

Backgrounder: Reconnecting risk & return

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This PortfolioConstruction Forum Backgrounder was conceived and published by PortfolioConstruction Forum as core pre-reading for those wanting to get the most from PortfolioConstruction Forum Conference 2014, whether attending live or after the fact via the online Resources Kit.

INTRODUCTION

The last decade has seen a distinct disconnect between investment risk and return, versus what we're taught should be the case. Up to the Global Financial Crisis, many asset classes and investments were providing seemingly risk-free return. Since the GFC, the opposite – return-free risk – has been the hallmark of many asset classes and investments, while others have performed beyond all expectation. As if to emphasise the point, in the past six months, the VIX has reached lows similar to those seen before the GFC. How can we reconnect risk and return in portfolios?

This Backgrounder reviews the long-term relationship between risk and return. It looks to help recalibrate expectations around how much is actually gained from investing in risky assets, and whether there are ways to beat the traditional risk/return relationship. Intentionally, it does not attempt to add to or extend the current research and literature. This is the arena for PortfolioConstruction Conference 2014. This Backgrounder aims to inform and set the scene for delegates as well as Members who don't attend the live program but instead "attend" it afterwards via the online Resources Kit.

This Backgrounder was researched and authored by PortfolioConstruction Forum's Accreditation Editor, Angela Ashton. We acknowledge and thank Professor Jack Gray (UTS), Tim Farrelly (farrelly's Investment Strategy), Michael Kitces (Pinnacle Advisory), Mark Thomas (Mark Thomas Financial Services), and Michael Furey (Delta Research & Advisory) for their useful comments and feedback on this Backgrounder.

We trust this Backgrounder increases your understanding of the past and current relationship between risk and return – and that, combined with the materials available in the online Conference 2014 Resources Kit, it helps you reconnect risk and return in portfolios.



Graham Rich, Publisher, PortfolioConstruction Forum

INTRODUCTION

The last 30 years or more have been unusual for investing – a long-term bond rally has fuelled increasing equity valuations, giving lots of return for not much risk. The relentless bull market lasted until 2007/08 when the placid risk/return relationship many had become to believe was normal in fact exploded.¹

While it has a few permutations, return is fairly straightforward. Whether we measure time-weighted, dollar-weighted, compounded, long-term or short-term returns, it usually does not take a lot of work on the part of the diligent to uncover the facts about an investment return.

However, definitions of risk abound – political, economic, market, idiosyncratic, tail, style, concentration, relative, diversification and manager risks to meaningless lists in PDSs, measures such as standard deviation, Greek letters and endless ratios.

But what is the real risk that portfolio construction practitioners face in their everyday work?

PortfolioConstruction Forum's view is that the most important investment risk to be addressed, above and beyond all others, is the risk of clients not meeting their investment goals. Portfolio balances are, after all, simply a means to an end – they contribute to the attainment of our goals and desires in life. [Thinking about risk in these terms moves the focus from maximising returns for a given level of risk, to minimising or managing 'risk' given a specific goal. For more on this topic, refer to PortfolioConstruction Forum's [2013 Issues Paper: Lifecycle Investing](#).]

Every other imaginable investment risk, from those listed above to the unknown unknowns, impacts on this central risk.

During the Global Financial Crisis, it became clear that the genuine nature of investment risk was not completely understood by many. It became obvious (yet again) that the standard Capital Asset Pricing Model (CAPM) approach to risk and return is at best a simplification of the real world.

In building portfolios to meet clients' investment goals, we must contend with non-normal return distributions, time-varying correlations and markets that are not always efficient. We must ensure more stable strategies for clients by using non-stable building blocks. It's no wonder there has been a surge in popularity of investment approaches, systematic or otherwise, that claim to manage risk while providing better than index returns with some degree of consistency.

This Backgrounder aims to reconnect risk and return – to help recalibrate expectations around how much is actually gained from investing in risky assets, and whether there are ways to beat the traditional risk/return relationship. It does this by:

- Firstly, examining the long-term relationship between risk and return.

- Secondly, considering some of the ways available to (perhaps) exploit or beat the standard risk/return relationship. In some ways, these are anomalies because they should not exist if CAPM, Modern Portfolio Theory (MPT) and the Efficient Market Hypothesis were fully correct.

In examining each anomaly, we review both the theoretical basis for it, and practical evidence of it, and try to quantify the size of each prospective return premium. But, this is difficult. Most return premia are time-varying, if they exist at all.

And, we look at bending the risk/return relationship from the point of view of enhancing return, and then from managing risk.

Many of the potential return enhancing techniques focus on equities, while many of the risk management techniques necessarily focus on multi-sector portfolios. This is a potential limitation in the discussion. There are also a number of valid approaches that are not considered in this Backgrounder, primarily due to time and space constraints.

Further, at times, for the reader's ease, certain approaches have been categorised as being part of the same theoretical family. This has been done based on information gleaned from the references cited. Because many of these approaches are new, and much of the theory is evolving, some commentators will disagree with the categorisation approach put forward, and we acknowledge this.

This Backgrounder reflects what we believe are consensus views, based on the literature at the present time. There is no intention to make any judgment on any approach or where it might fit into the theoretical landscape.

Some people will disagree with aspects of this Backgrounder, and this is to be expected – and encouraged – for that is the nature of Socratic debate, which is one of the primary aims of PortfolioConstruction Forum (a "forum" being a meeting or medium where ideas and views on a particular issue can be exchanged).

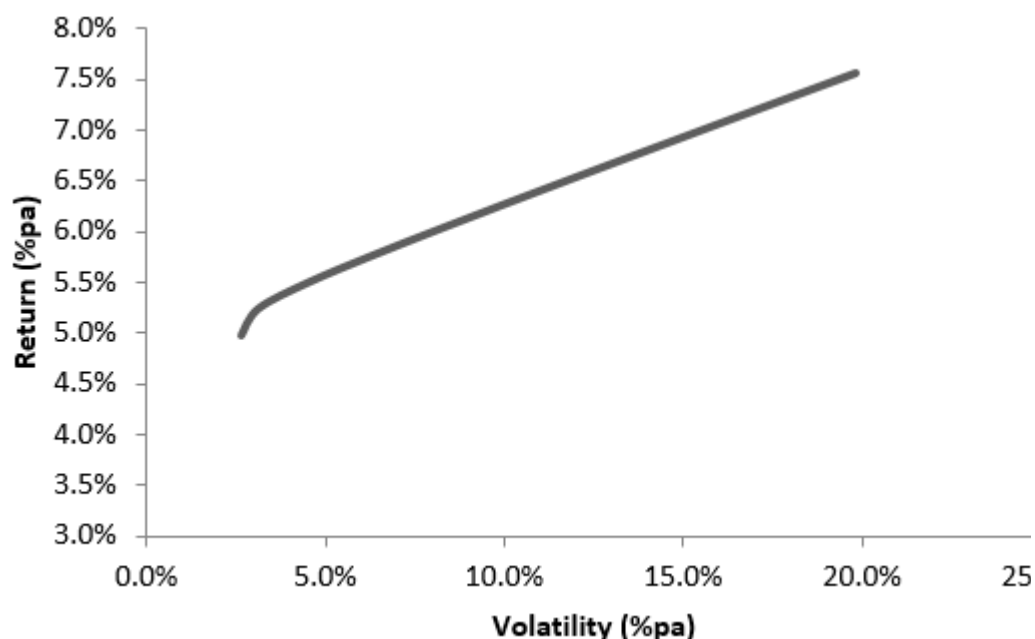
2. THE LONG-TERM RELATIONSHIP BETWEEN VOLATILITY AND RETURN

Volatility, being the standard deviation of returns, remains the most common definition of investment risk. It is certainly the easiest to measure (but remains hard to predict). Both theory and practical experience tell us that investments with higher volatility should provide greater returns in the long run.

However, we generally do not have a good understanding of how much volatility is required to generate extra return. Further, even over the very long term, excess return to equities is not assured. That is, after all, the very nature of risk.

Figure 1 presents a typical risk/return graph based 100 years of data for US equities and US 10-year government bonds.² It is clear that the volatility/return relationship has held in the US market over the time period measured. Figure 2 provides the same data in table form, showing the mix of equities to bonds in the portfolios.

Figure 1: Volatility and return – US equity/bond portfolios – 1914 to 2014



Source: Portfolio Construction Forum analysis based on US equity and US 10-year US government bond data sourced from Robert Shiller's website (<http://www.econ.yale.edu/~shiller/data.htm>).³

Figure 2: Return and volatility – US Equity/Bond Portfolios – 1914 to 2014

Portfolio	Return (%pa)	Volatility (%pa)
100% Equity	7.57	19.85
90% Equity / 10% Bond	7.31	17.87
80% Equity / 20% Bond	7.05	15.89
70% Equity / 30% Bond	6.79	13.92
60% Equity / 40% Bond	6.53	11.97
50% Equity / 50% Bond	6.27	10.03
40% Equity / 60% Bond	6.01	8.11
30% Equity / 70% Bond	5.75	6.25
20% Equity / 80% Bond	5.49	4.52
10% Equity / 90% Bond	5.23	3.11
100% Bond	4.97	2.63

Source: Portfolio Construction Forum analysis based on US equity and US 10-year government bond data sourced from Robert Shiller's website (<http://www.econ.yale.edu/~shiller/data.htm>).³

Over the last 100 years, the risk premium for US equities over 10-year US Government bonds has been about 2.5% per annum.⁴ This is probably lower than what would be commonly expected. It is evident that the addition of equities (or riskier assets) increases portfolio risk or volatility by a significantly greater amount than it increases return. So, to summarise the stakes: we can take on significant risk for small amounts of potential additional return. For every 10% of a portfolio that is re-allocated from equities to bonds, we could expect about an additional 0.25% per annum return and around 2% per annum additional volatility.

It can be argued that the data used is not indicative of the Australian equity market. For Australia, the equity risk premium has been significantly higher since 1900. In fact, it has been the highest in the world, at around 5.7% per annum since 1900⁵. This means a 10% re-allocation from bonds to equities could add approximately 0.6% per annum to returns. However, the Australian equity risk premium has been only 1.0% per annum since 2000.⁵

Further, other equity markets have shown negative risk premia over long time periods. For example, the Russian market has had an equity risk premium of -0.4% per annum since 1996, after having completely failed (that is, a loss of 100%) at the time of the Russian Revolution. The Chinese equity market has had a -5.2% per annum equity risk premium since 1993.⁶

The average equity risk premium across developed countries since 1900 has been about 3.0% per annum.⁷ Again, this is probably again much less than most realise.

Regardless of the exact numbers, the overall take out is clear – adding equities to portfolios adds what some might call significant risk for the possible incremental return enhancement. Hence, any value that can be added systematically to equity returns is very valuable, as is any management of the volatility, particularly if it means the traditional risk/return relationship can be bent.

2. CAN WE BEAT THE MARKET?

The risk/return relationship is not necessarily a proven one. Risk (in this case, volatility) is taken on in the hopes of receiving excess return. But it is never a guaranteed relationship. And, it is only human nature to look for a free lunch. Is there a way to can enhance the reliability of excess returns? Can returns above the market be generated in a systematic way?

This Backgrounder first examines some of the current approaches to generating excess returns, looking primarily at single sector approaches. There is very little research available in the multi-sector space, beyond the areas of dynamic asset allocation and tactical asset allocation. Later, this Backgrounder looks at approaches that aim to manage volatility and many are multi-sector approaches.

The return-based approaches considered here are:

- The Three Factor Model (and beyond)
- Smart Beta-based approaches (equal-weighting and FUNDamental Indexation)
- Active Management
- Hedge Funds

The risk-based approaches examined:

- Smart Beta-based approaches (low volatility or minimum variance, risk momentum and risk parity)
- Risk Factor Investing

It might be argued that the above categorisation is arbitrary. We agree there is 'greyness' to the approach. However, it does not change the conclusions to any appreciable degree.

3. RETURN-BASED APPROACHES

3.1 CAPM, the Three Factor Model and Beyond

The Capital Asset Pricing Model (CAPM) was developed in the 1960s, building on the work of Markowitz. It posited that only two variables helped to determine stock returns – beta and idiosyncratic risk, as markets were efficient and priced only risk.

French and Fama's seminal 1992 paper⁸ showed, however, that stocks with low Price/Book (P/B) ratios (cheap or value stocks) or those small in size performed better than they should, based solely on beta. Hence, they proposed a three factor model (beta or market, size and value) that explained stock returns more fully than CAPM.

Further studies have extended this. A four factor model, which includes momentum, was devised in 1997 by Carhart⁹. Many other models have been built and tested since with inclusion of some factors and exclusion on others.¹⁰ Recently, French and Fama released a paper on a five factor model that includes a profitability (profit to assets) factor and a capital investment¹¹ (the less capital investment a company is undertaking, the better) factor.^{12 13} Both factors are variants of 'quality' and are based on the Dividend Discount Model. There is some dissent as to their efficacy.¹⁴

Although value and size premia are well known, it should not be considered a lay down misere. There are definitely dissenters (such as John Bogle), while some funds management groups that use these factors have raised billions.

French and Fama argue that their two factors work due to excess volatility, so the higher returns are an extension of the standard volatility/return relationship. However, this seems to confuse beta with other factors and there are claims to having discredited it.¹⁵

Behavioural finance might hold the answer. This would theorise that there is more to an investment than return and risk. Investments, like all possessions, provide utilitarian, expressive and emotional benefits (think, for example, SRI funds). Humans prefer ideology over facts and stories over data.¹⁶ If large, popular, liquid stocks provide those benefits, their price may be bid up and their future performance may be weaker as a result¹⁷ – and hence, the rationale for ongoing and persistent value and size premia. This may also help to explain a momentum anomaly, to some extent.

So how big are these premia? Unfortunately, there is no clear answer. The premia are time varying and may even be negative for long periods. Further, Fama and French found that the value premium is much more consistent and stronger than the size premium.¹⁸

3.2 Smart Beta

Smart Beta has really made its way into our lexicon since the GFC. However, the idea has been around for quite a long time. Smart Beta usually refers to any index-based investment approach that uses a method other than market capitalisation to build its benchmark. Some of the approaches are returns-based (considered here), while some focus on risk (considered later in this Backgrounder). It can be a catch-all phrase and some will disagree with the categorisation of some approaches as being Smart Beta. As stated previously, this Backgrounder presents what our research has found to be the current consensus view.

The theoretical basis for Smart Beta approaches is that market capitalisation-weighted indices may not be optimal. For example, some assert that market cap-weighted indices are systematically overweight expensive stocks and underweight cheap stocks. Smart Beta strategies, then, have been described as new approaches that "aim at adding value in the presence of possibly efficient markets but severely inefficient cap-weighted benchmarks".¹⁹ Proponents believe market cap-weighted indices get values wrong systematically.

A further justification for the Smart Beta approach is that the standard mean-variance approach, because it is an optimisation technique, is very sensitive to the inputs used. Small changes to the inputs (return, risk, correlation) in an unconstrained optimisation can yield very different portfolios.²⁰ In contrast, many Smart Beta approaches are more robust – portfolios will not change a great deal with small changes in inputs.

Smart Beta approaches are effectively a mid-way house between standard passive investing and active investing in that they invest passively based on an index that is not market weighted. In that way, they can avoid issues such as concentration risk (consider the make-up of the S&P/ASX200 in Australia, for example).²¹

Smart Beta has become comparatively popular with institutional investors globally over the past few years, with the most-used strategies being the fundamental indexing-based approaches. As a result of the overwhelming popularity of some approaches, there are already some concerns around capacity and whether we may see these premia dissipate.

In considering Smart Beta strategies, it can be useful to think of them as falling into three distinct buckets:

- Fundamentally-based strategies – for example, fundamental indexing. These use alternative valuation or return methods.
- Comparatively naïve or more passive strategies – for example, equal weighting. These generally aim to increase diversification. Theoretically, this will include the Three Factor Model, as well.
- Risk moderation-based strategies – for example, minimum variance portfolios, low volatility, risk parity approaches.^{22 23}

Like many of these lists, there will be debate over which strategy fits where. Here, this Backgrounder will consider the first two approaches. Risk moderation strategies are considered later.

One of the most important criticisms of Smart Beta approaches is that, in some cases, it is unclear why the underlying market inefficiency might exist. There may be no logical or behavioural reason, so some of the results may be due to data mining. Nonetheless, there are some approaches where the reasons are quite clear.²⁴

There is also quite a lot of debate about the efficacy of these approaches. Some studies have shown that they add value²⁵ while others have found that while they add value, the excess returns can be attributed in significant part to known factors, primarily value, size and momentum. One Australian study showed that in the Australian market, a fundamentally-based approach did add value but this was largely explained by the value bias of the resulting portfolio.²⁶ Others believe any excess return is matched by increased risk.²⁷ Still others refute all of these claims, showing that the approaches add alpha above and beyond the well-known premia of value, size and momentum.²⁸ Nonetheless, some academics, including Bill Sharpe, think that Smart Beta approaches are rubbish.²⁹ Others point to the fact that Smart Beta approaches don't add value all the time.³⁰

What can we expect in terms of size of the premium? There are no hard and fast rules. If the premia are not just the result of random performance patterns, they are time varying. Essentially, the jury is still out as to whether all, or any, of them are real. Again, in many cases, there is no real theoretical justification as to why such premia should exist.

It is beyond the scope of this Backgrounder to discuss all existing Smart Beta approaches. As a result, it considers in a little more detail – one naïve approach and one fundamental approach.

3.2.1 Equal Weighting Approach

As the name suggests, Equal Weighting Approaches equally weight all stocks or assets in an index, rather than using market capitalisation to weight them. Compared to their likely weight in a standard market cap-weighted index, an equal weighted approach will overweight smaller cap and value stocks. This will mean any resultant fund or index will have both a small cap and value bias. Larger companies or industries will not dominate. If the three factor model works, then it is likely that this approach will lead to higher returns than a market cap-weighted index – however, French and Fama showed it is likely to have higher volatility as well.

It is also likely that the approach will garner some performance benefits from rebalancing, if we assume mean reversion in stock prices exists.³¹

Research shows that returns to this approach have been better than a market cap approach, on a volatility-adjusted basis over the tested time period of about 40 years.³² However, there are a number of issues. In practice, rebalancing costs can be very high, to the point where total returns are undermined.³³ Long periods of underperformance will also occur. Further, virtually all outperformance has been found to be due to the two factors previously mentioned. Other studies show that the approach is more risky during market downturns.³⁴

3.2.2 Fundamental Indexing

An alternative method of indexing is based on the fundamental characteristics of stocks (that is, price insensitive characteristics). Characteristics used can include revenue, book value, employment, cash flow or any other relevant metric. The first studies into this approach showed long-term outperformance of about 2% per annum over standard equity market indices.³⁵ The best known of these has approaches has been developed by Research Affiliates. Known as RAFI (Research Affiliates Fundamental Indices), this particular technique is based on book value, employment and a factor made up of cash flow and other income-related measures.

Proponents of the fundamental indexation claim it systematically takes advantage of times when stocks deviate from fair value (both upwards and downwards).

Detractors have a number of arguments:

- The approach assumes that the same stock characteristics (ie. those used to determine the fundamental weight) are relevant in determining stock market value regardless of market sector;
- Price movements may well be justified (and therefore not a movement from 'fair value'); and/or,
- That it is really just value investing in another guise.^{36 37}

Performance of fundamental index products (which now include ETFs) has been mixed. Long-term studies conducted by Arnott et al suggest a premium of about 2% per annum is available. However, recent shorter-term studies based on existing ETFs rather than historic data show excess return is sporadic.³⁸

3.3 Active Management

Clearly, the theoretical basis for an ability to beat standard risk/return relationship lies in the idea that the market is not efficient. The basis of that inefficiency is open for debate – information asymmetries, behavioural biases, luck, etc.

The dispersion of performance results between active fund managers does make the search meaningful. For the five years ended 31 March 2014, dispersion between the top and bottom

quartile US large cap growth funds was nearly 3% per annum. If we can find consistently outperforming managers in advance, this is a very worthwhile exercise.³⁹ And, some managers do seem to beat the index, particularly in the short-term. But the key question lies in whether we can predict which managers are more likely to do so.

But, the debate as to whether managers can add value consistently, is long, contradictory and far from resolved.

In 1968, Michael Jensen (of Jensen's Alpha) was amongst the first to write about the seeming inability of fund managers to add return beyond standard market indices. However, he noted that funds did provide good diversification, helped keep markets somewhat more efficient, and therefore provided some risk reduction for all market participants.⁴⁰

Since that time, numerous studies have shown that the average fund manager does not outperform the market after fees and expenses. However, some research has shown that a "significant minority" of active managers do add value, particularly hedge funds.⁴¹

In terms of how value can be added through active management, Grinold's "Fundamental Law of Active Management"⁴² is well accepted. He showed that value add is a function of managerial skill and the breadth (usually defined as lots of stocks to choose from, but there needs to be some independence, or low correlations, between them) of the available opportunity set. This means the keys to active investment management are having many positions to choose from and having skill across as many positions as possible. In other words, holding more positions in a portfolio means a skilled manager is more able to outperform. The formula Grinold derived is:

$$\text{Information Ratio} = \text{Information Coefficient (skill)} \times \text{Square Root of (Breadth)}$$

The conclusion that can be drawn from the Fundamental Law is that the best way to nurture outperformance, when using managers of some skill, is to ensure the fund manager takes a lot of positions (and has skill across those positions), combines models as much as possible, and doesn't market time or indulge in tactical asset allocation.⁴³

In contrast to Grinold's work, a series of recent Australian studies showed that fund managers do have stock picking skills but the broad diversification demanded by most fund investors destroys any value-add available.⁴² Fund managers' top five active positions were shown to provide significant excess returns over more diversified portfolios (about 2% per annum) with good Sharpe ratios, but much of this value dissipated with further positions held. Long/short portfolios based on a manager's top five best and worst bets perform even better again, returning 10% per annum alpha over 15 years.

The conclusions drawn were that, on average, managers do have good stock selection skills but that these are often compromised due to fund constraints. More aggressive funds do tend to add value. Younger and smaller funds (often those with no reputation) also add more value because they generally hold more concentrated, active portfolios.⁴⁴

It is also often thought that the efficiency of the actual market being invested in is key to the ability to add value on an ongoing basis. Consider, for example, that the standard argument for using active managers in emerging markets is that, because markets aren't efficient, managers can add value. However, there isn't significant research to support this. Further, breadth (as defined by the Fundamental Law) and efficiency are not the same thing.

One of the limitations of much of the current analysis is that much of it has used US equity funds only, due to the lack of other data. In a recent paper, Huij and Lansdorp (2012) expanded the universe to analyse fund data across 20 asset classes, including bonds and equities.⁴⁵ This paper finds that there is persistence in outperformance, and it is statistically significant. For example, for US small caps funds, the performance differential between 'winner' and 'loser' US small cap funds was 0.84% per annum.

The same paper also shows that persistence is more evident for active managers in markets with greater breadth, rather than less efficient markets. In fact, it found that there was no relationship between market efficiency and value add. However, persistence was only measured over the very short term, which is of limited value to most investors.

It remains to be seen if the results can be replicated for longer time frames.

3.4 Hedge Funds

Given the nature of this first part of this Backgrounder, we have not considered managed futures funds or other similar funds. There is a lot of speculation and even a number of informal studies based on small data samples on the topic of hedge fund performance. However, there is surprisingly little good quality work in the academic literature.

As quoted earlier, work by Ron Bird, an Australian finance professor, suggests that good managers have sufficient stock picking skills to generate alpha in a long/short environment. Bird's work suggests that a concentrated long/short portfolio could generate an average of 10% per annum alpha. This is a theoretical finding, however, and does not take account of issues such as fees.

Another recent study by highly regarded academics Ibbotson, Chen and Zhu looked at returns from hedge funds using a database of about 6,000 funds globally.⁴⁶ They concluded that from 1995 to 2009, hedge funds displayed alpha of about 3.0% per annum. This was after fees (which were high at around 3.4% per annum) and after adjusting for survivorship bias. They found that larger hedge funds tended to perform better. Other studies, using more advanced mathematical techniques, confirm outperformance in both equity and bond based strategies.⁴⁷

A further study by Kosowski, Naik and Two found a high dispersion of returns, about 5.5% per annum, between the top and bottom decile hedge funds. This particular study suggests that outperformance is not based on size, age, past performance or backfill bias, or serial

correlation. These dispersions also show persistence, meaning that an ability to choose good hedge funds could lead to good outperformance.⁴⁸

However, outperformance is not easy to find. Fung and Hsieh (2011) showed that less than 20% of long/short funds had added significant, persistent alpha. Most of the return from long/short funds was found to come from other factors – stock market beta, small cap bias, price momentum and market activity. In contrast, long-only funds had no significant, persistent, non-factor related return (that is, no alpha).⁴⁹

How does one choose a good hedge fund? Is it as simple as finding young, small funds? The question of the impact on performance of the age and size of a hedge fund has been the focus of a number of studies. The results are mixed. Some studies point to some outperformance from younger, smaller hedge funds, while others find the opposite is true. An example of a study that found outperformance in younger funds showed that their total performance fell by about 42 basis points per annum each year after inception. That particular study found this effect to be quite persistent, with early strong performance lasting for up to five years.⁵⁰

Although there seems to be fairly consistent evidence that some value can be added in a fairly persistent manner by some hedge funds, there are a number of issues or arguments that mean that value is difficult to find:

- The higher levels of fees in these funds may significantly affect the alpha available to investors;
- Liquidity may be an issue; and,
- The characteristics of potential outperformers is unclear.

4. MANAGING VOLATILITY

The idea of managing volatility in portfolios has been extremely popular with institutional investors since the GFC. As a result, the number of commercially available approaches in this area has exploded.

Some of the approaches which have increased in popularity over the past five years or so include those aimed specifically at volatility measurement/management, such as Risk Parity which is an approach that equalises the volatility of each asset class in a portfolio. Others look at managing risk in a completely different way, such as Risk Factor Investing, which looks at the underlying factors that drive asset class performance.⁵¹

Some are considered Smart Beta approaches, while other commentators disagree very strenuously with this categorisation. In this Backgrounder, we have provided the most current view of how each approach is categorised. However, as it is such a new area, opinions abound and there will be those who vehemently disagree with the approach taken here. Regardless, these are arbitrary classifications. Readers can look beyond the classification to the meat of the topic – is it possible to extract some sort of systematic excess return or volatility reduction premium by using these approaches?

In reviewing approaches that are aimed specifically at lowering volatility, there are few methods that manage risk at the asset class level. Most approaches, consider multi-sector portfolios. Even if they do focus on risk in each asset class, portfolio construction is considered integral into these approaches. For example, Risk Parity builds a portfolio such that the volatility contribution of each asset class is similar. Overall, most of the approaches to managing volatility are more mathematical in methodology.

As many of the following methodologies are quite new, there is a lot of marketing literature available, but far less academic literature. At this stage, live performance results (as opposed to back tested results) are not well known, or exist over short timeframes only. Further, given their very quantitative nature, most of these methodologies will be difficult for portfolio construction practitioners to implement themselves. Access to these approaches is most likely to occur through managed funds.

However, there are aspects of some of these styles that can provide insights to all portfolio construction practitioners as to how to think differently about portfolio construction and, perhaps, improve their own portfolio construction skills.

4.1 Smart Beta Approaches

There are a number of Smart Beta approaches that focus on managing volatility. Again, it is not the remit of this Backgrounder to discuss all of them in detail. Here we consider three approaches: Low volatility investing, risk budgeting and Risk Parity. For those interested in considering further approaches, the most important of the remaining methodologies is

arguably Maximum Diversification Investing.

4.1.1 Low Volatility Stocks

This investment approach, also known as the minimum variance anomaly, dates from studies conducted in the early to mid-1970s by Robert Haugen and James Heins.⁵² Although the case can be made that this is a Smart Beta approach, this particular anomaly was studied initially before that phrase came into existence and was really the first of its kind.

For many years, Haugen claimed that low risk stocks have higher expected returns, completely at odds with CAPM, and kept publishing studies in an attempt to prove it. Most people ignored him. However, various studies he conducted showed that it did provide superior returns from 1926 (being the earliest date data was available) onwards in the US and in all developed markets from 1990, with lower volatility.⁵³

Why might a low volatility anomaly exist? Some research suggests that those stocks have higher operating returns.⁵⁴ Other research hints at behavioural reasons. In particular, there are four reasons commonly cited as to why low volatility stocks should outperform:

- People over allocate to high volatility stocks due to leverage limitations and in search of high returns (and therefore bid prices up);
- People enjoy the lottery aspect of high volatility stocks;
- Analysts tend to be over optimistic on high volatility stocks; and,
- Many institutional investors will not buy low volatility stocks due to tracking error constraints.^{55 56}

However, research also shows that the low volatility factor has a high correlation with the value factor.⁵⁷ It may be value dressed up in a slightly different way.

The return premium Haugen found was about 2% per annum, based on US equity return data from 1967 to 2012 with an approximately a 20% drop in volatility. International equity returns were enhanced by more, by around 3%.⁵⁸

4.1.2 Risk Budgeting

Risk Budgeting, in one form or another, has been used by investment professionals for a long time. It can be as simple as setting a risk level for a portfolio in total, or can be much more complex. It can be used in conjunction with standard portfolio construction techniques (for example, a standard strategic asset allocation approach with a set limit for risk) or as an over-arching process to build and manage portfolios. The GFC has increased awareness and popularity of this technique. Newer forms of Risk Budgeting (which is the focus here) are considered by some to be Smart Beta approaches, but did stand on their own for many years.

In Risk Budgeting, portfolios are built with contributions to volatility being the initial consideration, rather than contributions to return. The aim, then, is to diversify risk, rather than focus on maximising return. However, the approach can ignore correlations. This is obviously problematic given that correlation can be one of the most valuable tools in lowering volatility.

There are a few different definitions of Risk Budgeting in the literature. The two primarily considered here are:

- A budget for risk is set at the portfolio level; and,
- A budget for risk is set at the asset class level (being part of a multi-sector portfolio). These are not necessarily equal for each asset class.⁵⁹ The special case where risk for each asset class is set at the same level is known as Risk Parity.

Both or a mix of both of these approaches can also be used when using in a Risk Budgeting approach. Risk in a Risk Budgeting approach can be based on volatility, tracking error, stress testing, marginal contribution to volatility or even Value at Risk (VaR). These can be derived using historical data or forward-looking scenario analysis, amongst other options.⁶⁰ Any resultant portfolio will differ depending on the approach used. Some groups will also include information ratios and other measures as part of the process.

The real advantage of these approaches is the understanding of risk and sources of risk that users develop. This means portfolio construction becomes more robust.⁶¹ It does not have to be prescriptive, it can be used as just a framework for discussion.⁶² Some research does show that it can deliver better return/volatility outcomes, primarily due to its focus on risk, but it will depend on exactly what any manager or fund actually implements.⁶³

However, these approaches are extremely difficult for an everyday portfolio construction practitioner to implement and manage. The approach is really only available to institutions or through a managed fund.

4.1.3 Risk Parity

Risk Parity is a specific case in the Risk Budgeting world. In a typical 60% equity, 40% bond portfolio, over 90% of the volatility is due to the exposure to equity assets. So, although the portfolio may be balanced from an allocation point-of-view, it is not balanced from a volatility point of view. The idea of Risk Parity came about as a result of this observation.⁶⁴ A Risk Parity portfolio is a portfolio where volatility contributions from each asset class in the portfolio are set so they are equal, either through asset allocation (a huge overweight to bonds, for example) or by using gearing, which can occur either at the asset class level or over the whole portfolio.⁶⁵

Usually, the array of assets used in the portfolios are quite broad, so that sources of risk are diversified and imperfect correlations are maintained. Given this diversification, some Risk

Parity approaches (those that gear each asset class separately) would then have portfolio volatility levels that are much lower than a standard portfolio.

However, the founder and most well-known proponent of Risk Parity, Ray Dalio of Bridgewater Associates, actually defines things slightly differently. He defines Risk Parity as a portfolio where expected returns from each asset class are set to the same level, and this is how he manages his All Weather Fund.⁶⁶ For example, bonds are levered enough to have the same expected return as equities. According to Dalio, this means the risk of the levered bonds is roughly similar (but not the same) to equities.⁶⁷ The All Weather Fund has performed very well, although it has had some difficult periods. However, it does not simply build a static portfolio. It is very actively managed, to reflect views on correlations, volatility and returns.

Regardless of definition, Risk Parity has become popular since the GFC, with the launch of a number of funds by different managers. Most of these approaches target a specific level of volatility (eg. 10% per annum).

Although Risk Parity in its different forms has been used for quite a while, there has not been, until recently, a theoretical basis for the approaches. Recent work by Asness has suggested that many investors have leverage aversion.⁶⁸ MPT assumes that investors can lever the optimal portfolio to increase returns, if required. As many investors cannot or will not lever, they instead overload portfolios with risky assets in an effort to increase returns. The prices of these assets are therefore bid up, and do not provide the anticipated returns as a result. This is a similar argument to that for low volatility stocks, so there may be some basis for it. Nonetheless, other recent studies dispute the existence of this effect.⁶⁹

The major issues with the approach are fairly self-evident. Depending on the exact approach taken, it can lever low risk assets such as bonds, sometimes quite significantly, in order to ensure the risk those levered bonds generate is similar to that from equities. Given return distributions have negative skew (ie., the drawdowns can be large), high levels of gearing may lead to poor outcomes especially in times of crisis.

Other issues include the measure of risk or volatility used. Backward-looking volatility measures have the same issues as backward-looking return measures. They may hold no information about the future.

Further, some argue that the underlying idea of Risk Parity – that ensuring each asset class has a similar overall volatility in a portfolio will help to diversify risk premia – is not correct because some asset classes just don't have a risk premium associated with them (eg., commodities). According to this argument, you forgo risk premia such as the equity risk premium using this approach.⁷⁰

Others would further argue that the past 30 or so years would have been a good time for strategies such as this, as bond returns have been good. However, bond returns over the next 30 or so years may not be so good.

Research suggests that Risk Parity may outperform on a risk-adjusted basis, under certain market circumstances and over certain time periods.^{71 72} However, there is no real guidance on the level of outperformance that might be possible.

4.2 Risk Factor Investing

Although this is considered here under the general category of risk-based approaches, it could just as easily have been considered a return-based approach.

Asset classes are the traditional building blocks of portfolios. Low correlations between these asset classes provides diversification benefits. However, another way to think about asset classes is that they are a collection of other risks or factors, such as inflation and GDP growth, or even value or size. These factors are the things that drive returns. For example, equity returns might be driven by inflation, gearing, value, size, global GDP growth and currency.

An analogy which is sometimes used to explain risk factors is that of food. We eat fruit, meat, cereals and other things. But the underlying 'factors' we consume are protein, fat, fibre and so forth. Factors can be gained across asset classes, or can be solely related to a single asset class. For example, equity and corporate bonds both have exposure to credit risk.⁷³ A good factor is one where there is a theoretical basis for its existence, it can't be diversified, it displays persistence and for which data can easily and reliably be found (such as inflation).⁷⁴

Using this approach, portfolios are built on risk factors, rather than asset classes. Research has shown that the correlation between factors is lower and more robust than those between asset classes, partly due to the fact that many asset classes have exposure to similar factors, without the investor fully appreciating this, like corporate bonds and equities.⁷⁵ This then allows an investor to diversify a portfolio according to its underlying drivers, potentially providing better diversification. This approach can also be used to budget risk if required.⁷⁶

Clearly, this approach only works if the factor structure of assets can be correctly identified. Different investors and academics will use different approaches to identifying factors. Factors that generally have some merit and are often used include:

- Real interest rates
- inflation
- Term premium
- Credit
- Economic/GDP growth
- Liquidity
- Political

- Style including value, momentum, size
- Volatility

There are a number of advantages to this approach. Some would argue that it allows for a better understanding of risk return trade-offs, better harvesting of return premia and monitoring of diversification.⁷⁷

However, research results are mixed.⁷⁸ Over longer periods, there seems to be some excess return and/or risk reduction through factor investing. As a general rule, however, return premia are not stable and therefore the size of any premium available is inconsistent.

Similar issues to those with standard portfolios remain – correlations aren't stable and each factor is rewarded differently during different economic periods. For example, from 2008 onwards, real interest rates were highly rewarded but this may not be the case going forward.^{79 80} Further, the persistence of factors can't be taken for granted. Size, for instance, has not provided excess returns for around a decade. Whether it works is a subject of some debate.

CONCLUSION

The purpose of this Backgrounder has been to begin recalibrating expectations about the relationship between risk and return. This is particularly important in light of the distortions to the risk/return relationship over the past 30 years.

Early in this Backgrounder, it is shown that the returns of the past 30 years are not in line with long-term averages and that the incremental value added by the addition of equities to a portfolio is probably lower than expected generally. Any approach that can help provide a free kick in the risk/return stakes should be valued. This Backgrounder has considered a significant number of approaches that aim to do just that. Some are 'traditional' approaches, such as active investment management. Other approaches are quite theoretical and represent the latest investment thinking, such as Risk Factor Investing. Of course, in 9,000 words, this Backgrounder merely skims the surface.

Nonetheless, it is possible to conclude that there are few identifiable free, consistent rides in financial markets. Return premia that do exist are time-varying and can be in or out of favour for long periods.

Many investment professionals would contend that investments foundation theories of MPT and CAPM are probably flawed. Most would argue that markets aren't completely efficient and so the ability to add value, somehow, must exist. However, to date, there are few, if any, tried and true formulae to achieve this consistently. The reality is that there is no obvious successor to those foundation theories at present.

ENDNOTES

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