KIRSTEIN

WELLINGTON MANAGEMENT®

Risk premia investing

March 2019

Introduction

Kirstein A/S and Wellington are pleased to present this report to Nordic investors, which is divided into two sections. In the first, Kirstein A/S highlights key findings from its survey of Nordic institutional investors on risk premia investing. The second section outlines Wellington's approach to premia-based investing.

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About the authors

Jesper Kirstein is the founder and CEO of Kirstein A/S, a Copenhagen-based consultant to asset managers. He has more than four decades of experience working with Danish, European and global asset asset managers.

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EXECUTIVE SUMMARY

In December 2018 and January 2019, Kirstein A/S asked a group of institutional Nordic investors about their attitudes towards risk premia investing, in a survey commissioned by Wellington Management.[1] Key conclusions:

- Risk premia are gaining traction in single-premia, long-only portfolios, and — increasingly — in multi-asset, multi-premia long/short portfolios. Long-only risk premia portfolios replace both passive and active traditional investments, whereas long/short premia strategies are added to the overall portfolio to obtain return streams with little to no correlation to markets. Interest in such characteristics has grown in a low-yield and high-valuation environment.
- Historically investors have preferred traditional academic premia such as value and small cap, but are at the same time concerned by possible overcrowding — and therefore lower returns — from these premia. This is spurring searches for new and potentially less crowded premia.
- Investors' attitudes about dynamically allocating across different risk premia are split. In principle all investors would like to benefit from shifts between different premia depending on their changing relative attractiveness over time. But a fair number of investors are skeptical and want solid proof that managers can do this successfully. Others are strong advocates of dynamic management.
- Historically risk premia have been managed either systematically, through quantitative models, or fundamentally, typically in single-premia, long-only strategies. Increasingly, though, investors see benefits in combining the two approaches.
- Many investors express concerns about a shortage of promising new premia and possible lack of access to able managers. That said, some investors outsource risk premia portfolios to external managers due to lack of internal resources and to gain insight from outside expertise.

Glossary of terms

There are many different ways to define risk premia and their implementation in investment strategies. In its survey of Nordic investors, Kirstein used the following definitions.

Types of risk premia

Academic – risk premia highlighted in the first academic papers on the subject: Value, small cap, momentum, quality, dividend yield (or carry) and defensive (low volatility).

Alternative – Event-driven, opportunistic premia such as merger arbitrage, equity-market neutral and macro.

Implementation methods

Embedded – Long-only approaches which include (embed) some element of market return or beta. This style of investing is sometimes called factor investing.

Dedicated – Long/short strategies that are focused on (dedicated to) capturing absolute returns from risk premia. Such strategies try to minimize an investor's exposure to directional market risk.

As outlined later in this paper, Wellington's Alternative Risk Premia strategy combines academic and alternative premia to pursue positive absolute returns regardless of market direction. This approach uses dedicated strategies and includes premia such as carry, momentum and convergence in addition to equity style premia.

[1] Excerpts reprinted with permission from Kirstein A/S. This survey should not be construed as an offer to sell or a solicitation of an offer to buy securities or adopt any investment strategy mentioned in this survey. All data in the survey was provided by Kirstein A/S and has not been independently verified by Wellington Management.

Risk premia investing: preferences of Nordic investors

Research panel

The findings in this report, prepared by Kirstein A/S, are based on interviews and quantitative data gathered from 41 institutional investors across the Nordic countries (Denmark, Sweden, Norway, Finland, and Iceland) in December 2018 and January 2019. The investors were selected based on their previously expressed interest in multi-asset risk premia obtained from Kirstein's Nordic Intelligence.

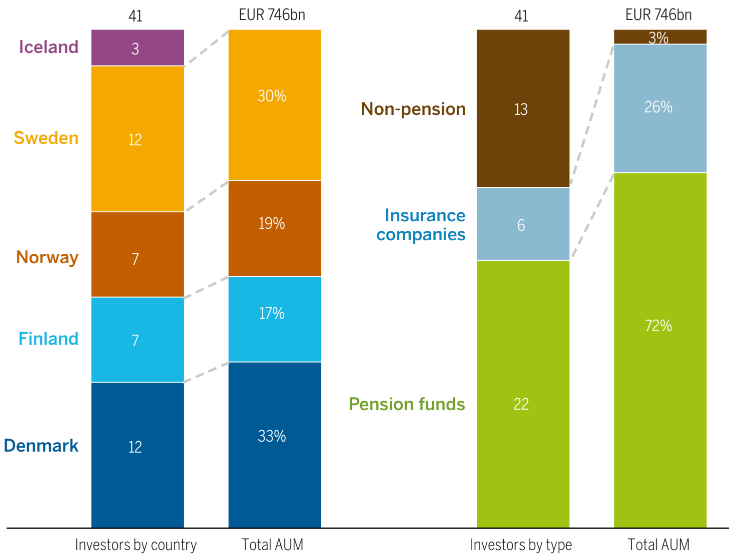
Sixteen of the investors held the position of chief investment officer or head of equities at their organizations. The remainder were alternative specialists who were either portfolio managers, or manager selectors.

Number, size and origin of the participating investors

The combined assets of the 41 investors who took part in this study amount to EUR 746bn, which is nearly 50% of total Nordic institutional assets. A breakdown of the investors is shown in **Figure 1**.

Figure 1

Number, size and origin of the participating investors



Source for all figures in Kirstein report: Kirstein A/S research

Danish and Swedish investors account for the largest part of the assets under management. Danish investors in particular have a strong tradition in multi-asset risk premia; for example, Danish pension fund PKA has moved forcefully to implement risk premia investing efficiently across asset classes. The universe was intentionally tilted towards pension funds and insurance companies.

Overall, we consider the surveyed group to be a representative peer group of Nordic investors, offering sound indications of how the Nordic market is moving in terms of risk premia investing.

> We have been running a project this year on risk premia in corporate credit because we want to be more effective in fixed income, and if we can reduce costs at the same time it is a win-win situation.
>
> — Danish investor

Risk premia investing in the Nordics: Background

History

Risk premia investing has been around for a long time, starting with dedicated value and small-cap long-only equity strategies based on academic research in the 1970s. Towards the end of the 1990s, low-volatility investing was introduced, and up through the beginning of this century, research on possible long-term, structural premia gained momentum.

Risk premia-based investments historically have often been implemented through systematic processes, and the breakdown of many systematic strategies in 2007 was a major setback for attempts to systematically capture risk premia. Yet over the past several years, premia-based investing has re-gained momentum in the investment community and lessons from the financial crisis have been learned.

For most investors, exposure to risk premia started with long-only strategies embedded within an equity allocation. In recent years some investors have begun allocations to long/short standalone approaches. Also, risk premia investing has for many years been the backbone of many long/short hedge fund strategies.

Risk premia investing by Nordic investors

Many Nordic investors, including some of the largest, base a substantial share of their equity investments on risk premia strategies. For example, Denmark's national pensions scheme, ATP, has— in cooperation with a couple of large managers — centred the equity portion of its portfolio on a select group of risk premia implemented through long/short strategies; beta is generated through index-tracking funds. The risk premia approach permeates all asset classes at ATP.

However, the most common type of risk premia strategy among surveyed institutions has been long-only equity. Some investors indicate that they intend to increase such allocations, while developing them in long-only fixed income. More recently, investing in multi-asset, dedicated (long/short) strategies has gained traction, as more investors seek returns with relatively low correlation to the traditional asset classes.

Among responding investors, a total of around EUR 110bn in assets is allocated to risk premia strategies. A substantial share of these are managed internally. The largest investors in the data set (AUM exceeding EUR 25bn) manage around 97% of the risk premia allocation internally, while smaller investors tend to outsource around 35%. Over time, migration into more complex risk premia may support greater outsourcing to external managers.

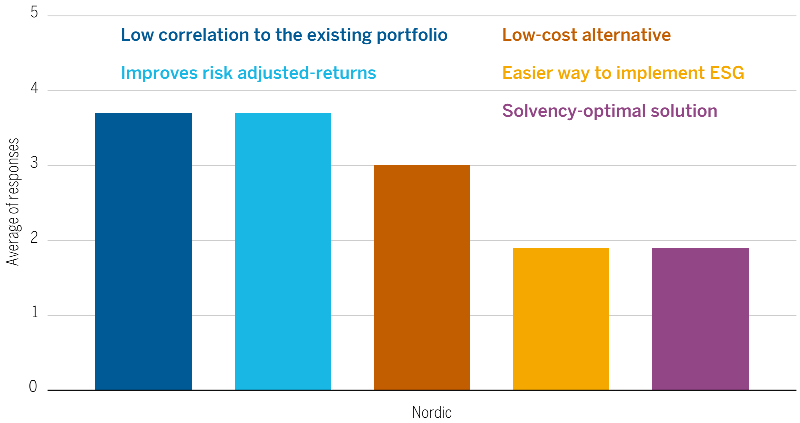
Preferences in risk premia investing

Main drivers in selecting a risk premia-based strategy

The reasons that respondents gave for investing in risk premia strategies are shown in **Figure 2**. Responses may cover attitudes towards both long-only and long/short strategies.

Figure 2

Benefits of risk premia investing



> **You cannot expect 10% from equity anymore, so you have to go elsewhere. We mostly look at risk premia.**
>
> — Norwegian investor

Two major reasons that investors across the Nordic region give for implementing risk premia-based strategies are low correlation to the traditional asset classes (this is particularly true for long/short approaches) and better risk-adjusted returns.

These findings are supported by investors' comments in interviews that they would welcome strategies with negative correlations to traditional asset classes, and with good performance when markets retreat. Many of the investors believe that risk premia portfolios typically incorporate better risk controls than traditional non-premia-based strategies, contributing to the desired objective of better risk-adjusted returns.

An important trend among Nordic investors has been an intensifying focus on costs and fees. An increasing number of investors regard premia-based investing as a low-cost alternative to active long-only management or hedge funds. We have seen movement from passive long-only to enhanced premia investing and from active to enhanced. Likewise some investors are considering replacing costly hedge funds with long/short risk premia strategies.

A number of Nordic insurance companies have implemented risk premia strategies in a quest to optimise allocations under the European Union's Solvency II regulatory regime. Although risk premia are not perceived as a solvency-optimal solution on an aggregated Nordic level, a number of insurers are still working with managers in this area.

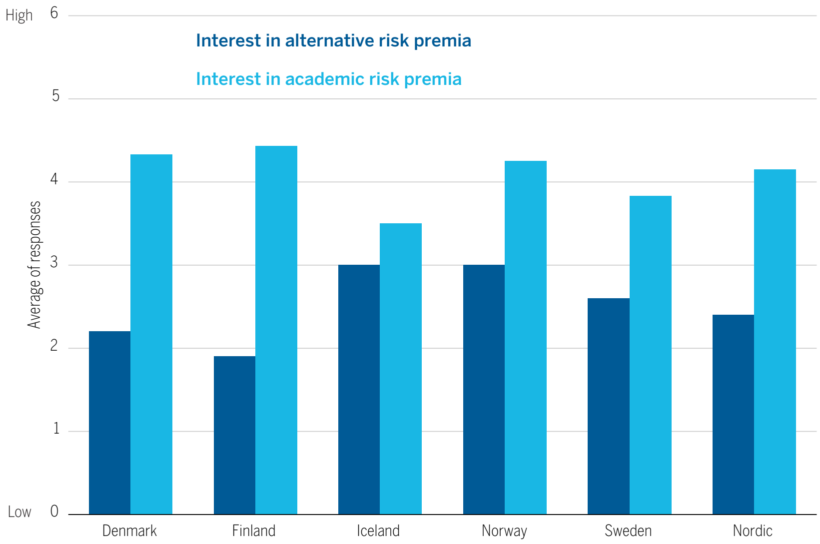
Likewise, a number of Nordic asset owners mention that systematic investment approaches provide an easier and more effective way of implementing ESG (standards, factors, etc.) in the portfolio. That said, the majority of Nordic investors still rely on pure fundamental approaches to ESG.

Types of risk premia

Figure 3 shows the interest in academic versus alternative risk premia. As a reminder, in this section of the paper alternative premia are defined as those that are more opportunistic or event-driven, such as merger or dividend arbitrage, volatility trades, and liquidity. Meanwhile, academic risk premia are those identified in early academic research on the subject: value, small cap, momentum, quality, dividend yield (or carry) and defensive (low volatility). Some investors and managers, including Wellington, group academic and other, newer risk premia together as "alternative risk premia."

Figure 3

Interest in academic compared to alternative risk premia



> We want risk premia that are well proven, and managers who have a strong academic background.
>
> — Finnish investor

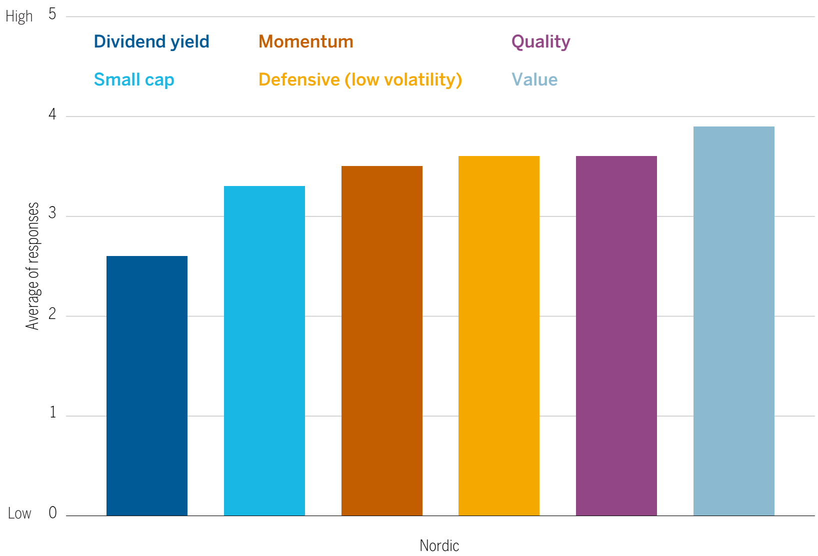
Based on our survey, Nordic investors' preferences tilt toward academic premia. This tilt may have been shaped by a few dominant managers with a preference for the academic factors. However, a number of investors express concerns that academic premia may be overcrowded. These worries were probably not diminished by the high variability and generally disappointing returns of traditional risk premia in 2018.

We see a strong preference for alternative risk premia among the largest and most sophisticated investors. Some of these are even talking about the use of artificial intelligence to identify new premia. We expect less-traditional premia to attract increasing attention from Nordic investors.

Which risk premia are in favour?

FIGURE 4

The risk premia in which investors have the most trust



In general, differences in premia preferences by country were not significant. The most preferred risk premia — not least among smaller investors — is value. That may be surprising in light of its underperformance in 2018. Yet value has been the best-performing risk premium over the long run in equities.[1] (It has proved less reliable in fixed income.) The preference for value is deeply rooted across investor types and sizes.

Quality is preferred by many investors, followed by defensive (low volatility) and momentum. Least preferred is dividend yield, which typically relates to equity. Interestingly, the same factor under another name, carry, seems to be in favour in fixed income.

Relating this to conversations with the surveyed investors, there seems to be a high degree of overlap between those risk premia currently most familiar to the investor community and those offered by asset managers. Less seasoned investors often only look at a few risk premia, whereas the more experienced investors look at a wider variety, ranging from conventional to alternative and even illiquid risk premia.

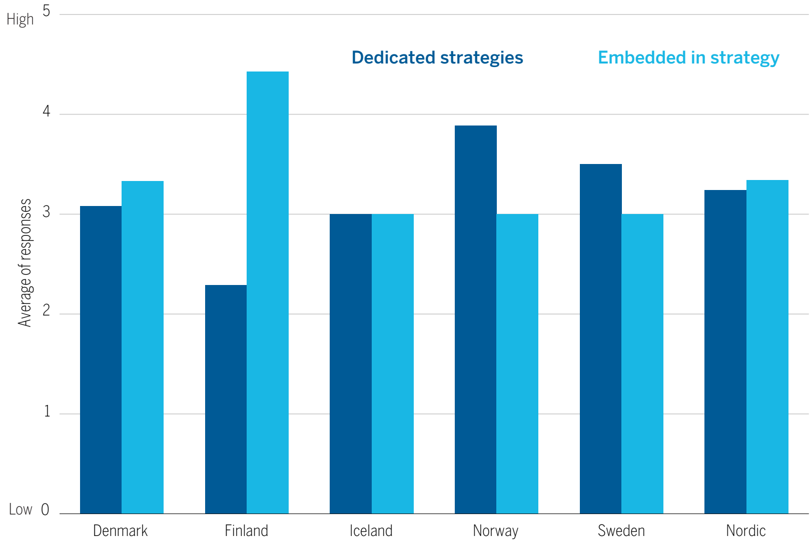
[1]Source: MSCI, "Introducing MSCI Factor Indexes". For the years 1976 to 2017

Embedded (long only) or dedicated (long/short)

Figure 5 shows the preference for embedded and dedicated strategies, respectively, by country.

Figure 5

Preferences for a dedicated versus an embedded strategy



Relative preferences vary by country, with a small overall tilt towards embedded strategies. We think this slight tilt can perhaps be explained by the historical evolution of premia investing in the Nordic region, which began with long-only equity portfolios and then slowly migrated into demand for uncorrelated returns driven by the low-yield environment of the post-crisis era. Based on our interviews and the continued prevalence of low yields, we think the demand for dedicated risk premia strategies will rise in the coming years. Indeed, the largest investors and the traditional frontrunners in the industry are among those moving most quickly into dedicated strategies to reduce market directionality; these are often paired with passive strategies.

> **We typically do an overlay on top of our passive strategies.**
>
> — Swedish investor

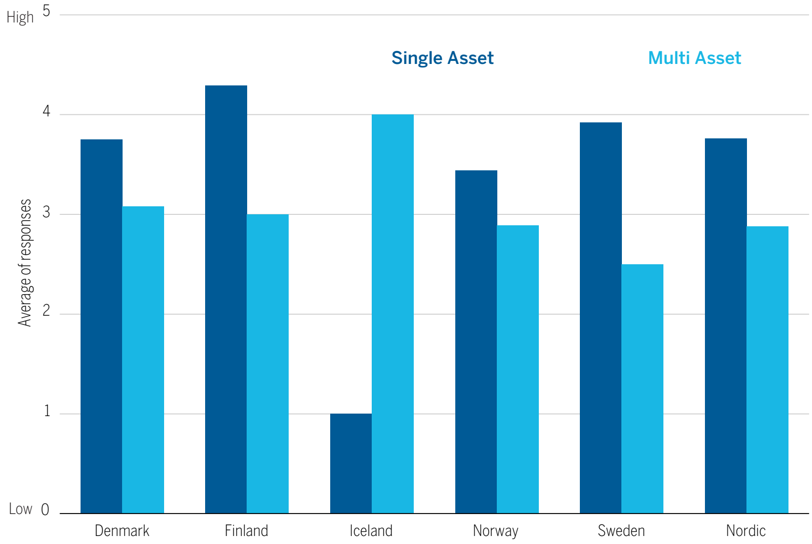
Norway and Sweden have a stronger preference for long/short structures, which should be seen in light of stronger traditions in hedge fund investing, particularly in Sweden.

Single-asset strategies versus multi-asset strategies

Choosing between embedded and dedicated strategies correlates strongly with the choice between single-asset and multi-asset strategies, as the latter are typically long/short.

Figure 6

Preferences for single versus multi-asset strategies



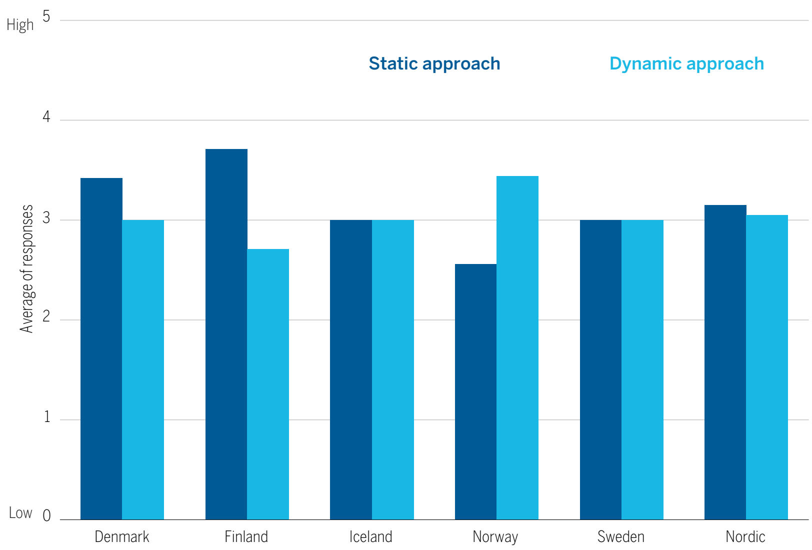
In most Nordic countries, single-asset-class strategies are favoured over multi-asset approaches, Again, this may be rooted in history — specifically, a tradition of investing in single-premium, single-asset strategies. Also, Nordic investors have benefited from a number of successful managers in value and low volatility.

Static versus dynamic approaches

Returns on risk premia vary significantly over time, with individual premia under- or –outperforming across different periods. Investors may address this situation by seeking to construct an "all-weather" premia-based portfolio, or by investing in a portfolio that tries to shift between different risk premia and assets based on their relative attractiveness. Which approach is better? This is a question that divides even the most knowledgeable investors. Among some, finding managers or algorithms that can consistently add value through dynamic management is the Holy Grail of premia investing.

Figure 7

Preferences for static versus dynamic approach to risk premia



On an overall regional level the approaches are equally preferred, but there are notable differences by country. Norwegian investors, along with certain Icelandic investors, have a strong preference for dynamic management.

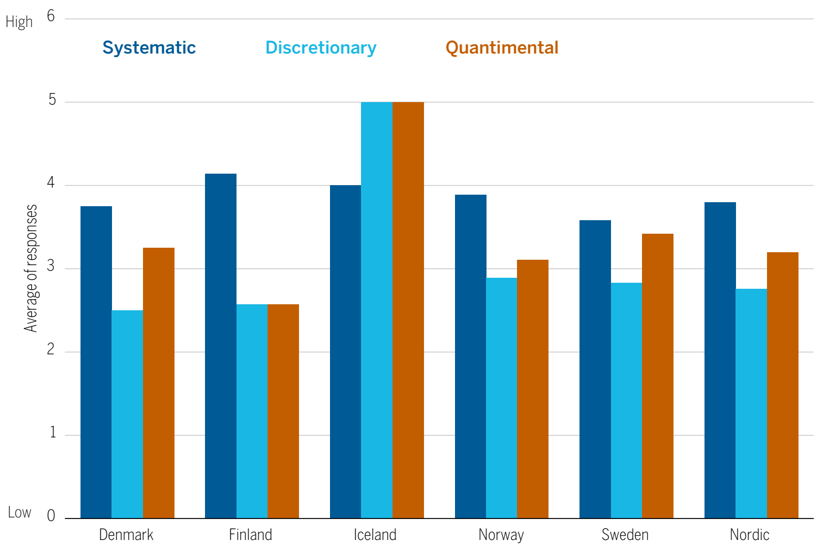
Generally speaking, larger, more amply resourced investors with greater internal management of risk premia tend to prefer a dynamic approach. Such investors also often have a more sceptical attitude to external managers' ability to create value through timing. But although many investors acknowledged that timing is difficult, there was also recognition that some degree of dynamic allocation may be necessary in order to obtain attractive returns in the long run.

We tested whether there were correlations between attitudes towards dynamic management and other issues such as preferences among risk premia, but that does not seem to have been the case.

Management style: systematic, discretionary or "quantimental"

Figure 8

Preferences for different approaches to management of risk premia



Systematic approaches to capturing premia are preferred in most Nordic countries, with the exception of Iceland. These strategies can range from a reliance on very simple algorithms to highly sophisticated self-adapting models based on big data. At the same time, there is widespread acceptance of the notion that fundamental inputs based on human insights can add value even in primarily model-driven approaches.

An important observation made in the wake of systematic investing's 2007 breakdown was that models that didn't adapt to changes in the financial environment were most prone to failure. This has led to an increased focus on building a degree of flexibility and adaptability in algorithms.

Many Nordics also like "quantimental" approaches that combine systematic management with a fundamental overlay. Such overlays temper model outputs with human judgment applied to sector or factor exposures, risk management, or other aspects of portfolio construction. Overall, small investors have the strongest preference for quantimental management. Many of the most risk premia-savvy investors also have a strong preference for this approach, with some correlation to internal management.

> In the end I believe in people and my gut feeling is that you cannot have the same connection with a machine.
>
> — Swedish investor

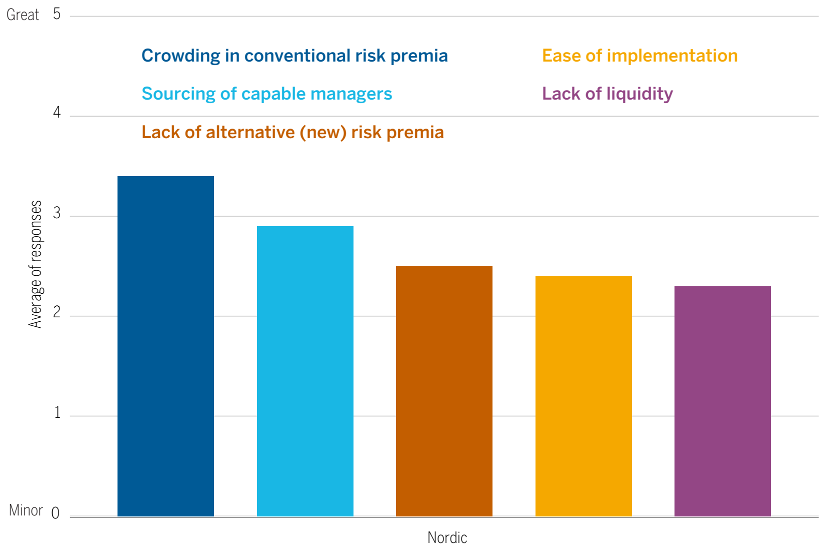
> We are worried about crowding in this space and we simply see value, growth, momentum, quality, and low volatility everywhere.
>
> — Swedish investor

Discretionary management also found favour among some investors, but tended to be limited mostly to single-risk-premia equity strategies such as value, quality or small cap.

Main concerns

We asked investors what their greatest concerns were about investing in risk premia (**Figure 9**).

Figure 9
Investors' main concerns about risk premia investing



Many investors mentioned that they were concerned about crowding in academic risk premia — that excess demand may have led to overly rich valuations of securities with the desired characteristic. These comments were probably influenced by the wide performance disparities and generally disappointing results for risk premia strategies in 2018. In this context, interest in newer kinds of risk premia is quite logical.

Investors across the Nordics mention "ease of implementation" as a key focus, pointing to the very important point of slippage. The premia to be extracted are quite often very slim, and therefore the cost of implementation can be crucial for extracting a decent return from premia strategies. Hence, investors believe the best managers have a very disciplined and direct focus on implementation.

Risk premia are considered highly liquid, hence concerns about liquidity should be minimal. Nevertheless, some investors express concerns about premia liquidity; it is fair to say that it is typically investors less experienced in premia-based investing that bring this up.

Sourcing capable managers of risk premia strategies was a widely expressed concern among surveyed investors. We think this stems at least partly from the disappointing returns from many managers in 2018, and the fact that the approaches of some of the best-known managers are closed to new clients. Some investors also mention scepticism about back-testing. Many strategies are quite new and are presented with backtested performance, which does not resonate well with many investors.

Transparency was also cited by some investors as a concern.

> We are concerned with the popularity of risk premia. They are getting a lot of attention in the Nordics right now and there are a lot of flows.
>
> — Finnish investor

Preferences for managers

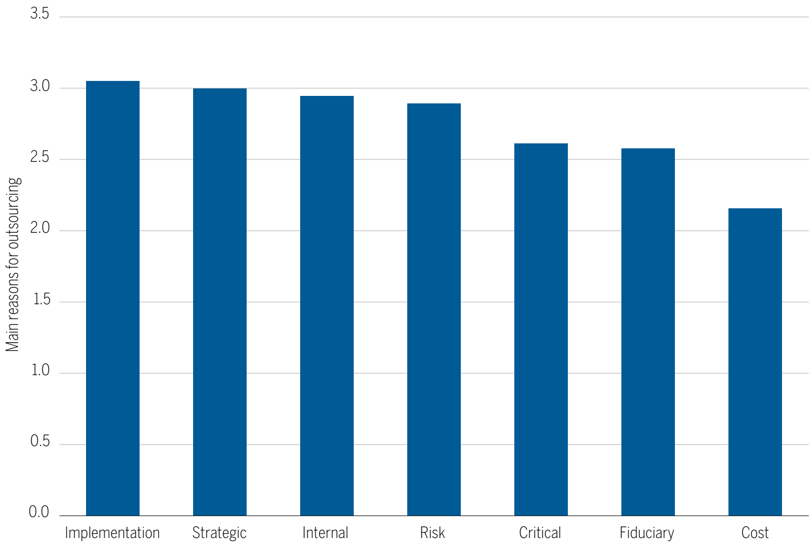
Main reasons for outsourcing

Our numbers show that many investors manage long-only risk premia strategies in-house. These portfolios can in some instances be supported by algorithms supplied by investment banks. At the same time, it is a well-known fact that most large investors carry out trades on their balance sheet ranging from carry trades in fixed income to long/short equity. These trades may act as substitutes for more structured long/short risk premia portfolios.

Other investors outsource the management of risk premia strategies, often while also managing some premia strategies internally. As can be seen in **Figure 10**, important reasons for outsourcing include accessing expertise in implementation and risk management, benefiting from critical mass in trade execution and other areas, gaining fiduciary insight, and creating a strategic partnership with the managers Through such a partnership, an investor might gain insight into the manager's toolkit and be positioned to draw on its know-how.

Figure 10

Main reasons for outsourcing



Many investors acknowledge that risk premia investing requires substantial dedicated resources — not only to analyse and construct the portfolios, but also to implement trades efficiently. This is most important for smaller investors, but outsourcing can mean cost savings and better risk management across a broad range of investors.

Management of risk premia strategies can be outsourced to traditional asset managers, investment banks, and/or hedge funds. Surveyed investors mentioned different pros and cons associated with each kind of provider. Notably, fee structures and lack of transparency were brought up when talking about hedge funds. Some investors mention quality of implementation as a key consideration in choosing between traditional asset managers and investment banks.

Wellington's approach to risk premia investing

Matthew Bullock
Investment Director

Matthew is responsible for a range of investment approaches and custom solutions for our clients in Europe, the Middle East and Africa. He meets regularly with investment teams as well as with clients, prospects and consultants to communicate investment philosophy, strategy, positioning and performance.

WELLINGTON ALTERNATIVE RISK PREMIA: WHAT MAKES IT DIFFERENT

We believe our strategy offers an attractive solution for Nordic investors who are considering either initiating or augmenting their exposure to risk premia-based investments.

- A multi-asset, multi-premia, long/short strategy that aims to deliver positive returns regardless of market direction
- Combines a wide breadth of proprietary premia, informed by granular insight into their composition and behaviours to avoid premia concentration
- Model-driven process employing fundamental oversight for risk management
- Robust risk management processes that seek to maintain premia balance and mitigate unintended risks
- Supported by the resources of one of the world's largest managers of alternative assets, with EUR 32 billion in alternatives and EUR 878 billion in total assets under management as of 31 December 2018

A great diversity of approaches — and outcomes

With equity markets wobbly and bond markets clouded by rate-path and credit concerns, Nordic investors are seeking sources of absolute return independent of market direction. Risk premia strategies by the nature of their objectives have therefore attracted much attention.

For investors who may have thought all risk-premia strategies were similar, recent market history offers a strongly contradicting message. A huge divergence in performance across risk premia managers was recorded in 2018, with a performance gap of almost 30% between the best and worst performers — vastly outweighing any differences in fees (**Figure 1**).

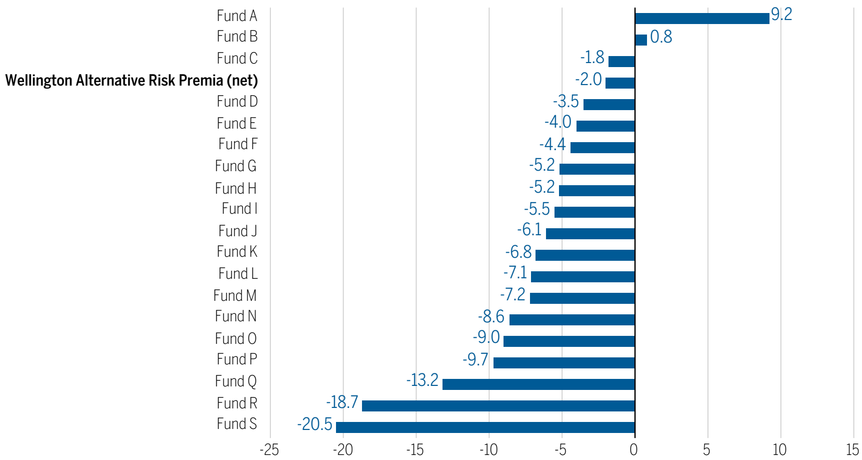
Defining risk premia: a brief recap of terminology

Kirstein's survey of Nordic investors places risk premia into two categories: traditional academic premia — value, small cap, momentum, quality, dividend yield (or carry) and defensive (low volatility) — and alternative risk premia — those that are event-driven or opportunistic, such as merger arbitrage, equity market neutral, and macro.

Wellington's Alternative Risk Premia (ARP) strategy accesses premia from both these categories. It focuses on four academic premia — carry, momentum (or trend), convergence and equity style premia (value, momentum, convergence and quality) but may use elements of alternative risk premia to express these.

Figure 1

Performance of risk premia managers in 2018 (%)



Sources: Bloomberg, Wellington Management | Alternative Risk Premia composite. The Alternative Risk Premia 8% Target Volatility Overlay Composite is an unfunded overlay with a live track record that dates back to November 2015, and it is shown as a demonstration of skill. The volatility target of this composite is 8%. The available Alternative Risk Premia approach has a 10% volatility target. It is managed by the same investment team and with the same investment philosophy and process as the lower volatility approach, but should not be considered representative of the past or future performance of the Alternative Risk Premia 10% Target Volatility approach. | The inception date of the Alternative Risk Premia 8% Target Volatility Overlay Composite is 30 November 2015. | **PAST RESULTS ARE NOT NECESSARILY INDICATIVE OF FUTURE RESULTS.**

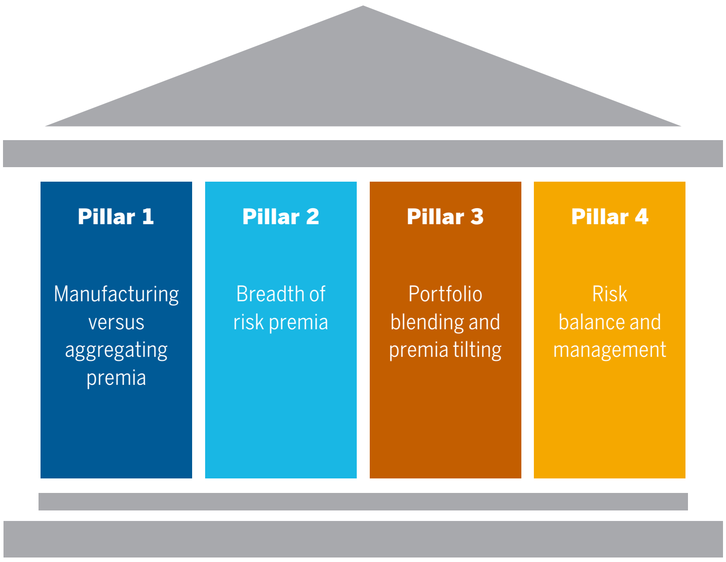
The performance gap testifies vividly to the fact that not all risk premia approaches are created equal. We believe that portfolio implementation and risk management decisions — two key reasons that Nordic investors give for outsourcing — are the main factors that drive performance differentials and a manager's ability to deliver consistent returns from risk premia regardless of market direction.

Four pillars of portfolio construction

Whilst it is relatively easy to isolate the performance of traditional risk premia, such as the risk premium in equities or the term premium in bonds, evaluating the performance of risk premia implemented in long/short strategies is far more difficult. One reason is that definitions of premia vary significantly across asset managers. Another is that there are notable differences in how managers combine these premia. We believe the dispersion seen in returns across managers in 2018 owed as much to variations in portfolio construction, diversification and risk management as it did to premia definitions.

In our view, there are four main portfolio construction decisions a risk premia manager must make. These are shown as pillars in **Figure 2**.

Figure 2
Portfolio construction in Alternative Risk Premia



Source: Wellington Management. For illustrative purposes only. The characteristics presented are sought during the portfolio management process. Actual experience may not reflect all of these characteristics,

First pillar: manufacturing versus aggregating premia

Managers tend to take one of two approaches to building a risk premia portfolio. Some managers are "manufacturers" who create premia from the bottom up. Other managers are "aggregators" who buy premia off-the-shelf from banks or other outside sources and package these together into portfolios.

The appeal of the aggregation approach is understandable; manufacturing risk premia requires significant resources and expertise in market instruments (derivatives, for example), trade execution, information technology, portfolio construction, and risk management. However, one should think of aggregators as a kind of "fund of funds." An investor can gain a lot of exposure very quickly with an aggregator. But compared to manufacturers, aggregated strategies may offer less transparency into the underlying holdings, may have hidden costs (for example, hidden in bid/ask spreads), and have little latitude for customisation.

Furthermore, an aggregator does not have first-hand knowledge of the (varying) designs of the externally provided premia that make up the portfolio. Without in depth knowledge, a manager may find it difficult to fully understand the risks and exposures present in the components of their portfolios, and how they interact with each other. This calls into question their ability to evaluate important risk-management characteristics, such as portfolio concentrations and correlations.

As a manufacturer — the approach we advocate — a portfolio manager can bring to bear internal research and development, trade design, and risk controls, and be more precise in almost every aspect of portfolio construction, from the rules that drive the systematic elements of the process to the breadth and depth of balance across position sizes. Manufacturing a risk premia portfolio also allows a manager granular insight into the underlying risks of the portfolio; portfolio management tools can be designed specifically to mitigate those risks, and to customise a strategy to a client's needs.

Our portfolio team builds premia informed by insights from our 264-person global research staff, derivatives specialists, global trading desk, and dedicated team of factor specialists, all embedded in a culture of collaboration supported by incentives.

A firmwide commitment to ESG integration

To better assess risks and opportunities in client portfolios, we have integrated the analysis of environmental, social, and corporate governance (ESG) factors into our investment and risk-management processes firmwide. Our dedicated ESG team provides the firm's investors with proprietary research and insight to support ESG considerations, incorporating analytics, company engagement, and in-depth portfolio reviews.

Wellington has entered into a collaborative initiative with the Woods Hole Research Center — the world's leading independent climate research institute — to integrate climate science and asset management. Our new alliance will focus on creating quantitative models to help analyze and better understand how and where climate change may impact global capital markets.

Second pillar: breadth of risk premia

In our view, last year's performance divergence among risk premia managers vividly demonstrates what happens when strategies have concentrated exposures to a limited range of premia. Such concentrations become especially risky during periods of market stress, when markets may sell off in tandem and correlations between traditional asset classes tend to rise.

In our risk premia approach we seek to capture the return potential of four broad groups of premia that have historically generated persistent, positive returns: carry, trend, convergence, and equity style premia. (Our research on these premia, and more broadly on the role of ARP in a portfolio, can be found here)[2]. **Figure 3** lists examples of the premia we access within these groups. The goal is to generate greater consistency of returns by minimising the impact when a premium or small set of premia underperform.

Figure 3

Examples of the breadth of premia we access

Trend	Carry	Convergence	Equity style premia
Time series	Selling implied volatility	Mean reversion/ contrarian	Value
Cross-sectional	Bond roll down/ term premium	Multi-asset relative value	Momentum
	Commodity carry	Volatility arbitrage	Low beta
	Currency carry	Yield curve arbitrage	Quality
	Credit spreads	Statistical arbitrage	
	Merger arbitrage		
	Dividend carry		

Source: Wellington Management

[2] https://www.wellington.com/en/insights/understanding-role-alternative-risk-premia

Of course, assessing the diversification of a risk premia strategy involves far more than simply counting the number of risk premia it targets. Even a fairly simple and intuitive signal like trend — which aims to capture the fact that a pattern of rising or falling asset prices often persists in the near term — may be defined in many ways.

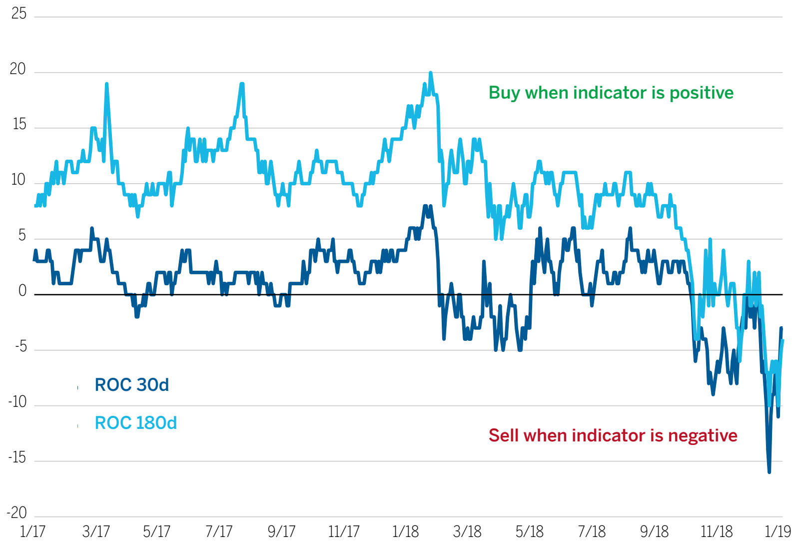
Moreover, managers' definitions of "near term" can vary. Is it a 30-day period of price returns? A 180-day period? What about combining the two time horizons? Using a 30-day period may produce a very different signal from using a 180-day period. In most periods the two measures will agree on the direction of travel — but not always, as shown in **Figure 4**, which displays a simple rate-of-change, or ROC, model for trading the S&P 500. A rate-of-change model measures the percent change in price over a defined time period. If the price change, and therefore the ROC signal, is positive you would buy the asset, whereas if the ROC signal is negative you would sell the asset.

Clearly there are times when the 30-day signal, represented by the dark blue line, differs from the 180-day model (light blue line) – one is negative, signalling a sell, whilst the other is positive, signalling a buy.

Figure 4

Even an apparently straightforward premium can vary meaningfully by definition

Trend of the S&P 500: 30-day versus 180-day rate of change



Source: Bloomberg, analysis by Wellington Management. | Chart data: 3 January 2017 – 3 January 2019. For illustrative purposes only. Not to be considered investment advice. Investments cannot be made directly in an index. **PAST RESULTS ARE NOT INDICATIVE OF FUTURE RESULTS**.

Even this simple example shows that no single systematic model is perfect. In other words, there is no "right" answer to how to build a signal to capture a certain risk premia. In this case a more diversified manager like Wellington would incorporate both the 30-day and 180-day signals in order to smooth out the return profile and aim to capture as much upside as possible.

Simply put, we believe the best approach to generating return consistency is to acknowledge that no signal is perfect, and therefore we seek to incorporate a wide variety of premia and signals to increase diversification.

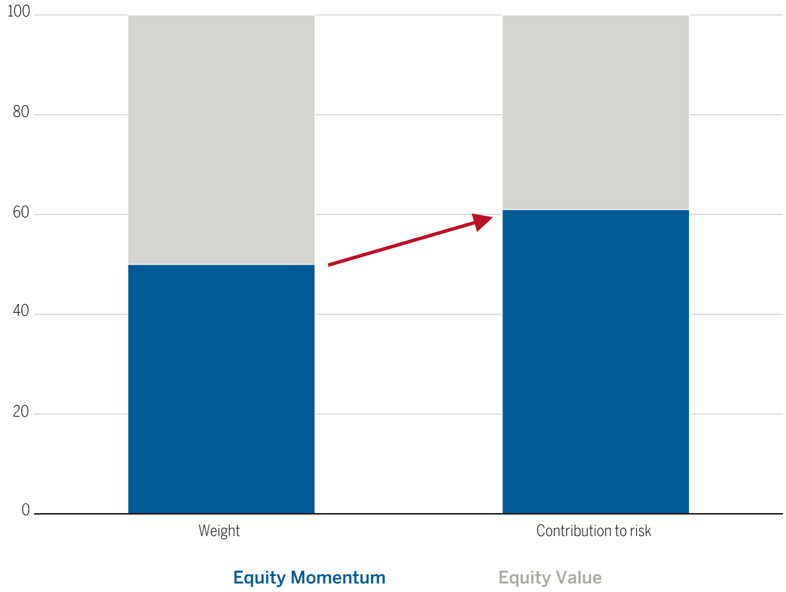
Third pillar: portfolio blending and premia tilting

In order to maximize the benefits of premia diversification, we believe it is essential to be able to see what the portfolio holds in real time through a premia lens so as to construct a portfolio with the appropriate blend of premia. A manager needs to be able to understand the tilts in every exposure, so as to properly assess how these exposures interact within the overall portfolio. Without this ability a manager may not understand where such exposure tilts may be excessive and therefore not adjust construction of the portfolio accordingly. Every exposure should be deliberate, not an unintended consequence of combining uncoordinated premia from various banks as "aggregator" ARP managers often do.

For example, an ARP strategy that allocated equally to two risk premia, equity value and equity momentum, would have greater factor concentration than one might expect. Contribution to risk would not be split evenly between the two premia; instead it would be skewed towards the momentum factor (**Figure 5**). This simple example highlights the need for careful portfolio construction to truly diversify the overall portfolio.

Figure 5

Equal weights, different risk contributions (%)



Source: HFRI; Wellington Management analysis. | Chart data: July 2009 – December 2018. | Equity value represented by HFR Bank Systematic Risk Premia Equity Value Index (HFRREVA), equity momentum represented by HFR Bank Systematic Risk Premia Equity Momentum Index (HFRREM). For illustrative purposes only. Investments cannot be made directly in an index. **PAST RESULTS ARE NOT INDICATIVE OF FUTURE RESULTS**.

In our eyes, a sound portfolio construction process begins with a strategic evaluation of risk premia over the past 20-plus years, obtained using well-researched, internally generated risk premia series so their construction is fully understood. Such an exercise underpins expectations for each risk premia group regarding diversification, breadth, directionality, downside-risk characteristics, and environmental considerations. We are sceptical of overly relying on (or "data-mining") the returns generated by back-tests — we think any assessment of historical returns should be informed by human judgment and viewed with a real-world lens — but nevertheless believe they provide co-variability and tail-risk information that becomes useful when combined with a robust portfolio construction process as we believe ours to be.

In our view, such top-down strategic processes should be combined with appropriate sizing, implementation, and management of positions according to their contribution to the volatility target of the portfolio. Conditional positioning filters and drawdown controls may also act systematically in seeking to limit the risk of individual trades and the overall portfolio, respectively.

Tilting versus timing premia

We believe it is very difficult to precisely time allocations to alternative risk premia given such a diverse set of underlying trades. However, we do incorporate a degree of flexibility into sizing premia exposures by tilting these in light of evolving market conditions.

For example, carry typically underperforms in more volatile markets while trend tends to do better so long as markets exhibit persistent directionality. So we may lean into trend, or lessen exposure to carry when markets are turbulent, but not move completely out of it. Returns from a single premium can experience sudden shocks, as seen in the correction in the momentum factor early in 2018. This is why we prefer to tilt rather than time premia exposures.

Fourth pillar: risk balance and management

It would be naïve to believe that any systematic process — or for that matter, any fundamental process — could be entirely immune from market risks. Hence, we believe that a strong risk management process is critical to achieving a portfolio's investment objectives over the longer term.

In our view, the overarching principle of investing in risk premia is the careful balancing of risks to promote consistency of returns across market regimes, along with downside mitigation in more volatile environments. We think risk management should therefore be at the centre of portfolio construction and ongoing management.

We think that not only should an investment team monitor and manage overall volatility and risk contribution both by risk factor and by market environment, but forward-looking volatility and correlations among asset classes should also play a role in ensuring balanced risks across the portfolio. Various options strategies may also be used to hedge market risk and target portfolio volatility when appropriate; here we benefit from the ability to work alongside Wellington's highly experienced derivatives team, tapping their expertise to identify the most appropriate hedges.

Several considerations drive our high-level risk budgeting among risk premia. These include risk-adjusted return potential, breadth of signals underpinning each group, drawdown potential, and correlation among the four groups and with traditional asset classes. We therefore lean our portfolios toward factors exhibiting higher return potential, greater consistency, lower negative skew, lower correlation and lower execution costs. The objective, however, is always to maintain a reasonable degree of diversification.

Once top-down strategic risk allocations to each risk premia group have been determined, we then seek to balance risk within each set to ensure maximal diversification. Cluster analysis is one such technique we use to identify similar risk profiles across positions. This technique groups different trade types into clusters of maximal return correlation with each other. Through such analysis, one of several methods we use to balance risk, we aim to ensure that a relatively large risk cluster only results in an appropriately small risk allocation.

Risk allocations to individual trades may also change, either due to a shift in market environment or a depressed Sharpe-ratio regime in which the rewards for risk-taking are reduced. For example, a currency carry strategy is particularly vulnerable to risk-off periods as outflows from assets in higher-yielding but higher risk countries may drive large and rapid depreciation in local currencies. We would measure the likelihood of such a risk-off episode by considering movements of a blend of three equity volatility indicators and systematically adjusting portfolio exposures.

Addressing one-off market events and shocks

Whilst risk premia portfolios may be run separately alongside a fundamental alpha strategy to add diversification and aim to improve the return experience for client — an approach we advocate — some risk premia strategies may additionally incorporate their own fundamental overlay.

Here there are two different approaches. Some managers intervene with their models to make active asset allocation decisions, such as setting and changing the risk budgets for each premium within the portfolio, choosing implementation options and determining the timing of trades. This calls into the question the confidence such managers have in the robustness of their systematic approaches. Other managers selectively intervene in model outputs only under certain conditions. Wellington's strategy takes the latter approach – we deploy our fundamental overlay only under unusual market conditions and would intervene to address a one-market event or shock.

Let's consider some circumstances in which our managers might intervene to tweak the models. One of these would be a one-off, binary market event such as the Brexit referendum, where no output from a historically based model or fundamental process will help. Algorithmic models are typically unable to capture risk-off market behaviours triggered by such events; everything from the price reactions before and after the shock, to correlations across asset classes is uncertain.

Another situation in which we would consider intervening in the model with fundamental insight is when the volatility of a single asset becomes so great that it dominates the performance of a single risk premia signal. An excellent example of this is the behaviour of Turkish assets and FX carry preceding the country's crisis in summer 2018. Turkish assets typically have high yields relative to more developed markets. Hence the Turkish lira is often a part of carry strategies. In the summer of 2018, the lira suddenly lost much of its value in forex markets due to idiosyncratic events in Turkey, impairing the performance of many carry strategies.

Systematic crisis control should also play an important role in any risk premia strategy. For example, we dynamically manage risk targets at a premia level (carry, trend, etc.) by reducing the risk target in line with a nonlinear function of the realized returns of an appropriate reference index. Simply put, we adjust our risk targets to better conserve returns from strategies which have outperformed. Using such a process also enables us to avoid risk target stagnation after a crisis; we are therefore better able to avoid whipsaw risk, when a portfolio struggles to capture upside in a post-crisis recovery scenario.

To summarise, under a small set of market conditions systematic investment approaches lacking intelligent human guidance are highly unlikely to fulfil their promise of protecting investor capital. Their models are simply not built to take such environments into account. So, we advocate letting the models run unless we see a large obstacle — or cause for alarm — ahead.

The role of risk premia strategies in diversifying investment portfolios

Long/short risk premia strategies aim to capture consistent returns regardless of market direction, so a well-crafted strategy can function well as a core portfolio holding. However, we believe premia-based portfolios can also be a differentiated source of returns, thereby helping an investor achieve both diversification and return objectives of the overall portfolio.

A diversifying return stream to other asset classes

Risk premia strategies typically have a low correlation to all major asset classes, and thus can potentially act as a powerful diversifier to help smooth portfolio performance when traditional asset classes are struggling (Figure 6).

But it is important to note that this low historical correlation to traditional assets is not an inverse correlation. That is, a risk premia strategy is not an explicit hedge against downside market risk; rather, it can help diversify that risk.

Figure 6

Correlation of ARP strategies with traditional asset classes

	Global equities	EM equities	Global fixed income	EM rates	Global credit	Bloomberg USD Index	Global high yield	**ARP**
Global equities	1.00							
EM Equities	0.75	1.00						
Global fixed income	-0.08	0.17	1.00					
EM rates	0.42	0.60	0.46	1.00				
Global credit	0.11	0.32	0.92	0.62	1.00			
Bloomberg USD Index	-0.14	-0.38	-0.82	-0.45	-0.79	1.00		
Global high yield	0.65	0.70	0.27	0.78	0.49	-0.45	1.00	
ARP	**0.10**	**0.05**	**0.06**	**0.09**	**0.13**	**-0.03**	**0.10**	**1.00**

Data sources: Wellington Performance Reporter, Bloomberg | ARP returns are composite returns of the Wellington Alternative Risk Premia composite, gross of fees, Global equities = MSCI AC World (USD), Global FI = Bloomberg Barclays Global Agg (USD), EM equities = MSCI EM (USD), EM Rates = JPM EMBI TR Index, Global Credit = Bloomberg Barclays Global Aggregate Credit TR Index, Global High Yield = Bloomberg Barclays Global High Yield Corporate TR Index. Weekly data (prices taken on Fridays) from ARP composite inception of 30 November 2015 through 31 December 2018. Gross performance results are net of commissions and other direct expenses, but before (gross of) advisory fees, custody charges, withholding taxes, and other indirect expenses, and include reinvestment of dividends and other earnings. If all expenses were reflected, the performance would be lower. | For illustrative purposes only. Investments may not be made directly into an index. PAST RESULTS ARE NOT NECESSARILY INDICATIVE OF FUTURE RESULTS AND AN INVESTMENT CAN LOSE VALUE.

[3]See Appendix A for a description of the methodology used to construct the representative Nordic portfolio

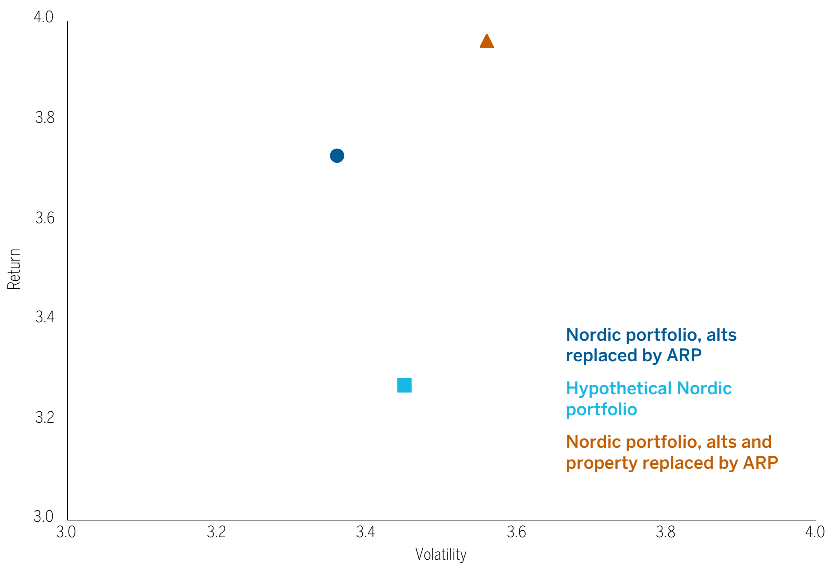
Quantifying the portfolio diversification benefits of risk premia strategies in Nordic portfolios

The diversification power of alternative risk premia strategies versus other asset classes can be estimated. Let us consider a hypothetical portfolio of an institutional Nordic investor,[3] one that incorporates a diverse blend of domestic and global equities, global bonds, property, cash, and alternatives. Such portfolios typically already have a great deal of asset-class diversification. However, many of these assets move together — that is, downward —during periods of market stress.

If we were to replace the alternatives component of the representative portfolio (proxied by the HRF-I Liquid Alternative Index to capture a broad range of liquid funds) with an allocation to Wellington's ARP approach, a clear improvement is seen in terms of both risk and returns. Replacing both the alternatives portion and the property allocation with ARP further improves returns whilst not significantly altering the risk outcome (**Figure 7**)

Figure 7

Risk-return plot for various hypothetical Nordic portfolios (%)

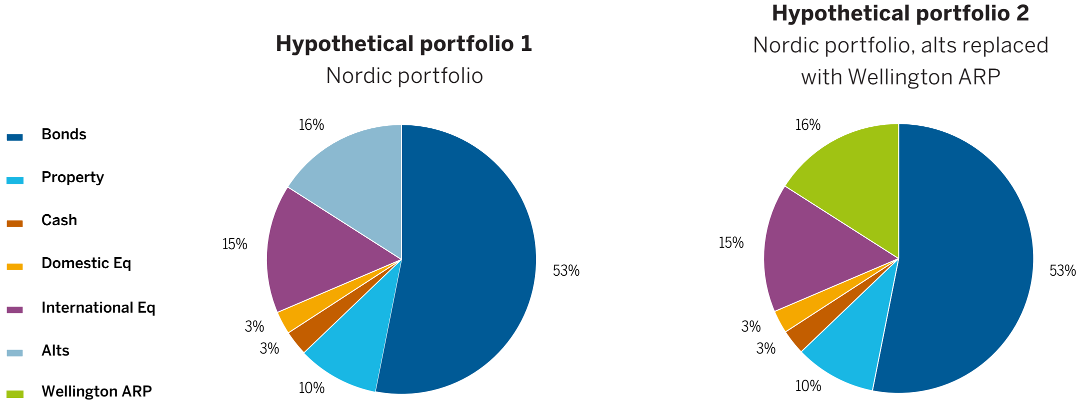


Monthly data, 30 November 2015 (inception of Wellington's ARP composite) through 31 December 2018. Source: Wellington Management, Bloomberg, DataStream, HFR. The hypothetical portfolio performance presented reflects the hypothetical performance an investor would have obtained had it invested in the manner shown and does not represents returns that any investor actually attained. Backtested performance results were achieved by means of a retroactive application of a model designed with the benefit of hindsight. Certain assumptions have been made for modeling purposes and are unlikely to be realised. No representation or warranty is made as to the reasonableness of the assumptions made or that all assumptions used in achieving the returns have been stated or fully considered. Investments may not be made into an index. Please see Appendix I for additional important disclosures. **PAST RESULTS ARE NOT NECESSARILY INDICATIVE OF FUTURE RESULTS AND AN INVESTMENT CAN LOSE VALUE.**

In **Figure 8**, we take a closer look at the diversification benefits of Wellington's ARP strategy at an aggregate portfolio level, focusing on the first scenario — reallocating the model portfolio's alternatives book to ARP.

The resulting hypothetical portfolio shows a better risk-return profile. What is important here is not the return outcome, which will vary over time. What we believe is most encouraging is that risk metrics such as maximum drawdown have improved. Also, the market-agnostic characteristics of ARP suggest a greater probability of generating positive returns from such an approach in difficult markets when traditional assets struggle.

FIGURE 8
Hypothetical portfolio analysis: the impact of introducing Alternative Risk Premia



	Hypothetical portfolio 1	Hypothetical portfolio 2
Return since ARP inception (%)	10.83	12.42
Annualised return (%)	3.27	3.73
Annualised volatility (%)	3.45	3.36
Sharpe ratio	0.67	1.09
Max drawdown (%) — daily data (%)	-4.60	-4.09
Beta to equities (1Y)	0.18	0.15

Monthly data, 30 November 2015 (inception of Wellington's ARP composite) through 31 December 2018 except where labelled daily data. Source: Wellington Management, Bloomberg, DataStream, HFR. The hypothetical portfolio performance presented reflects the hypothetical performance an investor would have obtained had it invested in the manner shown and does not represents returns that any investor actually attained. Backtested performance results were achieved by means of a retroactive application of a model designed with the benefit of hindsight. Certain assumptions have been made for modeling purposes and are unlikely to be realised. No representation or warranty is made as to the reasonableness of the assumptions made or that all assumptions used in achieving the returns have been stated or fully considered. Investments may not be made into an index. Please see Appendix I for additional important disclosures. **PAST RESULTS ARE NOT NECESSARILY INDICATIVE OF FUTURE RESULTS AND AN INVESTMENT CAN LOSE VALUE.**

Thus, we think an allocation to Wellington's ARP approach can serve not only as a cheaper, more liquid hedge-fund replacement, but may lower overall portfolio risk (while enhancing returns) by mitigating drawdowns in periods of market stress.

Summing up: why Wellington for risk premia?

- Deep, experienced investment team, with robust internal research capabilities offering a potential edge in strategy implementation
- Expansive set of risk premia, with potential to improve diversification and returns
- Differentiated portfolio construction aiming to maintain premia breadth/balance and mitigate unintended risks; risk management is a key focus
- Experienced, well-resourced relationship team
- Organizational stability and long-term focus of a 100% employee-owned private partnership, positioned to attract and retain top-caliber investment talent

APPENDIX A: NORDIC HYPOTHETICAL PORTFOLIO: CONSTRUCTION METHODOLOGY

The hypothetical portfolio represents the average allocations across asset class for Denmark, Finland, Norway and Sweden based on the Mercer 2017 Fund allocation survey. The returns presented reflect hypothetical performance an investor would have obtained had it invested in the manner shown and does not represent returns that any investor actually attained. The information presented is based upon the following hypothetical assumptions: The period presented for this analysis is 30 November 2015 through 31 December 2018. Both hypothetical portfolios rebalance daily to the below weights.

Hypothetical portfolio 1

- 2.75% Domestic equities represented by MSCI Nordic USD – Total Return Index (Source: Datastream)
- 15.5% International equities – MSCI All-Country World USD – Total Return Index (Source: Datastream)
- 53.25% Bonds – Bloomberg Barclays Global Aggregate - USD – Total Return Index (Source: Datastream)
- 9.75% Property – FTSE EPRA Nareit Global REITs Total Return index (Source: Bloomberg)
- 3% Cash – ICE BofAML 3-Month US Treasury Note Index – Total Return Index (Source: Datastream)
- 16% Alternatives – HFRI-I Liquid Alternative Index (source:HFR)

Hypothetical portfolio 2

- 2.75% Domestic equities represented by MSCI Nordic USD – Total Return Index (Source: Datastream)
- 15.5% International equities – MSCI All-Country World USD – Total Return Index (Source: Datastream)
- 53.25% Bonds – Bloomberg Barclays Global Aggregate – USD – Total Return Index (source: Datastream)
- 9.75% Property – FTSE EPRA Nareit Global REITs Total Return index (source: Bloomberg)
- 3% Cash – ICE BofAML 3-Month US Treasury Note Index – Total Return Index (Source: Datastream)
- 16% Wellington ARP: Alternative Risk Premia 8% Target Volatility Overlay Composite (net of fees)

Hypothetical portfolio 3

- 2.75% Domestic equities represented by MSCI Nordic USD – Total Return Index (Source: Datastream)
- 15.5% International equities – MSCI All-Country World USD – Total Return Index (Source: Datastream)
- 53.25% Bonds – Bloomberg Barclays Global Aggregate – USD – Total Return Index (Source: Datastream)
- 3% Cash – ICE BofAML 3-Month US Treasury Note Index – Total Return Index (Source: Datastream)
- 25.75% Wellington ARP: Alternative Risk Premia 8% Target Volatility Overlay Composite (net of fees)

The Alternative Risk Premia 8% Target Volatility Overlay Composite is an unfunded overlay with a live track record that dates back to November 2015, and it is shown as a demonstration of skill. The volatility target of this composite is 8%. The available Alternative Risk Premia approach has a 10% volatility target. It is managed by the same investment team and with the same investment philosophy and process as the lower volatility approach, but this should not be considered representative of the past or future performance of the Alternative Risk Premia 10% Target Volatility approach. The inception date of the Alternative Risk Premia 8% Target Volatility Overlay Composite is 30 November 2015.

Certain of the assumptions have been made for modeling purposes and are unlikely to be realized. No representation or warranty is made as to the reasonableness of the assumptions made or that all assumptions used in achieving the returns have been stated or fully considered. Changes in the assumptions may have a material impact on the hypothetical returns presented. These backtested performance results are shown for illustrative purposes only and do not represent actual trading or the impact of material economic and market factors on Wellington's decision-making process for an actual Wellington client account. Backtested performance results were achieved by means of a retroactive application of a model designed with the benefit of hindsight.

The indexes referenced herein are broad-based securities market indexes and used for illustrative purposes only. Broad-based securities indexes are unmanaged and are not subject to fees and expenses typically associated with managed accounts or investment funds. Investments cannot be made directly into an index.

WELLINGTON MANAGEMENT COMPANY LLP Boston | Chicago | Radnor, PA | San Francisco
WELLINGTON MANAGEMENT AUSTRALIA PTY LTD Sydney
WELLINGTON MANAGEMENT CANADA ULC Toronto
WELLINGTON MANAGEMENT HONG KONG LTD Hong Kong | Beijing Representative Office
WELLINGTON MANAGEMENT INTERNATIONAL LTD London | Frankfurt
WELLINGTON MANAGEMENT JAPAN PTE LTD Tokyo
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