A Framework for Risk Premia Investing

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We propose a new framework for alternative risk premia investing to facilitate the construction of balanced portfolios of commonly known strategies across asset classes. The categories of the framework, fundamental, behavioral, and structural premia, describe the nature and the robustness of the premia within the category. Each of the categories is further divided into a defensive and offensive compartment depending on the risk characteristics of the premia.

Introduction

The market for systematic factor strategies has experienced significant growth in the years following the financial crisis. A recent survey[1] estimates the size of the market to be in excess of a trillion dollars, represented by over 2,200 individual strategies offered by asset managers and investment banks. Despite the rapid growth of the market, and the ever-broadening institutional adoption of factor-based quantitative strategies, the industry still lacks a common framework of consistent terminology and definitions.

In his seminal book, Ilmanen (2011) presents a framework with four "style premia" – trend, value, carry, and volatility, and discusses their long-term performance and risk/return characteristics. Whilst such consensual premia are represented in most diversified risk premia portfolios, the universe of strategies promoted to institutional investors also includes quality, low beta, curve carry, and seasonal flow-based premia (to name but a few), as well as more esoteric trading strategies seeking to benefit from regulatory constraints and market supply / demand imbalances.

Systematic factor-based investment strategies are often called "alternative risk premia" in practitioner parlance. Such umbrella terminology contains a potentially misleading connotation, in that while some factor strategies have an obvious risk-based rationale, that is, their premia are a compensation for systematic risk exposure that coincides with economic "hard times"[2], this is not the case for many of the strategies implemented by market practitioners. The investment rationale of a strategy can have a significant impact on the robustness of its returns and risk characteristics, as will be discussed momentarily. Despite the semantic inaccuracy, we will follow the market convention in the rest of this article and use the term alternative risk premia ("ARP") to describe all systematic factor-based investment strategies regardless of their rationale.

Our objective is to take a first step towards formalizing a framework to classify some of the most common premia strategies according to their risk characteristics and robustness. One issue that this paper highlights is the need for the understanding of the fundamental risk of a strategy, and the additional risks that follow from its practical implementation – typically by use of leverage. Recent

[1] Campbell & Suhonen (2017)

[2] See e.g. Merton (1973), Cochrane (2001)

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academic research has also shed light on a number of other concerns related to the search for market anomalies and excess returns, such as data-mining, publication bias, and model overfitting[3]. We will not address such issues in this paper, but rather assume that all the strategies within the framework have passed a test of baseline rationale and robustness.

Framework

Our proposed framework categorizes ARP strategies based on their expected robustness and risk characteristics. The framework has *three categories of premia* and each of the categories has *two separate groups* depending on the risk characteristics of the premia.

The categories, fundamental, behavioral, and structural premia, describe the nature and the robustness of the premia within the category. *Fundamental* premia tend to be the most robust category, and in an ideal setting, such premia benefit from empirical evidence from different time horizons and markets, and a rational explanation based on economic theory – often based on investor risk aversion. *Behavioral* premia are based on typical investor behavior that may not be optimal from the perspective of a rational economic agent. Consequently, while behavioral premia may be observed over extended periods of time, they could be expected to be less robust than fundamental premia. *Structural* premia derive their returns from imbalances in market structure and liquidity provision, and are therefore by definition susceptible to changes in market structure, regulations and liquidity conditions. We would also propose that the clarity and stability of the risk characteristics of the premia diminishes as one moves from the fundamental to the structural.

Each of the categories has two separate classifications of risk, *defensive* and *offensive*. Defensive premia within each of the categories can typically be constructed in the long-only format without short-selling and leverage. On the contrary, practical implementation of offensive premia strategies tends to be characterized by use of either internal or external leverage, or short-selling. Consequently, negative skewness of the premia typically increases when moving from the defensive premia to the offensive ones. Similarly, the tail risk correlation of the premia with traditional risky assets can be expected to be higher in the offensive strategies. Long-short adaptations of defensive premia bring the strategies closer to offensive, however their exact risk profile will depend on the amount of leverage used.

Robustness decreases →

	Fundamental Premia	**Behavioral Premia**	**Structural Premia**
Defensive / Non-levered premia	**Balance Sheet Quality Premia: Quality**	**Crowd Behavior Premia: Momentum & Value (Mean-reversion)**	**Seasonal Flow Premia: Rolling Period Premia etc.**
Offensive / Levered premia	**Tail Risk Insurance Premia: Carry & Volatility Carry**	**Leverage Avoiding Behavior Premia: Low Beta & Curve Carry**	**Market Structure Premia: Size & other Inefficiencies in the market structure**

[3] See e.g. Harvey et al. (2016), McLean and Pontiff (2016) and Suhonen et al. (2017)

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We note that traditional asset classes with identifiable, well understood economic characteristics can also be categorized within the framework. Risk assets such as equity and credit would naturally inhabit the fundamental – offensive category, whereas unlevered default-free term premia (government bonds) would traditionally occupy the fundamental – defensive compartment[4].

Fundamental Premia

Fundamental premia can be expected to exhibit the most robust positive performance over the long term. These strategies either benefit from reliance on fundamental economic data, or have a strong risk-based explanation, as the investor accrues a positive premium over time, but is exposed to sudden, sharp shocks (negative skewness), often during economic "hard times".

We categorize quality strategies as an example of fundamental – defensive premia. The quality factor is based on accounting data such as profitability, earnings, and indebtedness, and evidence suggests that high quality companies outperform their low-quality peers, despite that their systematic risk is lower[5]. It is therefore arguable whether quality reflects market inefficiency or investor behavior rather than a risk premium. Recent academic research on profitability and investment factors[6] rely on the "tautological" mathematical interpretation of the classic dividend discount model, and are agnostic about the rationale for such factors being compensated. Quality measures may also be applied to the credit bond markets to produce defensive premia over credit market premia.

The offensive compartment of fundamental premia includes all types of carry strategies, which have a risk-based rationale. Most asset classes tend to have a carry component, which can be thought of as an economic rent for bearing (tail) risk in the financial markets[7]. Carry premium is typically constructed by choosing high-yielding assets in the long basket and hedging (financing) the strategy with low-yielding assets, and levering the long-short basket to the targeted level of risk/return.

Expected return of the carry premium can be defined on ex-ante basis by reference to forward curves, but the risk of the strategy is highly dependent of the efficiency of the hedge i.e. the correlation between the long and short baskets. Carry premium is thus highly vulnerable to changes in the correlation regime, and the levered nature of the typical implementation causes intense tail risk events from time to time. Carry premium can be defined in most asset classes by using either current yield information or the forward curves of the assets. Short volatility premium is similarly a carry premium by nature, as it may offer steady compensation for extended periods of time, only to be disrupted by occasional tail risk events, or "catastrophe" risk, as in Cochrane (1999).

[4] This last classification is not straightforward as the "safe haven" characteristics of government bonds may induce a *negative* risk premium (essentially, a cost of hedging) on bond holdings. Furthermore, the asset class has been strongly impacted by the unconventional monetary policy tools of central banks in recent years, leading to previously unprecedented valuations.

[5] E.g. Asness et al. (2017)

[6] Novy-Marx (2013), Fama and French (2015), Hou et al. (2015)

[7] Koijen et al. (2013) note that carry strategies in different asset classes do not necessarily exhibit negative skewness, but carry returns across markets tend to be low during global recessions.

Behavioral Premia

The second category of premia considered – behavioral premia – represents strategies whose logic relies on certain behavioral traits or limitations in the operations of market participants. The premia can be expected to persist as long as there are enough investors behaving in a similar way in the financial markets, without a sufficient counter-balancing flow of "arbitrage" capital. Due to this nature, behavioral premia can be expected to be less robust than fundamental premia.

We call the defensive category of behavioral premia Crowd behavior premia. These premia are based on the mass behavior of investors, that can plausibly cause for instance the trend following properties of the market. The mechanism behind such behavior may be linked to slow reaction to news, economic, and financial data.

On the other side of the investor crowding behavior is value premia. Overextended trending markets may become either over- or undervalued according to valuation measures in the longer run, and tend to mean-revert. Therefore, momentum and value premia can be thought to represent the two directions of the same crowd behavior-based phenomenon. Typically, the trend-following and mean-reverting properties of the market tend to occur in different time horizons. Momentum normally dominates in the intraday market movements, but market prices tend mean-revert within a one-month horizon. In the mid-term, from 3 to 12 months, momentum dominates and causes cycles, and the trends tend to end with (relatively) over/undervalued markets leading to mean reversion.

Momentum strategies are based on measures of price changes either in time series (trend following) or between securities (cross-sectional momentum). On the other hand, the identification of securities representing "value" premia usually requires exogenous measures such as accounting or economic data. This is an issue since there are many competing measures of value, and practitioners often combine them to form composite measures. There is also the question whether value measures are universal and absolute in nature, or better used in a relative context, e.g. between companies from the same industry sector[8].

As the academic definition of the equity value factor is based on company financial ratios, it could be argued that value belongs to the fundamental – defensive category. However, value premium does not naturally fit in either of the fundamental premia categories, whereas the evidence supporting behavioral explanations and over-extrapolation of past returns in particular[9] appears plausible. Quality and value strategies can be considered different dimensions of a similar phenomenon[10], and strategies combining the two are often used in practical contexts. As an example, quality screens may be used to filter out "value traps", or value stocks that are cheap for a reason (high risk of financial distress) and thus unlikely to mean-revert. In such cases, quality, or lack of it, may start to dominate the characteristics of the strategy and it can be classified into the fundamental category. Without any quality measures acting as an anchor, value on its own depends only on the tendency of asset prices to mean-revert.

Leverage avoidance by investors, and possibly individuals' preference for stocks with lottery-like payoffs, are behavioral explanations behind strategies such as low volatility and low beta, that we categorize as behavioral – offensive. The avoidance of explicit levering of portfolios may lead investors to favor assets with high implicit leverage or systematic risk exposure, such as high-beta

[8] See discussion in Ilmanen (2011)
[9] See e.g. Asness et al. (2017b)
[10] Asness et al. (2017) note *"[quality strategy] is buying and selling based on quality characteristics irrespective of stock prices, while [value strategy] is buying based on stock prices irrespective of quality"*

stocks, or long duration bonds. Investors able to apply leverage may harvest the premium by investing lower beta or short-duration assets (with leverage), either as a leveraged long-only investment, or by hedging the market risk with higher beta (duration) assets on risk-adjusted basis.

It is important to note the structural risk of strategies linked to leverage avoidance. The strategy depends on the inability or unwillingness of most investors to lever their portfolio holdings, but equally the implementation and attractiveness of the strategy to an ARP investor relies on the availability and cost of financing. Consequently, strategies such as "betting against beta" are exposed to funding liquidity[11] in the financial markets, which creates a systematic risk element to the strategy.

Structural Premia

Our third category – structural premia strategies – are based either on seasonal asset flows by different market participants, or on inefficiencies and liquidity imbalances in the market structure. The premia can be expected to persist only as long as there are structural reasons for the asset flows to continue, and not to be counter-balanced by other market actors. Changes in the market structure, for example as a result of financial regulation, may also create and remove premia opportunities. Structural premia are therefore less robust than the other premia categories, which is why these strategies are mostly traded by specialist funds and trading desks, and are rarely included in mainstream diversified risk premia products.

We title the defensive compartment of structural premia "seasonal flow" premia. The origin of the premia are the asset flows by market participants, such as regular portfolio rebalancing, or rolling of futures contracts. The construction of seasonal flow premia strategies requires identification of the flow patterns in the markets. As an example, turn-of-the month strategies aim to benefit from regular institutional investment flows by opening long positions prior to month-end, and closing them a few days into the next month. Typically, the strategies are fully invested only during the flow period and stay un-invested for the rest of the time. Seasonal flow premia can be harvested in a long-only format without leverage. In practice, obvious seasonal flow patterns are quick to attract the trading community to exploit them, leading to changing seasonality patterns and lack of robustness of the premia.

The offensive structural premia compartment is titled market structure premia. These premia tend to exist due to inefficiencies in the market structure, and they can be based either on regulation, market practices, or the lack of scalability of the premia opportunity. For example, banks and insurance companies are from time to time compelled by regulation or capital constraints to reduce the size of their balance sheet, or remove the economic risk of particular portfolio holdings. Investors with balance sheet capacity who don't operate under the same regulatory framework may enter into funding or risk sharing transactions with the regulated entities, in exchange for a premium.

Furthermore, common market practices might cause harvestable inefficiencies in the market. For instance, the stocks included in common market-cap weighted indices are influenced by the demand from index funds and ETF's, and stocks outside the indices might trade at a relative discount if the demand for passive investments is strong. Similarly, equity size premium can be classified to the structural - offensive compartment. Limited scalability of investments and higher search costs due to

[11] Brunnermeier and Pedersen (2009)

limited analyst coverage can result in limited small cap demand. Small cap stocks can also be expected to be less financially resilient, and even less liquid, at times of market stress.

As structural premia are based on market inefficiencies, they can disappear upon changes either in regulation or in the common market structure. In the case of structural funding or risk-sharing transactions, the use of new products, jurisdictions, documentation, risk management, or trade settlement framework add to the complexity of the strategy, and early-mover investors would be expected to earn a premium to compensate their search costs of a new asset class or strategy. On the flipside, because of the complex nature of the transactions, their investor base is likely to be limited especially during market turbulence, resulting in poor or non-existent liquidity. Negative basis trades and structured finance transactions prior and during the financial crisis serve as examples.

Discussion and Conclusions

We propose a new framework for alternative risk premia investing, where the different premia categories are defined by the risk characteristics and robustness of the premia. The clarity of the essence of the premia, as well as their economic rationale, appears strongest in the fundamental premia category, but it weakens when moving to the behavioral and further to the structural risk premia category.

The robustness of the premia strategies is also a reflection of the capacity of the strategies. Hence, high capacity enhances the robustness of a premium, and the lack of capacity will conversely make a premium more likely to be arbitraged away. The capacity of fundamental and behavioral premia can be expected to be relatively high, at least in the defensive groups, but it decreases when moving to the offensive groups or to the structural premia category.

Our proposed framework is related to the study of Lempérière et al. (2014), who use a measure of empirical skewness of strategy returns as an indication of whether the strategy represents an economic "risk premium" or a genuine market anomaly. However, as noted in Hamdan et al. (2016), empirical skew measures can be sensitive to strategy design and the sample period examined. Further, as per Cochrane (1999), "rare events are rare", and pure empirical analysis may give a false impression of strategy stability. We draw the reader's attention again to the structural interconnectedness of offensive strategies (those employing implicit or explicit leverage) with economic hard times and market liquidity factors.

The risk characteristics of offensive premia – negative skewness and tail risk correlation, sometimes combined with liquidity risks – have important consequences for portfolio construction and overall risk budgeting across traditional and alternative premia. ARP strategies are often marketed as a portfolio diversifier and source of uncorrelated returns in an environment characterized by fully-valued traditional asset classes. Portfolio allocations to different strategies usually follow their statistical properties such as volatility and correlations. However, the implication of skewness and tail risk correlation is that, first, portfolio diversification across strategies will not necessarily reduce the exposure to skew risk, and second, that a "diversifying" ARP portfolio may still suffer significant losses during periods of market turbulence[12].

[12] See e.g. Dumontier (2016) and Hamdan et al. (2016)

By nature, construction methods vary between different premia and some of them are easier to define than the others. For example, cross-sectional momentum and trend following strategies are relatively easy to construct in all liquid asset classes, compared to value or quality premia, where a variety of measures and methodologies have been proposed. In consequence, momentum premia, as well as carry premia, may become over-represented and value and quality premia under-represented in a typical portfolio of cross-asset ARP strategies. Naïve risk-based allocation within a sample of typical strategies easily generates momentum and carry-biased portfolios with only a limited amount of risk budgeted to value and quality factors. The proposed framework facilitates the construction of balanced and more diversified risk premia portfolios, when the risk characteristics of underlying strategies are understood.

Conceptually, ARP strategy allocation can be considered within the framework of Grinold's Fundamental Law of Active Management[13], as extended by Clarke et al. (2002). Weaker strategy robustness (loosely, information coefficient), or restricted implementation due to market or structural constraints (a lower transfer coefficient), can be compensated, other things equal, by greater portfolio diversification (breadth). In the context of our framework, this would advocate further diversification across strategies as one moves along to the less robust compartments. We would be hesitant to promote attempts to actively "time" fundamental or even behavioral premia, whereas structural premia are almost by definition more transient "trades" that probably work best when applied by an experienced and well-resourced investment professional or asset manager.

Endnotes

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[13] Grinold (1989)

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