THE BUILDING BLOCKS OF THIRD GENERATION ASSET ALLOCATION

A PRACTITIONERS´ GUIDE

Written by Rania A. Azmi, PhD
and
Mag. Markus Schuller, MBA, MScFE

December 2013
In this paper, we analyse recent asset allocation developments. We intend to answer how to replace traditional optimization methods by proposing practical building blocks for the third asset allocation generation (3GEN). Practitioners benefit from twelve concluding imperatives about how to implement the new framework.

1. The Evolution of Asset Allocation Generations

With his dissertation "Portfolio Selection", US economist and Nobel laureate Harry M. Markowitz did a big favor to the financial industry (Markowitz, 1952). He introduced the Mean-Variance-Optimizer as core component of the Modern Portfolio Theory (MPT). The industry welcomed the single-factor, single period tool as its theoretical foundation and practical implementation allowed a new set of business models.

Markowitz model has been simple enough to teach it to business school students and complex enough to impress investors with efficient frontier-based allocation explanations for the last 5 decades. To be clear, Markowitz’ model marked a milestone in professionalizing the asset allocation process by defining and measuring risk and return as well as how to combine assets through a repeatable, standardized process. It acted as starting point for a series of complementary single-factor, single-period models like the Capital Asset Pricing Model-CAPM (Sharpe, 1964).

The Efficient Market Hypothesis-EMH (Fama, 1970) added a contextual framework for a rationality-driven world and completed the triumvirate of MPT-CAPM-EMH that laid the theoretical foundation for first generation of asset allocation strategies- 1GEN (1950-2000). The derived 1GEN strategies like Balanced Portfolios (60/40 Portfolios), Long-Only or Buy-and-Hold led to the rise of the mutual fund industry; a success story that still manages about USD 26 trillion worldwide (ICI, 2013). However, the problem is as follows: of the three involved parties, mutual fund manager, mutual fund distributor and mutual fund investor, only the first two benefit from the success of this segment. The investor pays high fees for insufficiently diversified portfolios and an unfulfilled promise of alpha exposure (Carhart, 2002; Gottesman, 2013).

Driven by an emerging insight of insufficient diversification effects of first generation basic assumptions and models, institutional investors began to add further asset classes and strategies to their classic balanced portfolio allocation. The second generation arose (2GEN). Multi-Asset, Long/Short Equity and Risk Parity strategies serve as an example for the widening alternative scope during the 2000s. Multi-factor, multi-period models, academically developed during the 1970s and 1980s, were used as quantitative optimization techniques for this second generation. It shares most of the basic assumptions with 1GEN models while trying to overcome their limitations. Exemplary, econometric methods like autoregressive conditional Heteroskedastic models- ARCH (Engle, 1982), Generalized Autoregressive Conditional Heteroskedasticity-GARCH (Bollerslev, 1986) and Copula (Nelsen, 1999) methods can be named.

Despite the efforts, those optimization techniques, combined with alternative asset classes, could not buck the trend of increasing correlations of holdings in portfolios. Especially hedge funds began to suffer from what we call "mutualfundization", a classic main-stream-effect as a result of hedge fund investments turning from a High-Net-Worth-Individual (HNWI) play into an investment alternative for institutional investors (Asness, Krail, and Liew, 2001).

Overall, 2GEN is suffering of the following problem: on the basis of congruent assumptions with 1GEN, risk remains defined as volatility measure to minimize correlation between allocated assets. Even when including more sophisticated mathematical modeling, supported by computer-programmed algorithms, volatility based risk perception implies significant blind spots.

Exemplary, VaR-optimized portfolios (Schuller, 2012) or Risk Parity portfolios (Schuller, Kula, 2012) can be named as part of this undesirable development.
Furthermore, due to a dynamically encompassing globalization and an increasingly heterogeneous definition of asset classes as a mix of strategies, structures and geographies, the potential portfolio impetus of those blind spots increases.

1GEN & 2GEN Summary (Jones, 2011):

- They ignore the strong evidence of regime dependence, regime persistence, and time-variation in long-term asset returns.
- They assume rebalancing is the best form of risk-management, ignoring a role for hedging strategies or bubble identification as alternative risk mitigation approaches. Besides ignoring the costs involved in any rebalancing of portfolios.
- It assumes stable stock/bond correlations and stable diversification benefits – it ignores the fact that stocks and bonds are positively correlated in 2 out of 3 macro states.
- Risk weights are not the same as dollar weights – in a 60/40 mix of stocks and bonds equities account for around 95% of portfolio variability.
- Lengthy and severe drawdowns are commonplace.
- The 60/40 portfolio was ill-equipped to handle the stagflationary macroenvironment of the 1970s, a period bearing similarities to today.
- Most alternatives are short systemic liquidity risk, and so can compound losses of a equity-centric portfolio in a crisis (high “stress beta”).

Although empirical evidence suggests otherwise, Modern Portfolio Theory and its descendants are still dominating the investment committees of institutional investors. Especially for defining the risk budgets per asset class during the Strategic Asset Allocation (SAA) process, the traditional approaches enjoy great popularity.

If nothing else, since the Great Recession now followed by a Financial Repression in the developed economies, institutional investors do not know how to get any further as they recognize the limits of traditional asset allocation generations.

Given the growing level of despair, institutional investors are increasingly accessible to reason. An example: The Portfolio Whiteboard Project (Rittereiser, 2013) brought together the next generation of institutional investment leaders with asset managers to define an asset allocation model for the future. The group agreed that the financial crisis had seriously undermined the value of Modern Portfolio Theory, yet MPT continues to dominate for manager selection and asset allocation frameworks „How can we unlearn a lot of that?“, asked one investor.

In this paper, we intend to answer this question by proposing practical building blocks for a new asset allocation generation.

2. Third Generation Asset Allocation

When looking at all the deconstructed myths of 1GEN and 2GEN, the need for a new start beyond passing investment fads is immediate.

The third generation asset allocation (3GEN) represents emancipation from the MPT family by breaking with its basic assumptions. The homo oeconomicus acts no longer as starting point. 3GEN’s academic foundation reaches back to the early 1990s when the prospect theory laid the foundation for a behavioral finance breakthrough. In 2004, the third generation became its philosophical framework through Andrew Lo’s combination of neuro-science, evolution and econometrics, postulated as Adaptive Market Hypothesis (Lo, 2004). Lo defines market efficiency from an evolutionary perspective.

<table>
<thead>
<tr>
<th>Efficient Markets</th>
<th>Adaptive Markets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rational expectations</td>
<td>Adaptive Expectations</td>
</tr>
<tr>
<td>Optimizing behavior</td>
<td>Satisficing behavior</td>
</tr>
<tr>
<td>No free lunch</td>
<td>No free lunchplans</td>
</tr>
<tr>
<td>Risk/reward relation</td>
<td>Fear/greed vs logic</td>
</tr>
<tr>
<td>Stationary returns</td>
<td>Nonstationary returns</td>
</tr>
<tr>
<td>Static linear models</td>
<td>Dynamic nonlinear models</td>
</tr>
<tr>
<td>Homogeneous agents</td>
<td>Heterogeneous agents</td>
</tr>
<tr>
<td>Mathematical rigor</td>
<td>Biological rigor</td>
</tr>
</tbody>
</table>

(Lo, 2010)

His postulate of adaptive markets led to a new asset allocation framework.

<table>
<thead>
<tr>
<th>Traditional Framework</th>
<th>New Framework</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-only constraint</td>
<td>Long/short strategies</td>
</tr>
<tr>
<td>Diversify across stocks and bonds</td>
<td>Diversify across more asset classes and strategies</td>
</tr>
<tr>
<td>Market-cap-weighted indexes</td>
<td>Passive transparent indexes</td>
</tr>
<tr>
<td>Manage risk via asset allocation</td>
<td>Manage risk via active vola scaling algorithms</td>
</tr>
<tr>
<td>Alpha vs Market beta</td>
<td>Alphas --&gt; Multiple betas</td>
</tr>
<tr>
<td>Markets are efficient</td>
<td>Markets are adaptive</td>
</tr>
<tr>
<td>Equities in the long run</td>
<td>“In the long run we are all dead”, but make sure the short run doesn’t kill you first.</td>
</tr>
</tbody>
</table>

(Lo, 2010)

A visualized description for different generations of asset allocations can be found in Appendix 1.
What other aspects need to change in a post-crisis context (Azmi, 2013b)?:

- Managing risk is very different from managing strategy. Risk management focuses on the negatives (threats or failures) rather than opportunities and successes.
- A new investment strategy is needed, one that places risk first in its multitude of dimensions.
- Risk was either improperly measured, or considered a distant second to return. This now needs to change—forever.
- Risk metrics based on volatility, such as Value at Risk, are inherently short-term, making them unsuitable for institutional investors or long-term investors.
- Risk-factor analysis is critical to any institutional investor in order to identify underlying investment risk factors that describe the return variation in a particular portfolio or asset.

There are several issues to consider for proper asset allocation as part of the 3GEN paradigm. Examples include: emphasizing sound investment process, proper risk measurement and mitigation, balanced real diversification which accounts for behavioral implications on investments. However, the question remains: which empirically sound building blocks satisfy the new asset allocation framework of the third generation of asset allocation methods (3GEN)?

### 2.1 3GEN Building Block I

#### Global Transformation Processes

Tactical Asset Allocation (TAA) has been the name of the game for more than ten years. It is defined as creating extra value by taking advantage of certain situations in the marketplace. US financial advisors have discovered it in recent years and present themselves as skilled market timers. As a matter of fact, the skill of market participants to time the market for generating outperformance has been dismal since William Sharpe introduced CAPM in 1964 as equilibrium model to evaluate asset price levels. Take, for example, William Sherden’s research results in his book "The Fortune Sellers" (Sherden, 1998). Sherden reviewed the research and forecasting accuracy of economists on predicting business cycle turning points from 1970 to 1995. He concluded that economists’ forecasting skill is about as good as guessing. No economic theory increased sophistication and not even consensus forecasting offers improvement.

James Montier confirms the findings of William Sherden (Montier, 2007). Analysts and economists are lagging indicators, although they sell their expertise as leading indicators. To only name a few more, Dean Baker (Baker, 2002), Barry Ritholtz (Ritholtz, 2008) and Michael McCracken (McCracken, 2009) also confirm in their publications our inability to predict turning points in economic or asset price cycles.

Conclusively, the anticipation of turning points does not work for decades. Despite that fact, market timing strategies like TAA, sector rotation or country rotation still represent popular vehicles in the distribution channels of fund management companies.

Driven by a robust globalization process since the early 1980s, open economies expose themselves to importing volatility from trading partners. Given that, their business cycles became increasingly fragile. Market participants would be ill-advised to use fragile business cycles as their starting point in portfolio construction. Even more so if they would try to time them.

The Alternative: Global economic or social transformation processes, for instance infrastructure, emerging consumer or demographic trends, are stable enough to reduce the impact of business cycle changes (short cycles) and better quantifiable and isolable than Kondratieff cycles. Those 15-20 year ongoing cycles generate a real-economy driven yield in the single digits (Roland Berger, 2012).

By defining the replication of global transformation processes as the asset allocation process’ overall objective, investors increase the likelihood of achieving capital preservation due to their relatively stable, value-adding character in real economic terms. Exempli gratia, this hypothesis is based on the insight of investors avoiding to time markets, therefore being less exposed to market and product fashions and reducing their overall costs due to unnecessarily high portfolio turnover.

### 2.2 3GEN Building Block II

#### Risk Factor Diversification

In general, all securities can be traced back to the roots of equity or liability based sources. The different ways of how to access those sources increased significantly during the second half of the 20th century. By now, asset classes consist of a heterogeneous set of fragmented strategies, structures and geographies.
Following Markowitz’ idea of not putting all of our eggs in one basket, it was assumed to be sufficient during 2GEN to diversify in many different asset classes. Empirical evidence has proven this idea of simple asset class diversification wrong. One example was provided by Sebastien Page from PIMCO (Page, 2011) who worked out the weakness of multi-asset portfolios that rely on the belief of headline diversification.

The idea of factor investing is far from new. It can be dated back to William Sharpe’s CAPM, which predicts that the only determinant of an asset’s expected return is how strongly its returns move with the market (Beta). This factor has been proven wrong in the 1970s (Ross, 1976), but researchers started the search for more determining factors. A prominent example of the search was published in 1993 by Eugene Fama and Kenneth French (Fama & French, 1993). They introduced the three-factor-model to describe stock returns, namely beta, small cap and value. Carhart added „momentum“ as fourth factor in 1997 (Carhart, 1997).

Factor investing has been researched for the last fifty years based on the following assumption: risk is as a quantitative, vola-related (SD, Variance, MaxD, Beta, etc.) factor, which has to pay a premium in exchange for an investors exposure.

Under 3GEN, a risk factor is defined more comprehensively: it’s a measurable, quantitative or qualitative factor of influence on an asset.

An in-depth analysis of state-of-the-art risk factor diversification can be found in the publication „Diversifikation von Risikofaktoren. Eine Einführung.“ (Schuller, Kula, 2013) of Gökhan Kula (MYRA Capital) and Markus Schuller (Panthera Solutions).

Fundamentally, in recent years, factor based investing became increasingly popular due to the success of passive investing. Value or Size factors are now accessible even for retail investors via ETFs. Those Smart Beta (or as descendants Alternative Beta) products simply represent a new way of structuring risk factors that follow the traditional definition.

When starting the Asset Allocation process with building block I by replicating the aggregate value added of global transformation processes in a portfolio, a 3GEN risk factor framework achieves diversification through managing quantitative and qualitative factors across three main levels, which are as follows (Schuller, Kula, 2013):

- Macro level: global risk factors
- Meso level: transformation process risk factors
- Micro level: financial instrument risk factors

### 2.3 3GEN Building Block III
#### Applied Behavioral Finance

As early as in the 1960s, Benoit Mandelbrot (Mandelbrot, 2006), father of fractals and creator of Chaos Theory, criticized the MPT by explaining why the simplifying assumptions are getting them out of relevance to the real world. Back then, the mind-set was biased towards a deterministic image of humanity („homo oeconomicus“). It was the time when Milton Friedman published his Capitalism and Freedom (Friedman, 1962), laying the foundation for a school of thought (Chicago school of economics) that dominated most of the second half of the 20th century. It should not surprise that this mind-set found its way into finance. The Efficient Market Hypothesis – EMH (Fama, 1970) acts as signal example. It should be equally unsurprising why warning voices back then went unheard. They were against the zeitgeist.

Today, we can rely on the insights of behavioural finance pioneers like Daniel Kahneman (Kahneman, 2011), Andrew Lo (Lo, 2004) and Robert Shiller (Shiller, 2009). Exchanging the image of humanity in our understanding of markets from a mathematical to a biological rigor leads to significantly different conclusions for a rule-based investment process.

The process, even when being implemented automatically, is defined and managed by people. Not taking the human factor into consideration during its implementation would underestimate the impact of more than 90 cognitive biases academia has defined. Having said that, defining decision-making, believes and behavioural biases as well as knowing them is not sufficient. The action makes the difference. As Benjamin Franklin used to say: "Well done is better than well said." How to apply behavioural finance in an investment team/process?

This 3GEN building block III should operate along the following imperative:

**Minimize blind spots:** Our perception is our reality. The cognitive inability to experience ontological truth is known at least since Plato’s allegory of the cave. Human beings, as non-trivial machines (von Förster, 2006) in their ongoing auto poiesis (Maturana, Varela, 1992) are limited to epistemological perceptions of reality. It results in us trying to analyze other market participants as moving non-trivial subjects while being in motion ourselves. Even if high technical competence, high ethical standards and a strong will for implementation is assumed, this represents a highly complex task.
All we can do is trying to minimize as many blind spots in our perception as possible through managing our cognitive biases. This leads to a relative and temporary competitive advantage to other market participants. Like how Benoit Mandelbrot has described it (Mandelbrot, 2006): “The prime mover in financial markets is not value or price, but price differences; not averaging, but arbitraging (between places and/or times).”

Conclusively, the advantage of a market participant is not sourced from finding ontological truth, like an absolute algorithm – quasi a world formula of investing - but in being able to interpret the epistemological landscape better than others. This implies the need of an investment process that responds dynamically to changes in the perception of the landscape.

Donald Rumsfeld (Rumsfeld, 2002), for example, managed to guide us at least in structuring this process of minimizing blind spots:

“[T]here are known knowns; they are things we know we know (category 1). We also know there are known unknowns (category 2); that is to say we know there are some things we do not know. But there are also unknown unknowns (category 3) – there are things we do not know we don’t know."

Nassim Taleb names them differently, but comes to the same conclusion when categorizing risk factors as follows:

1. White Swans (= known knowns / category 1)
2. Grey Swans (= known unknowns / category 2)
3. Black Swans (= unknown unknowns / category 3)

The psychoanalytical philosopher Slavoj Žižek extrapolated a 4th category out of the first three: “unknown knowns” (Žižek, 2006). Those refuse to acknowledge epistemological realities and pretend not to know them like US mortgage lending practices during the last cycle.

When implementing building block II – the diversification of risk factors – we actually try to maximize the quantity of category 1 factors, together with an estimate on their impact probability and likelihood of occurrence on a macro, meso and micro level. Implicitly we try to minimize the number of factors in category 2-4.

What is required for an investment team to do well in minimizing blind spots?

1. Individual qualities of investment team members like technical skills, critical thinking, ethics and intrinsic motivation to search, find and minimize blind spots. Ongoing mental hygiene achieved through single and/or team supervision will facilitate continuous development of those individual qualities.

2. A team culture that encourages the willingness to constructively challenge oneself and each other in search for blind spots, in order to reach better explanation not higher rank rules in a debate. Consequentially creating wisdom will supersede career risk. Given that, teams will consider it ‘normal’ to second-guess traditional norms in the investment industry on a continuous basis, with the ability to generate innovative ideas to overcome them.

3. An incentive system that demands from individuals to have skin in the investment game.

4. A transparent governance structure with clearly defined roles, strategies, decision-making process participation and principles for execution. The investment decision-making process itself requires a scientific, evidence driven framework, utilizing both the art and experience of professional investing.

5. A diverse set of quantifiable risk measures that support the investment team to monitor the blind spot minimization

Ray Dalio can be named as positive example of how to create an organization that is determined to minimize blind spots. In his “Principles” (Dalio, 2011), he describes his interpretation for the 5 requirements from above.

2.4 3GEN Building Block IV
Vehicle & Jurisdiction Agnosticism

Are CTAs part of the hedge fund pocket? Should we categorize an Alternative UCITS product of an offshore hedge fund manager as mutual fund? Can an actively managed ETF in a UCITS structure still be called passive investment or is it a plain vanilla mutual fund like the vehicle suggests? When entering a broad Emerging Market ETF are we actually buying exposure to emerging markets or only a reciprocal home bias via large, export oriented index members?

As shown in building block II, the days of simple headline diversification via asset classes are over. We need to break down each asset class in its risk factors. The break-down needs to be guided by the deconstruction of generalizing myths, like mutual funds generating alpha or hedge funds adding non-correlation to a portfolio.
Exemplary implications of vehicle & jurisdiction agnosticism:

- The distinction between traditional and alternative investments is obsolete. An increasing "mutualfundization" effect in AI emerging has been seen. Consequentially, asset class correlations remain high.
- Apply the same detailed quantitative and qualitative due diligence process for onshore or offshore, retail or institutional, hedge fund or mutual fund, and active or passive products.
- The Investment Company Institute (ICI, 2013) counts 73243 mutual funds worldwide. About 80% of them apply classic long-only equity, bond or balanced portfolio strategies. Avoid them!
- Each selected product needs to offer exposure to at least one transformation process (building block I) and manages at least one risk factor (building block II).
- Minimize costs via passive bias. Only enter in actively managed products if niche is attractive enough to offer a temporary alpha opportunity.

2.5 3GEN Building Block V
Evidence-driven, rule-based DSAA Process

Since Markowitz’ model marked a milestone in professionalizing the asset allocation process in the form of a repeatable, standardized process, the trend in asset allocation went towards “optimization through automation”. It allowed to run larger portfolios with a lower head-count and also enabled the manager to outsource responsibilities of the final allocation decision to a mathematical formula. Career risk minimized, mission accomplished.

Outsourcing responsibilities to a mathematical formula, thus an algorithm, is not only ethically wrong, but also epistemologically flawed – see building block III. It suffers from the “garbage in, garbage out” syndrome. Nassim Taleb (Taleb, 2012) points on the danger of outsourcing this responsibility in case of a rare event: “Black Swans hijack our brains, making us feel we »sort of« or »almost« predicted them, because they are retrospectively explainable. [...] An annoying aspect of the Black Swan problem – in fact the central, and largely missed, point, is that the odds of rate events are simply not computable.”

When turning away from quantitative optimization models, the rule-based process offers a feasible alternative to random discretion. Running portfolios according to rule-based processes is nothing new. Even some plain vanilla long-only equity mutual funds claim to apply this technique. A rule itself is neutral factor with a normative intention.

It now depends on the quality of rule and the context it is embedded in.

How can an evidence-driven, rule-based 3GEN framework combine the different building blocks in one coherence asset allocation process?

Step 1 Define Asset Allocation Principles
Asset allocation principles help to convert the general idea of 3GEN building blocks 1-5 into actionable work packages, by defining a durable set of rules.

(BB: building block)

Example I  Principle On General Setting (BB I)
“Each principle has to be evidence-driven.”

Example II  Principle On Team Culture (BB III)
“Each team member meets quarterly for a supervision.”

Example III Principle On Strategy (BB I)
“Each selected transformation process needs to qualify in two main criteria: a) it can be quantified and b) a sufficiently diverse set of financial instruments is available to cover it from different angles.”

Example IV Principle on Product Selection (BB IV)
“Invest as close to the value generating source of an opportunity as possible.”

Example V Principle on Product Selection (BB IV)
“For each product selected, a ‘product journal’ has to be filled in to reason the choice.”

Example VI Principle On Rebalancing (BB V)
“Rebalance quarterly on the first trading day of a new quarter.”

Step 2 Define Operational Process
Form the asset allocation principles to work packages which should be arranged in a flat-hierarchy-based work flow.

Step 3 Manage Operational Process
Running the operational process represents a managerial task, comparable to those in other industries. Best-practice methods like Management-by-Exception and Balanced Scorecards will help managers to run their organizations. Both, principles and process should be reviewed periodically in a transparent and participative way.
3. 3GEN Implementation Support

The main issues discussed around the building blocks for 3GEN asset allocation represent a paradigm shift in asset allocations in a post-crisis world. Risk mitigation, real diversification and multiple-objectives decision making are at its core.

3.1 On Investment Decision Making

As has often been noted (Lee, 1972; Lai and Hwang, 1994), a major concern in making decisions is that almost all decision problems have multiple and usually conflicting criteria. The soundness of decision making is thus measured by the degree to which the relevant goals are achieved. To that end, an application of the scientific approach is necessary, and this calls for systematic analysis of the decision system.

Systematic investigation enables the decision maker to consider all pertinent factors related to the decision so that the best ultimate course of action can be identified from among a set of alternatives. There is a practical scientific approach to portfolio selection utilizing multiple objectives optimization, called, goal programming, an approach which is capable as far as is possible of achieving a required set of preferences.

Goal Programming (GP) is perhaps the most widely used approach in the field of multiple criteria decision making that enables the decision maker to incorporate numerous variations of constraints and goals. The original portfolio selection problem, with risk and return optimization, can be viewed as a case of Goal Programming with two objectives. Additional objectives representing other factors can be introduced for a more realistic approach to portfolio selection problems.

Although any Goal Programming problem of meaningful size would be solved on the computers, the notion of programming in GP is associated with the development of solutions, or programs, for a specific problem. Therefore, GP has nothing intrinsically to do with computer programming and the name GP is used to indicate seeking the (feasible) program for a mathematical model that is composed solely of goals (Ignizio, 1985).

Ignizio and Romero (2003) highlight that real-world decision problems are usually changeable, complex and resist treatment with conventional approaches. Therefore, the optimization of a single objective subject to a set of rigid constraints is in most cases unrealistic, and that is why Goal Programming was introduced, in an attempt to eliminate or at least mitigate this shortcoming.

The two philosophical concepts that serve to best distinguish Goal Programming from conventional methods of optimization (with a single objective) are the incorporation of flexibility in constraint functions and the adherence to the philosophy of Satisficing as opposed to Optimization.

Satisficing is an old Scots word that refers to the desire to find a practical and real-world solution to a problem, rather than an idealistic or optimal solution to a highly simplified model of that problem. In Goal Programming, the decision maker usually seeks a useful, practical, implementable and attainable solution rather than one satisfying the mathematician’s desire.

3.2 On Using Risk Measures

As outlined above, risk-management practices have become a central topic since the recent financial crisis. Risk management is no longer a compliance issue. Organisations/investors should identify and prepare for non-preventable risks that arise internally and externally to their investment strategy – see previous category 1-4 risks segmentation.

In implementation, risk is often under-measured. For example, many investment institutions use risk-distorting factors like standard deviation or Sharpe ratio as a measure of risk, due to its ease of use and the availability of the underlying data. However, many researchers provide analysis of risk measures that go beyond standard deviation, such as Pflug (2006), Balbas, Balbas and Mayoral (2009) and Rockafellar, Uryasev and Zabarankin (2006):

- Pflug (2006) researches measures of risk in two categories: risk capital measures (which serve to determine the necessary amount of risk capital in order to avoid damage if the outcomes of an economic activity are uncertain, and their negative values may be interpreted as: acceptability measures, safety measures, and pure risk measures) and risk deviation measures (which are natural generalisations of the standard deviation).
- Rockafellar, Uryasev and Zabarankin (2006) systematically study general deviation measures for their potential applications to risk measurement in areas such as portfolio optimisation and engineering.
- Balbas, Balbas and Mayoral (2009) emphasise that modern risk analysis must face two major drawbacks affecting most of the available securities and many investment strategies; namely: asymmetric returns and fat tails.

Other alternative approaches in creating a framework of risk management measures include Tobin’s Q (Tobin, 1968), Minsky Moments (Minsky, 1992) and Ineichen’s “FEI - Financial Explosivity Index” (Ineichen, 2012).
4. Twelve 3GEN Imperatives for Practitioners

1. Stop market timing, start transformation process replication
2. Stop predicting asset price changes and economic turning points, invest forecast-free
3. Stop asset class diversification, start risk factor diversification
4. Rebalance frequently
5. Only adjust your DSAA when risk factors change
6. Be vehicle agnostic
7. Be jurisdiction agnostic
8. Create a mission driven culture that facilitates open debates and rewards the best reasoning
9. Develop a long-term investment mindset
10. Define AA principles as general guidance for an evidence driven, rule-based asset allocation process
11. Combine your mission driven culture and your rule-based asset allocation process to achieve anti-cyclical investment rhythms
12. Complement your experience with a scientific decision making framework to utilize both your experience and talent practically.

Authors

Dr. Rania Azmi
Rania Azmi is an adviser to one of the world’s largest Sovereign Wealth Funds. She enjoys a first-hand experience investing in Middle Eastern markets as well as global financial markets. Azmi enjoys 13+ years of private/institutional investing experience, and she believes that the best theory has no purpose unless it is applied in a practical manner. Azmi was chosen by aiCIO magazine as one of the forty under forty brightest stars in institutional investment. She received her Doctorate in Investment Decision Making from the University of Portsmouth and is the author of Making Investment Decisions for Portfolios (Cambridge Scholars, 2013).

Azmi is also an activist for women’s positions in business, politics, and society. She has spoken for the World Bank on gender and economics, and was awarded the Google Prize for “Most Interesting and Creative Work.” Most recently, she was designated an Egyptian Woman of Influence globally by the Women Speakers Association and contributed a multidimensional model in preparation for the new generation of the United Nations Millennium Development Goals beyond 2015 in support of women.

Mag. Markus Schuller, MBA, MScFE
Markus Schuller is the founder of Panthera Solutions, a Strategic Asset Allocation Consultancy in the Principality of Monaco. Panthera Solutions provides access to the third generation of portfolio optimization techniques to European institutional investors. Panthera’s monthly macro-newsletter (PSC) reaches 10,000+ finance professionals in Germany/Switzerland/Austria and is regularly published in German quality newspapers.

Markus has over 15 years experience in trading, structuring and managing standard and alternative investment products and was working at banks and asset management companies prior to Panthera Solutions. He graduated from his Master in Economics at Johannes Kepler University and University of Pittsburgh, his MBA at the International University of Monaco and his MSc in Financial Engineering degree at IUM. Since 2009 Markus is teaching the courses "Portfolio Theory & Alternative Assets" and "Investment Banking" at the International University of Monaco and established a 3-day workshop on “Third Generation Multi-Asset & Risk Management”, together with Deutsche Börse and Vienna Stock Exchange.
Bibliography


Jones B (2011) Third Generation Asset Allocation. Deutsche Bank Research, Hong Kong


Maturana H, Varela F (1992) Tree of Knowledge. Shambhala; Rev Sub edition


McCracken M (2009) How Accurate are forecasts in a recession. Federal Reserve Bank of St Louis Publication, St. Louis


Rittereiser C (2013) The Portfolio Whiteboard Project, Uncorrelated LLC

Bibliography


Appendix I

1. Generation
1950 - 2000
Traditional Beta & Long-term Investment Horizon

2. Generation
2000 - 2010
Multi-Asset-Diversification & Globalization of Allocation

3. Generation
2010 -
Dynamisation of Multi-Asset-Allocation & Diversification via Risk Factors

Dominant Characteristics of 1st Generation
- Quantitative optimization via Mean-Variance
- Diversification as theme – explains popularity of mutual funds
- Diversification via traditional asset classes - stocks, bonds, real estate and cash
- Single-Factor and Single-Period models dominate
- Home Bias
- No use of risk budgets

Dominant Characteristics of 2nd Generation
- Quantitative optimization via Mean-Variance and Minimum-Variance (for equity exposure)
- Diversification via traditional and alternative asset classes (leverage-sensitive: HF, PE, Infrastructure)
- Multi-Factor and Multi-Period models dominate
- SAA & TAA distinction
- Active management - Asset classes managed by specialists

Dominant Characteristics of 3rd Generation
- Asset Allocation via risk factor diversification
- „Real“ active managers (vs beta players) receive larger freedom
- Alternative Assets extended by catastrophe bonds, carbon credits, intellectual property rights & longevity swaps
- SAA & TAA distinction loses explanatory power – see DSAA
- Emancipation from MPT-Family

Disclaimer

This material is for your information only and is not intended to be used by anyone other than you. It is directed at professional clients and eligible counterparties only and is not intended for retail clients. The information contained herein should not be regarded as an offer to sell or as a solicitation of an offer to buy any financial products, including an interest in a fund, or an official confirmation of any transaction. Any such offer or solicitation will be made to qualified investors only by means of an offering memorandum. The material is intended only to facilitate your discussions with Panthera Solutions as to the opportunities available to our clients. The given material is subject to change and, although based upon information which we consider reliable, it is not guaranteed as to accuracy or completeness and it should not be relied upon as such. The material is not intended to be used as a general guide to investing, or as a source of any specific investment recommendations.

Past performance is not a guide to future performance. Future returns are not guaranteed and a loss of principal money may occur.

© 2013 Panthera Solutions. All rights reserved.