MULTI-ASSET INVESTING

A PRACTITIONER'S FRAMEWORK

Pranay Gupta, CFA ▪ Sven R. Skallsjö ▪ Bing Li, CFA

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Multi-Asset Investing

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"I don't pretend we have all the answers,
but the questions are certainly worth thinking about."

— Arthur C. Clarke

For Aanya and Jennifer

May you have the
wisdom to not stop questioning,
the creativity to innovate,
and the courage to express your power,
and fulfill your potential.

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Preface

I was asked once in an interview, "Why do you want to become an investment manager?" My reply was that it is the only business where anything and everything that happens in any corner of the world can impact the decisions that you will make that day. This is even more true today.

The problem of course is that we all perceive these events differently, have different processes to assimilate the information, and have different views on how they will impact economies and asset prices. This diversity of views, on the one hand, is what creates a financial market, and on the other creates numerous debates on the "correct" solution to any investment problem. The dimensions of these views are numerous: academia versus practitioner, fundamental versus systematic, bottom-up versus top-down, rigorous versus conceptual, utopian versus practical, return-oriented versus risk-oriented or global versus local. With each side having defined the lens they will use for their perspective, there is seldom much debate on creating a framework which can accommodate everyone and which may well turn out to be the most investment optimal solution for the asset owner. This text is an attempt in this direction.

Multi-asset investing as a term has been used to mean many things as it is probably one of the broadest investment problems for any portfolio, which covers all geographies, all asset classes, all sectors and almost all financial market instruments. An attempt to analyze this investment problem often leads us down paths which can be very subjective in nature and thus open to criticism for lack of evidence or proof. At other times we end up creating an extensive theoretical quantitative framework, which may not be practical to implement. All these viewpoints are valid and we believe that each sub-issue within the scope of multi-asset investing lends itself to a solution, which may be biased in one of these directions.

Beginning with an overview of how multi-asset investing functions today, we detail the areas where we believe the incumbent framework needs improvement to create a more robust investment solution. Addressing these specific areas one at a time in each chapter, we aim to describe the methods that we have come to believe in, as a function of our experience in managing global multi-asset portfolios. Often these methods are very fundamental in nature, and at other times quite quantitative; however, at all times we have aimed to describe processes which are implementable in practice, and have proved useful in managing portfolios. The intention of the book is to ask the question, "If you could redesign the multi-asset investment process today, starting with a clean sheet of paper, what would that process look like?"

Concurrent with the multi-asset investment problem, we also examine the business of multi-asset investing. The diversity of current multi-asset products today affords us a rich landscape to ask how we would structure a multi-asset business today, as well as how we would tackle the associated issues such as manager compensation and multi-asset investing for individual investors.

Finally, we close with a guest chapter from Willis Towers Watson Investment Services on how they are helping their asset owner clients to think about these issues.

Pranay Gupta

Sven Skallsjö

Bing Li

About the Authors

Pranay Gupta, **Sven Skallsjö** and **Bing Li** have worked together for the last 15 years and the combination of their individual skills in asset allocation, financial mathematics and portfolio management respectively, has allowed them to innovate and implement novel solutions to practical problems they have encountered in the course of managing large pools of assets.

Pranay Gupta, CFA, has 25 years of experience in investment management, having worked in Europe, the UK, the US and Asia. As Chief Investment Officer for eminent asset management businesses in Asia, Pranay has been responsible for overseeing over US$85bn in institutional, retail and insurance assets across 11 countries. Pranay has also been the Portfolio Manager of a US$22bn multi-strategy multi-asset fund where he deployed innovative methodologies to deliver consistent positive performance, and has been awarded the title of *Best Discretionary Asset Manager in Asia*. Over the course of his career, Pranay has managed equity funds in every part of the world, emerging market debt funds, fund of hedge funds and systematic quantitative funds. Pranay was the Chairman of the Investment Committee of the CFA Institute Research Foundation, responsible for overseeing the asset allocation of the endowment, and a Research Fellow at the Centre for Asset Management Research and Investments at the National University of Singapore. Pranay is the Founder of the Global Association of Alternative Investors (GAAI), a global not-for-profit investment think tank of sovereign wealth funds, university endowments, and corporate and government pension plans, which debate issues on a wide range of topics in asset management. Pranay also currently helps the CFA Institute in directing the design of the Asset Allocation and Alternatives curriculum of the CFA Program. Pranay has lectured around the world on various subjects, and is a frequent guest on BBC World, Bloomberg TV, CNBC and CNN.

Sven R. Skallsjö, PhD is a finance expert specializing in mathematical techniques for asset allocation and risk management. Following a degree in mathematics he turned his interest to economics and financial markets. He earned his PhD in 2004 from the Stockholm School of Economics, where he investigated the interplay between monetary policy and the dynamics of the yield curve focusing on implications of the zero bound for policy rates. He is currently active in the field of risk management, and has designed and developed risk models at Ignis Asset Management, AGL Structured Finance and Shell Asset Management. In his work he uses mathematical techniques to help structure

intuitive concepts. Sven has co-authored various papers on multi-asset class investment and risk management.

Bing Li, PhD, CFA is currently the president of BC Capital Management Ltd a Hong Kong-based firm that provides investment solutions for high-net-worth individuals in mainland China. After earning his PhD in Chemistry from the University of Western Ontario, Bing started his career in financial services as a quantitative developer at Greydanus, Boeckh & Associates, Inc., where he successfully developed bond trading strategies by modeling the movement of the yield curve and spread curve. During his 20 years of experience, Bing has been the Portfolio Manager and worked for several global asset management firms in Canada, Europe, the UK and Hong Kong, and managed institutional and retail funds of global bonds, equities, fund of hedge funds and multi-class asset allocation. As a long-time industrial practitioner, Bing has paid detailed attention to the implementation issues in constructing investment strategies, and consistently outperformed respective benchmarks.

CHAPTER ONE

1 An Introduction to the Multi-Asset Investment Problem

The last decade of financial market research and asset management has focused a great deal on the generation of alpha, the separation of return into alpha and beta, and in debating active versus passive management. Indeed, the majority of the investment industry across the world today is structured to support these facets of managing assets. The majority of market research carried out in investment banks is at the individual security level to advocate potential investments expected to generate excess return over the market benchmark. The majority of active asset managers in any asset class in any geographic region of the world claim to have skill in finding the "right" stocks and bonds, which would allow them to beat market benchmarks, and thus charge active management fees. Even asset owners, be it sovereign wealth funds, corporate and government pension plans or endowments have the majority of their effort and resources focused on selecting the right strategies and hiring and firing external managers.

This structure of the financial industry, however, seems to be at odds with a basic tenet that all of us have learnt over and over again – that asset allocation is responsible for 90% of the risk and return of a portfolio. While the actual number of 90% has been disputed by many, it is still widely accepted that asset allocation as a function accounts for a large part if not the majority of a portfolio's total return. Why then do we have the bulk of the global financial services industry structured to focus on the 10% related to research and investment strategies based on security selection? Meanwhile, the main meat of the investment problem, portfolio allocation, remains pitifully under-researched, under-innovated and remains the single biggest cause for asset owners, institutional or individual, failing to reach their portfolio objectives.

A realization of this fact has led to an interest in global multi-asset investing. Initially starting with a focus on asset allocation, the field of multi-asset investing has

become diverse, and is called by different names and positioned differently in different organizations. Apart from multi-asset, this research area has been called asset allocation, risk allocation, factor allocation, risk budgeting, strategic asset allocation, tactical asset allocation, macro investing, investment solutions and policy portfolio creation, to name a few, and is used at almost all levels of the investment spectrum from asset owner strategic portfolio creation to creation of fund of funds.

In this text we examine the many facets of multi-asset investing and propose a generalized framework that puts the nomenclature of various market activities in this field into perspective. We argue that all assets today operate within a global multi-asset context, and the "real" active management skill required for the successful management of asset owner portfolios is one of allocation. What is represented today as active or passive management relative to a market benchmark is a problem of considerably smaller significance. However, the multi-asset absolute return problem is far more difficult than a relative return investment problem, and requires better tools and methodologies than are available in the investment world today. This book hopes to propose some practical suggestions in this continuing evolution.

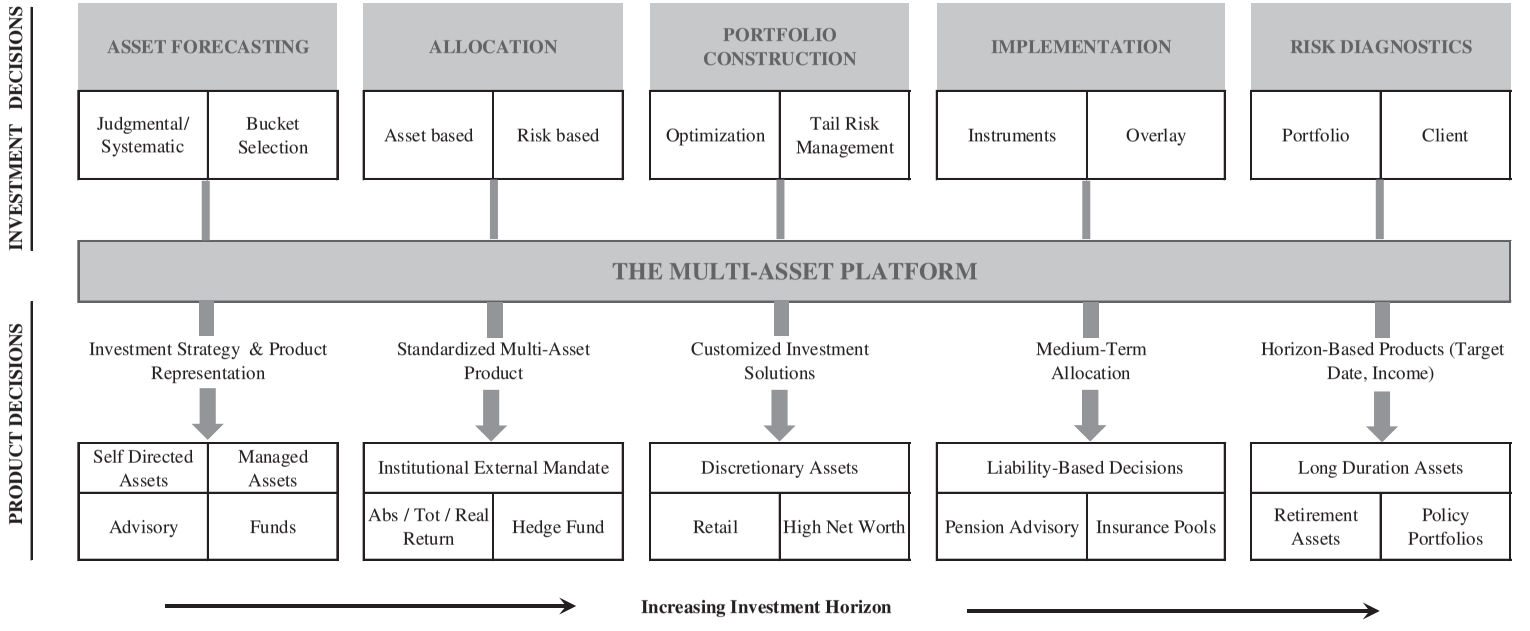
1.1 WHAT IS MULTI-ASSET INVESTING?

We define multi-asset investing as any investment activity where more than one asset class is involved in the composition of an investment product, service or solution. This includes everything from the client requirement and product design, to the various components of the investment process and portfolio analysis required to manage such a product.

Figure 1.1 depicts a framework showing the broad architecture of all multi-asset activities covering this broad field. In the investment decisions category this covers asset forecasting, allocation, portfolio construction, implementation and risk diagnostics. A greater variety is emerging in the asset forecasting processes, both judgmental and systematic, along with greater introspection of the choice of buckets being used for allocation purposes. This variety of forecasts can then be formulated on the basis of return, risk or a combination of the two, at multiple investment horizons. Portfolio construction of a multi-asset portfolio is evolving to incorporate "real risk" constraints, along with greater focus on the management of tail risk. Implementation of the multi-asset portfolio is becoming more flexible, not only with active managers as is traditionally done, but with the newly available derivative instruments. This has brought back the active–passive debate, with the popularity of smart beta as a product category. Finally, the portfolio analysis or diagnostics framework needed to analyze issues and design improvements in the investment process is becoming a basic necessity. At the product decision level, there is greater effort to customize the investment product being offered. This has led to the creation of multiple multi-asset strategies, each of which is relevant to a category of asset owners, where their specific requirements and constraints are incorporated into the investment solution.

In this book, we challenge some of the long accepted beliefs in the management of global multi-asset strategies, and propose some heuristic solutions to problems that are

Figure 1.1 The variety of investment and product and decisions required in a multi-asset investment platform



faced by practitioners. We propose tested non-standard solutions to some of the actual practical problems faced in global multi-asset investing. In many cases, it is difficult to prove with an academic level of rigor that the proposed solution is theoretically optimal; however, what we can say is that we have used each and every one of these tools successfully in the management of large asset pools. The techniques described here may not be the final end product of the investment process evolution, but seem to be a more robust solution than what is used in many investment processes today. Finally, we aim to provide a structure that can serve as the basis for the direction of future research initiatives in the many areas that encompass multi-asset investing.

1.2 THE CONVENTIONAL STRUCTURE

The original concept of investing across multiple asset classes in a portfolio was based on the premise that it provided diversification and that investing in equities would earn a risk premium. These two concepts of diversification and risk premium spawned the creation of multi-asset investing for asset owner portfolios. However, the two basic tenets of the traditional framework stand challenged today as cross-asset correlation is much higher and risk premium lower and more volatile. The basic requirements of an asset owner of a target return and managed drawdown risk are therefore more challenging to meet. This has led to greater focus on all aspects of the multi-asset investment process which can be improved. An evolution in the creation, management and deployment of multi-asset products is therefore underway in order to accommodate the more complex global financial markets, where hybrid instruments and derivatives are more readily available.

1.3 TRANSITIONING FROM ACTIVE MANAGEMENT TO EXPOSURE ALLOCATION

The concept of asset classes based on instruments used in corporate capital structure has been at the foundation of multi-asset investing. Having segmented the financial universe into these asset classes, the majority of investment resources in both asset owners and asset managers are focused on beating the respective asset class market benchmarks to create alpha. But is separation of alpha and beta necessary for a better investment outcome or simply for deciding what is an appropriate fee structure? We propose a structure which generalizes the concepts of alpha and beta, and argue that there is no clear distinction between alpha and beta. The demarcation is actually between commoditized and non-commoditized beta exposures, which changes as the market evolves. We believe that the implications of this framework for active investment and risk management processes, is that the investment management industry will transition to a structure where greater resources and effort are spent on allocation, compared to alpha generation.

Another ramification of the instrument-based asset class structure is that this categorization has also been used as the basis for asset allocation decisions. However, while

allocation is improved by using uncorrelated silos, we know that there is a conceptual overlap between credit and equity as parts of a single corporate capital structure. Disentangling interest rate risk present in sovereign bonds, credit risk present in corporate bonds and equity risk present in equity securities, would allow the creation of a stacked structure for estimation of risk and risk premiums. We believe this may be a more appropriate structure for allocation decisions.

1.4 CREATING AN IMPROVED ALLOCATION STRUCTURE

Most plan sponsors formulate a single long-term asset allocation for their assets, and then spend a great deal of effort to select a number of active managers within each silo of asset class or style. While this diversifies alpha and manager risk, it ignores the fact that the single most important decision responsible for the risk and performance of the assets, the allocation decision, which remains as an undiversified single decision, is in many cases outsourced or done with minimal internal resources, and is the primary cause of many plans having funding gaps.

We argue that the traditional plan sponsor asset allocation process needs to be redesigned to become multi-strategy in design, and be implemented by asset owners using a range of approaches. Different views and methodologies will therefore reduce the plan's exposure to a single point of failure, and provide diversification where it's needed most. We discuss two such approaches – a fundamental process and a systematic process. Our fundamental allocation process is based on the concept of business cycles, and proposes that asset prices are impacted by six main cycles – the global business cycle, the local business cycle, the monetary cycle, the credit and capex cycles and the market cycle. Along with risk limiting factors, we have found that this assimilation of cycle information is useful in taking allocation decisions.

A second approach to allocation is grounded in quantitative techniques to create a strategic allocation stance against major asset classes. Using a risk budgeting framework, and adapting it to regimes caused by macroeconomic changes allows us to actively alter the allocation between the main asset classes. With the implementation of a drawdown management approach, we find that this modified active risk budgeting process yields better results across various evaluation parameters, when compared to a standard risk allocation process, or a 60/40 portfolio. We further confirm the stability of this approach by testing its viability in different historic time periods, and different bull and bear market regimes for equities and bonds.

Finally, we discuss a new approach to make the allocation forecasting process more efficient. An army of investment analysts at investment banks regularly analyze individual securities and publish earnings estimates for each company. These forecasts are disseminated widely through vendors, to the extent that market participants are able to find the mean consensus expectation for each company, as well as how surprising it would be if their individual forecast proved more accurate. However, no such mechanism for collation and distribution of the consensus of recommended allocations is available in the world today. Arguably, if one were to create a database of expectations of allocation

buckets for each market strategist, then one could follow a similar process to corporate expectations for asset allocation purposes.

1.5 CONSTRUCTING A MULTI-ASSET PORTFOLIO TO MANAGE TAIL RISKS

Tail risk arises at multiple stages in the investment process – from the high level asset allocation decision down to the individual portfolio manager's process for selecting securities. While asset owners often cite that they have a long-term investment horizon, in practice they are very sensitive to intra-horizon drawdowns. Intra-horizon risk can represent a substantial part of the total risk, and thus needs to be managed explicitly when constructing a portfolio of assets, strategies or asset classes. However, conventional risk parameters and practices followed in portfolio construction processes largely ignore intra-horizon risk. This leads to sub-optimal assessment of asset risk and leads to the construction of portfolios which are not in sync with the risk aversion of the client.

We propose a composite risk measure which simultaneously captures the risk of breaching a specified maximum intra-horizon drawdown threshold, as well as the risk that the performance is not met at the end of the investment horizon. We believe this captures the "true" risk of a portfolio much better than traditional end-of-horizon risk measures. We also propose a portfolio construction process which uses the full return distribution, without the assumption of a normal distribution, and demonstrate how this can result in improved control over the tail risk of a portfolio.

The traditional approach to portfolio risk analysis is the use of a single methodology for risk estimation of a portfolio. We believe that risk by its very nature needs to be analyzed in a multi-dimensional manner. A diagnostic framework which disentangles the return of a portfolio in various dimensions, including between skill and luck, is critical to evaluating investment strategies and more importantly, re-engineering an investment process to deliver stable portfolio performance. We discuss examples of some of the important analysis in this regard.

1.6 MULTI-ASSET INVESTING IN EMERGING MARKETS

Emerging markets have historically been segmented into various sub-categories and regions for convenience. This is evident both in the debt universe, where separate market benchmarks exist for hard currency and local currency debt, and in the equity universe where countries are categorized into regions, without a definitive investment rationale. We propose that emerging market investments require an integrated multi-asset investment universe, where there is a synchronized classification across asset classes.

It is a fact that active managers in emerging markets on average have a poorer performance compared to those in developed markets. In Asia, the majority of active equity

strategies claim to derive their value addition by focusing on security selection. However, we find that if a manager's skill in asset allocation and stock selection were the same, then two-thirds of the portfolio's return in Asia would come from asset allocation, not from security selection. This is in sharp contrast to a US equity portfolio, where this would be only 18%. We therefore propose that for Asian equity portfolios, a much greater emphasis is required on the allocation process; a facet which seems to have been missed by asset managers thus far.

1.7 FROM MULTI-ASSET STRATEGIES TO MULTI-ASSET SOLUTIONS

The investment industry has gone through three major disruptions in recent history – a fee-led disruption caused by the rise of index funds, a return-led disruption caused by the rise of hedge funds, and a distribution-led disruption caused by the choice by some financial institutions to be client focused and to market investment products in an open architecture, without necessarily manufacturing them as well. We believe that the industry will now go through an allocation process-led disruption, caused by a renewed focus on the allocation process, rather than the pursuit of alpha. This will impact the product structure manufactured by asset management firms and transition the industry to focus on client investment solutions, rather than the current focus on investment strategies.

For institutional asset owners, conventional active and passive strategies will then simply be implementation methods, the proportion of each being based on their own constraints of cost and skill in manager selection. The current active versus debate will become passé.

An individual or private wealth investment has the same portfolio objectives as that of any institutional asset owner: a requirement of absolute return from a global multi-asset, multi-strategy portfolio. However, the business model of private banking makes a direct application of institutional investment processes difficult. We propose a revised framework for private wealth investment management, which we believe overcomes some of the organizational challenges, yet allows better management of private wealth assets from an investment standpoint.

1.8 STRUCTURING A MULTI-ASSET BUSINESS

Asset managers across the world have initiated activities to enhance their multi-asset capabilities, with the increased interest and asset flow into this category. Each firm having analyzed its strengths and weaknesses has positioned its multi-asset offering in a market segment where they will be able to exploit competitive advantage. From a product standpoint, we look at the major product categories in multi-asset and the skills that are required to be successful in each. From an investment skill perspective, we identify the key areas where significant improvement is required in the investment process. Finally, from a client standpoint we analyze the areas where a mismatch exists today between

the products supplied by asset managers and client expectations. We also examine the combination of skills that are required to run a successful commercial multi-asset business – thought leadership, investment process skill, market strategy advice, media presence and a broad knowledge of all component strategies.

We also analyze the business model of hedge funds which argues that incorporating a performance fee in asset management fees aligns the interests of the asset manager and asset owner. We study the implications of a typical hedge fund contract where the manager is allowed to adjust the activeness of the portfolio dynamically over time. Taking managerial compensation into account can have considerable consequences for the probability distribution of assets. In particular, in the management of allocation decisions, we find that a performance fee incentive structure leads to a greater propensity for taking large bets, to the detriment of the portfolio.

The text ends with a chapter from Willis Towers Watson Investment Services, which is one of the leading investment consultants and advises a large number of corporate and government pension plans, sovereign wealth funds and endowments on allocation issues.

CHAPTER TWO

The Traditional Allocation Structure

In the management of any pool of assets, the asset allocation decision is undoubtedly of fundamental importance. Brinson, Hood and Beebower (1986) claimed that asset allocation explains on average 93.6% of the variation in total plan return. While the number itself has been disputed, there is consensus on the importance of asset allocation in the investment process. A typical 60/40 allocation to equity and fixed income results in a volatility of around 10%. A common active management policy is to allocate a 3% tracking error limit for the asset manager. These two assumptions alone are sufficient to arrive at a variance contribution of the asset allocation decision in excess of 90%.

Apart from asset owner asset allocation, multi-asset funds also perform asset allocation as the mainstay of their investment process. Fraser-Jenkins et al. (2012) analyzed 529 multi-asset funds, and found that assets under management had increased from $100bn in 2004 to $600bn in July 2012. This compares to equity funds having a net outflow of $200bn over the same period, and fixed income funds having an inflow of $1200bn.

It is notable that in spite of its significance for total fund returns, the high-level asset allocation is often managed with less rigor than the active management component of any portfolio. Greater effort is generally devoted to diversifying the set of active portfolio managers, often hiring multiple managers within the same area, and well-formulated routines typically exist for evaluating and handling candidate investment processes.

This disproportionate attention to active management could be motivated if the asset allocation decision was a clear given, and had been "solved" with near certainty for a given pool of assets. However, experience over the last few decades with results is proof to the contrary. The funding gaps, which exist today in most plan sponsors, can be traced back largely to poor asset allocation decisions.

Secondly, it has been recognized that recent research in asset allocation methods could lead to the creation of possible alternatives. For instance, risk parity has been proposed as an alternative method for balancing between equities and fixed income. Also, within both equities and fixed income there are alternative ways for constructing the benchmarks, for

example constructing country weights by GDP rather than market capitalization. Within equities there are also benchmarks allocating higher weight to stocks with low volatility.

Amid this richness in views on asset allocation, the asset base of plan sponsors has experienced significant variability over the past decade. This has spurred an increased focus on risk management, including a demanding growth in regulatory reporting. Therefore, it is not difficult to argue that focus should also be directed towards the asset allocation decision, since this is where the majority of the investment risk originates.

2.1 THE TRADITIONAL INVESTMENT PROCESS

The basic objective of any asset owner is to achieve a target absolute return (derived from liability analysis or inflation expectations), with a requirement of a 90% confidence level that the maximum drawdown does not exceed a pre-specified level, say 10%. Of course, one would like to achieve this with the highest portfolio efficiency. Figure 2.1 depicts this basic asset owner problem as a time series of assets and liabilities.

The question is then how to invest the assets while respecting the constraints. A very common investment approach used worldwide across asset owners and asset managers is a two-step process. First, deciding on a long-term strategic or policy portfolio. This is generally done by an in-house research group or in consultation with an external advisor, to arrive at an allocation to the major asset classes – equities, fixed income and alternatives. Second, finding investment managers or strategies within each of the asset class silos, and allocating assets to fulfill the allocation made.

Each of the managers is required to operate within specified tracking error limits calculated with respect to standard market indices. Monitoring of performance and risk, and rebalancing of the overall portfolio are done at appropriate intervals. Figure 2.2 depicts the overall plan sponsor investment process.

Figure 2.1 The basic asset owner problem

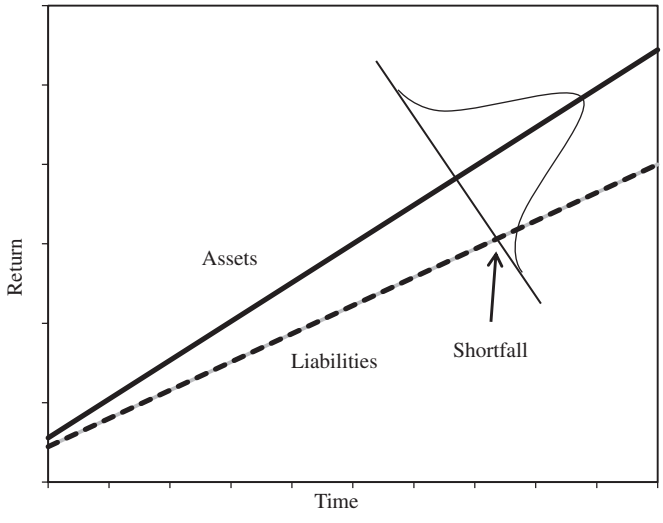
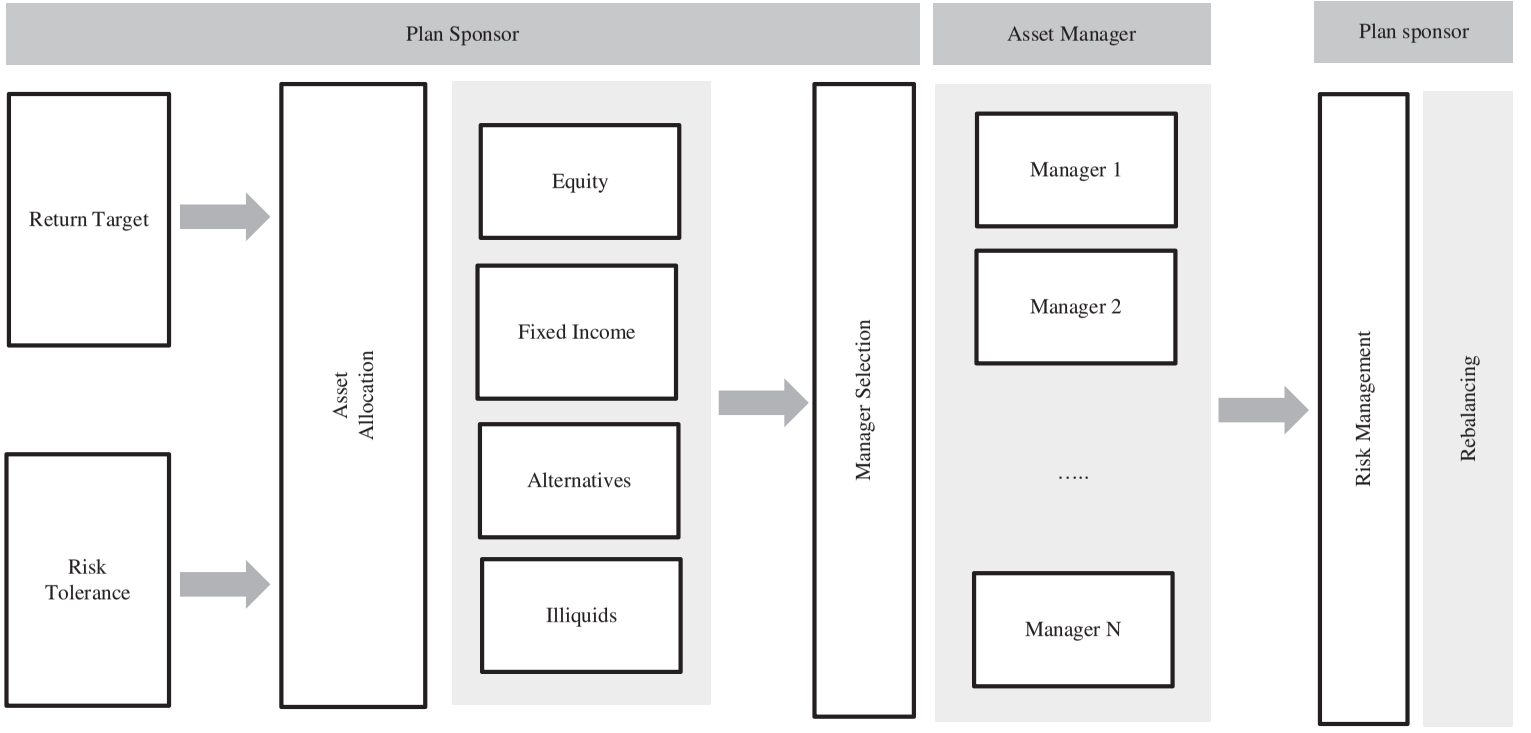


Figure 2.2 Schematic overview of the traditional plan sponsor investment process



2.2 THE ASSET ALLOCATION PROCESS

The traditional investment approach is based on a number of beliefs and assumptions.

First, the basic belief is that investing in multiple asset classes delivers a diversified portfolio. Second, the belief that investing in equities enables the investor to harness a long-run equity risk premium and is a hedge against inflation. Third, an assumption that the definition of the silos provides a clear separation of asset class investment skills, and alternatives are a separate "asset class." Finally, the belief that creating an organization structure that neatly compartmentalizes each of the investment process steps is optimal. Here, we investigate whether the basic beliefs on which the traditional investment process is based are actually true in reality.

Allocation is generally done over eight major asset classes – the four equity regions of US, Europe, Asia and Japan, the three fixed income categories of sovereigns, investment grade and high yield bonds, and a commodity basket (we use gold here as a representative asset). Variation to this categorization exists based on the domicile of the asset owner and use of conceptual groupings, such as GEM and EAFE. Most asset allocators believe that they have some insight into the expected future return of asset classes, and hence take an active allocation decision to tilt towards the asset classes with the higher expected returns. They believe that this allocation skill will help the portfolio achieve the desired return. Further, it is also assumed that the resulting portfolio will be diversified, which would help in mitigating the maximum drawdown risk. Here, we exclude illiquid assets such as real estate and private equity, in order to facilitate a time series analysis illustration; however, the inclusion of these illiquid assets would not result in a substantially different outcome.

Figure 2.3 and Table 2.1 show the performance of the eight asset classes over the illustration period of 2000 to 2014. Also included are two composite portfolios – firstly, a perfect foresight portfolio, constructed as equally weighted in the top two performing asset classes over the subsequent year, annually rebalanced; and secondly, an equal weighted portfolio of all asset classes, signifying a zero skill asset allocation process. We will refer to these portfolios in a later section.

A point to note here is that the maximum drawdown of most of the asset classes exceeds, say, an allowed 10% threshold by far, the exception being global sovereigns. However, if the results were calculated over a longer period of time, sovereign yields would have also gone through a cycle, which would display the characteristics of a higher drawdown. Figure 2.3 also includes a statistic on the 10% maximum drawdown Value at Risk (VaR). This is the 10% quantile for the maximum drawdown over a 1-year horizon using monthly returns. The numbers are calculated by stochastic simulations using the historical mean and volatility estimates. Note that these also exceed the 10% maximum drawdown constraint in most cases.

The drawdown characteristics of asset classes emphasize that the asset allocation problem has poor quality ingredients at inception and it would require both