity asset classes they are classified as "other". According to Lipper "there are now a number of mutual funds that use a greater freedom of investment powers and are not necessarily restricted to long only. Other classes are not conventional long only funds but are regulated investments and do not fall into the category of hedge fund either." The commodity funds invest in commodity assets through either direct trading in physical commodities or commodity-linked structured securities or derivatives (Lipperweb, 2013).

Lipper subclasses do not suffer from survivorship bias. The subclasses are annually rebalanced aiming to at the end of each year each index embraces only the biggest fund in each asset class underlying that year. The funds which create the index at a given year have consequently the same weight on the index at the annual rebalance (Lipper, 2010).

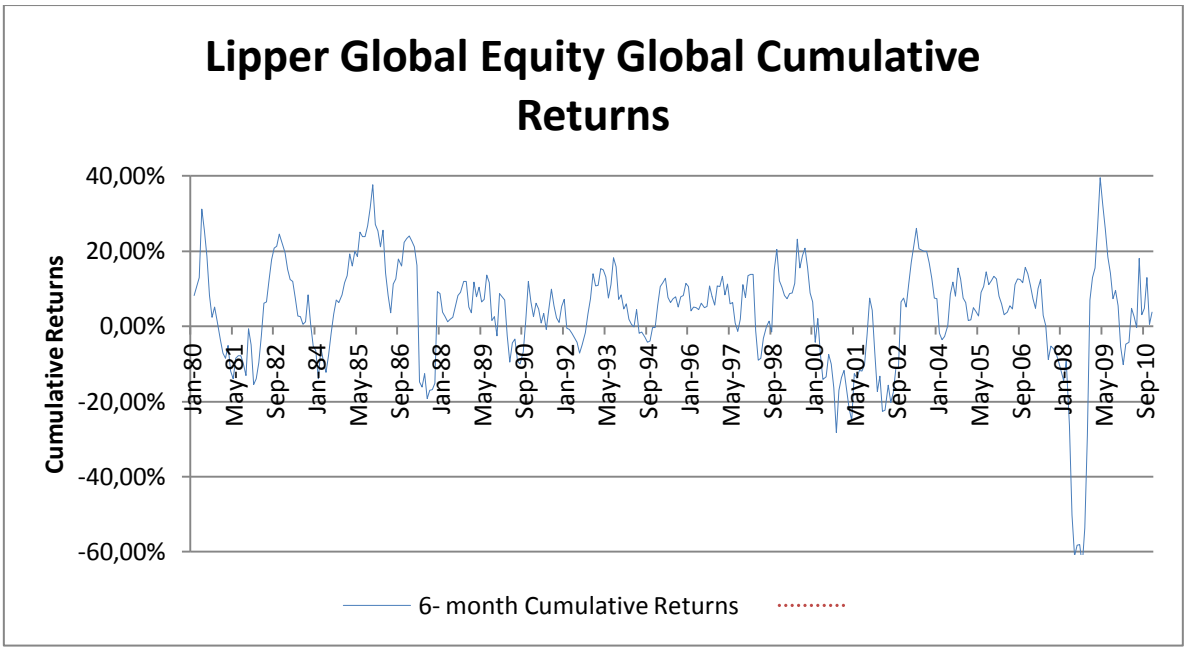
4.3 Benchmarks

Aiming to accurate evaluate the fund performance it is necessary to establish a benchmark. The fund performance and the benchmark performance is then computed and analysed against each other. The custom benchmark was motivated by the L fund of the Federal Thrift Savings Plan. This fund embraces both stocks and bonds: 75% Global MSCI World Stock Index and 25% Global WGBI Citigroup Bond Index. The choice of this benchmark relies on the US saving retirement plan for an individual within 20 years. Three benchmarks have in addition been established: 1) 75% of the portfolio is composed by stock and 25% by bonds; 2) 25% of the portfolio is composed by bonds and 75% by stocks; 2) 50% of the portfolio is composed by stocks and 50% by bonds. With those three benchmarks it is possible to establish

comparisons between three ways of investing: aggressive (or risk lover); moderate and cautious (or risk averse). The risk-free rate is one month US LIBOR.

4.4 Crises Periods

One of the goals of this study is to analyse the performance of investment styles during crises periods. All of the periods referred as crises are known as so just after they have occurred. Despite of returns falling on those periods at the time nothing benchmarked those periods as a crises. Aiming to define what can be seen as a crisis period Lipper Global Equity Global is going to be seen as the benchmark index for the study. A crisis period is hereinafter said to occur when the cumulative returns for at least six months are lower than 20%. Analysing the figure it can be easily seen six periods were accumulated returns reached -20%: 1987, 1998, 2000, 2001, 2008 and 2010. All of those periods correspond to what is today known as crises periods.



4.4.1. Crises Periods

This work is going to be focused in-between 1976 and 2010. After 1976 seven important crises have been identified.

Dates	Terminology	Description
1987	The Black Monday	On this day millions of investors have sold their stocks at New York Stock Exchange. Stocks have been sold because investors believed on inappropriate confidential information management and companies were being acquired with borrowed money. The consequences were worldwide felt.
1998	The Asian Crisis	After the "Giant Asian crisis" on 1997 follows Russian bank crisis. On 1998 the Russian bank system collapsed and international payments were suspended. With IMF intervention the Russian ruble did not plummet and the damage have been successfully controlled.
2000	The Dotcom crisis	Turning the century "the dotcom crisis" arises. This crisis relies on speculation with respect to telecommunication companies. Five thousand companies have disappeared in just three years. The Federal Reserve approach stand by 0,5 interest rate reduction.
2001	The Twin Towers Attack	In 2001 with terrorist attacks to the USA motivated stock index fall. The Federal Reserve responded by interest rate reduction. Nikkei stock index fell around 6% and several European stock exchanges also end up losing points. The Federal Reserve responded by interest rate reduction.
2008-2009	The Subprime Crisis	Between 2008 and 2009 USA receives the worst economic crisis since 1930 due to misleading risk interpretations. The consequence was a house bubble. The banks extended the loans to people who were unable to pay them back. The house mortgages were packed and sold on the markets. Barack Obama, the actual USA president implemented an $787 billion plan in order to stimulate the economy.

Dates	Terminology	Description
2009-2010	European debt crisis	Greece debt is revealed to be higher than was initially expected. Both IMF and EU have been dealing with a rescue plan to Greece whilst investors penalise this country for being in default. The consequences were extended rapidly to other countries, such Portugal, Spain, Ireland and Italy. The Euro value plummets. The CEB responds by buying sovereign debt.

5. General Overview

5.1 Alternative Asset Class

The overall alternative subclasses returns are instable i.e. the subclasses returns do not follow a clear trend. The minimum and maximum return peaks do not often match with economic depression or boom periods. The lowest return figures are frequent all over the period as the maximum return figures. The lowest figure accounts to -18% whereas the maximum return figure is about 11%. The returns instability is greater after the subprime US crises where the negative return figures are more regular. Despite of the irregular return behaviour only two out of six subclasses return did not beat the defined benchmarks. Lipper Global Alternative Long/Short Equity JP is the subclass with the best return/risk relationship: it shows the highest arithmetic annual mean with the lowest annual standard deviation. Lipper Global Alternative Credit Focus return/risk trade-off appears to have the worst relationship amongst the alternative subclasses. It has a negative return though with the average level of standard deviation. Lipper Global Alternative Long/Short Equity GBL evidences the second lowest return arithmetic mean and the second highest standard deviation. Those two subclasses are therefore ranked on the bottom quartile.

5.2 Bond Asset Class

Unlike Lipper Global Alternative subclasses Lipper Global Bond subclasses behave in a similar way. Until the beginning of 1997 there are no important subclasses fluctuations that may be regarded. An important instability is in-between the 1998 last quarter and the 1999 first quarter for Lipper Global Bond RUB. This period matches to the Russian Ruble crisis. On September 30th the Lipper Global Bond RUB evidenced its lowest return of -530%

approximately. Again between 2003 and 2008 the subclasses variability is stable. On 2008 last quarter Lipper Global Bond Europe High yield shows the lowest return value of the subclass lifetime approximately -35%. Focusing at the Europe subclasses returns it recorded losses ranging between -8% and -10% half way on 2010. Those negative returns are plausible explained by the European Debt crisis which arises on 2010. Furthering analysis to the subclasses returns it might be stated less than one-quarter of the subclasses did not beat the defined benchmarks thereof over than 75% of the manager did not exhibited skills in actively creating returns. Most of the subclasses return arithmetic mean and standard deviation range from 2% to 7% and from 1% to 20% correspondingly. The Lipper Global Bond RUB presents the worst return/risk relationship. It is the riskiest subclass and furthermore exhibits the worst return arithmetic mean. Relying on the highest subclasses' return arithmetic mean there are four main subclasses to be highlighted: Lipper CE Global Income Fund Subclass; Lipper Global Bond BRL Short Term; Lipper Global Bond PHP Medium Term; and Lipper Global Bond CZK. Regarding return arithmetic average Lipper CE Global Income Fund Subclass exhibits the highest one along with the second highest standard deviation amongst the four subclasses. Comparing with the Lipper Global Bond CZK and Lipper Global Bond BRL Short Term the previous mentioned subclass evidences a better return/risk relationship because displays a higher return arithmetic mean along with lower standard deviation.

5.3 Commodity Asset Class

Lipper Global Commodity subclasses have only data available from 2000. Lipper Global Commodity subclasses' return exhibit an irregular path throughout its lifetime. Along with the two other peers two important periods are highlighted: first the subclasses devaluation by 2008 last quarter and the second return shrink by half of 2010. Both of events occur during crises periods: first the US sub-prime crises and second the European Debt Crisis. It can also be stated that the risk associated with each one of the subclasses seems high since there is no clear pattern on returns movements. Comparing the subclasses' return with the benchmark returns only the Industrial Metal subclass return did not beat the benchmarks returns. Analysing the return/risk dimension it is easy to identify the Lipper Global Commodity Precious Metals as the subclass with the best reward/risk relationship. Comparing with its peers it has the highest return arithmetic mean along with the lowest standard deviation.

5.4 Equity Asset Class

At the first glance it can be inferred Lipper Global Equity subclasses are very volatile. The subclasses do not follow a clear pattern and both maximum and minimum return peaks are often. At least five important periods may be identified during the period in analysis. The first period corresponds to the "Black Monday" in 1987 where the ultimate result was enormous equity subclasses devaluation all over the world. The subclasses recovery started although on the last two months of 1987, recording positive returns by the beginning of 1988 most of them. The second highlighted period occurred in 1994 with Mexico's currency crisis. Mexico was not able to maintain its exchange rate fixed in relation with dollar. The government therefore was forced to depreciate the currency. Along with the lowest levels of trust felt by investors Mexico lost millions of dollars with investor's capital retreat. Lipper Global Equity returns continues to be very instable throughout the years. The last two periods corresponds to post Twin Towers terrorist attacks and Argentina's crisis. The returns decreased not as much as during the other crisis periods. Lastly on 2008 with US subprime crises none of the subclasses experienced positive return figures. The US crisis with global repercussions affected the good performance of any subclass. The impact of 2008 US subprime crisis were the greatest since 1929 crisis. European Debt Crisis in 2010 led also to equity subclasses return depreciation. US credit crisis repercussions and lack of responsibility in management of European Countries' debt happens to be the primarily reason for the crisis. The lowest return arithmetic means amongst the subclasses range between 1% and 3,6%. The analysis of return/risk relationship often depends upon the degree of investor's risk aversion. If the investor is risk averse then he/she prefers lower standard deviation for the highest possible return arithmetic mean. As most of investors are risk adverse Lipper Global Equity Sector Pharma&Health seems the subclass with the best reward/risk relationship. It exhibits one of the highest return arithmetic mean along with one of the lowest standard deviation figure. It seems furthermore to be a concentration of the return arithmetic mean between 4% and 10% whilst regarding standard deviation ranges between 15% and 30%. Some of the subclasses prove additional risk sometimes is not properly rewarded. The top 25% return arithmetic mean subclasses ranges between 8% and 11%. Just one of the top 25% subclasses with the highest return arithmetic mean also has the lowest standard deviation, being Lipper Global Equity Sector Pharma&Heatlh subclass. About 35% of the equity managers successfully beat the benchmarks thereof created actively returns.

5.5 Mixed Assets Asset Class

Lipper Global Mixed Assets GBP Aggressive, GBP Balanced and CHF Balanced were the first subclasses being traded. Throughout their lifetime the subclasses follow the same track. Lipper Global Mixed Assets GBP Aggressive and GBP balanced path are actually almost undistinguishable. The negative return figures came up again on late 1981 for all of the subclasses. It is after 1984 that more subclasses started to be traded. On late 1987 the subclasses return recorded losses over than -15%. The recovery arises on the two subsequent months though on the beginning of 1991 the subclasses return decreased once more. It seems the volatility of the subclasses augmented on late 90's and persisted in this way until the end of 2010. On 2000 with the Dot Com Bubble the subclass seems to suffer again from negative returns. Lipper Global Mixed Asset BRL Aggressive was the subclass which depreciates the most. Instability continues along the way but only two key periods might be referred. On 2008 with the US credit crisis all of the subclasses register negative returns. On October 2008 none of the subclasses recorded positive returns. The losses ascended almost to 60% in some cases. A similar situation occurred when the European debt crisis arises. The consequences of this crisis were not as deeper as the prior one. The subclasses recorded losses twice during 2010. The negative returns were about 20% for some of the subclasses. There were though subclasses traded with positive return figures. The asset class average of returns arithmetic mean seems to range in-between 4% to 9% while standard deviation's figures range 10% to 20%. Lipper Global Mixed Asset GBP Flexible appears to exhibit the best reward/risk relationship. Its average standard deviation combined with the second highest return arithmetic mean is the reasoning for such conclusion. Comparing with Lipper Global Mixed Asset INR Flexible the prior subclass shows a lower return arithmetic mean but also a lower standard deviation in about 8%. The choice between each one of the subclass an investor should invest depends upon how risk averse the investor is. Focusing on the top quartile the return arithmetic mean ranges from 8,3% for Lipper Global Mixed Assets AUD Flexible to 15,5% for Lipper Global Mixed Assets INR Flexible. On the top quartile of standard deviation the figures vary in addition from 8% (Lipper Global Mixed Asset TWD Conservative) to 12% (Lipper Global Mixed Asset Other Balanced) approximately. Finally at least 40% of the mixed asset managers beat the benchmarks return thereof they successfully created returns. Considering the 25% Stock, 75% Bond benchmark the rate of manager whom successfully beat the benchmark increases to 50%.

5.6 Money Market Asset Class

In general there is not a clear pattern followed by the Lipper Global Money Market subclasses. It is clear though the subclasses exhibit higher volatility. Followed by maximum return figures are negative return figures around 20% or more. The return negative figures are emphasised during period crises as on 2001 and 2002 with Twin Towers and DotCom Bubble as well as during US credit crisis. As the analysis is extended to the most recent years it is clear the volatility augmented so as the maximum and minimum return peaks. From 2002 until nearly half of 2008 the subclasses movements are similar and probably the volatility have diminished in-between this period. As a consequence both maximum and minimum return values are not as higher as used to be before or after this period. It is important to remark two important periods moreover: first the post dotcom periods; the second period corresponds to the US sub-prime crisis where almost of the subclasses devaluated between -10% and -20%. As a consequence of European Debt Crisis the subclass recorded again losses around -10% to -15% on 2010. Most of the money market subclasses return arithmetic mean and standard deviation's figures ranges between 3% and 8% and 3% and 17% accordingly. As investor dislike higher standard deviation and like returns it can be inferred Lipper Global Money Market CNY is one of the subclasses with the best return/risk relationship. Its return is in-between return arithmetic mean average and the standard deviation of the subclass is the second lowest. There is no other fund offering such a higher return for such a lower standard deviation. Similarly to the previous asset class about 40% of the managers achieved higher returns than the established benchmark returns. Despite from 60% of the information ratio figures being negative – regardless the benchmark – the subclasses exhibited very close to zero excess returns.

5.7 Real Estate Asset Class

Each of the Real Estate subclass follow its own path consequently it cannot be established a clear trend among them. The subclasses nonetheless have an identical path after the beginning of 2008. From here it almost can be draw a clear trend. After plummet around 20% or more in the last quarter of 2008 the subclasses show some recovery but it plunged again. Lipper Global Real Estate Other maximum records losses were around 25% in the last quarter of 2008. The second lowest return figure belongs to Lipper Global Real Estate Japan somewhere in the first quarter of 2009. These negative returns were clearly generated by the US sub-prime crisis consequences. The highest average return figure for the real estate asset

class is about 9% whereas the average risk of this asset class seems to range from 10% to 15%. Only the real estate Japan subclass recorded close to zero return arithmetic mean thereof its reward/risk relationship is regarded to be weak. The minimum return figures exhibit all two digits being higher than -14% approximately. Those were recorded during the US subprime crises. The highest return figures are in average about 12%. Finally only one subclass achieved positive information ratio regardless the benchmarks. Despite all of the four remaining subclasses recorded close to zero figures it may be stated their managers did not exhibited skills in actively creating returns.

6. Crises Top Quartile Risk-adjusted Performance Ratios Comparison

6.1 1987

Examining the performance of the subclasses on the 1987 implies to know this crisis was featured by the massive stock sale and investor distrust. The analysis range from April 1987 to October 1988.

Most of the bond subclasses return behaves similarly however there is not a clear trend over this period. On October 1987 only four subclasses recorded negative return figures.

Analysing the equity subclass breakdown it is possible to identify a clear trend. The subclasses return range about -5% and 15% almost all of the period. By October 1987 all of the subclasses recorded negative return performance somewhere from -5% to -80%. It is followed by a strong recovery for all of the funds to November 1987. The majority of the subclasses recorded for the second time negative figures on January 1988. The forthcoming months recorded returns from -5% to +10% approximately for the majority of the subclasses suggesting a return period has arisen.

Focusing at the mixed assets subclasses their return behaves identically. Almost all of the subclasses reached their minimum return figure on October 1987. The return decreased on 1988 second quarter though before the third quarter the subclasses return recouped and by the beginning of 1988 last quarter positive return figures are recorded for all of the subclasses again.

Regarding the money market asset class each one of the subclasses follows their own path meaning there is not a clear trend to be designed. The highest and the lowest peaks are frequent. Right after to be traded the subclasses returns dropped reaching their minimum value by the beginning of 1988 third quarter.

Breaking down the real estate subclass on 1987 were traded just two subclasses: Lipper Global Real Estate European and Lipper Global Real Estate UK. Both subclasses follow similar path. Mostly when one depreciates (appreciates) the other depreciates (appreciates). By the beginning of 1987 last quarter both subclasses returns drops to negative figures around -8% and -5%. Again by the half of 1988 both subclasses record negative figures about -6%. It follows a recouping period to positive return figures on the beginning of 1988 last quarter.

Finally the riskiest asset class during this period is the equity asset class with an average risk of about 33% whereas the money market asset class is the less risky subclass. The real estate asset class evidences the highest average return arithmetic mean however it is the money market asset class which exhibits the best return/risk performance.

The Sharpe ratio figures (table II and table II cont. a)) during the period in analysis ranges from -0,000145 to 0,405283. The ratio measures the performance of an investment after being adjusted for risk. It is calculated by working out excess returns produced above cash and dividing this number by the standard deviation of returns. It highlights the reward for each unit of risk assumed. The higher the figure the higher the level of risk-adjusted performance is. The lowest Sharpe ratio obtained belongs to Lipper Global Equity Global Income whereas the highest figure belongs to Lipper Global Mixed Assets AUD Flexible. Mixed assets, money market and real estate asset classes exhibit all positive Sharpe figures. Lipper Global Bond evidenced one subclass with negative Sharpe ratio figure however very close to zero. The highest figure on this subclass is 0,31 achieved by Lipper Global Bond AUD. Lipper Global CAD Short Term, Other and GBP Corporates exhibit positive figures however substantially lower. Focusing on the Lipper Global Equity the highest positive figures ranges from 0,11 to 0,18. Lipper Global Equity Japan and UK Sm&Mid Cap evidenced close to zero figures although positive. Lipper Global Mixed Assets subclass exhibited subclasses with higher Sharpe ratio figures varying from 0,08 to 0,41. Lipper Global Money Market CAD and Other demonstrated very similar Sharpe ratio figures accounting to 0,25 and 0,24 accordingly. Lipper Global Real Estate UK is the only Real Estate subclass regarded as top quartile at 1987

under the Sharpe Ratio. In relative terms Money Market subclass exhibited the best Sharpe ratio performances with 100% of the subclasses exhibiting higher and positive figures.

Focusing on the Information ratio (table II and table II cont. a)) there are three benchmarks to be analysed: 75% Stock, 25% Bond benchmark; 25% Stock, 75% Bond benchmark and 50% Stock, 50% Bond benchmark. It assesses the degree to which a manager uses skill and knowledge to enhance returns. This is a versatile and useful risk-adjusted measure of actively-managed fund performance. It is calculated by deducting the returns of the fund's benchmark from the fund's overall returns, then dividing the result by its tracking error, also named as standard deviation of excess returns. It is achieved in this way the value per unit of extra risk assumed, that the manager's decisions have added to what the market would have delivered anyway. The 75% Stock, 25% Bond benchmark figures range from 0,031839 (Lipper Global Bond Global Short Term) to 0,280309 (Lipper Global Money Market Other). As the figures are positive it might be concluded all the subclasses return beat the benchmark return. The 25% Stock, 75% Bond benchmark Information ratio values ranges through –0,000074 (Lipper Global Equity Asia Pacific ex Japan) to 0,322101 (Lipper Global Mixed Assets AUD Flexible). Regarding the last benchmark the figures range from 0,006573 (Lipper Global Bond Global Short Term) to 0,289708 (Lipper Global Money Market Other). Analysing the intervals it seems clear the subclasses return beat easily the 75% Stock, 25% Bond benchmark. This situation suggested the return of this benchmark was lower comparing to the 25% Stock, 75% Bond and 50% Stock, 50% Bond benchmarks. A thorough analysis suggests the highest return during this period was obtained by the 25% Stock, 75% bond benchmark as it is the benchmark that exhibits more negative figures. The best performance was obtained again by money market and real estate asset class once their subclasses information ratio are all positive regardless the benchmark. It is also worthy highlight the mixed assets subclass exhibited the third tightest information ratio figures interval regardless the benchmark.

The Sortino ratio (table II cont. and table II cont. b)) top quartile figures range from -0,012827 (Lipper Global Bond GBP Short Term) to 1,224359 (Lipper Global Mixed Assets AUD Flexible). The Sortino ratio measures the risk-adjusted return of an investment asset, portfolio or strategy. The ratio comprise a special case of the Sharpe ratio but penalizes only those returns falling below a predetermined target, or required rate of return, whereas the Sharpe ratio penalizes both upside and downside volatility equally. Mixed assets, money market and real estate asset classes exhibited only positive figures thereof positive excess

return per unit of downside risk. The top quartile figures for the bond asset class range from -0,01 for Lipper Global Bond GBP Short term being the only subclass with negative performance to 0,74 for Lipper Global Bond AUD. There is also a large gap on the Sortino ratio regarding the equity subclass however two negative figures are recorded. This scenario suggests heterogeneity of the excess return per unit of downside risk produced within the asset class in analysis.

Studying the Upside Potential ratio (table II cont. and table II cont. b)) all the figures are positive as expected. Bond asset class figures range from 0,36 to 0,43 whereas equity asset class figures range from 0,22 to 0,53. The mixed assets subclasses Upside Potential ratio results vary from 0,33 to 0,56. The money market and real estate subclasses exhibited the highest average gains per unit of expected loss. The mixed assets asset class evidences the tightest interval figures thereof the average gains are regarded to be more equally distributed demonstrating also a good performance.

The Calmar ratio (table II cont. and table II cont. b)) takes into account the subclasses return. If the Calmar ratio figure is negative the subclass return is negative once maximum drawdown cannot be negative. As all of the subclasses exhibited positive figures it might be concluded their return is also positive. The highest figure belongs to the bond asset class accounting to 1,903339 while the lowest belongs to the equity asset class. Apart from Lipper Global Bond Other and Mixed Assets Flexible the highest figures are obtained at the money market and real estate asset class. This scenario suggests those asset classes return performed much better than the remaining asset classes return. The bond asset class figures range from 0,004 to 1,90; equity figures range from 0,01 to 0,11 and mixed assets from 0,10 to 1,69.

6.2 1998

The main event on 1998 is the Russian debt crisis. The effects were successfully managed by the IMF however the consequences were felt on each of the asset classes. The return analysis starts at November 1997 and ends at May 1999.

Lipper Global Bond RUB highlights during the period in analysis. The return movement of that subclass is instable. That bond subclass is related with the ruble and thereof with the ruble crisis and Russian default. The instability though prevails throughout the period in analysis. The remaining subclasses returns are steady all over the period.

Lipper Global Equity subclasses seem to exhibit high volatility. The subclasses appear to have a downward trend until 1998 last quarter. The peaks are often as well as the bottom return figures. There are many peaks in-between 10% and 20% though the average positive return figures stand around 5%. On August 1998 none of the subclasses recorded positive return figures. Afterwards the subclasses returns recouped and again the volatility is enormous.

The mixed assets subclasses exhibited a similar return behaviour throughout the period in analysis. The subclasses exhibited their lowest return figures on the last month of 1997. By the end of 1998 third quarter the subclass recorded negative return figures. Some of the subclasses recorded additionally higher losses than other which might be due to the Russian debt default effect.

Focusing at Lipper Global Money Market subclasses returns were steady throughout the period in analysis. The figures range roughly from -2% to 2% almost all over the period. A greater instability is however recorded during the last two quarters of the period in analysis.

The real estate subclasses return exhibited in turn different paths. The high and low return peaks are frequent suggesting the returns are very volatile. The greatest depreciation seems to occur between July and August of 1998 when Lipper Global Real Estate Asia and Other depreciates around 12%. Lipper Global Real Estate Other recoups more than 12% on the following month whereas Lipper Global Real Estate Asia takes more than a quarter to recover from negative return figures.

The equity asset class continues to be the riskiest one whereas the real estate asset class is the less risky. The real estate asset class achieved however negative average return arithmetic mean but the money market achieved the highest average positive arithmetic mean.

Studying the risk-adjusted measure or the Sharpe ratio (table III, table III cont. a) and table III cont. c)) there were subclasses which achieved strong level of risk-adjusted performances whereas others performed weakly. The top quartile figure during this crisis period range through -0,000042 to 1,181409. The weakest performance belongs to Lipper Global Bond GBP Short Term and the strongest performance was achieved by Lipper Global Money Market ARS. It is important to remark all of the negative Sharpe ratio figures need at least four decimal cases to be different from zero. Those subclasses return was thereof very close to the risk-free interest rate. Regarding the bond asset class the Sharpe ratio varies through -

0,000042 (Lipper Global GBP Short Term) to 0,14 (Lipper Global Bond HKD). Six out of eleven top quartile subclasses exhibited positive and different from zero Sharpe ratio whereas five out of eleven subclasses exhibited approximately zero Sharpe ratios. Equity, mixed assets and real estate asset classes evidenced only positive Sharpe ratio figures meaning the manager had taken smart investment decisions and the additional return provided by those subclasses did not encompass additional risk. Focusing at money market asset class only one subclass exhibited negative Sharpe ratio however close to zero thus it is treated as so. All of the three remaining subclasses evidenced the strongest performances (Lipper Global Money Market ARS and MYR) excepting Lipper Global Money Market THB (it evidenced the lowest positive Sharpe ratio for that subclass). Comparing with the previous crisis period the overall figures are higher i.e. generally the subclasses exhibited better risk-adjusted performance.

Examining the information ratio (table III, table III cont. a) and table III cont. c)) aiming to conclude about the manager skills the analysis has to be broken-down into the three benchmarks. The 75% Stock, 25% Bond benchmark figures range form -0,000570 (Lipper Global Money Market CAD) to 0,789854 (Lipper Global Money Market MYR). The bond, mixed assets and real estate subclasses achieved only negative figures meaning none of the subclasses return beat the benchmark i.e. the manager did not actively created returns. Five out of thirteen equity top quartile subclasses performed over the benchmark i.e. five subclasses exhibited positive information ratios thereof the manager actively created returns above the benchmark. The money market asset class exhibited only one subclass with a positive information ratio. The manager exhibits strong skills thereof was able to actively create return and beat the benchmark. Evaluating the 25% Stock, 75% Bond Benchmark the conclusions are similar. The bond and real estate asset class achieved negative figures. At the opposite side is the equity asset class. All of the subclasses evidenced positive figures ranging from 0,006270 to 0,253675. This scenario suggests the subclasses manager actively created returns and consequently was able to beat the benchmark. Over than 75% of mixed assets subclasses exhibited either negative or close to zero figures. Lipper Global Mixed Assets USD Aggressive and USD BAL – US exhibited the best performance around the mixed assets subclasses. The figures accounts to 0,057859 and 0,044342 accordingly. The money market asset class performed weakly. Only Lipper Global Money Market MYR exhibits a stronger performance and at the same time the highest figure amongst the top quartile subclasses. Finally appraising the 50% Stock, 50% Bond benchmark the figures range through -0,000506 to 0,814485. Once again Lipper Global Money Market MYR evidenced the highest figure.

Under this benchmark the bond asset class exhibit again weak performance with any of the subclasses performing above the benchmark. The conclusion above drawn may be extended to the mixed assets and real estate asset class. Furthering analysis to the equity subclasses the information ratio figures are negative thereof those subclasses did not outperformed the benchmark. The negative figures on the equity asset class are yet very close to zero. Summing up the conclusions drawn suggest the lowest benchmark return belongs to 25% Stock, 75% Bond benchmark because under this benchmark there are more positive than negative figures i.e. considering the subclass return and the standard deviation unchanged if the benchmark return decreased higher information ratios are obtained. Broadly, comparing with the previous crisis the subclasses information ratios evidenced similar occurrences. The maximum value augmented about 2 times whereas the lowest figures diminished. The 75% Stock, 25% Bond and 50% Stock, 50% Bond lower figure are at this time negative. Though the lowest figures are negative they may be treated as zero once it is needed at least three decimal places to be different from zero. It may be stated the information ratio performance was better during 1998 crisis with respect to 1987 one.

Analysing the Sortino ratio (table III cont., table III cont. b) and table III cont. d)) the figures range from -0,076841 to 79,741901. Most of the bond subclasses recorded positive excess return per unit of downside risk. This means the excess return generated by the subclass was positive because semi standard deviation cannot be negative. Only Lipper Global Bond Other, Convertibles Japan and THB recorded negative Sortino ratio. All of the equity subclasses conversely recorded positive figures ranging from 0,08 to 1,11 achieving as a result positive excess return. The conclusion drawn to equity asset class may be extended to the mixed assets and real estate asset classes. Both the highest and the lowest figure rely on the money market asset class. Lipper Global Money Market BRL Leveraged and ARS recorded those figures accordingly. The Sortino ratio performance during this crisis is inconclusive. On one hand the lower figure is even lower yet on the other hand the highest figure is even higher.

Focusing on the upside potential ratio (table III cont., table III cont. b) and table III cont. d)) aiming to conclude about the average gain per unit of expected loss the figures vary through 0,304890 to 79,954345. Once again the money market asset class evidenced the highest figures then the highest average gains per unit of expected loss. The bond asset class figures range from 0,33 to 0,54 whereas the equity asset class figures range from 0,39 to 1,41.

The mixed assets subclasses interval average gains is tight thereof the average gains are more equally distributed evidence which did not occurred under the equity and bond asset class. The average gain per unit of expected loss under the real estate asset class accounts to 0,44 very close to the lowest figure on the overall range. The average gains per unit of expected losses performance increased comparing the previous crisis figures i.e. both the lowest and the highest figures increased.

Finally through the Calmar ratio (table III cont., table III cont. b) and table III cont. d)) it is possible to infer about the potential opportunity of gains versus potential opportunity of expected loss on investing with a particular manager. The bond asset class interval ranges from 0,02 to 0,26 whereas the equity and mixed assets interval ranges through 0,05 to 0,32 and from 0,05 to 0,25 respectively. It can be concluded the mixed assets potential opportunity of gains versus potential opportunity of loss is more concentrated than the bond or equity subclass. The money market asset class evidences the highest potential opportunity of expected gains versus potential opportunity of expected loss. It also exhibits two subclasses (Lipper Global Money Market ARS and USD) under which the potential opportunity of expected gains is not possible to be analysed because the maximum drawdown is zero. Due to the positive return achieved the real estate subclass the Calmar ratio is going to be also positive. Apart from the special cases the Calmar ratio performance improved once the lower figure is higher and the highest figure is higher moreover. The potential opportunity of gains versus potential opportunity of losses improved as a result.

6.3 2000

On 2000 the crisis was featured by the dotcom bubble i.e. the speculation around the telecommunication companies. The analysis starts on January 2000 and it is extended by eighteen months.

The bond asset class returns are instable all over the period. On June 2000 the bond subclasses experienced a return appreciation though a downward trend is seen afterwards. After the beginning of 2000 last quarter the subclasses recorded a return appreciation again followed by depreciation. From that point on the return movement seem to be very instable once all of the subclasses exhibit their own path.

Focusing at the commodity subclass it is straightforward the reasoning behind such a high risk and negative return arithmetic mean. Lipper Global Commodity Precious Metals recorded only four times positive return i.e. during the period in analysis is clear the downward trend and thereof the negative performance of the subclass.

Lipper Global Equity subclasses exhibited in turn during the period several return peaks. The first recorded peak was on February 2000 where almost all of the subclasses recorded positive returns or less negative return figures. Some of the subclasses recover though the downside return trend maintains. It is from this month the upside trend begins but on 2000 third quarter the subclasses returns depreciated again. The downside trend recorded by April 2000 might be related with of dotcom crisis beginning. Followed by a slight recover the returns seem to smooth until the end of the year. After recording a peak on 2001 the returns decreased again and recover by 2001 second quarter and again it seems the returns are going to follow a downside trend.

The mixed asset subclasses return exhibit an identical path all over the period. By April 2000 all of the subclasses recorded negative returns. The subclasses return increased suddenly in May of the same year and by June they were already renewing maximum return figures. A downward trend is seen until December 2000 where the subclasses returns seem to recover. The mixed assets subclasses return recorded by this month its second lowest figure accounting to -20%. Once again the subclasses exhibit a downside trend until the end of the last quarter on 2001 following a slight recover and then the returns seem to be steady.

The money market subclasses return seems to be correlated in turn. Some of them show very similar return behaviour. Most of the subclasses experienced negative return figures by the beginning of 2000 second quarter following an appreciation and again decreased by June 2000. After remaining on negative figures the subclasses return generally recorded their highest increase on the last month of 2000. The return appreciated around 8% though after January 2001 restarted exhibiting negative return figures. Some of the subclasses recover once again on by the second quarter whilst others remained with negative figures.

The real estate subclasses return exhibit dissimilar trend. Each of the subclasses seems to follow their own path i.e. there might not be correlation amongst the subclasses. The real estate subclasses exhibit furthermore great instability. The maximum peaks and minimum return values regenerate almost every two months or every quarter. From the end of 2000

second quarter until November 2000 there might be a downward trend on the return movement. This scenario is followed by a massive recovery leading to the highest positive return figures recorded throughout the period. The returns decrease again.

During this period computing the average return arithmetic mean it is realised that none of the asset classes evidenced a positive figure. The money market asset class demonstrated to be the less risky asset class whereas the equity asset class prevails to be the riskiest one.

Regarding the Sharpe ratio (table IV, table IV cont. a) and table IV cont. c)) metric the top quartile figures range from -0,001342 (Lipper Global Commodity Precious Metals) to 0,855672 (Lipper Global Money Market ARS). Once again regardless the asset classes all of the negative figures under the Sharpe ratio are extremely close to zero. As the Sharpe ratio denominator is always positive it may be concluded the excess return plays the foremost role on achieving either positive or negative figures. Focusing on the bond asset class half of the top quartile exhibited zero Sharpe ratios meaning the subclasses return (MYR, USD, USD Short Term, ILS Short Term and CAD Short Term) was equal to the risk-free interest rate. The other top quartile half exhibited different from zero figures meaning the manager has taken smart investment decisions and consequently obtained positive risk-adjusted performance. The commodity asset class exhibits only one subclass which performed weakly once its return was lower than the risk-free interest rate. Focusing on the equity asset class only three out of thirteen subclasses evidenced positive Sharpe ratios (Saudi Arabia, Sector Real Estate North America and Sector Pharma&Health). As the negative performances demonstrated extremely close to zero figures the Sharpe ratios are regarded to be zero thus the subclass return did not beat the risk-free interest rate and the manager did not had taken smart investment decisions. Lipper Global Mixed Assets RUB Balanced is the only subclass within the mixed assets asset class which exhibited a positive risk-adjusted performance. The remaining eleven subclasses performed poorly. With respect to the money market asset class only Lipper Global Money Market ARS performance is highlighted once it exhibits the highest Sharpe ratio amongst all of the subclasses. Both the positive and negative Sharpe ratios evidenced are close to zero. A similar situation occurs on the real estate asset class. As so the risk-adjusted performance of a manager is regarded to be weak. Comparing with the previous crisis periods the figures range is neither tighter nor wider. On one hand the negative figure is even more negative however the positive figure is higher than the 1987 and lower than 1998 figures. Despite of this feature both mixed assets and equity asset class evidenced

a better performance during 1987 and 1998. This conclusion is drawn under relative terms (it is important to notice there were fewer subclasses in 1987 comparing with 1998 and 2000). The money market asset class exhibited furthermore weaker performance on 2000 than in 1998. Under this asset class the risk-adjusted performance metric deteriorated. The same conclusion can be extended to real estate asset class once its performance has been deteriorating since 1998.

The manager skills appraisal encompasses the analysis of three different benchmarks (table IV, table IV cont. a) and table IV cont. c)). Regarding the 75% Stock, 25% Bond the figures range from -0,000790 (Lipper Global Commodity Precious Metals) to 0,486262 (Lipper Global equity Saudi Arabia) whereas to 25% Stock, 75% Bond and 50% Stock, 50% Bond the figures range through -0,001067 (Lipper Global Commodity Precious Metals) to 0,563877 (Lipper Global equity Saudi Arabia) and -0,000892 (Lipper Global Commodity Precious Metals) to 0,541375 (Lipper Global equity Saudi Arabia). Again the negative figures are very close to zero thereof a manager neither actively generated returns nor beat the benchmark. The bond, mixed Assets, money market and real estate asset classes beat successfully the benchmark i.e. all of the top quartile subclasses evidenced positive figures. Lipper Global Equity Sector Utilities, US and Lipper Global Commodity Precious Metals were the only subclasses which did not achieved a higher return than the benchmark producing as a result negative information ratio. Following the reasoning the bond, money market and real estate asset classes evidenced positive information ratios under the 25% Stock, 75% Bond benchmark. For any of the subclasses it can be stated a single conclusion. A manager used skills and actively created returns i.e. a manager used knowledge to improve the subclasses returns. The commodity asset class performed poorly once again. Seven out of thirteen equity subclasses exhibited negative information ratios meaning the excess return generated was negative i.e. the subclasses return did not beat the benchmark return. As so it may be stated the 25% Stock, 75% Bond benchmark return was greater than the 75% Stock, 25% Bond return if it is considered the subclasses return and standard deviation are constant. The similar reasoning may be extended to the mixed assets subclasses. Both abovementioned asset classes performed poorly under the 25% Stock, 75% Bond benchmark with respect to 75% Stock, 25% Bond benchmark. Evaluating the 50% Stock, 50% Bond benchmark the conclusions are similar. The bond, money market and real estate asset classes beat the benchmark generating consequently positive information ratio. The commodity subclass continues to underperform the benchmark producing a negative figure. Most of the mixed assets subclass which

performed under the benchmark also exhibits nearly zero figures. In relative terms the mixed assets exhibit higher percentage of subclasses performing under the benchmark comparing with the equity asset class. However amongst the positive figures their range is tighter meaning the manager is more constant than at the equity subclass. With respect to the two previous crises periods all of the highest information ratios are even higher i.e. the maximum limit increased from 1987 to 1998 and from 1998 to 2000 regardless the benchmark. This mean the manager generally augmented the subclasses return and thereof beat the targeted returns successfully. Focusing at the lowest limit on 2000 the figures are even lower. An important feature is however shared. Both on 1998 and 2000 the negative figures need at least three decimal places to be different from zero.

Focusing at the Sortino ratio (table IV cont., table IV cont. b) and table IV cont. d)) aiming to infer about the excess return per unit of downside risk the conclusions are similar with the Sharpe ratio ones. Firstly those subclasses whose excess return is negative under the Sharpe ratio will also be negative under the Sortino ratio. This is so once both ratios excess return is computed in the same way. The bond asset class exhibited only three top quartile negative Sortino ratio. The positive figures range from 0,04 to 0,58 whereas the equity and money market positive figures range from 0,05 to 0,92 and 0,004 to 11,76. Regarding the commodity asset class the figures are negative whilst the mixed assets top quartile subclasses performed under the risk-free interest rate. Lipper Global Mixed Assets RUB Balanced is the only positive excess return per unit of downside risk subclass. The money market highest Sortino ratio is driven by the lower semi standard deviation and high excess return producing that extremely high figure. On 2000, the Sortino ratio lower limit is even lower meaning the performance of the subclasses was worse than the at the two previous crises periods. The highest figure is an exception. The second highest Sortino ratio figure accounts to 0,77 which was lower than the second highest figure at 1998 and similar to 1987 figure.

Focusing on the upside potential ratio (table IV cont., table IV cont. b) and table III cont. d)) the figures are all positive as it might be expected. The top quartile figures range from 0,165845 (Lipper Global Commodity Precious Metals) to 12,032941 (Lipper Global Money Market ARS). The bond asset class evidences higher average gains per unit of expected loss than either equity or mixed assets subclasses and the mixed assets average gains are lower than the equity average gains in turn. The bond range is also narrower. The average gains regarding the money market asset class are the highest of the subclasses. The result is mainly

driven because the maximum limit belongs to Lipper Global money Market ARS. Finally the commodity average gain per unit of expected loss is close to the lower limit whereas the real estate average gain is twice as great as the lower limit. Comparing with 1987 and 1998 the upside potential ratio lower limit decreased meaning the gains also diminished. The maximum limit is higher than the 1987 maximum limit though lower than the 1998 limit. Thereof it cannot be drawn a single conclusion regarding the upside potential behaviour.

The Calmar ratio (table IV cont., table IV cont. b) and table IV cont. d)) is highly influenced by returns. As many subclasses achieved a negative return their Calmar ratio is going to be thereof negative. The overall figures range through -0,046711 (Lipper Global Commodity Precious Metals) to 30,022260 (Lipper Global Equity UAE). Regarding the bond asset class all of the figures are positive meaning the potential opportunity of expected gains is higher than the potential opportunity of expected losses. Lipper Global Commodity Precious Metals evidences poor performance once again. At the equity asset class the range is larger and the figures are moreover discrepant. It is at this subclass that it is recorded the higher potential opportunity of expected gains but also the lowest potential opportunity of expected gains versus potential opportunity of expected loss. Five out of thirteen equity subclasses recorded negative performances. More than three-quarter of the mixed assets subclasses evidenced higher potential opportunity of expected loss with investing with a particular manager. The money market asset class evidences two asset classes where it is not possible comment about the Calmar ratio. This is so because those subclasses achieved a zero single drop or maximum drawdown. Apart from that the figures are very different ranging from almost zero to 0,63. Finally Lipper Global Real Estate Asia evidences positive Calmar ratio. The Calmar ratio lower limit has decreased since 1987 generally speaking. Though it increases slightly on 1998 it decreased abruptly to 2000 recording a negative figure. Regarding the maximum limit the conclusion is similar. It increased strongly to 1998 and diminished abruptly to 2000.

6.4 2001

On 2001 the foremost event occurred on September with the terrorist attacks. The Federal Reserve responded with interest rate reduction.

The bond subclasses return may exhibit some correlation once they behave similarly all over the period in analysis. The first return peak is recorded on December 2000 where the highest appreciations almost reach 10%. From this point on the subclasses recorded a downward trend though some of the bond subclasses tend to recover later. The second highest peak during this period was by August 2001 however on the last quarter of the same year the returns dropped.

Regarding the commodity subclass return an up and down pattern clearly featured the analysis in 2001. The lowest return figure is obtained on December 2000 and from this point on it may be concluded an upward trend. This is so because the other negative return figures recorded were gradually lower than the first one. The subclass return evidenced moreover an exponential recover on April 2001.

The equity subclasses return recorded in addition the first peak generally by the beginning of 2001. Though when the first quarter ended the subclasses return diminished and only two subclasses recorded positive figures (Lipper Global Saudi Arabia and Taiwan). A slight recovery is recorded at this time though the downside trend prevails. Some of the subclasses may be more instable than others. The subclasses recorded moreover negative return figures on September 2001. This situation might be related with the terrorist attacks to USA. Only Lipper Global Equity Sector Gold and Precious Metals and UAE recorded positive figures. The returns seem to follow always a pattern: after recovery it usually follows a return decrease.

Lipper Global Mixed Assets subclasses returns seem to exhibit high correlation. After an upside trend recorded but in the beginning of 2001 second quarter the returns decreased and almost all of the subclasses recorded negative return figures ranging from -20% to -7% approximately. By February once again almost all of the subclasses exhibited negative returns and from this point on the instability seem to increase. The returns behaviour is not clear and both maximum and minimum peaks are very frequent.

The money market asset class returns seem to evidence also high correlation. The subclasses returns movements are very similar amongst some of the subclasses. The

subclasses return came from negative values and after a smooth recoup started on October 2000 again on December the return exhibit a downward trend until the end of 2001 first quarter. Despite the volatility increase felt during the 2001 third quarter returns seem to be steady around zero from that point. The effects of the terrorist attacks to New York do not seem to affect this subclass.

Lipper Global Real Estate subclasses return exhibit dissimilar tracks. Each of the subclasses shows a different path though in some points they either increase or decrease at the same time. After a probable downward trend all of the subclasses recorded positive returns on the last month of 2000. The return figures range from 0,5% to 7,5% approximately. The instability prevails throughout the period in analysis and most of the times followed by a return increase is a return decrease. By January 2002 all of the subclasses recorded negative return figures followed by an upward trend. Lipper Global Real Estate though continues with that downward trend.

From September 2000 to March 2002 the equity asset class demonstrated to be the riskiest whereas the bond asset class the less risky. Apart from the real estate asset class all of the assets classes evidenced negative average return arithmetic mean thereof only the real estate asset class evidenced the best return/risk relationship.

Focusing on the Sharpe ratio (table V, table V cont. a) and table V cont. c)) on the bond asset class it may be stated almost all of the subclasses exhibited positive risk-adjusted performance. In fact there are only two subclasses exhibiting negative figures (USD and USD Short Term) though extremely close to zero. It was at the bond asset class that the best risk-adjusted performance subclass falls. The top quartile figures range as a result from -0,000401 to 0,552044 (Lipper Global Bond INR). In line with the previous performance the commodity asset class continues to exhibit lower return figure than the risk-free interest rate thereof generating negative risk-adjusted performance. Extending the analysis from the equity to mixed assets asset class it may be concluded the figures range roughly from zero to at least 0,44. Some of the subclasses evidenced negative performances though the figures achieved need three decimal places to be different from zero. Regarding the money market only one subclass performed positively as well as at real estate asset class. In this sense those which performed positively suggests smart investment decisions taken by a manager. The figures range is narrower comparing with both 1998 and 2000 crises, meaning the risk-adjusted performance is being more homogeneous. On the other hand it mean the manager

performance diminished i.e. probably driven by the risk increase the excess return has not being a key factor in producing higher Sharpe ratios. The maximum limit value diminished considerably, being the second highest, and about 53% and 35% lower than 1998 and 2000 figures.

Evaluating the information ratio (table V, table V cont. a) and table V cont. c)) implies studying three different benchmarks: the 75% Stock, 25% Bond benchmark then the 25% Stock, 75% Bond and finally the 50% Stock, 50% Bond benchmark. The 75% Stock, 25% Bond benchmark figures range from 0,114718 (Lipper Global Equity Korea) to 0,713283 (Lipper Global Mixed Asset RUB Balanced); the 25% Stock, 75% Bond and finally the 50% Stock, 50% Bond benchmark figures range through -0,000170 (Lipper Global Commodity Precious Metals) to 0,640979 (Lipper Global Bond INR) and from 0,017274 (Lipper Global Commodity Precious Metals) to 0,66536 (Lipper Global Mixed Asset RUB Balanced). Considering both the subclass return and standard deviation constant it might be concluded the highest return achieved belongs to 25% Stock, 75% Bond benchmark. Both the minimum and maximum limits are lower comparing with the two benchmark peers. All of the asset classes exhibit positive information ratios under the 75% Stock, 25% Bond benchmark thus in this sense they achieved higher return than the benchmark. As expected the same reasoning cannot be extended to the 25% Stock, 75% Bond benchmark. As this benchmark generated the highest return amongst the benchmarks it is expected some negative information ratios. The negative figures might be seen only at the mixed assets and equity asset classes. The remaining asset classes performed strongly in the sense they beat successfully the benchmark. Finally the figures at the 50% Stock, 50% Bond benchmark are generally lower than the figures achieved at the 75% Stock, 25% Bond. This suggests the 50% Stock, 50% Bond benchmark achieved the second highest benchmark return. Apart from that all of the subclasses were able to achieve positive figures thereof their manager exhibited skills then it beat the benchmark and generated actively returns. Comparing with the previous crises periods the minimum limit increased and the maximum limit also increased in addition with respect to 1987 and 2000 crises. The figures on 1998 with respect to the maximum limit were however lower.

The Sortino ratio (table V cont., table V cont. b) and table V cont. d)) conclusions corroborate the conclusions drawn under the Sharpe ratio. The figures range from -0,129575 (Lipper Global Mixed Asset AUD Balanced) to 2,728697. In relative terms the bond asset

class exhibited the less percentage of negative figures along with the narrowest range. One (Lipper Global Bond EUR Long Term) out of ten bond subclasses evidenced negative excess return per unit of downside risk. The commodity subclass continues to evidence negative performances. On the equity subclass it may be found the subclass with the highest excess return per unit of downside risk (Lipper Global Equity UAE). Both mixed assets and equity asset class demonstrated in relative terms having more subclasses with negative excess return per unit of downside risk than subclasses with positive excess return per unit of downside risk. It may be stated nevertheless the negative excess return per unit of downside risk is even more negative on the mixed assets subclasses meaning the return of those subclasses were lower than the equity top quartile subclasses. The money market range is large with two positive Sortino ratio figures and two negative figures. Finally on the real estate asset class the figures are negative yet close to zero. Comparing with the previous crises the trend is not clear. The minimum limit is lower than the minimum limit recorded at 2000 however higher than on 1987 and 1998. Regarding the maximum limit it is lower than both the maximum limit recorded at 1998 and 2000 yet higher than at 1987. The range is the second narrowest recorded so far.

Examining the upside potential ratio (table V cont., table V cont. b) and table V cont. d)) the top quartile figures range from 0,269226 (Lipper Global Mixed Asset Other Balanced) to 2,411065 (Lipper Global Equity UAE). The bond asset class exhibit the highest average gains per unit of expected loss where the figures range from 0,40 to 0,93. The equity and money market asset classes evidenced the second and third highest average gains whilst the average gains per unit of expected loss at mixed assets subclasses is about 0,40. It is also important to notice the top quartile average gains per unit of expected losses are narrower at the money market asset class than equity asset class. In addition to what have been written the real estate asset class demonstrated to be the most homogeneous asset class regarding the upside potential ratio. The values range from 0,41 to 0,46. It is important to remark though there are only two subclasses ranked on the top quartile whereas any of the previous mentioned asset classes evidences more than two top quartile figures. There is not in addition a clear trend regarding the performance of the upside potential ratio. The minimum limit decreased with respect to the 1998 period though it is higher than the figure registered on 1987 and 2000. Regarding the maximum limit from 1998 there have been a decreasing trend being in this sense the 2001 figure lower. It is yet higher than the one recorded on 1987.

Regarding the Calmar ratio (table V cont., table V cont. b) and table V cont. d)) it is possible to see the clear influence of the negative return achieved by the subclasses. The figures range from -0,016026 (Lipper Global Commodity Precious Metals) to 2,868497 (Lipper Global Equity UAE). The bond, money market and real estate asset classes were the asset classes which recorded only positive figures. As a result it may be inferred the potential opportunity of expected gain is higher than potential opportunity of expected loss with investing with a particular manager. Two out of thirteen top quartile equity subclasses exhibited negative Calmar ratio figures and thereof along with the fact that this asset class encompasses the highest Calmar ratio figure it also evidences the largest range amongst the asset classes. The mixed assets asset class also exhibit negative figures for the Calmar ratio though extremely close to zero. Along with lower potential opportunity of expected gains versus potential opportunity of expected loss the Calmar ratio range is the narrowest at the mixed assets asset class meaning the potential opportunity of average gains are more homogeneous. Comparing with the figures obtained during the previous crises periods it cannot be establish a clear pattern because of 1998 figures. The figures recorded on 1998 and 2000 both the minimum and the maximum figures are higher and lower meaning the interval narrowed and thereof the potential opportunity of average gains have been more homogeneous. The conclusion is destroyed when the 1987 figures are taken into account. The range encompasses only positive figures though the maximum figures are lower. It may be concluded the 1987 potential opportunity of expected gain is the most homogenous however it may be settled there were fewer subclasses being traded by that time than on any of the following periods.

6.5 2008

The US subprime crisis occurred during 2008. It has occurred mainly due to risk misleading interpretation. The consequences were felt worldwide. The return movement analysis embraces an eighteen month period starting on December 2007.

Lipper Global Alternative subclasses returns are very volatile. From January 2008 the subclasses return exhibit an upside trend however on the beginning of the second quarter return figures were already negative. From this point on the subclasses return decreased recording losses over 10%. On December 2008 the returns raise exponentially recording figures from 2% to almost 10%. The beginning 2009 is featured again by returns plummeting though on February they recovered. Right after new maximum return figure was reached for all of the subclasses on May 2009 the subclasses return plunged again.

The bond subclass exhibits some instability over the period in analysis. Until August 2008 the returns were more or less steady. From August 2008 the return exhibit a downside trend and the minimum figures are recorded on October 2008. The bond subclass returns recovered until the end of the year but the returns plummeted again. By the end of the first quarter on 2009 the returns are again positive however on the second quarter the downside trend prevails.

Higher volatility also features the commodity subclasses returns. From January 2008 the subclasses return exhibited a downside trend however on the beginning of the second quarter the return figures seem to recoup. From this point on the subclasses return decreased recording negative return figures ranging from -19% to -35% approximately. The second quarter and part of the third seem to correspond to the US subprime crisis. On December 2008 the returns raise exponentially recording figures from 2% to almost 10%.

The equity subclasses returns exhibited both higher correlation and larger instability. After recorded systematically peaks of positive and negative returns from the second quarter of 2008 all of the subclasses evidenced a clear return downward trend. The returns plummeted after the fourth quarter where the return figures reached -60%. Only Lipper Global Equity Pakistan at that time exhibit an upward trend however its volatility is explicit. On December the returns recouped exponentially though after January 2009 the returns plummeted for the second time. The 2009 second quarter recorded again returns appreciation. The returns fall

again by the beginning of the third quarter. Once again the US subprime crisis is playing an important role on the returns behaviour. The uncertainty over this period is a key factor.

The mixed assets subclass returns are very volatile and in addition their correlation seems high. From December 2007 the returns seem to decrease in general i.e. the returns interval seems to encompass lower return figures. From 2008 second quarter until November the return downside trend is obvious. On October and November 2008 the subclasses did not recorded positive return figures. This scenario matches with the peak of the US credit crisis. The subclasses return however increased exponentially until January 2009. On this month the downside trend is noticeable and just after the beginning of 2009 second quarter the subclasses return to positive values. From the third quarter the returns seem to follow a downside trend once again.

Lipper Global Money Market exhibits a downside trend all over the period. The decreasing trend is plain until December 2008. The US subprime crisis is felt once again on this subclass returns. After the majority of the subclasses renew maximum return figures by the beginning of 2009 the returns plunged again. The returns remained positive on 2009 second quarter though a decreasing trend starts once again from June 2009.

There are two important periods to be analysed regarding the real estate asset class. Firstly on October 2008 all of the subclasses return renews their minimum return figures. The downside trend of the returns is clear from the second quarter of 2008. All of the subclasses from that point the return decreased. The losses on October reached 25%. This was an expected result as the cause of the 2008 crisis was the real estate bubble. Despite of the clear upward trend from October 2008 the returns plummeted again by the end of 2009 first quarter. Again there were no subclass recording positive returns. Later on the final stages of 2009 second quarter the subclasses return seem to plunge once more.

From December 2007 to June 2009 none of the asset classes recorded positive average return arithmetic figures. The average return arithmetic mean for the equity asset class ascends to almost 40% being also the riskiest asset class. The money market asset class continues to be the less risky and in addition the one with the lowest losses.

Relying on the Sharpe ratio (table VI, table VI cont. a), table VI cont. c) and table VI cont. e)) the top quartile figures obtained during the 2008 crisis window range from -0,001955 (Lipper Global Equity Global) to 0,937295 (Lipper Global Money Market CNY). The

consequences of the subprime crisis are clear when analysing this risk-adjusted metric. The top quartile range is large however most of the return figures are lower or close to the risk-free interest rate. The commodity, equity and real estate asset classes evidenced only negative Sharpe ratio. The conclusion which might be drawn is the excess return generated was not positive due to lower subclass return over the risk-free interest rate. The mixed assets asset class evidenced only one positive Sharpe ratio figure thereof the remaining subclass performed poorly regarding this risk-adjusted metric. Exhibiting more positive than negative figures is alternative, bond, and money market asset classes. The alternative subclass figures are however very close to zero. The risk-adjusted performance is regarded to be weak thereof. One quarter of the top quartile bond subclasses evidenced extremely close to zero excess return however the figures are negative. The highest figure belongs to Lipper Global Bond JPY accounting to 0,18 approximately. The money market asset class evidenced the highest Sharpe ratio figures accounting to 0,094 and 0,23 to Lipper Global Money Market CNY and JPY. The remaining asset classes Sharpe ratio are much lower of about four times at least. Only one subclass evidenced negative performance although close to zero. Comparing with the previous crises periods the Sharpe ratio lower limit is the lowest recorded so far. After a slight increase recorded from 2000 to 2001 the Sharpe ratio performance deteriorated. Regarding the higher limit it increased substantially from 2001. As a result the decreasing trend recorded from 2000 is contradicted. The maximum limit for the Sharpe ratio figure is the second highest registered from 1987. It may be stated nonetheless there is a big gap from one subclass to another.

Examining the Information ratio the analysis encompasses three benchmarks (table VI, table VI cont. a), table VI cont. c) and table VI cont. e)). The 75% Stock, 25% Bond benchmark achieved the lowest return amongst the benchmarks. This is corroborated by the figures in comparison with the other benchmarks. The 75% Stock, 25% Bond benchmark information ratio figures range through -0,000442 (Lipper Global Equity Israel Sm&Mid Cap) to 0,437930 (Lipper Global Money Market JPY) whereas the 25% Stock, 75% Bond benchmark figures range from -0,001361 (Lipper Global Equity Global) to 0,372386 (Lipper Global Money Market CNY) and the 50% Stock, 50% Bond benchmark figures vary from -0,000821 (Lipper Global Equity Global) to 0,406019 (Lipper Global Money Market JPY). It may be determined in addition the second lowest benchmark return was achieved by 50% Stock, 50% Bond benchmark once considering constant the subclass return and the standard deviation figures the second lowest figure is obtained by that benchmark. Regardless the

benchmark the alternative, bond, commodity and money market subclasses evidenced positive information ratio. Such feature allows concluding the subclasses which belong to those asset classes achieved higher return than the benchmarks return. The manager generated as a result actively return and beat the benchmark as a consequence. The equity asset class contrariwise evidenced only negative information ratio figures except Lipper Global Equity Sector Biotechnology under the 75% Stock, 25% Bond benchmark. The equity subclasses return did not beat the benchmark as a result. Focusing on the mixed assets asset class the information ratio figures are positive under the 75% Stock, 25% Bond benchmark and under the 50% Stock, 50% Bond benchmark (only Lipper Global Mixed Assets Other Balanced and TWD Balanced evidenced negative though close to zero figures). Under the 25% Stock, 75% Bond benchmark the mixed assets subclasses evidenced more difficulty in beating the benchmark with eight out of twelve subclasses recording negative performances. Regardless the benchmark the information ratio figures keep with the decreasing trend although they have recouped on 2001. The maximum limit figures are higher comparing with the 1987 crisis though lower with respect to the other crises period. The lower figures are in addition lower. Comparing with the 1987 crises the 2008 crises subclasses evidenced more difficulty in beating the benchmark however it may be stated there were just a few subclasses traded at 1987.

Furthering analysis to the excess return per unit of downside risk or to the Sortino ratio (table VI cont., table VI cont. b), table VI cont. d) and table VI cont. f)) it might be stated the conclusions are very similar to the ones drawn under the Sharpe ratio. The top quartile figures obtained on 2008 range through -0,169600 (Lipper Global Real Estate European) to 3,733862 (Lipper Global Money Market JPY). It might be said nonetheless the only difference is that Sortino ratio takes into account the semi standard deviation rather than standard deviation. The commodity, equity, mixed assets and real estate asset classes evidenced only negative figures. This means the excess return generated is negative or in turn the subclasses returns were lower than the risk-free interest rate. As a result the excess return per unit of downside risk is negative. The only exception is made to Lipper Global Mixed Assets BRL Conservative which obtained the only positive figure under the mixed assets asset class. The alternative asset class evidenced positive Sortino ratio however close to zero. Three quarters of the bond subclasses evidenced positive excess return per unit of downside risk meaning the excess return generated by those subclasses were positive. Lastly the money market subclass also evidences only positive Sortino ratio despite of the excess return large gap recorded

amongst the subclasses. Relating with the previous crises period the 2000 Sortino ratio lower limit is the lowest recorded so far. Despite of the greatest increase recorded from 2000 to 2001 there is a slight decrease on the excess return per unit of downside risk lower limit. The maximum limit evidences contrariwise a slight increase. Apart from the decreasing trend recorded since 2000 the higher limit of Sortino ratio increased on 2008.

Extending the comparison analysis to the upside potential ratio (table VI cont., table VI cont. b), table VI cont. d) and table VI cont. f)) it is possible to infer on the average gains per unit of expected loss. The top quartile figures range through 0,201828 (Lipper Global Real Estate European) to 3,432575 (Lipper Global Money Market CNY). The alternative and real estate asset class evidenced the most homogeneous average gains however it may be remarked there are only two subclasses in each of the asset classes. The money market in turn evidenced the highest average gains dispersion. There is a large gap amongst the three highest average gains per unit of expected loss. The bond and equity asset class evidenced more homogeneous average gains where the bond asset class average gains per unit of expected loss range from 0,20 to 0,50 whereas the equity figures range through 0,20 and 0,30 approximately. The equity subclass evidenced one of the lowest average gains per unit of expected loss in comparison with the other asset classes. Apart from the undefined trend regarding the lowest limit of upside potential ratio it was recorded a decrease once again. Focusing on the upper limit the 2008 figure shuts down the decreasing trend recorded from 2000 with a slight increase on the average gains per unit of expected loss with respect to the 2001 figure.

The Calmar ratio (table VI cont., table VI cont. b), table VI cont. d) and table VI cont. f)) compares the potential opportunity of gains with the potential opportunity of expected loss of investing with a particular manager. The 25% highest figures recorded during 2008 range from -0,032257 (Lipper Global Equity Sector Natural Resource) to 5,443427 (Lipper Global Money Market CNY). The Calmar ratio uses two items: returns and maximum drawdown. As the return is the only item which may achieve negative figures it might be concluded the negative performance of the commodity, equity, mixed assets and real estate asset class is due to the negative return figures. For those it may be determined moreover the potential opportunity of expected gains is lower than the potential opportunity of expected loss. The Lipper Global Mixed Assets BRL Conservative is the only exception to the abovementioned conclusions. The alternative asset class exhibited furthermore one positive and one negative

figure. Again 75% of the bond subclasses achieved positive Calmar ratio figures and those which did not evidenced very close to zero figures. Finally focusing on the money market asset class it may be seen the largest discrepancy on the Calmar ratio figures. It exhibited the highest potential opportunity of gains however the remaining top quartile subclasses evidenced much lower figures where the majority need at least two decimal places to show different from zero figure. Comparing the performance with the earlier crises periods regarding the lower limit it is the second lowest figure. The upper limit breaks contrariwise the decreasing trend recorded since 2000 representing an increase of about 100%.

6.6 2010

The 2010 crisis was featured by some of European countries debt default. The consequences are obviously worldwide felt however it were more severe on Europe and therefore on investor's trust on Europe. It might be stated however this might be seen as a recover period from the 2008 crisis which was considered as severe as 1929 crisis. The analysis ranges from July 2009 to December 2010.

The alternative asset class returns evidenced downside trend from September 2009 to June 2010. This mean the alternative subclasses return generally decreased within this period. Despite of this decreasing trend there is also a short increasing trend. Between January 2010 and April 2010 the returns seemed to recoup. From June 2010 the returns seem to be highly correlated feature that was not shared before this date. On July recorded a massive appreciation and then it plummeted. The 2010 last quarter is also featured by massive recovery and plummets.

The bond asset class return trend is very clear. From July 2009 until 2010 second quarter it might be seen a decreasing trend however some of the subclasses recorded maximum return peaks meanwhile. The decreasing trend is emphasised on May 2010 when only Lipper Global Bond JPY and HKD recorded positive return figures. The remaining subclasses recorded negative figures ranging from about 0% to -15% approximately. The bonds somehow related with the Europe were the ones suffering higher losses. This is so because 2010 crisis was featured by the European debt crises. From May 2010 the subclasses return seem to recoup though the returns plunged again on November.

The commodity subclasses return is very instable. It cannot be drawn a single conclusion regarding the return behaviour. A clear pattern however may be established until May 2010: the return evidence a decreasing trend. From this point on the return movements are variable with many ups and downs.

The equity returns right before May 2009 the return figures were positive however it is clear the downside trend. The downside trend stops only on June 2010. The returns decreased generally until the 2010 first quarter despite of the some slight recoveries recorded. On the 2010 second quarter after all of the subclasses recording positive return figures the returns plunged again. On May 2010 none of the subclasses recorded positive returns. The figures range from -2% to -20%. It is followed by an ascending trend until the 2010 last quarter. It might be noticed a recovery period. Though the negative figures are frequent after August they tend to be less negative progressively.

The mixed assets asset class returns have been decreasing even before July 2009. This decreasing trend prevails until May 2010 where the subclasses returns were negative. On May 2010 any of the subclasses achieved positive return figures where the average losses account to 15%. Meanwhile until May 2010 the subclasses return evidenced some slight recoveries on September, November 2009 and March 2010. This latest return appreciation is the most noticeable. During the 2010 second quarter the figures plummeted. By July the return figures were once again positive however until December 2010 the volatility is implicit.

The money market subclasses returns behave dissimilarly. Before July 2009 the return seems to be falling however a slight recovery was recorded by the 2009 last quarter. From this month it is clear the return downward trend until the end of the 2010 second quarter. At this point almost all of the subclasses return were either zero or below zero. On the 2010 third quarter the returns seem to exhibit an upward trend apart from a slight return decrease recorded by August. The money market asset class return plunged once again during the 2010 last quarter when by November 2010.

The real estate subclasses return evidenced in turn a decreasing trend until May 2010, despite of some recovery recorded meanwhile. Until then the subclasses return are very close to zero or negative. By May 2010 none of the subclasses recorded positive return figures. From the minimum return figure recorded by that month the subclasses return recouped

massively however a new decreasing trend is seen until November 2010. The subclasses seem to start a recouping trend after December 2010.

Apart from the alternative and money market asset classes the average return arithmetic mean evidences at least two digits where the figures range from 10% to 27%. The equity recorded the second highest average return arithmetic mean. It must be also stated the standard deviation figures also exhibit two digits for all of the asset classes. From July 2009 to December 2010 can be defined as a massive recovery periods although the uncertainty prevailed.

Analysing the top quartile figures under the Sharpe ratio (table VII, table VI cont. a), table VI cont. c) and table VI cont. e)) it is straightforward concluding the top quartile subclasses regardless the asset class achieved higher return rate than the risk-free interest rate. The figures generated are therefore all positive. The top quartile figures range through 0,163642 (Lipper Global Alternative Credit Focus) to 0,929548 (Lipper Global Bond ARS Short Term). As it was obtained positive figures it might be concluded a manager exhibited smart investment decisions and in addition did not relied in additional risk to conquer higher return. Comparing with the previous crisis periods 2010 figures are higher. The lower limit is for the first time positive whereas the upper limit is the third highest amongst all the upper limits. It suffered however a slight decrease with respect to 2008 figure.

The information ratio exhibits however negative figures (table VII, table VI cont. a), table VI cont. c) and table VI cont. e)). It is crucial however study the three benchmarks figures. The 75% Stock, 25% Bond benchmark figures range from -0,000210 (Lipper Global Alternative Long/Short Equity GBL) to 0,778274 (Lipper Global Equity Canada Sm&Mid Cap) whereas the 25% Stock, 75% Bond benchmark and 50% Stock, 50% Bond benchmark figures range from -0,000022 (Lipper Global Alternative Credit Focus) to 0,784500 (Lipper Global Real Estate Asia) and from -0,000119 (Lipper Global Alternative Credit Focus) to 0,660423 Lipper Global Equity Canada Sm&Mid Cap). The alternative subclass did not beat the benchmark as the money market subclass (except Lipper Global Money Market BRL Leveraged). All of the remaining subclasses under the 75% Stock, 25% Bond benchmark achieved higher return than the benchmark. All of the figures under the 25% Stock, 75% Bond benchmark are positive if the lower limit is considered as equal to zero. It is in addition the only subclass which needs more than one decimal place to evidence different from zero figures. Finally focusing on the 50% Stock, 50% Bond benchmark alternative subclass did not

beat again the benchmark return producing accordingly negative figures. The manager did not exhibit skills. Lipper Global Money Market MYR and CAD evidenced very close to zero figures though negative. The remaining subclasses beat successfully the benchmark consequently the manager used knowledge to improve returns. Focusing on the benchmarks range it might be inferred the 75% Stock, 35% Bond benchmark achieved the highest return amongst the benchmarks followed by 50% Stock, 50% Bond benchmark. It is possible to conclude this because considering the subclass return and the standard deviation unchanged the lowest value is obtained on the first benchmark abovementioned. Comparing with the prior crises periods the figures increase both regarding the lower and the upper limit, broadly. The subclasses performance increased therefore.

The Sortino ratio (table VII cont., table VI cont. b), table VI cont. d) and table VI cont. f)) conclusions are very similar to the Sharpe ratio ones. The key difference relies on using semi standard deviation over standard deviation. The Sortino ratio only takes into account as a result the deviations below a predefined target. It measures the downside risk per unit of expected loss. The top quartile figures generated during 2010 ranges from 0,172683 (Lipper Global Alternative Credit Focus) to 3,170280 (Lipper Global Bond THB). As it was inferred on the Sharpe ratio analysis the subclass return rate were greater than the risk-free interest rate thereof the excess return produced was positive. With respect to the previous crises periods the 2010 lower limit was the greatest and moreover the only positive lower limit since 1987. Regarding the maximum limit it breaks the increasing trend felt during 2008 with a figure close to what was recorded on 2001.

The upside potential ratio table VII cont., table VI cont. b), table VI cont. d) and table VI cont. f)) infers on the average gains per unit of expected loss. The higher the ratio figures the higher the average gains are going to be. The top quartile figures range from 0,503156 (Lipper Global Alternative Credit Focus) to 3,077590 (Lipper Global Money Market THB). The bond and money market asset class evidenced the highest average gains per unit of expected loss whereas the mixed assets evidenced the most heterogeneous upside potential ratio (it evidenced both higher and very low figures). Comparing with the previous crises periods the lower limit evidenced again the highest figure since 1987. The lower average gain recorded during 2010 is as a result the highest registered since 1987. Regarding the maximum limit it diminished after the slight increase recorded during 2008 nonetheless it is higher than the maximum figure recording in 1987 and 2001.

The Calmar ratio table VII cont., table VI cont. b), table VI cont. d) and table VI cont. f)) top quartile figures range from 0,053156 (Lipper Global Alternative Credit Focus) to 1,2127705 (Lipper Global Mixed Assets THB Conservative). From this ratio one can infer about the potential opportunity of gains versus potential opportunity of expected loss of investing with a particular manager. As all of the figures exhibited on the top quartile regardless the asset class are positive it might be inferred the potential opportunity of average gains are higher than the potential opportunity of expected loss. Once gain the lower limit recorded the highest value since 1987. From 1987 it have been recorded negative figures on the lower limit. The manager performance in this sense increase revealing the highest potential of average gains versus potential opportunity of expected loss. Focusing on the upper limit the conclusion is different. The highest figure generated on 2010 is the lowest one. It might however be stated managers were more homogeneous than during previous crises periods.

7. Top Quartile of Crises Top Quartile

Subsequent to examining the top quartile figures all over the crises periods now the focus rely on the 25% best subclasses performance including all of the risk-adjusted ratios.

Aiming to retrieve the best 25% of the best 25% on each crisis it was assigned an equal weight to each of the ratios in analysis (tables VIII to XIII). A final score is thus generated. Regardless the asset class it will be chosen only the 25% highest scores on each period. The goal is to verify what subclasses which systematically have obtained strong performance during those stages. Compelling the 25% highest scores on each period there are only three subclasses which obtained on at least three out of six periods 25% strongest scores: Lipper Global Bond HKD, Lipper Global Mixed Asset THB Conservative and Lipper Global Equity Sector Real Estate North America. These subclasses are regarded to have the best strategy to be implemented during crises periods because they exhibited stronger performance on at least 50% of the crises periods analysed.

It was assigned equal weights in order to study what could be a neutral status. If a conservative investor have been considered he/she might assign heavier weight to Sharpe or Information ratio whereas an aggressive investor might assign heavier weight to Sortino ratio for instance.

8. Conclusion

This thesis aimed to study the best investment strategies in periods of market meltdowns. It was used thereof five different risk-adjusted performance measures to classify the funds according their performance during market turmoil. Through a long-term analysis the main contribution of the thesis relies on the examination of mutual funds behaviour with a meticulous analysis of periods where the financial markets plunged at least 20% on six consecutive months.

The empirical analysis is done using traditional mean variance performance measures, but also downside risk measures and measures that consider risk below a target. This is so because the mean-variance variance model premises evidenced some shortcomings, for instance, treats upside and downside deviations from a predetermined target equally. It is also important to remark the risk definition under the portfolio theory as well as the assumption of returns follow a normal distribution both are not true most of the times. Considering both traditional and alternative risk-adjusted measures, it is possible to overcome those drawbacks (is used a metric that either treats deviations above and below the mean equally but also another metric which penalize only deviations under a pre-specified target; other items such as the maximum drawdown and potential opportunity of expected loss are taken into account).

To represent the performance of mutual funds, it is used Lipper indexes from 1976 to 2010 on monthly frequency. The indexes were grouped by asset classes: alternative, bond, commodity, equity, mixed assets, money market and real estate. The empirical analysis is divided in two stages: first the indexes' performance is analysed on a long-term perspective since 1976 to 2010; second based on the Lipper Global Equity Global returns it was found six periods where the cumulative returns were at the very least -20% during six consecutive months. Then it was created an eighteen month window (six months before and twelve months after the cumulative return being equal or superior to -20%) and recomputed the traditional and alternative risk-adjusted measures. The goal was finding the top 25% (first quartile) best indexes performance over those periods. Once found those subclasses with at least one metric being top quartile on each crisis period it was created a final ranking to each subclass. An index was computed to rank the strategies with the most consistent performance, as metrics favour different performance items. In the final ranking it was considered only the 25% highest strategies and then it was looked for consistency, it figure out which subclasses displayed more than 3 times, at least, a solid performance during those crisis periods.

The main findings are as follows. Lipper Global Bond HKD evidenced strong risk adjusted performance on four out of six periods (1998, 2000, 2001 and 2008) whereas Lipper Global Mixed Asset THB Conservative and Lipper Global Equity Sector Real Estate North America exhibited solid risk-adjusted performances on three out of the six periods (1998, 2008, 2010 and 2000, 2001, 2010 respectively). Lipper Global Bond HKD primary objective is to invest in international fixed income securities of developed markets denominated in Hong Kong Dollar, irrespective of the debtor domiciles, with an average maturity above than 1 year. According to Lipper (2013) under the mixed assets asset class the fund strategically invests in fixed income and equity securities by over weighting a specific currency or market. Lipper Global Mixed Assets THB Conservative aims to optimise returns in the Thai Baht by over-weighting this currency and/or its respective market. As the study fall at the conservative risk level according to Lipper a mixed asset conservative then the subclass invests more than 65% in fixed income securities and the remainder in variable income securities. Finally the equity subclasses strategically invest in variable income securities with ancillary liquid assets. Lipper Global Equity Sector Real Estate North America subclass invests more than 75% on Real Estate industry (Lipperweb, 2013).

Despite of the subclasses with the most solid risk-adjusted performance it is also important conclude about the most solid risk-adjusted performance asset classes. Looking at the top of top quartile subclasses it is realised the bond asset class displayed the largest number of subclasses followed by the equity, mixed assets and money market whereas commodity and alternative asset classes evidenced only one top of top quartile subclass and the real estate only two subclasses. The money market asset class seems to be the best asset class to invest when the market crashes. Focusing on the lower limit and upper limit of each metrics at the money market asset class regardless the crisis stages this asset class exhibits the highest lower and highest upper limits. This means this asset class provided the highest excess return per unit of risk and per unit of downside risk along with the highest returns above the benchmarks and potential opportunity of average gains. Regarding the bond asset class it provided the second highest excess return per unit of risk and per unit of downside risk and the second highest average gains. This asset class exhibits however difficulties in beating the benchmark. Both equity and mixed assets asset class evidenced higher upper limits regarding the information ratio. The equity asset class displayed though the highest excess return per unit of risk it also evidenced the highest potential opportunity of gains versus potential opportunity of expected loss with investing with a particular manager. The mixed assets asset class

demonstrated higher excess return per unit of downside risk and higher average gains per unit of expected loss than the equity asset class. Overall the money market and bonds seem to be the safest asset classes.

The definition of what could be a crisis period is not straightforward. As Baur (2010, page 1896) states "as has been shown in the so called contagion literature, it is not straightforward to define the outbreak of a crisis and its end". The crises periods were defined as whenever the Lipper Global Equity Global returns decreased at least 20% during six consecutive months. Such straightforward clarity might be seen as a shortcoming.

Generally the results achieved do not contradict Baur and Lucey (2010) outcome. They have determined gold is a safe haven against stocks for all markets but not for bonds. It is a safe haven at all times but only after extreme market crashes and only for about 15 trading days. Gold is thus a safe haven in the short-run. In the long-run gold loses value and is therefore not a safe haven. They have furthermore defined safe haven as "the asset is one to which one moves in times of turbulence" (Bauer and Lucey, 2006, page 1896).

The thesis contributes in large to investors' decisions by analysing several asset classes as well as their performance throughout six different crises periods. The analysis goes further by using alternative risk-adjusted measures rather than just traditional mean-variance risk-adjusted ratios. Our results also add to literature on safe havens. Recent works of Baur and Lucey (2010) have investigated whether gold is a safe heaven. They have found gold is a safe haven against stocks for all markets but not for bonds and but only after extreme market crashes and only for about 15 trading days. However, investing in gold was restrained to small investors until 2004, when the first Gold ETF has appeared. In contrast, this work has identified feasible investment strategies, based on the behaviour of mutual funds, which provided good performance during crisis.

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10. Appendix

10.1 Table I: Subclasses Designation

ID	Name	Asset Type	Launch date
11026039	75% Stock/25% Bond		31-08-1976
11026040	75% Bond/25% Stock		31-08-1976
11026041	50% Stock/50% Bond		31-08-1976
11043543	Lipper Custom Index Blend ILCC/IMLC (50:50)		31-03-1989
15013937	Lipper Closed-End US Mortgage Term Trust Index		31-12-1992
15036973	Lipper CE Gen&Ins Mun IX	Bond	31-12-1993
15171915	Lipper CE Global Funds Index	Equity	30-06-2008
15171916	Lipper CE Global Income Funds Index	Bond	30-06-2008
19048036	Lipper Global Equity Indian Sub-Continent	Equity	29-11-1989
19057002	Lipper Global Bond AUD	Bond	29-04-1988
19057004	Lipper Global Bond CAD Short Term	Bond	02-08-1973
19057006	Lipper Global Bond CHF Short Term	Bond	02-09-1994
19057008	Lipper Global Bond Convertibles Europe	Bond	02-01-1992
19057010	Lipper Global Bond Convertibles Japan	Bond	04-06-1991
19057012	Lipper Global Bond Convertibles Other	Bond	04-05-1981
19057014	Lipper Global Bond Emerging Markets Europe	Bond	03-01-1996
19057016	Lipper Global Bond Emerging Markets Latin Am	Bond	04-11-1991
19057018	Lipper Global Bond EUR	Bond	04-02-1985
19057020	Lipper Global Bond EUR High Yield	Bond	31-05-1989
19057022	Lipper Global Bond EUR Long Term	Bond	24-11-1998
19057024	Lipper Global Bond EUR Short Term	Bond	03-05-1985
19057026	Lipper Global Bond Europe High Yield	Bond	31-10-1986
19057028	Lipper Global Bond EuroZone	Bond	04-02-1985
19057030	Lipper Global Bond EuroZone Short Term	Bond	05-10-1988
19057032	Lipper Global Bond GBP Corporates	Bond	01-01-1980
19057034	Lipper Global Bond GBP Short Term	Bond	02-09-1983
19057036	Lipper Global Bond Global Corporates	Bond	09-11-1989
19057038	Lipper Global Bond Global High Yield	Bond	01-01-1980

ID	Name	Asset Type	Launch date
19057040	Lipper Global Bond Global Short Term	Bond	19-05-1986
19057042	Lipper Global Bond HKD	Bond	28-07-1995
19057044	Lipper Global Bond INR	Bond	04-04-1995
19057046	Lipper Global Bond JPY	Bond	21-02-1989
19057048	Lipper Global Bond MYR	Bond	04-04-1984
19057050	Lipper Global Bond Other	Bond	15-07-1988
19057052	Lipper Global Bond Other EUR Hedged	Bond	04-02-1985
19057054	Lipper Global Bond Other Inflation Linked	Bond	10-01-2003
19057056	Lipper Global Bond SEK	Bond	05-07-1989
19057058	Lipper Global Bond THB	Bond	17-03-1995
19057060	Lipper Global Bond USD	Bond	04-05-1982
19057062	Lipper Global Bond USD High Yield	Bond	03-04-1984
19057064	Lipper Global Bond USD Medium Term	Bond	17-09-1991
19057066	Lipper Global Bond USD Short Term	Bond	22-11-1985
19057068	Lipper Global Bond ILS Short Term	Bond	31-12-1999
19057070	Lipper Global Bond CAD High Yield	Bond	09-03-1992
19057072	Lipper Global Bond BRL Short Term	Bond	11-08-1995
19057074	Lipper Global Bond MXN Short Term	Bond	24-06-1985
19057076	Lipper Global Bond PHP	Bond	19-06-1997
19057078	Lipper Global Bond PHP Medium Term	Bond	13-05-2002
19057080	Lipper Global Bond NZD	Bond	03-01-1989
19057082	Lipper Global Bond ARS Short Term	Bond	05-02-2002
19057084	Lipper Global Bond TND	Bond	05-01-1999
19057088	Lipper Global Bond ILS Corporate	Bond	26-06-2008
19057090	Lipper Global Bond CZK	Bond	18-04-2002
19057092	Lipper Global Bond ZAR	Bond	01-05-1987
19057094	Lipper Global Bond RUB	Bond	28-03-1997
19057096	Lipper Global Bond HUF	Bond	05-06-1997
19058002	Lipper Global Equity Asia Pacific Ex Japan	Equity	01-01-1980
19058004	Lipper Global Equity Australasia	Equity	02-07-1981
19058008	Lipper Global Equity Brazil	Equity	28-08-1990
19058010	Lipper Global Equity Canada Sm&Mid Cap	Equity	01-12-1986
19058012	Lipper Global Equity Denmark	Equity	09-12-1983
19058014	Lipper Global Equity Emerging Mkts Europe	Equity	04-02-1985
19058016	Lipper Global Equity Emerging Mkts Latin Am	Equity	10-11-1989
19058018	Lipper Global Equity Europe	Equity	04-05-1982
19058020	Lipper Global Equity Europe Sm&Mid Cap	Equity	04-02-1985
19058022	Lipper Global Equity EuroZone Sm&Mid Cap	Equity	03-07-1990

(Table I cont.: Subclasses Designation)

ID	Name	Asset Type	Launch date
19058024	Lipper Global Equity France	Equity	03-02-1981
19058026	Lipper Global Equity German Sm&Mid Cap	Equity	01-01-1980
19058028	Lipper Global Equity Global	Equity	01-01-1980
19058030	Lipper Global Equity Global ex Japan	Equity	30-05-1985
19058032	Lipper Global Equity Global ex US	Equity	03-01-1985
19058034	Lipper Global Equity Global Sm&Mid Cap	Equity	04-09-1984
19058036	Lipper Global Equity Hong Kong	Equity	02-03-1984
19058038	Lipper Global Equity New Zealand	Equity	03-01-1989
19058042	Lipper Global Equity Japan	Equity	01-01-1980
19058044	Lipper Global Equity Korea	Equity	28-08-1990
19058046	Lipper Global Equity Malaysia Sm&Mid Cap	Equity	04-01-1984
19058048	Lipper Global Equity Netherlands	Equity	09-07-1990
19058050	Lipper Global Equity US	Equity	01-01-1980
19058052	Lipper Global Equity US Sm&Mid Cap	Equity	04-10-1983
19058054	Lipper Global Equity Philippines	Equity	28-04-1994
19058058	Lipper Global Equity Sector Banks&Financial	Equity	01-01-1980
19058060	Lipper Global Equity Sector Biotechnology	Equity	03-01-1992
19058062	Lipper Global Equity Chile	Equity	02-04-1986
19058064	Lipper Global Equity Sector Gold&Prec Metals	Equity	29-04-1983
19058066	Lipper Global Equity Sector Natural Resource	Equity	01-01-1980
19058068	Lipper Global Equity Sector Pharma&Health	Equity	03-11-1981
19058070	Lipper Global Equity Sector Real Est Global	Equity	03-01-1992
19058072	Lipper Global Equity Sector Real Est N Am	Equity	15-09-1992
19058074	Lipper Global Equity Sector Tech Media&Tele	Equity	05-01-1993
19058076	Lipper Global Equity Sector Utilities	Equity	29-07-1985
19058080	Lipper Global Equity Swiss Sm&Mid Cap	Equity	16-03-1990
19058082	Lipper Global Equity Taiwan	Equity	06-01-1986
19058084	Lipper Global Equity Thailand	Equity	16-08-1989
19058086	Lipper Global Equity UK	Equity	01-01-1980
19058088	Lipper Global Equity UK Sm&Mid Cap	Equity	01-01-1980
19058090	Lipper Global Equity Israel Sm&Mid Cap	Equity	31-12-1999
19058092	Lipper Global Equity Saudi Arabia	Equity	01-04-1992
19058094	Lipper Global Equity South Africa	Equity	28-07-1976
19058096	Lipper Global Equity Mexico	Equity	07-10-1988
19058098	Lipper Global Equity Egypt	Equity	14-10-1994
19058100	Lipper Global Equity Sweden Sm&Mid Cap	Equity	19-11-1991
19058102	Lipper Global Equity Pakistan	Equity	12-03-2002
19058104	Lipper Global Equity UAE	Equity	01-11-2000

(Table I cont.: Subclasses Designation)

ID	Name	Asset Type	Launch date
19058106	Lipper Global Equity Global Income	Equity	26-02-1988
19058108	Lipper Global Equity Active Extension Europe	Equity	18-05-2005
19058110	Lipper Global Equity Active Extension Other	Equity	08-11-1995
19058114	Lipper Global Equity Sector Real Est Asia Pacific	Equity	05-01-1989
19058116	Lipper Global Equity Sector Real Est Australia	Equity	01-04-1987
19060002	Lipper Global Mixed Assets AUD Balanced	Mixed Assets	03-07-1984
19060004	Lipper Global Mixed Assets AUD Flexible	Mixed Assets	07-04-1988
19060006	Lipper Global Mixed Assets CAD Balanced	Mixed Assets	15-04-1985
19060008	Lipper Global Mixed Assets CAD Flexible	Mixed Assets	17-04-1992
19060010	Lipper Global Mixed Assets CHF Balanced	Mixed Assets	01-01-1980
19060012	Lipper Global Mixed Assets CHF Flexible	Mixed Assets	25-03-1988
19060016	Lipper Global Mixed Assets EUR Agg - Europe	Mixed Assets	04-02-1985
19060018	Lipper Global Mixed Assets EUR Agg - Global	Mixed Assets	22-06-1984
19060020	Lipper Global Mixed Assets EUR Bal - EuroZone	Mixed Assets	04-02-1985
19060022	Lipper Global Mixed Assets EUR Cons - Europe	Mixed Assets	04-02-1985
19060024	Lipper Global Mixed Assets EUR Cons - Global	Mixed Assets	21-05-1985
19060026	Lipper Global Mixed Assets EUR Flex - EuroZon	Mixed Assets	05-01-1990
19060028	Lipper Global Mixed Assets GBP Aggressive	Mixed Assets	02-01-1970
19060030	Lipper Global Mixed Assets GBP Balanced	Mixed Assets	01-02-1965
19060032	Lipper Global Mixed Assets GBP Conservative	Mixed Assets	24-01-1984
19060040	Lipper Global Mixed Assets INR Balanced	Mixed Assets	03-04-1995
19060042	Lipper Global Mixed Assets JPY Balanced	Mixed Assets	06-01-1995
19060044	Lipper Global Mixed Assets KRW Aggressive	Mixed Assets	03-01-1996
19060046	Lipper Global Mixed Assets KRW Conservative	Mixed Assets	21-06-1994
19060048	Lipper Global Mixed Assets NOK Balanced	Mixed Assets	31-12-1987
19060050	Lipper Global Mixed Assets Other Balanced	Mixed Assets	02-02-1989
19060052	Lipper Global Mixed Assets Other Flexible	Mixed Assets	04-06-1991
19060054	Lipper Global Mixed Assets PLN Conservative	Mixed Assets	19-09-1996
19060056	Lipper Global Mixed Assets SEK Balanced	Mixed Assets	11-12-1990
19060058	Lipper Global Mixed Assets SGD Aggressive	Mixed Assets	12-11-1992
19060060	Lipper Global Mixed Assets SGD Conservative	Mixed Assets	06-05-1996
19060062	Lipper Global Mixed Assets THB Conservative	Mixed Assets	25-09-1998
19060064	Lipper Global Mixed Assets THB Flex - Global	Mixed Assets	26-07-2004
19060066	Lipper Global Mixed Assets TWD Balanced	Mixed Assets	25-12-1989
19060068	Lipper Global Mixed Assets USD Aggressive	Mixed Assets	24-08-1987
19060070	Lipper Global Mixed Assets USD Bal - US	Mixed Assets	05-03-1993
19060072	Lipper Global Mixed Assets USD Flex - Global	Mixed Assets	18-01-1996
19060074	Lipper Global Mixed Assets BRL Conservative	Mixed Assets	01-11-1995

(Table I cont.: Subclasses Designation)

ID	Name	Asset Type	Launch date
19060076	Lipper Global Mixed Assets BRL Aggressive	Mixed Assets	01-01-1996
19060078	Lipper Global Mixed Assets INR Conservative	Mixed Assets	18-12-1995
19060080	Lipper Global Mixed Assets INR Flexible	Mixed Assets	13-11-2001
19060082	Lipper Global Mixed Assets ILS Conservative	Mixed Assets	31-12-1999
19060084	Lipper Global Mixed Assets PHP Balanced	Mixed Assets	02-01-1991
19060086	Lipper Global Mixed Assets CZK Conservative	Mixed Assets	23-09-1997
19060088	Lipper Global Mixed Assets MAD Conservative	Mixed Assets	01-02-1995
19060090	Lipper Global Mixed Assets MYR Flexible	Mixed Assets	07-11-2003
19060092	Lipper Global Mixed Assets NZD Aggressive	Mixed Assets	03-01-1989
19060094	Lipper Global Mixed Assets TWD Conservative	Mixed Assets	11-08-1999
19060096	Lipper Global Mixed Assets NZD Conservative	Mixed Assets	02-05-1991
19060098	Lipper Global Mixed Assets ZAR Balanced	Mixed Assets	01-03-1994
19060100	Lipper Global Mixed Assets ZAR Flexible	Mixed Assets	13-03-1990
19060102	Lipper Global Mixed Assets RUB Balanced	Mixed Assets	12-02-2001
19060104	Lipper Global Mixed Assets RUB Flexible	Mixed Assets	01-06-2000
19060106	Lipper Global Mixed Assets GBP Flexible	Mixed Assets	29-05-2009
19061002	Lipper Global Money Market CAD	Money Market	04-01-1983
19061004	Lipper Global Money Market CNY	Money Market	31-12-2003
19061006	Lipper Global Money Market EUR Leveraged	Money Market	01-01-1992
19061008	Lipper Global Money Market Global	Money Market	02-05-1980
19061012	Lipper Global Money Market JPY	Money Market	03-10-1995
19061014	Lipper Global Money Market MYR	Money Market	04-01-1999
19061016	Lipper Global Money Market Other	Money Market	11-12-1985
19061018	Lipper Global Money Market SEK	Money Market	25-01-1988
19061020	Lipper Global Money Market THB	Money Market	16-05-1997
19061022	Lipper Global Money Market USD	Money Market	01-01-1980
19061024	Lipper Global Money Market KWD	Money Market	29-06-1999
19061026	Lipper Global Money Market NZD	Money Market	03-01-1989
19061028	Lipper Global Money Market BRL Leveraged	Money Market	12-01-1995
19061030	Lipper Global Money Market PHP	Money Market	15-07-2004
19061032	Lipper Global Money Market ARS	Money Market	06-11-1996
19061034	Lipper Global Money Market PKR	Money Market	11-04-2003
19061036	Lipper Global Money Market HUF	Money Market	04-01-1996
19061038	Lipper Global Money Market ZAR	Money Market	30-05-1997
19062002	Lipper Global Real Estate European	Real Estate	04-02-1985
19062004	Lipper Global Real Estate Japan	Real Estate	03-10-2003
19062006	Lipper Global Real Estate Other	Real Estate	02-01-1998
19062008	Lipper Global Real Estate UK	Real Estate	01-01-1980

(Table I cont.: Subclasses Designation)

ID	Name	Asset Type	Launch date
19062010	Lipper Global Real Estate Asia	Real Estate	03-05-1994
19063048	Lipper Global Commodity Agriculture	Commodity	27-09-2006
19063050	Lipper Global Commodity Industrial Metals	Commodity	27-09-2006
19063052	Lipper Global Commodity Precious Metals	Commodity	01-02-2000
19063054	Lipper Global Alternative Relative Value	Alternatives	30-07-2004
19063056	Lipper Global Alternative Multi Strategies	Alternatives	02-11-2004
19063058	Lipper Global Alternative Credit Focus	Alternatives	20-04-2006
19063060	Lipper Global Alternative Long/Short Equity UK	Alternatives	12-03-2008
19063062	Lipper Global Alternative Long/Short Equity JP	Alternatives	20-12-2002
19063064	Lipper Global Alternative Long/Short Equity GBL	Alternatives	03-10-2005

(Table I cont.: Subclasses Designation)

10.2Table II: 1987 Risk-Adjusted Figures

Date	Asset Class	Subclass	Sharpe	14%	Information ratio75% Stock, 25% Bond	14%	Information Ratio25% Stock, 75% Bond	14%	Information Ratio 50% Stock, 50% Bond	14%
1987	Bond	AUD	0,313188	1	0,130668	1	0,229615	1	0,175482	1
		CAD Short Term	0,042557	2	0,107438	2	0,069562	2	0,099724	2
		Other	0,032497	3	-0,000031	9	-0,000002	5	-0,000012	6
		GBP Corporates	0,009528	4	0,058331	3	0,020023	3	0,043363	3
		GBP Short Term	-0,000027	5	0,045812	4	0,001578	4	0,028245	4
		Global Short Term	-0,000070	7	0,031839	5	-0,000063	6	0,006573	5
	Equity	Taiwan	0,175788	1	0,141973	2	0,159774	2	0,150904	2
		Denmark	0,114125	2	0,222505	1	0,163146	1	0,212580	1
		Japan	0,049163	3	0,133304	4	0,067393	3	0,105193	3
		UK Sm&Mid Cap	0,025452	4	0,135098	3	0,041172	4	0,083847	4
		Sector Real Est Australia	-0,000053	5	0,047688	6	0,000150	5	0,021619	6
		UK	-0,000065	6	0,075447	5	-0,000014	6	0,032094	5
		Global Income	-0,000145	7	-0,000131	13	-0,000164	8	-0,000146	9
		Canada Sm&Mid Cap	-0,000408	10	-0,000066	9	-0,000308	11	-0,000171	10
		Asia Pacific Ex Japan	-0,000159	8	0,039960	7	-0,000074	7	0,012939	7
	Mixed Assets	AUD Flexible	0,405283	1	0,202756	1	0,322101	1	0,259201	1
		GBP Conservative	0,144442	2	0,162690	4	0,152000	2	0,164029	3
		GBP Balanced	0,109388	3	0,177006	3	0,141595	3	0,174912	2
		AUD Balanced	0,084139	4	0,199383	2	0,110082	4	0,159092	4
		EUR Cons - Europe	-0,000112	7	0,017252	6	-0,000107	8	-0,000037	6
		NOK Balanced	0,001175	6	-0,000236	13	-0,000091	6	-0,000156	10

Date	Asset Class	Subclass	Sortino	14%	Upside	14%	Calmar	14%	Final Value	Final Ranking
1987	Bond	AUD	0,746747	1	0,423879	2	0,798463	2	0,402577	3
		CAD Short Term	0,040440	2	0,376477	3	0,248250	3	0,140635	11
		Other	0,037348	3	0,072053	16	1,903339	1	0,292170	6
		GBP Corporates	0,010306	4	0,427827	1	0,046874	4	0,088036	15
		GBP Short Term	-0,012827	5	0,357932	4	0,037040	5	0,065393	16
		Global Short Term	-0,064046	6	0,355570	5	0,025718	6	0,050789	19
	Equity	Taiwan	0,213037	1	0,379315	3	0,112748	1	0,190506	9
		Denmark	0,132395	2	0,532337	1	0,102030	2	0,211303	7
		Japan	0,046023	3	0,390472	2	0,051965	3	0,120502	13
		UK Sm&Mid Cap	0,021743	4	0,295101	4	0,025650	4	0,089723	14
		Sector Real Est Australia	-0,004191	5	0,217922	9	0,014613	7	0,042535	20
		UK	-0,010637	7	0,259923	5	0,020721	6	0,053924	17
		Global Income	-0,114066	21	0,236556	6	0,022964	5	0,020696	24
		Canada Sm&Mid Cap	-0,064565	9	0,220517	7	0,001778	10	0,022397	23
		Asia Pacific Ex Japan	-0,010072	6	0,183917	12	0,010358	8	0,033838	22
	Mixed Asset	AUD Flexible	1,224359	1	0,561349	1	1,689686	1	0,666391	1
		GBP Conservative	0,162822	2	0,522491	2	0,101284	4	0,201394	8
		GBP Balanced	0,110287	3	0,451006	3	0,120646	2	0,183549	10
		AUD Balanced	0,069424	4	0,278734	8	0,049132	5	0,135712	12
		EUR Cons - Europe	-0,089795	7	0,332853	4	0,018835	7	0,039841	21
		NOK Balanced	0,001597	6	0,269351	10	0,102049	3	0,053384	18

(Table II cont.: 1987 risk-adjusted figures)

Date	Asset Class	Subclass	Sharpe	14%	Information ratio75% Stock, 25% Bond	14%	Information Ratio25% Stock, 75% Bond	14%	Information Ratio 50% Stock, 50% Bond	14%
1987	Money Market	CAD	0,254421	1	0,163559	2	0,224133	2	0,184857	2
		Other	0,240657	2	0,280309	1	0,269888	1	0,289708	1
	Real Estate	UK	0,390689	1	0,252387	1	0,321283	1	0,282372	1

(Table II cont. a): 1987 risk-adjusted figures)

Date	Asset Class	Subclass	Sortino	14%	Upside	14%	Calmar	14%	Final Value	Final Ranking
1987	Money Market	CAD	0,282479	1	0,595580	1	0,537914	1	0,320420	4
		Other	0,274778	2	0,586442	2	0,214140	2	0,307989	5
	Real Estate	UK	0,524676	1	0,820859	1	0,379168	1	0,424490	2

(Table II cont. b): 1987 risk-adjusted figures)

10.3Table III: 1998 Risk-Adjusted Figures

Date	Asset Class	Subclass	Sharpe	14%	75% Stock, 25% Bond	14%	25% Stock, 75% Bond	14%	50% Stock, 50% Bond	14%
1998	Bond	HKD	0,142763	1	-0,000353	5	-0,000026	3	-0,000137	4
		Convertibles Europe	0,103056	2	-0,000312	3	-0,000028	4	-0,000132	3
		MXN Short Term	0,094563	3	-0,000253	2	-0,000003	2	-0,000118	2
		HUF	0,081838	4	-0,000093	1	0,047206	1	-0,000017	1
		Europe High Yield	0,041106	5	-0,000323	4	-0,000047	5	-0,000138	5
		PHP	0,018527	6	-0,000625	20	-0,000159	15	-0,000384	20
		USD Short Term	-0,000014	7	-0,000623	19	-0,000113	10	-0,000319	16
		Other	-0,000016	8	-0,000386	6	-0,000088	6	-0,000190	6
		USD Medium Term	-0,000023	9	-0,000582	15	-0,000102	9	-0,000290	14
		USD	-0,000028	10	-0,000571	14	-0,000099	7	-0,000282	13
		GBP Short Term	-0,000042	11	-0,000598	18	-0,000140	14	-0,000319	17
		AUD	-0,000333	30	-0,000695	25	-0,000407	30	-0,000506	31
		CAD Short Term	-0,000089	15	-0,000453	9	-0,000122	12	-0,000225	8
		Convertibles Japan	-0,000101	16	-0,000663	23	-0,000247	24	-0,000423	22
		GBP Corporates	-0,000045	12	-0,000594	17	-0,000139	13	-0,000316	15
		Global Corporates	-0,000060	13	-0,000536	13	-0,000121	11	-0,000273	12
		Global High Yield	-0,000109	17	-0,000488	11	-0,000101	8	-0,000220	7
		JPY	-0,000338	31	-0,000939	34	-0,000491	34	-0,000683	35
		THB	-0,000343	32	-0,001600	38	-0,000756	37	-0,001170	37
		USD High Yield	-0,000126	21	-0,000475	10	-0,000175	18	-0,000268	11
		CAD High Yield	-0,000127	22	-0,000438	8	-0,000170	16	-0,000245	9
		TND	-0,000284	28	-0,000413	7	-0,000206	20	-0,000266	10

Date	Asset Class	Subclass	Sortino	14%	Upside	14%	Calmar	14%	Final Value	Final Ranking
1998	Bond	HKD	0,162951	1	0,540300	1	0,268602	1	0,159157	10
		Convertibles Europe	0,107548	3	0,484676	2	0,077233	3	0,110292	19
		MXN Short Term	0,090221	4	0,414597	3	0,065700	6	0,094958	25
		HUF	0,117799	2	0,318315	10	0,067517	5	0,090367	27
		Europe High Yield	0,039496	5	0,394220	4	0,080662	2	0,079282	32
		PHP	0,019156	6	0,386940	5	0,022302	11	0,063679	37
		USD Short Term	-0,587857	39	0,016262	40	0,004846	15	-0,081117	59
		Other	-0,026687	7	0,364491	6	0,067840	4	0,057852	39
		USD Medium Term	-0,292857	36	0,129602	34	0,064436	7	-0,014259	56
		USD	-0,298254	37	0,107708	36	0,040889	9	-0,021520	57
		GBP Short Term	-0,103253	11	0,355604	7	0,051968	8	0,043317	42
		AUD	-0,192490	27	0,304890	11	-0,020094	28	0,012909	51
		CAD Short Term	-0,182574	24	0,280034	15	0,003446	16	0,014288	50
		Convertibles Japan	-0,056482	9	0,338560	9	0,007138	14	0,041112	43
		GBP Corporates	-0,111307	12	0,291266	14	0,037108	10	0,030853	45
		Global Corporates	-0,168940	22	0,222507	24	0,013826	12	0,009486	52
		Global High Yield	-0,275182	35	0,137497	32	-0,033051	36	-0,024522	58
		JPY	-0,147964	17	0,341848	8	-0,005156	22	0,026611	48
		THB	-0,031640	8	0,245849	21	0,001673	17	0,030288	46
		USD High Yield	-0,143311	16	0,177516	27	-0,001849	19	0,004473	53
		CAD High Yield	-0,148371	18	0,263918	18	-0,001423	18	0,016163	49
		TND	-1,173667	41	0,000000	41	-0,250000	41	-0,203548	61

(Table III cont.: 1998 risk-adjusted figures)

Date	Asset Class	Subclass	Sharpe		Information Ratio 75% Stock, 25% Bond		Information Ratio 25% Stock, 75% Bond		Information Ratio 50% Stock, 50% Bond	
1998	Equity	Sector Utilities	0,286752	1	-0,000023	6	0,248367	2	0,134673	5
		France	0,269329	2	0,217270	1	0,253675	1	0,236153	1
		Netherlands	0,261439	3	0,183671	2	0,239409	3	0,213162	2
		German Sm&Mid Cap	0,231467	4	0,145483	3	0,206835	5	0,177755	3
		Sector Tech Media&Tele	0,229208	5	0,124108	4	0,209689	4	0,177451	4
		Active Extension Other	0,200306	6	0,027173	5	0,155896	6	0,096074	6
		EuroZone Sm&Mid Cap	0,178577	7	-0,000097	8	0,114841	8	0,041540	8
		US	0,176740	8	-0,000034	7	0,139688	7	0,068051	7
		Global Income	0,122861	9	-0,000156	10	0,049448	9	-0,000061	9
		UK	0,118579	10	-0,000213	12	0,015136	12	-0,000089	11
		Europe	0,104748	11	-0,000216	13	0,033779	10	-0,000089	12
		Global ex Japan	0,104358	12	-0,000159	11	0,019285	11	-0,000081	10
		Global	0,091960	13	-0,000154	9	0,006270	15	-0,000089	13
		Asia Pacific Ex Japan	-0,000521	33	-0,001262	36	-0,000792	35	-0,001032	36
		Korea	0,026840	17	-0,000789	28	0,011737	13	-0,000180	16
		Europe Sm&Mid Cap	0,077678	14	-0,000335	16	0,006884	14	-0,000159	14
	Mixed Assets	USD Aggressive	0,162136	1	-0,000133	2	0,057859	1	-0,000043	2
		USD Bal - US	0,147542	2	-0,000066	1	0,044342	2	-0,000023	1
		THB Conservative	0,146003	3	-0,000628	26	0,007953	4	-0,000291	17
		GBP Balanced	0,134647	4	-0,000266	8	-0,000017	6	-0,000097	6
		EUR Agg - Europe	0,123501	5	-0,000200	4	0,025549	3	-0,000081	3
		GBP Conservative	0,112678	6	-0,000312	10	-0,000026	7	-0,000121	7
		GBP Aggressive	0,110855	7	-0,000213	5	-0,000013	5	-0,000087	4

(Table III cont. a): 1998 risk-adjusted figures)

Date	Asset Class	Subclass	Sortino		Upside		Calmar		Final Value	Final Ranking
1998	Equity	Sector Utilities	0,324996	4	0,641292	4	0,134529	4	0,252941	6
		France	1,112611	1	1,412658	1	0,329296	1	0,547285	3
		Netherlands	0,596030	2	0,925619	2	0,178593	3	0,371132	4
		German Sm&Mid Cap	0,496372	3	0,817873	3	0,193196	2	0,324140	5
		Sector Tech Media&Tele	0,227568	6	0,497293	7	0,103757	5	0,224154	7
		Active Extension Other	0,213321	7	0,564544	5	0,077658	7	0,190710	8
		EuroZone Sm&Mid Cap	0,228914	5	0,562189	6	0,097704	6	0,174810	9
		US	0,160705	8	0,410924	9	0,074635	8	0,147244	12
		Global Income	0,117002	10	0,396933	10	0,063032	10	0,107008	21
		UK	0,118829	9	0,446781	8	0,061375	11	0,108628	20
		Europe	0,097680	12	0,386333	15	0,051292	13	0,096218	24
		Global ex Japan	0,102802	11	0,393829	11	0,071906	9	0,098849	23
		Global	0,084411	13	0,349870	23	0,057076	12	0,084192	30
		Asia Pacific Ex Japan	-0,069615	27	0,392425	12	-0,003090	26	0,045159	40
		Korea	0,030134	16	0,386672	14	0,015032	21	0,067064	35
		Europe Sm&Mid Cap	0,073314	14	0,388478	13	0,040720	15	0,083797	31
	Mixed Assets	USD Aggressive	0,166144	2	0,447874	5	0,109910	4	0,134821	14
		USD Bal - US	0,133909	4	0,404616	11	0,087674	6	0,116856	17
		THB Conservative	0,298464	1	0,319576	22	0,124771	3	0,127978	15
		GBP Balanced	0,159546	3	0,569827	1	0,184268	2	0,149701	11
		EUR Agg - Europe	0,124615	6	0,443619	7	0,079125	7	0,113733	18
		GBP Conservative	0,130435	5	0,529320	2	0,246796	1	0,145539	13
		GBP Aggressive	0,115518	7	0,444795	6	0,077528	8	0,106912	22

(Table III cont. b): 1998 risk-adjusted figures)

Date	Asset Class	Subclass	Sharpe		Information Ratio 75% Stock, 25% Bond		Information Ratio 25% Stock, 75% Bond		Information Ratio 50% Stock, 50% Bond	
1998	Mixed Assets	EUR Agg - Global	0,080742	8	-0,000220	6	-0,000030	8	-0,000096	5
		EUR Bal - EuroZone	0,059201	9	-0,000297	9	-0,000047	9	-0,000135	8
		INR Balanced	0,036728	10	-0,000510	20	-0,000081	10	-0,000266	14
		SEK Balanced	0,022224	11	-0,000256	7	-0,000084	11	-0,000154	9
		CHF Balanced	-0,000041	16	-0,000359	11	-0,000092	12	-0,000171	11
		USD Flex - Global	0,005868	12	-0,000185	3	-0,000118	13	-0,000169	10
		CZK Conservative	-0,000035	15	-0,000640	28	-0,000223	21	-0,000413	27
		MAD Conservative	0,000453	14	-0,000640	29	-0,000135	17	-0,000343	19
	Money Market	ARS	1,181409	1	-0,000411	3	-0,000035	3	-0,000172	3
		MYR	0,823732	2	0,789854	1	0,824426	1	0,814485	1
		THB	0,126501	3	-0,000158	2	0,078900	2	0,024287	2
		USD	-0,000001	4	-0,000572	5	-0,000088	4	-0,000279	4
		CAD	-0,000131	7	-0,000570	4	-0,000161	7	-0,000299	6
		JPY	-0,000320	11	-0,000848	12	-0,000451	12	-0,000622	12
		BRL Leveraged	-0,002794	14	-0,004899	14	-0,003451	14	-0,004154	14
	Real Estate	UK	0,018696	1	-0,000476	1	-0,000072	1	-0,000225	1

(Table III cont. c): 1998 risk-adjusted figures)

Date	Asset Class	Subclass	Sortino		Upside		Calmar		Final Value	Final Ranking
1998	Mixed Assets	EUR Agg - Global	0,076922	8	0,387864	14	0,090441	5	0,090803	26
		EUR Bal - EuroZone	0,057511	9	0,421489	9	0,062088	9	0,085687	29
		INR Balanced	0,038623	10	0,405417	10	0,054074	10	0,076284	33
		SEK Balanced	0,019766	11	0,333379	19	0,046498	11	0,060196	38
		CHF Balanced	-0,067964	25	0,290746	24	0,042493	12	0,037801	44
		USD Flex - Global	0,005025	13	0,270240	26	0,027636	14	0,044042	41
		CZK Conservative	-0,014225	16	0,448678	4	0,024379	16	0,065360	36
		MAD Conservative	0,000519	14	0,464994	3	0,031568	13	0,070916	34
	Money Market	ARS	79,741401	1	79,954345	1	0,000000	3	22,982362	1
		MYR	9,587195	2	2,065766	2	113,265696	1	18,310165	2
		THB	0,138482	3	0,427347	3	0,031898	2	0,118180	16
		USD	-0,703625	14	0,000000	14	0,000000	3	-0,100652	60
		CAD	-0,282739	12	0,221276	8	-0,017226	9	-0,011407	55
		JPY	-0,131698	5	0,345527	4	-0,005069	6	0,029502	47
		BRL Leveraged	-0,076841	4	0,093268	13	-0,018441	10	-0,002473	54
	Real Estate	UK	0,019039	1	0,441011	1	0,124630	1	0,086086	28

(Table III cont. d): 1998 risk-adjusted figures)

10.4Table IV: 2000 Risk-Adjusted Figures

Date	Asset Class	Subclass	Sharpe		Information Ratio 75% Stock, 25% Bond		Information Ratio 25% Stock, 75% Bond		Information Ratio 50% Stock, 50% Bond	
2000	Bond	MXN Short Term	0,370876	1	0,433480	3	0,477694	1	0,466809	1
		RUB	0,269888	2	0,461598	1	0,339717	3	0,406112	3
		INR	0,207867	3	0,451916	2	0,428566	2	0,452911	2
		HKD	0,132358	4	0,300358	6	0,330771	4	0,312621	4
		USD Medium Term	0,034085	5	0,276953	7	0,266414	5	0,277661	6
		MYR	-0,000002	6	0,315201	5	0,264879	6	0,302812	5
		USD	-0,000005	7	0,261248	8	0,212220	7	0,252723	7
		USD Short Term	-0,000007	8	0,200721	11	0,070468	11	0,168275	11
		ILS Short Term	-0,000021	10	0,183438	12	0,080093	10	0,153255	12
		CAD Short Term	-0,000044	11	0,230346	9	0,042555	12	0,189758	9
		CHF Short Term	-0,000227	21	0,063793	19	-0,000126	20	-0,000008	19
		Emerging Markets Latin Am	-0,000094	14	0,317233	4	0,088432	9	0,214567	8
	Commodity	Precious Metals	-0,001342	1	-0,000790	1	-0,001067	1	-0,000892	1
	Equity	Saudi Arabia	0,429658	1	0,486262	1	0,563877	1	0,541375	1
		Sector Real Est N Am	0,246617	2	0,381565	2	0,349902	2	0,383432	2
		Sector Pharma&Health	0,046964	3	0,215468	5	0,110823	4	0,169339	5
		UAE	-0,000003	4	0,204435	6	0,156797	3	0,192795	4
		Sector Real Est Global	-0,000011	5	0,254297	3	0,109322	5	0,206029	3
		Sector Natural Resource	-0,000130	6	0,176479	8	0,022614	6	0,099189	7
		Sector Banks&Financial	-0,000164	7	0,231355	4	-0,000004	8	0,106514	6
		Denmark	-0,000170	8	0,184195	7	0,008597	7	0,091232	8

Date	Asset Class	Subclass	Sortino		Upside		Calmar		Final Value	Final Ranking
2000	Bond	MXN Short Term	0,584220	1	0,952765	1	0,395866	1	0,525959	4
		RUB	0,405210	2	0,793325	2	0,004597	12	0,382921	6
		INR	0,223942	3	0,502471	3	0,153661	3	0,345905	8
		HKD	0,125519	4	0,402945	5	0,364174	2	0,281249	9
		USD Medium Term	0,036665	5	0,434903	4	0,122179	4	0,206980	11
		MYR	-0,145087	10	0,178999	32	0,006687	11	0,131927	17
		USD	-0,063470	9	0,380114	6	0,086577	6	0,161344	12
		USD Short Term	-0,469575	42	0,060962	42	0,084989	7	0,016548	35
		ILS Short Term	-0,045289	7	0,348732	9	0,090501	5	0,115816	18
		CAD Short Term	-0,168167	12	0,281568	11	0,050829	8	0,089549	22
		CHF Short Term	-0,208687	14	0,305288	10	-0,007170	15	0,021837	34
		Emerging Markets Latin Am	-0,061189	8	0,350099	8	0,014852	10	0,131986	16
	Commodity	Precious Metals	-0,359922	1	0,165845	1	-0,046711	1	-0,034983	50
	Equity	Saudi Arabia	0,921570	1	1,228470	1	0,370516	2	0,648818	3
		Sector Real Est N Am	0,310148	2	0,696775	2	0,282241	3	0,378669	7
		Sector Pharma&Health	0,051072	3	0,455526	3	0,031914	5	0,154444	13
		UAE	-0,121422	10	0,066501	52	30,022260	1	4,360195	1
		Sector Real Est Global	-0,011944	4	0,350396	8	0,080732	4	0,141260	14
		Sector Natural Resource	-0,047886	5	0,452791	4	0,020814	6	0,103410	20
		Sector Banks&Financial	-0,078468	7	0,359272	6	0,009859	7	0,089766	21
		Denmark	-0,048028	6	0,318570	11	0,007648	8	0,080292	23

(Table IV cont.: 2000 risk-adjusted figures)

Date	Asset Class	Subclass	Sharpe		Information Ratio 75% Stock, 25% Bond		Information Ratio 25% Stock, 75% Bond		Information Ratio 50% Stock, 50% Bond	
2000	Equity	Canada Sm&Mid Cap	-0,000324	9	0,095334	9	-0,000096	9	0,031993	9
		Sector Utilities	-0,000385	10	-0,000008	12	-0,000218	10	-0,000108	10
		Sector Real Est Australia	-0,000445	11	0,015736	10	-0,000264	11	-0,000116	11
		Sector Real Est Asia Pacific	-0,000637	12	-0,000248	19	-0,000462	14	-0,000351	19
		Malaysia Sm&Mid Cap	-0,000675	13	-0,000082	14	-0,000467	15	-0,000281	14
		US	-0,000758	16	-0,000080	13	-0,000443	13	-0,000218	13
		Sector Biotechnology	-0,001538	38	-0,000252	20	-0,001092	35	-0,000670	33
		Sector Gold&Prec Metals	-0,000801	19	-0,000150	16	-0,000556	19	-0,000349	18
		Mexico	-0,000877	21	-0,000086	15	-0,000557	20	-0,000301	15
	Mixed Assets	RUB Balanced	0,299834	1	0,446673	1	0,352959	1	0,411508	1
		RUB Flexible	-0,000059	2	0,258451	3	0,070843	2	0,172107	2
		INR Conservative	-0,000075	3	0,184484	4	0,000455	3	0,124921	3
		USD Bal - US	-0,000166	4	0,318090	2	-0,000040	5	0,123058	4
		PLN Conservative	-0,000182	5	0,118997	6	-0,000016	4	0,062174	5
		SGD Conservative	-0,000187	6	0,011514	13	-0,000097	7	-0,000062	12
		CAD Balanced	-0,000193	7	0,178282	5	-0,000062	6	0,026561	6
		ILS Conservative	-0,000217	8	0,072152	10	-0,000111	10	-0,000013	8
		GBP Conservative	-0,000242	9	-0,000006	15	-0,000137	11	-0,000085	16
		CZK Conservative	-0,000252	10	0,038481	11	-0,000148	13	-0,000053	10
		CAD Flexible	-0,000256	11	0,111480	7	-0,000104	8	-0,000010	7
		Other Balanced	-0,000260	12	0,076392	9	-0,000107	9	-0,000030	9
		Other Flexible	-0,000339	15	0,005066	14	-0,000165	14	-0,000068	14
		USD Flex - Global	-0,000317	14	-0,000015	16	-0,000147	12	-0,000065	13
		BRL Conservative	-0,000302	13	0,022741	12	-0,000176	15	-0,000081	15
		TWD Conservative	-0,000367	16	0,076566	8	-0,000207	16	-0,000055	11

(Table IV cont. a): 2000 risk-adjusted figures)

Date	Asset Class	Subclass	Sortino		Upside		Calmar		Final Value	Final Ranking
2000	Equity	Canada Sm&Mid Cap	-0,081057	8	0,387899	5	-0,001302	9	0,061778	26
		Sector Utilities	-0,236719	19	0,246367	16	-0,030753	16	-0,003118	43
		Sector Real Est Australia	-0,182962	14	0,265891	14	-0,029666	15	0,009739	38
		Sector Real Est Asia Pacific	-0,329374	40	0,185216	30	-0,053681	45	-0,028505	48
		Malaysia Sm&Mid Cap	-0,184272	15	0,278238	12	-0,014003	11	0,011208	36
		US	-0,238069	21	0,227287	20	-0,035496	23	-0,006825	45
		Sector Biotechnology	-0,095546	9	0,350799	7	-0,013838	10	0,033980	31
		Sector Gold&Prec Metals	-0,174581	13	0,273424	13	-0,035490	22	0,008785	39
		Mexico	-0,145199	12	0,338058	9	-0,020509	13	0,024361	33
	Mixed Assets	RUB Balanced	0,766895	1	0,399350	1	0,343485	1	0,431529	5
		RUB Flexible	-0,026580	2	0,299366	3	0,015695	2	0,112832	19
		INR Conservative	-0,173336	4	0,249098	8	0,008412	3	0,056280	28
		USD Bal - US	-0,201308	7	0,276728	6	-0,013551	6	0,071830	24
		PLN Conservative	-0,074734	3	0,313655	2	0,005705	4	0,060800	27
		SGD Conservative	-0,350047	33	0,114992	43	-0,046287	24	-0,038597	52
		CAD Balanced	-0,183107	6	0,278769	4	-0,011165	5	0,041298	30
		ILS Conservative	-0,201597	8	0,219823	12	-0,016813	8	0,010461	37
		GBP Conservative	-0,352952	34	0,187420	21	-0,051296	36	-0,031042	49
		CZK Conservative	-0,220783	9	0,260663	7	-0,025717	11	0,007456	41
		CAD Flexible	-0,180153	5	0,278499	5	-0,013974	7	0,027926	32
		Other Balanced	-0,233213	11	0,242850	9	-0,024610	10	0,008718	40
		Other Flexible	-0,242410	13	0,234925	10	-0,029256	13	-0,004607	44
		USD Flex - Global	-0,291844	18	0,219603	13	-0,042772	22	-0,016508	47
		BRL Conservative	-0,227743	10	0,215203	14	-0,019458	9	-0,001402	42
		TWD Conservative	-0,285128	16	0,179187	25	-0,027118	12	-0,008160	46

(Table IV cont. b): 2000 risk-adjusted figures)

Date	Asset Class	Subclass	Sharpe		Information Ratio 75% Stock, 25% Bond		Information Ratio 25% Stock, 75% Bond		Information Ratio 50% Stock, 50% Bond	
2000	Money Market	ARS	0,855672	1	0,318637	1	0,420177	1	0,344092	1
		KWD	0,004581	2	0,280822	2	0,292425	2	0,285765	2
	Money Market	USD	-0,000002	3	0,194012	5	0,046379	4	0,157093	4
		MYR	-0,000003	4	0,195185	4	0,050367	3	0,158898	3
		CAD	-0,000077	5	0,206045	3	-0,000006	5	0,141058	5
		HUF	-0,000158	8	0,078515	8	-0,000063	6	0,026290	6
	Real Estate	Asia	0,005310	1	0,264707	1	0,128295	1	0,211607	1

(Table IV cont. c): 2000 risk-adjusted figures)

Date	Asset Class	Subclass	Sortino		Upside		Calmar		Final Value	Final Ranking
2000	Money Market	ARS	11,763748	1	12,032941	1	0,000000	4	3,676467	2
		KWD	0,004378	2	0,370434	2	0,634219	1	0,267518	10
	Money Market	USD	-0,695283	15	0,000000	14	0,000000	4	-0,042543	53
		MYR	-0,659917	14	0,000000	14	0,000000	4	-0,036496	51
		CAD	-0,181851	4	0,297577	4	0,007530	2	0,067182	25
		HUF	-0,132736	3	0,341493	3	0,001547	3	0,044984	29
	Real Estate	Asia	0,005829	1	0,316409	1	0,015984	1	0,135449	15

(Table IV cont. d): 2000 risk-adjusted figures)

10.5Table V: 2001 Risk-Adjusted Figures

Date	Asset Class	Subclass	Sharpe		Information Ratio 75% Stock, 25% Bond		Information Ratio 25% Stock, 75% Bond		Information Ratio 50% Stock, 50% Bond	
2001	Bond	INR	0,552044	1	0,447339	5	0,640979	1	0,512226	1
		MXN Short Term	0,317750	2	0,481777	2	0,491887	2	0,509233	2
		HUF	0,282584	3	0,544200	1	0,393927	3	0,491976	3
		Emerging Markets Europe	0,246222	4	0,459944	4	0,366993	4	0,442905	4
		HKD	0,238975	5	0,335495	7	0,295569	6	0,325520	7
		MYR	0,121549	6	0,344356	6	0,313501	5	0,338235	6
		RUB	0,087797	7	0,468332	3	0,218148	7	0,377227	5
		USD Medium Term	0,041020	8	0,297614	8	0,205270	8	0,271519	8
		CHF Short Term	0,028643	9	0,244724	17	0,121931	11	0,199626	15
		USD	-0,000006	10	0,279933	11	0,157027	9	0,245083	10
		USD Short Term	-0,000006	11	0,259188	15	0,120329	12	0,221712	12
		Convertibles Other	-0,000056	22	0,297344	9	0,043258	21	0,227619	11
		EUR Long Term	-0,000035	16	0,208324	24	0,064827	16	0,153124	21
		GBP Corporates	-0,000016	14	0,261073	14	0,108698	13	0,212304	13
		Other	-0,000015	13	0,291607	10	0,137495	10	0,251325	9
		NZD	-0,000013	12	0,269838	13	0,085186	14	0,194729	16
	Commodity	Precious Metals	-0,000401	1	0,160012	1	-0,000170	1	0,017274	1
	Equity	UAE	0,434603	1	0,452827	2	0,500999	1	0,496684	1
		Sector Gold&Prec Metals	0,281673	2	0,453647	1	0,345822	2	0,409050	2
		Saudi Arabia	0,210147	3	0,449177	3	0,315245	3	0,406350	3

Date	Asset Class	Subclass	Sortino		Upside		Calmar		Final Value	Final Ranking
2001	Bond	INR	0,715162	1	0,939194	1	0,163484	3	0,567204	3
		MXN Short Term	0,393899	3	0,712665	3	0,089287	4	0,428071	5
		HUF	0,411489	2	0,570007	5	0,064735	6	0,394131	6
		Emerging Markets Europe	0,354138	4	0,746559	2	0,031164	12	0,378275	7
		HKD	0,272106	5	0,611591	4	0,219040	2	0,328328	10
		MYR	0,160970	6	0,518176	6	0,256857	1	0,293378	13
		RUB	0,088304	7	0,459549	9	0,047519	8	0,249554	15
		USD Medium Term	0,040369	8	0,406499	10	0,051585	7	0,187697	16
		CHF Short Term	0,033702	9	0,483495	8	0,036125	10	0,164035	21
		USD	-0,062415	14	0,361962	16	0,065748	5	0,149619	24
		USD Short Term	-0,313884	40	0,131555	39	0,036668	9	0,065080	42
		Convertibles Other	-0,116346	25	0,297770	23	0,003458	23	0,107578	33
		EUR Long Term	-0,037118	11	0,402089	11	0,008746	14	0,114280	32
		GBP Corporates	-0,053099	12	0,494118	7	0,015464	13	0,148363	25
		Other	-0,071912	17	0,284026	24	0,035462	11	0,132570	30
		NZD	-0,008617	10	0,380021	12	0,006463	17	0,132515	31
	Commodity	Precious Metals	-0,118568	1	0,309108	1	-0,016026	1	0,050175	46
	Equity	UAE	2,728697	1	2,411065	1	2,868497	1	1,413339	1
		Sector Gold&Prec Metals	0,345898	2	0,693658	2	0,016656	6	0,363772	8
		Saudi Arabia	0,224400	3	0,484693	4	0,109805	2	0,314260	11

(Table V cont.: 2001 risk-adjusted figures)

Date	Asset Class	Subclass	Sharpe		Information Ratio 75% Stock, 25% Bond		Information Ratio 25% Stock, 75% Bond		Information Ratio 50% Stock, 50% Bond	
2001	Equity	Sector Real Est N Am	0,152652	4	0,433383	4	0,289770	4	0,397271	4
		Sector Real Est Asia Pacific	0,038168	5	0,339918	5	0,145247	5	0,264050	5
		Sector Real Est Australia	0,009419	6	0,260853	7	0,082779	7	0,179023	7
		Sector Real Est Global	0,009048	7	0,330809	6	0,121805	6	0,252781	6
		Korea	-0,000074	8	0,114718	13	0,026263	8	0,068114	12
		New Zealand	-0,000141	9	0,215495	8	0,019444	9	0,116998	8
		Sector Natural Resource	-0,000184	10	0,187463	9	0,005163	11	0,096709	9
		Malaysia Sm&Mid Cap	-0,000232	11	0,178898	10	-0,000060	13	0,075434	11
		Mexico	-0,000235	12	0,165246	11	0,007155	10	0,078997	10
		Thailand	-0,000331	13	0,093739	14	0,003614	12	0,048146	13
		Australasia	-0,000538	15	0,084171	15	-0,000273	15	-0,000019	15
		Emerging Mkts Europe	-0,000674	18	0,067677	16	-0,000357	17	-0,000060	16
		Sector Banks&Financial	-0,000365	14	0,141975	12	-0,000169	14	-0,000010	14
	Mixed Assets	RUB Balanced	0,474967	1	0,713283	1	0,561996	1	0,665356	1
		PLN Conservative	0,138629	2	0,397446	2	0,232263	2	0,332933	2
		RUB Flexible	0,024868	3	0,305489	4	0,117863	4	0,228199	4
		CZK Conservative	0,021141	4	0,337198	3	0,141531	3	0,271937	3
		INR Flexible	0,003032	5	-0,000116	37	-0,000039	9	-0,000070	27
		INR Conservative	-0,000040	6	0,278467	5	0,068101	5	0,219908	5
		NZD Conservative	-0,000101	7	0,249190	7	0,027983	6	0,151173	6

(Table V cont. a): 2001 risk-adjusted figures)

Date	Asset Class	Subclass	Sortino		Upside		Calmar		Final Value	Final Ranking
2001	Equity	Sector Real Est N Am	0,163909	4	0,528624	3	0,094372	3	0,294283	12
		Sector Real Est Asia Pacific	0,039627	5	0,394924	6	0,008279	7	0,175745	19
		Sector Real Est Australia	0,009270	6	0,410117	5	0,021330	5	0,138970	28
		Sector Real Est Global	0,008120	7	0,304443	13	0,009870	6	0,148125	26
		Korea	-0,004003	8	0,363672	9	0,001759	8	0,081493	39
		New Zealand	-0,038329	11	0,313328	12	0,001852	8	0,089807	36
		Sector Natural Resource	-0,056850	12	0,375693	7	0,000467	10	0,086923	37
		Malaysia Sm&Mid Cap	-0,092565	13	0,295724	14	-0,009628	15	0,063939	43
		Mexico	-0,034948	10	0,356048	10	0,000344	11	0,081801	38
		Thailand	-0,028681	9	0,367686	8	0,000314	11	0,069213	41
		Australasia	-0,105990	14	0,255871	19	-0,005306	13	0,032560	53
		Emerging Mkts Europe	-0,108019	15	0,347996	11	-0,007590	14	0,042710	48
		Sector Banks&Financial	-0,160682	20	0,237656	23	-0,009855	16	0,029793	55
	Mixed Asset	RUB Balanced	0,819171	1	0,844517	1	0,078790	2	0,594011	2
		PLN Conservative	0,178980	2	0,593442	2	0,019029	4	0,270389	14
		RUB Flexible	0,024064	3	0,354980	4	0,019338	3	0,153543	22
		CZK Conservative	0,021751	4	0,433865	3	0,009786	5	0,176744	18
		INR Flexible	0,004851	5	0,095009	46	0,080437	1	0,026158	57
		INR Conservative	-0,109037	9	0,268079	13	0,009773	6	0,105036	34
		NZD Conservative	-0,053795	7	0,331798	7	0,001766	7	0,101145	35

(Table V cont. b): 2001 risk-adjusted figures)

Date	Asset Class	Subclass	Sharpe		Information Ratio 75% Stock, 25% Bond		Information Ratio 25% Stock, 75% Bond		Information Ratio 50% Stock, 50% Bond	
2001	Mixed Assets	GBP Conservative	-0,000118	8	0,206088	8	-0,000037	8	0,103711	7
		SGD Conservative	-0,000124	9	0,150349	14	-0,000061	10	0,032111	12
		THB Conservative	-0,000165	10	0,161956	12	-0,000083	12	0,032393	11
		EUR Cons - Global	-0,000190	11	0,137813	16	-0,000091	13	0,034241	10
		Other Flexible	-0,000202	12	0,180176	9	-0,000019	7	0,089018	8
		AUD Balanced	-0,000371	25	0,130433	17	-0,000169	24	0,009003	17
		KRW Aggressive	-0,000596	35	-0,000495	44	-0,000658	42	-0,000573	42
		Other Balanced	-0,000271	19	0,175304	10	-0,000111	16	0,023787	13
		TWD Balanced	-0,000791	40	-0,000031	32	-0,000540	40	-0,000281	38
		USD Bal - US	-0,000228	14	0,277903	6	-0,000074	11	-0,000004	19
		BRL Conservative	-0,000264	16	0,164939	11	-0,000091	14	0,056452	9
		BRL Aggressive	-0,001660	45	-0,000440	42	-0,001218	45	-0,000791	45
		NZD Aggressive	-0,000354	24	0,140149	15	-0,000158	22	0,011724	16
	Money Market	KWD	0,442771	1	0,370234	2	0,394649	1	0,377717	2
		HUF	0,278960	2	0,421415	1	0,362383	2	0,416337	1
		USD	-0,000002	3	0,271424	7	0,111550	4	0,231097	4
		MYR	-0,000002	4	0,298451	3	0,189569	3	0,271261	3
		Other	-0,000018	6	0,279485	6	0,108748	5	0,224452	5
		NZD	-0,000013	5	0,284658	4	0,087374	7	0,204188	7
	Real Estate	Other	0,004150	1	0,305328	1	0,103179	2	0,223630	2
		UK	-0,000003	2	0,301105	2	0,148371	1	0,256633	1

(Table V cont. c): 2001 risk-adjusted figures)

Date	Asset Class	Subclass	Sortino		Upside		Calmar		Final Value	Final Ranking
2001	Mixed Asset	GBP Conservative	-0,214970	20	0,275167	10	-0,005503	11	0,052048	45
		SGD Conservative	-0,288475	37	0,108913	44	-0,021572	26	-0,002694	61
		THB Conservative	-0,308255	41	0,133973	41	-0,035206	42	-0,002198	60
		EUR Cons - Global	-0,211224	19	0,237194	18	-0,011895	17	0,026550	56
		Other Flexible	-0,089886	8	0,348862	6	-0,001114	9	0,075262	40
		AUD Balanced	-0,129279	11	0,258313	14	-0,005984	12	0,037421	52
		KRW Aggressive	-0,025451	6	0,311452	8	0,000059	8	0,040534	49
		Other Balanced	-0,178872	15	0,269226	12	-0,011847	16	0,039602	50
		TWD Balanced	-0,189638	17	0,271608	11	-0,028657	34	0,007381	59
		USD Bal - US	-0,251642	28	0,207985	23	-0,024990	29	0,029850	54
		BRL Conservative	-0,127606	10	0,354038	5	-0,004133	10	0,063334	44
		BRL Aggressive	-0,196385	18	0,303837	9	-0,014884	21	0,012637	58
		NZD Aggressive	-0,129575	12	0,254703	15	-0,009008	14	0,038212	51
	Money Market	KWD	0,627162	1	0,892987	1	0,289071	3	0,484942	4
		HUF	0,383629	2	0,590588	2	0,038798	4	0,356016	9
		USD	-0,663265	15	0,000000	15	0,367237	2	0,045434	47
		MYR	-0,433757	13	0,070648	13	0,767301	1	0,166210	20
		Other	-0,035107	4	0,423659	3	0,019991	5	0,145887	27
		NZD	-0,008772	3	0,370750	4	0,006455	7	0,134949	29
	Real Estate	Other	0,004069	1	0,409246	2	0,015151	2	0,152107	23
		UK	-0,007557	2	0,461647	1	0,081730	1	0,177418	17

(Table V cont. d): 2001 risk-adjusted figures)

10.6Table VI: 2008 Risk-Adjusted Figures

Date	Asset Class	Subclass	Sharpe		Information Ratio 75% Stock, 25% Bond		Information Ratio 25% Stock, 75% Bond		Information Ratio 50% Stock, 50% Bond	
2008	Alternative	Long/Short Equity JP	0,085964	1	0,349856	1	0,212689	1	0,311079	1
		Long/Short Equity UK	0,006328	2	0,189313	3	0,053896	3	0,135397	3
		Relative Value	-0,000033	3	0,267266	2	0,059851	2	0,179159	2
	Bond	JPY	0,184445	1	0,306130	5	0,243035	1	0,287436	3
		HKD	0,079262	2	0,240235	13	0,192886	2	0,229776	5
		ILS Short Term	0,072251	3	0,338178	3	0,174636	3	0,291677	2
		Other	0,048263	4	0,385953	1	0,164777	5	0,328078	1
		BRL Short Term	0,048024	5	0,310711	4	0,118609	6	0,225205	6
		Emerging Markets Latin Am	0,033486	6	0,289874	6	0,101637	8	0,206039	9
		CHF Short Term	0,030768	7	0,245955	10	0,105221	7	0,194174	12
		THB	0,019891	8	0,264751	7	0,168558	4	0,249047	4
		EUR Long Term	0,017922	9	0,261580	8	0,096653	9	0,200294	10
		Lipper CE Global Income Funds Index	-0,000006	10	0,340924	2	0,054241	14	0,213746	8
		EuroZone	-0,000024	11	0,243790	11	0,067702	12	0,177784	13
		USD Short Term	-0,000026	12	0,185776	27	-0,000002	21	0,143429	20
		Convertibles Japan	-0,000239	31	0,167442	30	-0,000074	33	0,072422	33
		Global Short Term	-0,000118	21	0,249173	9	-0,000005	23	0,174097	14
		USD	-0,000040	14	0,243334	12	0,080362	10	0,220507	7
		USD Medium Term	-0,000032	13	0,225175	18	0,074251	11	0,198470	11
		ARS Short Term	-0,000043	15	0,213643	20	0,056271	13	0,156083	18

Date	Asset Class	Subclass	Sortino		Upside		Calmar		Final Value	Final Ranking
2008	Alternative	Long/Short Equity JP	0,089043	1	0,416407	1	0,019110	1	0,212021	4
		Long/Short Equity UK	0,007036	2	0,354116	2	-0,004211	2	0,105982	24
		Relative Value	-0,010684	3	0,299269	3	-0,004952	3	0,112839	22
	Bond	JPY	0,205324	1	0,479271	2	0,022172	2	0,246830	3
		HKD	0,100206	2	0,520710	1	0,076025	1	0,205586	5
		ILS Short Term	0,076311	3	0,470497	3	0,013405	3	0,205279	6
		Other	0,045976	4	0,402909	6	0,007295	5	0,197607	7
		BRL Short Term	0,043251	5	0,344575	8	0,004775	6	0,156450	10
		Emerging Markets Latin Am	0,028009	7	0,239839	35	0,003323	8	0,128887	16
		CHF Short Term	0,034320	6	0,449598	4	0,004626	7	0,152095	12
		THB	0,020558	8	0,413771	5	0,008231	4	0,163544	8
		EUR Long Term	0,017085	9	0,358231	7	0,000277	9	0,136006	14
		Lipper CE Global Income Funds Index	-0,002038	10	0,270778	25	-0,017026	25	0,122946	18
		EuroZone	-0,010360	11	0,335624	10	-0,004439	11	0,115726	21
		USD Short Term	-0,304619	48	0,158087	46	-0,035858	48	0,020970	50
		Convertibles Japan	-0,118463	36	0,323571	12	-0,029928	44	0,059247	37
		Global Short Term	-0,086029	29	0,259061	29	-0,016060	22	0,082874	32
		USD	-0,100304	32	0,256606	31	-0,020843	32	0,097089	25
		USD Medium Term	-0,135975	38	0,265418	27	-0,021771	34	0,086505	29
		ARS Short Term	-0,018184	12	0,241455	34	-0,001917	10	0,092472	27

(Table VI cont.: 2008 risk-adjusted figures)

Date	Asset Class	Subclass	Sharpe		Information Ratio 75% Stock, 25% Bond		Information Ratio 25% Stock, 75% Bond		Information Ratio 50% Stock, 50% Bond	
2008	Bond	CZK	-0,000135	22	0,182390	28	0,018545	19	0,107819	24
		ZAR	-0,000245	32	0,172646	29	-0,000003	22	0,080865	30
		RUB	-0,001627	48	-0,000404	48	-0,001140	48	-0,000717	48
	Commodity	Precious Metals	-0,000226	1	0,112729	1	0,003565	1	0,062349	1
	Equity	Sector Biotechnology	-0,000630	1	0,062991	1	-0,000335	1	-0,000088	1
		Sector Pharma&Health	-0,000814	2	-0,000023	2	-0,000468	2	-0,000191	2
		Malaysia Sm&Mid Cap	-0,001021	3	-0,000090	3	-0,000645	3	-0,000318	3
		Japan	-0,001487	4	-0,000283	7	-0,000998	4	-0,000571	4
		Chile	-0,001540	5	-0,000238	4	-0,001096	6	-0,000631	6
		US	-0,001637	6	-0,000240	5	-0,001073	5	-0,000577	5
		Israel Sm&Mid Cap	-0,001690	7	-0,000442	15	-0,001277	11	-0,000816	13
		Active Extension Other	-0,001693	8	-0,000282	6	-0,001158	7	-0,000651	7
		Sector Tech Media&Tele	-0,001725	9	-0,000312	8	-0,001170	8	-0,000665	8
		Philippines	-0,001776	10	-0,000440	14	-0,001280	12	-0,000805	12
		Global ex Japan	-0,001802	11	-0,000388	10	-0,001241	10	-0,000739	10
		US Sm&Mid Cap	-0,001809	12	-0,000322	9	-0,001230	9	-0,000698	9
		Global Income	-0,001877	13	-0,000412	12	-0,001294	13	-0,000775	11
		Global	-0,001955	14	-0,000436	13	-0,001361	14	-0,000821	14
		Australasia	-0,003083	35	-0,001016	35	-0,002343	35	-0,001606	35
		Brazil	-0,003111	36	-0,000941	33	-0,002390	37	-0,001607	36

(Table VI cont. a): 2008 risk-adjusted figures)

Date	Asset Class	Subclass	Sortino		Upside		Calmar		Final Value	Final Ranking
2008	Bond	CZK	-0,032273	13	0,325980	11	-0,009250	15	0,084725	31
		ZAR	-0,040912	16	0,338060	9	-0,006790	14	0,077660	33
		RUB	-0,220316	46	0,153065	47	-0,005343	12	-0,010926	82
	Commodity	Precious Metals	-0,033228	1	0,300193	1	-0,006832	1	0,062650	36
	Equity	Sector Biotechnology	-0,130565	6	0,256659	4	-0,036203	30	0,021690	49
		Sector Pharma&Health	-0,165126	18	0,228017	14	-0,036668	34	0,003532	66
		Malaysia Sm&Mid Cap	-0,170382	22	0,242210	8	-0,028963	7	0,005827	61
		Japan	-0,197756	38	0,235274	10	-0,036677	35	-0,000357	70
		Chile	-0,121915	5	0,209406	24	-0,020282	1	0,009101	58
		US	-0,212879	48	0,193595	38	-0,037094	37	-0,008558	80
		Israel Sm&Mid Cap	-0,098885	1	0,267509	2	-0,022000	2	0,020343	51
		Active Extension Other	-0,147441	9	0,257652	3	-0,031044	12	0,010769	56
		Sector Tech Media&Tele	-0,177023	23	0,212577	22	-0,033915	20	-0,000319	69
		Philippines	-0,162699	16	0,189284	41	-0,033727	18	-0,001635	76
		Global ex Japan	-0,199126	42	0,200197	32	-0,035861	29	-0,005566	78
		US Sm&Mid Cap	-0,177469	26	0,213166	21	-0,034983	25	-0,000478	71
		Global Income	-0,212143	47	0,187899	43	-0,037069	36	-0,009382	81
		Global	-0,198950	41	0,199914	33	-0,036383	31	-0,005713	79
		Australasia	-0,163106	17	0,235215	11	-0,033964	21	0,004300	64
		Brazil	-0,107576	2	0,243330	7	-0,025008	5	0,014671	53

(Table VI cont. b): 2008 risk-adjusted figures)

Date	Asset Class	Subclass	Sharpe		Information Ratio 75% Stock, 25% Bond		Information Ratio 25% Stock, 75% Bond		Information Ratio 50% Stock, 50% Bond	
2008	Equity	Emerging Mkts Latin Am	-0,003483	43	-0,001312	43	-0,002729	43	-0,001953	43
		German Sm&Mid Cap	-0,003150	38	-0,001081	39	-0,002422	39	-0,001682	39
		New Zealand	-0,002600	26	-0,000731	25	-0,001904	26	-0,001240	26
		Sector Gold&Prec Metals	-0,003647	47	-0,001486	46	-0,002977	47	-0,002195	47
		Sector Natural Resource	-0,003637	45	-0,001491	47	-0,002894	46	-0,002128	46
		Swiss Sm&Mid Cap	-0,002157	17	-0,000522	16	-0,001556	17	-0,000970	17
		Taiwan	-0,002357	19	-0,000702	23	-0,001770	22	-0,001178	24
		Thailand	-0,001975	15	-0,000394	11	-0,001426	15	-0,000856	15
		Saudi Arabia	-0,002663	28	-0,000950	34	-0,002055	31	-0,001443	32
		South Africa	-0,002414	22	-0,000612	18	-0,001767	21	-0,001120	19
		Mexico	-0,002459	24	-0,000652	20	-0,001807	24	-0,001159	22
		Egypt	-0,002350	18	-0,000737	26	-0,001755	20	-0,001181	25
		Sweden Sm&Mid Cap	-0,003122	37	-0,001026	37	-0,002383	36	-0,001634	37
	Mixed Assets	BRL Conservative	0,034958	1	0,289436	4	0,100038	1	0,201753	3
		ILS Conservative	-0,000025	2	0,291306	3	0,064695	3	0,193063	4
		THB Conservative	-0,000034	3	0,246631	5	0,086887	2	0,213455	2
		MAD Conservative	-0,000111	4	0,190089	8	0,024095	4	0,119775	6
		TWD Conservative	-0,000145	5	0,345758	1	-0,000007	6	0,270664	1
		SGD Conservative	-0,000174	6	0,291628	2	-0,000029	7	0,167800	5

(Table VI cont. c): 2008 risk-adjusted figures)

Date	Asset Class	Subclass	Sortino		Upside		Calmar		Final Value	Final Ranking
2008	Equity	Emerging Mkts Latin Am	-0,148588	10	0,187978	42	-0,030524	9	-0,000087	68
		German Sm&Mid Cap	-0,149849	11	0,202450	28	-0,035020	26	0,001321	67
		New Zealand	-0,193250	33	0,229127	13	-0,034288	23	-0,000698	72
		Sector Gold&Prec Metals	-0,112084	3	0,196159	36	-0,023311	3	0,007208	59
		Sector Natural Resource	-0,158012	14	0,191456	39	-0,032257	14	-0,001280	74
		Swiss Sm&Mid Cap	-0,152706	13	0,235797	9	-0,034018	22	0,006267	60
		Taiwan	-0,159064	15	0,275441	1	-0,030886	10	0,011355	54
		Thailand	-0,117209	4	0,218377	18	-0,024728	4	0,010256	57
		Saudi Arabia	-0,166444	19	0,195544	37	-0,030964	11	-0,001282	75
		South Africa	-0,138454	7	0,249953	6	-0,029859	8	0,010818	55
		Mexico	-0,143687	8	0,207234	25	-0,028551	6	0,004131	65
		Egypt	-0,177244	25	0,209637	23	-0,031591	13	-0,000746	73
		Sweden Sm&Mid Cap	-0,151098	12	0,233357	12	-0,033391	17	0,005815	62
	Mixed Assets	BRL Conservative	0,031337	1	0,335082	3	0,002012	1	0,142088	13
		ILS Conservative	-0,007791	2	0,336059	2	-0,004206	4	0,124729	17
		THB Conservative	-0,055545	5	0,354308	1	-0,001117	2	0,120655	19
		MAD Conservative	-0,033795	3	0,305577	5	-0,004012	3	0,085945	30
		TWD Conservative	-0,117652	14	0,293641	6	-0,021738	10	0,110074	23
		SGD Conservative	-0,094523	9	0,282978	10	-0,020528	8	0,089593	28

(Table VI cont. d): 2008 risk-adjusted figures)

Date	Asset Class	Subclass	Sharpe		Information Ratio 75% Stock, 25% Bond		Information Ratio 25% Stock, 75% Bond		Information Ratio 50% Stock, 50% Bond	
2008	Mixed Assets	Other Flexible	-0,000220	7	0,210198	6	-0,000005	5	0,097717	7
		EUR Cons - Europe	-0,000231	8	0,192869	7	-0,000051	8	0,088841	8
		EUR Cons - Global	-0,000325	9	0,157155	10	-0,000121	9	0,044918	9
		JPY Balanced	-0,000357	10	0,165581	9	-0,000143	10	0,018013	10
		INR Conservative	-0,000408	11	0,096145	14	-0,000197	11	-0,000029	15
		CHF Balanced	-0,000460	12	0,115491	11	-0,000215	12	-0,000014	13
		CHF Flexible	-0,000530	15	0,092097	16	-0,000265	15	-0,000040	16
		INR Balanced	-0,000763	23	0,010978	25	-0,000449	23	-0,000179	24
		Other Balanced	-0,000592	19	0,104115	13	-0,000284	17	-0,000010	12
		TWD Balanced	-0,000486	14	0,111220	12	-0,000229	13	-0,000006	11
		BRL Aggressive	-0,001198	34	0,028335	21	-0,000716	33	-0,000191	26
		CZK Conservative	-0,000678	22	0,061778	19	-0,000368	22	-0,000078	20
		NZD Conservative	-0,000588	18	0,095699	15	-0,000289	18	-0,000019	14
	Money Market	CNY	0,937295	1	0,270260	4	0,372386	1	0,298630	2
		JPY	0,226841	2	0,437920	1	0,332534	2	0,406019	1
		BRL Leveraged	0,049831	3	0,319545	3	0,123191	4	0,233630	5
		Other	0,011692	4	0,354257	2	0,115264	5	0,280453	3
		USD	-0,000002	5	0,203937	9	0,100157	7	0,178228	7
		Global	-0,000033	7	0,269668	5	0,100332	6	0,242949	4
		THB	-0,000012	6	0,244078	6	0,125699	3	0,219956	6
		ZAR	-0,000139	12	0,214116	7	0,021192	8	0,113481	9
	Real Estate	Asia	-0,000441	1	0,144873	1	-0,000163	1	0,036683	1
		European	-0,000538	2	0,038617	2	-0,000304	2	-0,000109	2

(Table VI cont. e): 2008 risk-adjusted figures)

Date	Asset Class	Subclass	Sortino		Upside		Calmar		Final Value	Final Ranking
2008	Mixed Assets	Other Flexible	-0,043157	4	0,280620	11	-0,013421	5	0,075962	34
		EUR Cons - Europe	-0,075828	7	0,270956	15	-0,020378	7	0,065168	35
		EUR Cons - Global	-0,098262	10	0,253220	22	-0,023875	15	0,047530	39
		JPY Balanced	-0,147781	25	0,271338	14	-0,030005	25	0,039521	41
		INR Conservative	-0,167890	34	0,284806	9	-0,022645	12	0,027112	48
		CHF Balanced	-0,127582	19	0,288506	8	-0,029580	24	0,035164	43
		CHF Flexible	-0,128732	20	0,277934	12	-0,028197	19	0,030324	45
		INR Balanced	-0,168313	35	0,289887	7	-0,024082	16	0,015297	52
		Other Balanced	-0,090293	8	0,269777	16	-0,021841	11	0,037267	42
		TWD Balanced	-0,118607	15	0,328360	4	-0,021692	9	0,042652	40
		BRL Aggressive	-0,066207	6	0,269598	17	-0,018765	6	0,030122	46
		CZK Conservative	-0,104260	12	0,261734	21	-0,023309	14	0,027831	47
		NZD Conservative	-0,100163	11	0,266387	19	-0,022880	13	0,034021	44
	Money Market	CNY	3,733862	1	3,432575	1	5,443427	1	2,069776	1
		JPY	0,265318	2	0,466444	2	0,054675	2	0,312822	2
		BRL Leveraged	0,044880	3	0,345913	5	0,005128	5	0,160303	9
		Other	0,010362	4	0,318913	6	0,000863	6	0,155972	11
		USD	-0,525528	18	0,017070	18	0,012664	3	-0,001925	77
		Global	-0,044945	7	0,278779	10	-0,004091	9	0,120380	20
		THB	-0,026807	6	0,366417	3	0,007516	4	0,133835	15
		ZAR	-0,026330	5	0,351835	4	-0,001784	7	0,096053	26
	Real Estate	Asia	-0,070502	1	0,285846	1	-0,018656	1	0,053949	38
		European	-0,169600	2	0,201828	2	-0,031355	2	0,005506	63

(Table VI cont.: f) 2008 risk-adjusted figures)

10.7Table VII: 2010 Risk-Adjusted Figures

Date	Asset Class	Subclass	Sharpe		Information Ratio 75% Stock, 25% Bond		Information Ratio 25% Stock, 75% Bond		Information Ratio 50% Stock, 50% Bond	
2010	Alternative	Long/Short Equity JP	0,360365	1	-0,000167	1	0,134446	1	-0,000018	1
		Credit Focus	0,163642	2	-0,000246	3	-0,000022	2	-0,000119	2
		Long/Short Equity GBL	0,089574	4	-0,000210	2	-0,000086	4	-0,000147	3
	Bond	ARS Short Term	0,929548	1	-0,000140	19	0,306523	7	-0,000003	18
		USD Short Term	0,857740	2	-0,000432	41	-0,000046	36	-0,000190	36
		USD High Yield	0,793376	3	0,118290	2	0,725886	1	0,417559	1
		Lipper CE Global Income Funds Index	0,786660	4	0,088833	3	0,668991	2	0,352829	3
		USD	0,763747	5	-0,000283	33	0,032942	30	-0,000091	30
		USD Medium Term	0,737062	6	-0,000335	36	-0,000011	32	-0,000125	34
		THB	0,729495	7	-0,000190	26	0,167229	19	-0,000031	24
		Emerging Markets Latin Am	0,693942	8	-0,000001	7	0,493690	3	0,200037	6
		MYR	0,678628	9	-0,000111	16	0,295581	8	0,030391	15
		ILS Corporate	0,555438	10	-0,000027	11	0,352365	6	0,136842	10
		BRL Short Term	0,527656	11	0,073219	4	0,399022	5	0,249957	4
		PHP	0,517268	12	-0,000121	17	0,244579	14	-0,000002	17
		ZAR	0,387342	17	-0,000031	12	0,256902	12	0,121551	11
		NZD	0,381702	18	-0,000014	9	0,258156	11	0,137051	9
		CAD High Yield	0,506790	13	0,137449	1	0,444644	4	0,373376	2
		Global High Yield	0,373800	19	-0,000013	8	0,256032	13	0,140464	8

Date	Asset Class	Subclass	Sortino		Upside		Calmar		Final Value	Final Ranking
2010	Alternative	Long/Short Equity JP	0,423470	1	0,741974	1	0,173844	1	0,261988	72
		Credit Focus	0,172683	2	0,500346	2	0,053156	2	0,127063	77
		Long/Short Equity GBL	0,087580	4	0,404551	4	0,026757	3	0,086860	78
	Bond	ARS Short Term	2,621749	2	2,888172	2	1,112163	1	1,122573	4
		USD Short Term	1,612353	3	1,916695	3	0,747091	3	0,733316	10
		USD High Yield	1,188812	6	1,403774	8	0,432764	7	0,725780	11
		Lipper CE Global Income Funds Index	1,059845	9	1,278433	9	0,391998	9	0,661084	14
		USD	1,239737	5	1,515169	5	0,500759	6	0,578854	19
		USD Medium Term	1,149802	8	1,432149	7	0,420427	8	0,534138	23
		THB	3,170280	1	3,062631	1	1,078133	2	1,172507	2
		Emerging Markets Latin Am	1,181361	7	1,459014	6	0,534885	5	0,651847	16
		MYR	1,298666	4	1,574519	4	0,540113	4	0,631112	17
		ILS Corporate	0,840161	10	1,103911	10	0,252349	15	0,463006	29
		BRL Short Term	0,618156	15	0,862209	16	0,251326	16	0,425935	36
		PHP	0,689925	12	0,975482	13	0,277345	12	0,386354	50
		ZAR	0,645276	14	0,999554	12	0,313551	10	0,389164	49
		NZD	0,455587	19	0,751185	18	0,179730	17	0,309057	68
		CAD High Yield	0,792916	11	1,064284	11	0,302230	11	0,517384	25
		Global High Yield	0,428836	23	0,692522	22	0,165044	21	0,293812	70

(Table VII cont.: 2010 risk-adjusted figures)

Date	Asset Class	Subclass	Sharpe		Information Ratio 75% Stock, 25% Bond		Information Ratio 25% Stock, 75% Bond		Information Ratio 50% Stock, 50% Bond	
2010	Bond	Europe High Yield	0,262067	30	-0,000025	10	0,164894	20	0,086232	12
		Convertibles Other	0,391557	16	0,050442	5	0,294343	9	0,203618	5
		AUD	0,392474	15	0,044621	6	0,291803	10	0,196985	7
	Commodity	Precious Metals	0,632742	1	0,230617	2	0,486728	1	0,360379	1
		Industrial Metals	0,351864	2	0,233972	1	0,302967	2	0,279479	2
	Equity	Chile	0,778300	1	0,354596	7	0,645440	1	0,509536	4
		Thailand	0,661856	2	0,386953	5	0,574054	4	0,494663	5
		Philippines	0,654195	3	0,475516	3	0,606072	2	0,566449	2
		Malaysia Sm&Mid Cap	0,608268	4	0,309143	11	0,542530	6	0,466119	6
		Canada Sm&Mid Cap	0,575012	5	0,778274	1	0,581632	3	0,660423	1
		Sector Real Est N Am	0,561523	6	0,525013	2	0,542983	5	0,560744	3
		Sector Gold&Prec Metals	0,533158	7	0,302013	12	0,453156	8	0,389036	9
		Korea	0,522371	8	0,359347	6	0,463166	7	0,423104	7
		Swiss Sm&Mid Cap	0,454771	9	0,275436	16	0,393567	10	0,351044	14
		South Africa	0,445871	10	0,407974	4	0,413643	9	0,421115	8
		Emerging Mkts Latin Am	0,433306	11	0,346769	8	0,393013	11	0,385517	10
		Mexico	0,422078	12	0,290703	14	0,373904	12	0,359929	12
		US Sm&Mid Cap	0,400359	13	0,326727	10	0,358930	14	0,355030	13
		Sweden Sm&Mid Cap	0,399671	14	0,342942	9	0,366718	13	0,360161	11
		Sector Real Est Global	0,399226	15	0,296397	13	0,354277	15	0,339752	15

(Table VII cont. a): 2010 risk-adjusted figures)

Date	Asset Class	Subclass	Sortino		Upside		Calmar		Final Value	Final Ranking
2010	Bond	Europe High Yield	0,285741	29	0,574444	31	0,113634	26	0,212427	75
		Convertibles Other	0,433367	21	0,659967	25	0,152144	23	0,312205	67
		AUD	0,446996	20	0,684103	23	0,158281	22	0,316466	65
	Commodity	Precious Metals	1,010090	1	1,284490	1	0,304718	1	0,615681	18
		Industrial Metals	0,426272	3	0,744349	3	0,123668	2	0,351796	59
	Equity	Chile	1,798753	1	2,043565	1	0,847066	1	0,996751	6
		Thailand	1,227991	2	1,537462	2	0,574017	2	0,779571	8
		Philippines	1,026991	3	1,291313	3	0,410160	3	0,718671	12
		Malaysia Sm&Mid Cap	0,803426	7	1,021071	7	0,280805	5	0,575909	20
		Canada Sm&Mid Cap	0,820934	5	1,137920	5	0,231125	7	0,683617	13
		Sector Real Est N Am	0,873390	4	1,243686	4	0,287122	4	0,656351	15
		Sector Gold&Prec Metals	0,813872	6	1,127432	6	0,226145	9	0,549259	21
		Korea	0,777522	8	0,831049	10	0,228413	8	0,514996	26
		Swiss Sm&Mid Cap	0,549822	10	0,796452	12	0,173764	14	0,427837	35
		South Africa	0,690040	9	1,017618	8	0,237033	6	0,519042	24
		Emerging Mkts Latin Am	0,511803	12	0,782474	13	0,223024	10	0,439415	31
		Mexico	0,494781	13	0,779934	15	0,151078	20	0,410344	43
		US Sm&Mid Cap	0,489145	15	0,851593	9	0,150724	21	0,418930	39
		Sweden Sm&Mid Cap	0,543205	11	0,815852	11	0,168932	16	0,428212	34
		Sector Real Est Global	0,481650	18	0,778780	16	0,177547	13	0,403947	46

(Table VII cont. b): 2010 risk-adjusted figures)

Date	Asset Class	Subclass	Sharpe		Information Ratio 75% Stock, 25% Bond		Information Ratio 25% Stock, 75% Bond		Information Ratio 50% Stock, 50% Bond	
2010	Equity	Brazil	0,394133	17	0,283887	15	0,348168	16	0,328388	16
		Asia Pacific Ex Japan	0,387281	18	0,209803	18	0,326945	17	0,290614	18
	Mixed Assets	THB Conservative	0,763098	1	-0,000071	34	0,347826	9	0,081758	29
		PHP Balanced	0,672873	2	0,346603	1	0,598620	1	0,508023	1
		MYR Flexible	0,596287	3	0,176172	6	0,530862	2	0,417860	3
		TWD Conservative	0,540936	4	-0,000062	30	0,396764	5	0,089630	28
		BRL Conservative	0,525676	5	0,085651	16	0,410873	4	0,271132	14
		SGD Conservative	0,489772	6	-0,000075	35	0,310695	17	0,055014	33
		BRL Aggressive	0,475514	7	0,339963	2	0,430091	3	0,410423	4
		ILS Conservative	0,469159	8	-0,000066	33	0,280640	21	0,078590	30
		JPY Balanced	0,463988	9	-0,000163	40	0,190719	34	-0,000044	39
		USD Bal - US	0,452759	10	-0,000019	24	0,390827	6	0,425945	2
		INR Balanced	0,447765	11	-0,000063	32	0,285287	20	0,106421	26
		ZAR Flexible	0,437457	12	0,257329	3	0,385333	7	0,368759	5
		RUB Balanced	0,431102	13	0,183681	5	0,342248	12	0,271336	13
		AUD Balanced	0,354842	26	0,175102	7	0,292596	19	0,255147	15
		AUD Flexible	0,339853	29	0,120010	12	0,269001	26	0,220133	17
		CAD Balanced	0,394644	20	0,136977	9	0,330642	13	0,304942	7
		CAD Flexible	0,376660	24	0,130259	11	0,310778	16	0,281909	9
		KRW Aggressive	0,336475	31	0,240729	4	0,296405	18	0,272070	12

(Table VII cont. c): 2010 risk-adjusted figures)

Date	Asset Class	Subclass	Sortino		Upside		Calmar		Final Value	Final Ranking
2010	Equity	Brazil	0,484328	17	0,780362	14	0,182623	12	0,400270	47
		Asia Pacific Ex Japan	0,489791	14	0,760620	18	0,193412	11	0,379781	51
	Mixed Assets	THB Conservative	2,951634	1	3,045998	1	1,212705	1	1,200421	1
		PHP Balanced	1,138110	2	1,402299	2	0,473653	2	0,734312	9
		MYR Flexible	0,802416	4	1,033393	4	0,286098	5	0,549012	22
		TWD Conservative	0,812272	3	1,078756	3	0,300496	4	0,459828	30
		BRL Conservative	0,627237	9	0,873204	12	0,255442	7	0,435602	32
		SGD Conservative	0,681128	5	0,972596	5	0,321304	3	0,404348	45
		BRL Aggressive	0,599590	13	0,869355	14	0,283777	6	0,486959	27
		ILS Conservative	0,642250	8	0,893815	11	0,196427	15	0,365831	56
		JPY Balanced	0,680533	6	0,831765	17	0,240286	9	0,343869	61
		USD Bal - US	0,613727	11	0,949445	7	0,180790	19	0,430496	33
		INR Balanced	0,621729	10	0,866346	15	0,250680	8	0,368309	55
		ZAR Flexible	0,647021	7	0,954203	6	0,228429	12	0,468361	28
		RUB Balanced	0,596383	14	0,803083	20	0,164038	23	0,398839	48
		AUD Balanced	0,399976	28	0,648680	32	0,141036	28	0,323911	64
		AUD Flexible	0,375282	32	0,627592	34	0,130886	31	0,297537	69
		CAD Balanced	0,569551	16	0,925591	9	0,182127	17	0,406353	44
		CAD Flexible	0,517836	20	0,872645	13	0,166536	22	0,379517	52
		KRW Aggressive	0,495509	25	0,474751	43	0,095455	38	0,315913	66

(Table VII cont. d): 2010 risk-adjusted figures)

Date	Asset Class	Subclass	Sharpe		Information Ratio 75% Stock, 25% Bond		Information Ratio 25% Stock, 75% Bond		Information Ratio 50% Stock, 50% Bond	
2010	Mixed Assets	THB Flex - Global	0,419030	15	0,092148	15	0,342457	11	0,278979	10
		TWD Balanced	0,427493	14	0,114956	14	0,347910	8	0,277274	11
		USD Aggressive	0,396120	19	-0,000002	23	0,325382	14	0,306006	6
		INR Flexible	0,379330	23	0,035981	20	0,273523	24	0,176120	20
		NZD Aggressive	0,318787	32	0,119122	13	0,250678	27	0,204499	19
		ZAR Balanced	0,411949	17	0,135505	10	0,343659	10	0,298670	8
		RUB Flexible	0,416086	16	0,139173	8	0,321644	15	0,243087	16
	Money Market	THB	0,693839	1	-0,000249	8	0,092789	5	-0,000068	6
		CNY	0,590254	2	-0,000486	15	-0,000048	13	-0,000207	13
		BRL Leveraged	0,521522	3	0,051892	1	0,390885	1	0,234484	1
		MYR	0,505574	4	-0,000208	6	0,114970	4	-0,000051	5
		ARS	0,411065	5	-0,000458	14	-0,000056	14	-0,000208	14
		CAD	0,288740	9	-0,000119	4	0,085339	6	-0,000033	4
		SEK	0,176658	13	-0,000185	5	0,029603	7	-0,000083	8
		NZD	0,297119	8	-0,000092	3	0,156030	3	0,020800	3
		ZAR	0,339370	7	-0,000080	2	0,189793	2	0,035220	2
	Real Estate	Asia	0,849636	1	0,232899	1	0,784500	1	0,532574	1
		Japan	0,427714	2	0,193909	2	0,349293	2	0,287200	2
		Other	0,424108	3	-0,000043	3	0,283690	3	0,114030	3

(Table VII cont. e): 2010 risk-adjusted figures)

Date	Asset Class	Subclass	Sortino		Upside		Calmar		Final Value	Final Ranking
2010	Mixed Assets	THB Flex - Global	0,523460	18	0,764812	24	0,183351	16	0,372034	53
		TWD Balanced	0,580735	15	0,898784	10	0,237041	10	0,412028	42
		USD Aggressive	0,502337	24	0,830161	18	0,151192	26	0,358742	57
		INR Flexible	0,512227	21	0,810263	19	0,230982	11	0,345489	60
		NZD Aggressive	0,354817	35	0,650668	31	0,137085	30	0,290808	71
		ZAR Balanced	0,608860	12	0,931812	8	0,220670	13	0,421589	38
		RUB Flexible	0,540252	17	0,773496	23	0,157580	24	0,370188	54
	Money Market	THB	2,981865	2	3,077590	1	1,187645	1	1,147630	3
		CNY	3,040764	1	3,037948	2	1,126598	2	1,113546	5
		BRL Leveraged	0,615628	5	0,857387	6	0,247491	5	0,417041	40
		MYR	0,829437	3	1,141380	3	0,378874	3	0,424282	37
		ARS	0,753468	4	1,128440	4	0,214780	6	0,358147	58
		CAD	0,412380	8	0,787593	7	0,155509	8	0,247058	73
		SEK	0,216105	12	0,576335	12	0,067372	13	0,152258	76
		NZD	0,336129	9	0,649830	9	0,134632	9	0,227778	74
		ZAR	0,549250	6	0,925384	5	0,261642	4	0,328654	63
	Real Estate	Asia	1,521966	1	1,738014	1	0,533127	1	0,884674	7
		Japan	0,595172	2	0,884444	2	0,163402	3	0,414448	41
		Other	0,550790	3	0,800663	3	0,200248	2	0,339069	62

(Table VII cont. f): 2010 risk-adjusted figures)

10.8Table VIII: 1987 Top quartile of top quartile figures

Date	Asset Class	Subclass	Sharpe		Information Ratio 75% Stock, 25% Bond		Information Ratio 25% Stock, 75% Bond		Information Ratio 50% Stock, 50% Bond	
1987	Bond	AUD	0,313188	1	0,130668	1	0,229615	1	0,175482	1
		Other	0,032497	3	-0,000031	9	-0,000002	5	-0,000012	6
	Equity	AUD Flexible	0,405283	1	0,202756	1	0,322101	1	0,259201	1
	Money Market	CAD	0,254421	1	0,163559	2	0,224133	2	0,184857	2
		Other	0,240657	2	0,280309	1	0,269888	1	0,289708	1
	Real Estate	UK	0,390689	1	0,252387	1	0,321283	1	0,282372	1

Date	Asset Class	Subclass	Sortino		Upside		Calmar		Final Value	Final Ranking
1987	Bond	AUD	0,746747	1	0,423879	2	0,798463	2	0,402577	3
		Other	0,037348	3	0,072053	16	1,903339	1	0,292170	6
	Equity	AUD Flexible	1,224359	1	0,561349	1	1,689686	1	0,666391	1
	Money Market	CAD	0,282479	1	0,595580	1	0,537914	1	0,320420	4
		Other	0,274778	2	0,586442	2	0,214140	2	0,307989	5
	Real Estate	UK	0,524676	1	0,820859	1	0,379168	1	0,424490	2

(Table VIII cont.: 1987 Top quartile of top quartile figures)

10.9Table IX: 1998 Top quartile of top quartile figures

Date	Asset Class	Subclass	Sharpe		Information Ratio 75% Stock, 25% Bond		Information Ratio 25% Stock, 75% Bond		Information Ratio 50% Stock, 50% Bond	
1998	Bond	HKD	0,142763	1	-0,000353	5	-0,000026	3	-0,000137	4
	Equity	Sector Utilities	0,286752	1	-0,000023	6	0,248367	2	0,134673	5
		France	0,269329	2	0,217270	1	0,253675	1	0,236153	1
		Netherlands	0,261439	3	0,183671	2	0,239409	3	0,213162	2
		German Sm&Mid Cap	0,231467	4	0,145483	3	0,206835	5	0,177755	3
		Sector Tech Media&Tele	0,229208	5	0,124108	4	0,209689	4	0,177451	4
		Active Extension Other	0,200306	6	0,027173	5	0,155896	6	0,096074	6
		EuroZone Sm&Mid Cap	0,178577	7	-0,000097	8	0,114841	8	0,041540	8
		US	0,176740	8	-0,000034	7	0,139688	7	0,068051	7
	Mixed Asset	USD Aggressive	0,162136	1	-0,000133	2	0,057859	1	-0,000043	2
		THB Conservative	0,146003	3	-0,000628	26	0,007953	4	-0,000291	17
		GBP Balanced	0,134647	4	-0,000266	8	-0,000017	6	-0,000097	6
		GBP Conservative	0,112678	6	-0,000312	10	-0,000026	7	-0,000121	7
	Money Market	ARS	1,181409	1	-0,000411	3	-0,000035	3	-0,000172	3
		MYR	0,823732	2	0,789854	1	0,824426	1	0,814485	1

Date	Asset Class	Subclass	Sortino		Upside		Calmar		Final Value	Final Ranking
1998	Bond	HKD	0,162951	1	0,540300	1	0,268602	1	0,159157	10
	Equity	Sector Utilities	0,324996	4	0,641292	4	0,134529	4	0,252941	6
		France	1,112611	1	1,412658	1	0,329296	1	0,547285	3
		Netherlands	0,596030	2	0,925619	2	0,178593	3	0,371132	4
		German Sm&Mid Cap	0,496372	3	0,817873	3	0,193196	2	0,324140	5
		Sector Tech Media&Tele	0,227568	6	0,497293	7	0,103757	5	0,224154	7
		Active Extension Other	0,213321	7	0,564544	5	0,077658	7	0,190710	8
		EuroZone Sm&Mid Cap	0,228914	5	0,562189	6	0,097704	6	0,174810	9
		US	0,160705	8	0,410924	9	0,074635	8	0,147244	12
	Mixed Asset	USD Aggressive	0,166144	2	0,447874	5	0,109910	4	0,134821	14
		THB Conservative	0,298464	1	0,319576	22	0,124771	3	0,127978	15
		GBP Balanced	0,159546	3	0,569827	1	0,184268	2	0,149701	11
		GBP Conservative	0,130435	5	0,529320	2	0,246796	1	0,145539	13
	Money Market	ARS	79,741401	1	79,954345	1	0,000000	3	22,982362	1
		MYR	9,587195	2	2,065766	2	113,265696	1	18,310165	2

(Table IX cont.: 1998 Top quartile of top quartile figures)

10.10 Table X: 2000 Top quartile of top quartile figures

Date	Asset Class	Subclass	Sharpe		Information Ratio 75% Stock, 25% Bond		Information Ratio 25% Stock, 75% Bond		Information Ratio 50% Stock, 50% Bond	
2000	Bond	MXN Short Term	0,370876	1	0,433480	3	0,477694	1	0,466809	1
		RUB	0,269888	2	0,461598	1	0,339717	3	0,406112	3
		INR	0,207867	3	0,451916	2	0,428566	2	0,452911	2
		HKD	0,132358	4	0,300358	6	0,330771	4	0,312621	4
		USD Medium Term	0,034085	5	0,276953	7	0,266414	5	0,277661	6
		USD	-0,000005	7	0,261248	8	0,212220	7	0,252723	7
	Equity	Saudi Arabia	0,429658	1	0,486262	1	0,563877	1	0,541375	1
		Sector Real Est N Am	0,246617	2	0,381565	2	0,349902	2	0,383432	2
		Sector Pharma&Health	0,046964	3	0,215468	5	0,110823	4	0,169339	5
		UAE	-0,000003	4	0,204435	6	0,156797	3	0,192795	4
	Mixed Asset	RUB Balanced	0,299834	1	0,446673	1	0,352959	1	0,411508	1
	Money Market	ARS	0,855672	1	0,318637	1	0,420177	1	0,344092	1
		KWD	0,004581	2	0,280822	2	0,292425	2	0,285765	2

Date	Asset Class	Subclass	Sortino		Upside		Calmar		Final Value	Final Ranking
2000	Bond	MXN Short Term	0,584220	1	0,952765	1	0,395866	1	0,525959	4
		RUB	0,405210	2	0,793325	2	0,004597	12	0,382921	6
		INR	0,223942	3	0,502471	3	0,153661	3	0,345905	8
		HKD	0,125519	4	0,402945	5	0,364174	2	0,281249	9
		USD Medium Term	0,036665	5	0,434903	4	0,122179	4	0,206980	11
		USD	-0,063470	9	0,380114	6	0,086577	6	0,161344	12
	Equity	Saudi Arabia	0,921570	1	1,228470	1	0,370516	2	0,648818	3
		Sector Real Est N Am	0,310148	2	0,696775	2	0,282241	3	0,378669	7
		Sector Pharma&Health	0,051072	3	0,455526	3	0,031914	5	0,154444	13
		UAE	-0,121422	10	0,066501	52	30,022260	1	4,360195	1
	Mixed Asset	RUB Balanced	0,766895	1	0,399350	1	0,343485	1	0,431529	5
	Money Market	ARS	11,763748	1	12,032941	1	0,000000	4	3,676467	2
		KWD	0,004378	2	0,370434	2	0,634219	1	0,267518	10

(Table X cont.: 2000 Top quartile of top quartile figures)

10.11 Table XI: 2001 Top quartile of top quartile figures

Date	Asset Class	Subclass	Sharpe		Information Ratio 75% Stock, 25% Bond		Information Ratio 25% Stock, 75% Bond		Information Ratio 50% Stock, 50% Bond	
2001	Bond	INR	0,552044	1	0,447339	5	0,640979	1	0,512226	1
		MXN Short Term	0,317750	2	0,481777	2	0,491887	2	0,509233	2
		HUF	0,282584	3	0,544200	1	0,393927	3	0,491976	3
		Emerging Markets Europe	0,246222	4	0,459944	4	0,366993	4	0,442905	4
		HKD	0,238975	5	0,335495	7	0,295569	6	0,325520	7
		MYR	0,121549	6	0,344356	6	0,313501	5	0,338235	6
		RUB	0,087797	7	0,468332	3	0,218148	7	0,377227	5
	Equity	UAE	0,434603	1	0,452827	2	0,500999	1	0,496684	1
		Sector Gold&Prec Metals	0,281673	2	0,453647	1	0,345822	2	0,409050	2
		Saudi Arabia	0,210147	3	0,449177	3	0,315245	3	0,406350	3
		Sector Real Est N Am	0,152652	4	0,433383	4	0,289770	4	0,397271	4
	Mixed Asset	RUB Balanced	0,474967	1	0,713283	1	0,561996	1	0,665356	1
		PLN Conservative	0,138629	2	0,397446	2	0,232263	2	0,332933	2
	Money Market	KWD	0,442771	1	0,370234	2	0,394649	1	0,377717	2
		HUF	0,278960	2	0,421415	1	0,362383	2	0,416337	1

Date	Asset Class	Subclass	Sortino		Upside		Calmar		Final Value	Final Ranking
2001	Bond	INR	0,715162	1	0,939194	1	0,163484	3	0,567204	3
		MXN Short Term	0,393899	3	0,712665	3	0,089287	4	0,428071	5
		HUF	0,411489	2	0,570007	5	0,064735	6	0,394131	6
		Emerging Markets Europe	0,354138	4	0,746559	2	0,031164	12	0,378275	7
		HKD	0,272106	5	0,611591	4	0,219040	2	0,328328	10
		MYR	0,160970	6	0,518176	6	0,256857	1	0,293378	13
		RUB	0,088304	7	0,459549	9	0,047519	8	0,249554	15
	Equity	UAE	2,728697	1	2,411065	1	2,868497	1	1,413339	1
		Sector Gold&Prec Metals	0,345898	2	0,693658	2	0,016656	6	0,363772	8
		Saudi Arabia	0,224400	3	0,484693	4	0,109805	2	0,314260	11
		Sector Real Est N Am	0,163909	4	0,528624	3	0,094372	3	0,294283	12
	Mixed Asset	RUB Balanced	0,819171	1	0,844517	1	0,078790	2	0,594011	2
		PLN Conservative	0,178980	2	0,593442	2	0,019029	4	0,270389	14
	Money Market	KWD	0,627162	1	0,892987	1	0,289071	3	0,484942	4
		HUF	0,383629	2	0,590588	2	0,038798	4	0,356016	9

(Table XI cont.: 2001 Top quartile of top quartile figures)

10.12 Table XII: 2008 Top quartile of top quartile figures

Date	Asset Class	Subclass	Sharpe		Information Ratio 75% Stock, 25% Bond		Information Ratio 25% Stock, 75% Bond		Information Ratio 50% Stock, 50% Bond	
2008	Alternative	Long/Short Equity JP	0,085964	1	0,349856	1	0,212689	1	0,311079	1
	Bond	JPY	0,184445	1	0,306130	5	0,243035	1	0,287436	3
		HKD	0,079262	2	0,240235	13	0,192886	2	0,229776	5
		ILS Short Term	0,072251	3	0,338178	3	0,174636	3	0,291677	2
		Other	0,048263	4	0,385953	1	0,164777	5	0,328078	1
		BRL Short Term	0,048024	5	0,310711	4	0,118609	6	0,225205	6
		Emerging Markets Latin Am	0,033486	6	0,289874	6	0,101637	8	0,206039	9
		CHF Short Term	0,030768	7	0,245955	10	0,105221	7	0,194174	12
		THB	0,019891	8	0,264751	7	0,168558	4	0,249047	4
		EUR Long Term	0,017922	9	0,261580	8	0,096653	9	0,200294	10
		Lipper CE Global Income Funds Index	-0,000006	10	0,340924	2	0,054241	14	0,213746	8
		BRL Conservative	0,034958	1	0,289436	4	0,100038	1	0,201753	3
	Mixed Asset	ILS Conservative	-0,000025	2	0,291306	3	0,064695	3	0,193063	4
		THB Conservative	-0,000034	3	0,246631	5	0,086887	2	0,213455	2
	Money Market	CNY	0,937295	1	0,270260	4	0,372386	1	0,298630	2
		JPY	0,226841	2	0,437920	1	0,332534	2	0,406019	1
		BRL Leveraged	0,049831	3	0,319545	3	0,123191	4	0,233630	5
		Other	0,011692	4	0,354257	2	0,115264	5	0,280453	3
		Global	-0,000033	7	0,269668	5	0,100332	6	0,242949	4
		THB	-0,000012	6	0,244078	6	0,125699	3	0,219956	6

Date	Asset Class	Subclass	Sortino		Upside		Calmar		Final Value	Final Ranking
2008	Alternative	Long/Short Equity JP	0,089043	1	0,416407	1	0,019110	1	0,212021	4
	Bond	JPY	0,205324	1	0,479271	2	0,022172	2	0,246830	3
		HKD	0,100206	2	0,520710	1	0,076025	1	0,205586	5
		ILS Short Term	0,076311	3	0,470497	3	0,013405	3	0,205279	6
		Other	0,045976	4	0,402909	6	0,007295	5	0,197607	7
		BRL Short Term	0,043251	5	0,344575	8	0,004775	6	0,156450	10
		Emerging Markets Latin Am	0,028009	7	0,239839	35	0,003323	8	0,128887	16
		CHF Short Term	0,034320	6	0,449598	4	0,004626	7	0,152095	12
		THB	0,020558	8	0,413771	5	0,008231	4	0,163544	8
		EUR Long Term	0,017085	9	0,358231	7	0,000277	9	0,136006	14
		Lipper CE Global Income Funds Index	-0,002038	10	0,270778	25	-0,017026	25	0,122946	18
		BRL Conservative	0,031337	1	0,335082	3	0,002012	1	0,142088	13
	Mixed Asset	ILS Conservative	-0,007791	2	0,336059	2	-0,004206	4	0,124729	17
		THB Conservative	-0,055545	5	0,354308	1	-0,001117	2	0,120655	19
	Money Market	CNY	3,733862	1	3,432575	1	5,443427	1	2,069776	1
		JPY	0,265318	2	0,466444	2	0,054675	2	0,312822	2
		BRL Leveraged	0,044880	3	0,345913	5	0,005128	5	0,160303	9
		Other	0,010362	4	0,318913	6	0,000863	6	0,155972	11
		Global	-0,044945	7	0,278779	10	-0,004091	9	0,120380	20
		THB	-0,026807	6	0,366417	3	0,007516	4	0,133835	15

(Table XII cont.: 2008 Top quartile of top quartile figures)

10.13 Table XIII: 2010 Top quartile of top quartile figures

Date	Asset Class	Subclass	Sharpe		Information Ratio 75% Stock, 25% Bond		Information Ratio 25% Stock, 75% Bond		Information Ratio 50% Stock, 50% Bond	
2010	Bond	ARS Short Term	0,929548	1	-0,000140	19	0,306523	7	-0,000003	18
		USD Short Term	0,857740	2	-0,000432	41	-0,000046	36	-0,000190	36
		USD High Yield	0,793376	3	0,118290	2	0,725886	1	0,417559	1
		Lipper CE Global Income Funds Index	0,786660	4	0,088833	3	0,668991	2	0,352829	3
		USD	0,763747	5	-0,000283	33	0,032942	30	-0,000091	30
		THB	0,729495	7	-0,000190	26	0,167229	19	-0,000031	24
		Emerging Markets Latin Am	0,693942	8	-0,000001	7	0,493690	3	0,200037	6
		MYR	0,678628	9	-0,000111	16	0,295581	8	0,030391	15
	Commodity	Precious Metals	0,632742	1	0,230617	2	0,486728	1	0,360379	1
	Equity	Chile	0,778300	1	0,354596	7	0,645440	1	0,509536	4
		Thailand	0,661856	2	0,386953	5	0,574054	4	0,494663	5
		Philippines	0,654195	3	0,475516	3	0,606072	2	0,566449	2
		Canada Sm&Mid Cap	0,575012	5	0,778274	1	0,581632	3	0,660423	1
		Sector Real Est N Am	0,561523	6	0,525013	2	0,542983	5	0,560744	3
	Mixed Asset	THB Conservative	0,763098	1	-0,000071	34	0,347826	9	0,081758	29
		PHP Balanced	0,672873	2	0,346603	1	0,598620	1	0,508023	1
	Money Market	THB	0,693839	1	-0,000249	8	0,092789	5	-0,000068	6
		CNY	0,590254	2	-0,000486	15	-0,000048	13	-0,000207	13
	Real Estate	Asia	0,849636	1	0,232899	1	0,784500	1	0,532574	1

Date	Asset Class	Subclass	Sortino		Upside		Calmar		Final Value	Final Ranking
2010	Bond	ARS Short Term	2,621749	2	2,888172	2	1,112163	1	1,122573	4
		USD Short Term	1,612353	3	1,916695	3	0,747091	3	0,733316	10
		USD High Yield	1,188812	6	1,403774	8	0,432764	7	0,725780	11
		Lipper CE Global Income Funds Index	1,059845	9	1,278433	9	0,391998	9	0,661084	14
		USD	1,239737	5	1,515169	5	0,500759	6	0,578854	19
		THB	3,170280	1	3,062631	1	1,078133	2	1,172507	2
		Emerging Markets Latin Am	1,181361	7	1,459014	6	0,534885	5	0,651847	16
		MYR	1,298666	4	1,574519	4	0,540113	4	0,631112	17
	Commodity	Precious Metals	1,010090	1	1,284490	1	0,304718	1	0,615681	18
	Equity	Chile	1,798753	1	2,043565	1	0,847066	1	0,996751	6
		Thailand	1,227991	2	1,537462	2	0,574017	2	0,779571	8
		Philippines	1,026991	3	1,291313	3	0,410160	3	0,718671	12
		Canada Sm&Mid Cap	0,820934	5	1,137920	5	0,231125	7	0,683617	13
		Sector Real Est N Am	0,873390	4	1,243686	4	0,287122	4	0,656351	15
	Mixed Asset	THB Conservative	2,951634	1	3,045998	1	1,212705	1	1,200421	1
		PHP Balanced	1,138110	2	1,402299	2	0,473653	2	0,734312	9
	Money Market	THB	2,981865	2	3,077590	1	1,187645	1	1,147630	3
		CNY	3,040764	1	3,037948	2	1,126598	2	1,113546	5
	Real Estate	Asia	1,521966	1	1,738014	1	0,533127	1	0,884674	7

(Table XIII cont.: 2010 Top quartile of top quartile figures)