For professional investors - Marketing communication - September 2019

A PRACTICAL GUIDE TO MULTI-FACTOR INVESTING

BNP PARIBAS ASSET MANAGEMENT

The asset manager for a changing world

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Why BNP Paribas Asset Management for Multi-factor Investing

FOREWORD

BNP Paribas Asset Management has been among the leaders in Factor Investing solutions since 2009. This success is the result of a strong commitment from the company to develop a recognised expertise in quantitative investments. This expertise is actively engaged in serving the best interests of our investors at a time when investors are keen to diversify portfolios and target higher risk-adjusted returns.

Our teams work closely with investors to build innovative, unique and client-oriented solutions across all major asset classes: offering Factor Investing solutions in Equities, Fixed income (corporate bonds, government bonds, and currencies) and Multi-Asset. We recognise the extent to which investors are integrating sustainability into their portfolios, and have recently integrated environmental, social and governance (ESG) factors into all of our multi-factor strategies. We believe that this helps us to achieve better risk-adjusted returns over the long term – a benefit we are pleased to share with you, our investors.

Over the years our combination of fundamental, academic views and quantitative modelling expertise has resulted in a robust multi-factor offering which, today fully integrates ESG goals in its investment process.

We firmly believe the breadth of our Factor Investing expertise, combined with the outstanding depth of our research and our ESG goals, allows us to address the needs of all types of investors.
Our key attributes that add value to our clients and push the industry standard higher:

- Regular quality academic research contributing to the industry thought leadership
- A department of quantitative experts - comprising researchers, portfolio managers and investment specialists of more than 40 professionals with 15 years of average experience[1]
- A recognised capacity to build innovative quantitative solutions tailored to specific client needs
- A Multi-factor Investing expertise applied across all main asset classes and regions

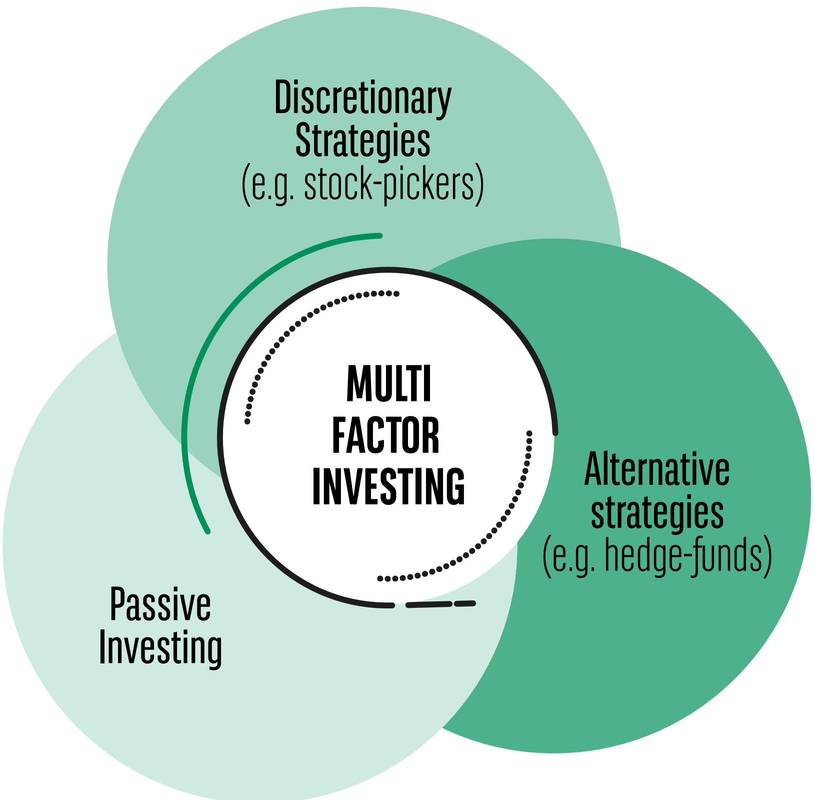
Denis Panel
Chief Investment Officer of Multi-Asset,
Quantitative and Solutions at BNP Paribas Asset Management

1 BNP Paribas Asset Management, 2019.

INTRODUCTION TO MULTI-FACTOR INVESTING

Factor Investing has been instrumental for investors to diversify their portfolios from traditional active managers and aim for systematic outperformance based on factors. The natural evolution from single to multi-factor investing is visible in all asset classes. Investors see the benefit of multi-factor investing with clear investment objectives: stable excess returns, controlled investment risk and integration of ESG principles into the investment process.

At BNP Paribas Asset Management (BNPP AM), we are able to offer investors a large range of strategies relying on a multi-factor approach in both equities and fixed income markets. These multi-factor investing strategies can be positioned at the crossroads of passive, discretionary and alternative strategies. It is essentially the implementation of quantitative techniques, based on several indicators often used by traditional stock-pickers, with a strong focus on transparency and cost efficiency.



1 Past performance is not an indication of future performance.

THE BENEFITS OF MULTI-FACTOR INVESTING

Factor-based investing is an investment approach aiming to generate higher risk-adjusted returns over the long term through security selection, building on proven long-term drivers of relative returns: *factors*.

Allocations towards multi-factor portfolios are more frequently ‘core’ long-term strategic allocations versus a single factor ‘satellite’ approach.

In our multi-factor approach, we focus on four factors: Low Volatility, Quality, Value and Momentum. These have delivered sustained performance over time and across regions, due to low correlations between each factor[1]. The absence of bias in terms of sector and beta has been proven, by our proprietary academic research team, to bring more stable returns and better performance adjusted to risk over the long term. This applies to both equity and fixed income markets, and is the reason why our multi-factor strategies are developed for both asset classes.

LOW VOLATILITY
Preferring companies with a low risk profile

QUALITY
Favoring companies with a proven business model

VALUE
Selecting companies with attractive valuations

MOMENTUM
Choosing companies on a positive trend

The objective behind factor investing is not complex. We seek to tilt portfolios towards the cheapest, the most profitable and well-managed companies with the lowest risk and strongest momentum. Not only does this seem intuitive from an investment philosophy point of view, it has also been shown by academics to be a way of targeting higher risk-adjusted returns over the long term.

A source of **active returns** building on proven and efficient long-term sources of performance

A risk-oriented approach aiming to maintain **a stable risk profile**

A **source of diversification** with low correlations to traditional investments

An investment process that includes **ESG integration**

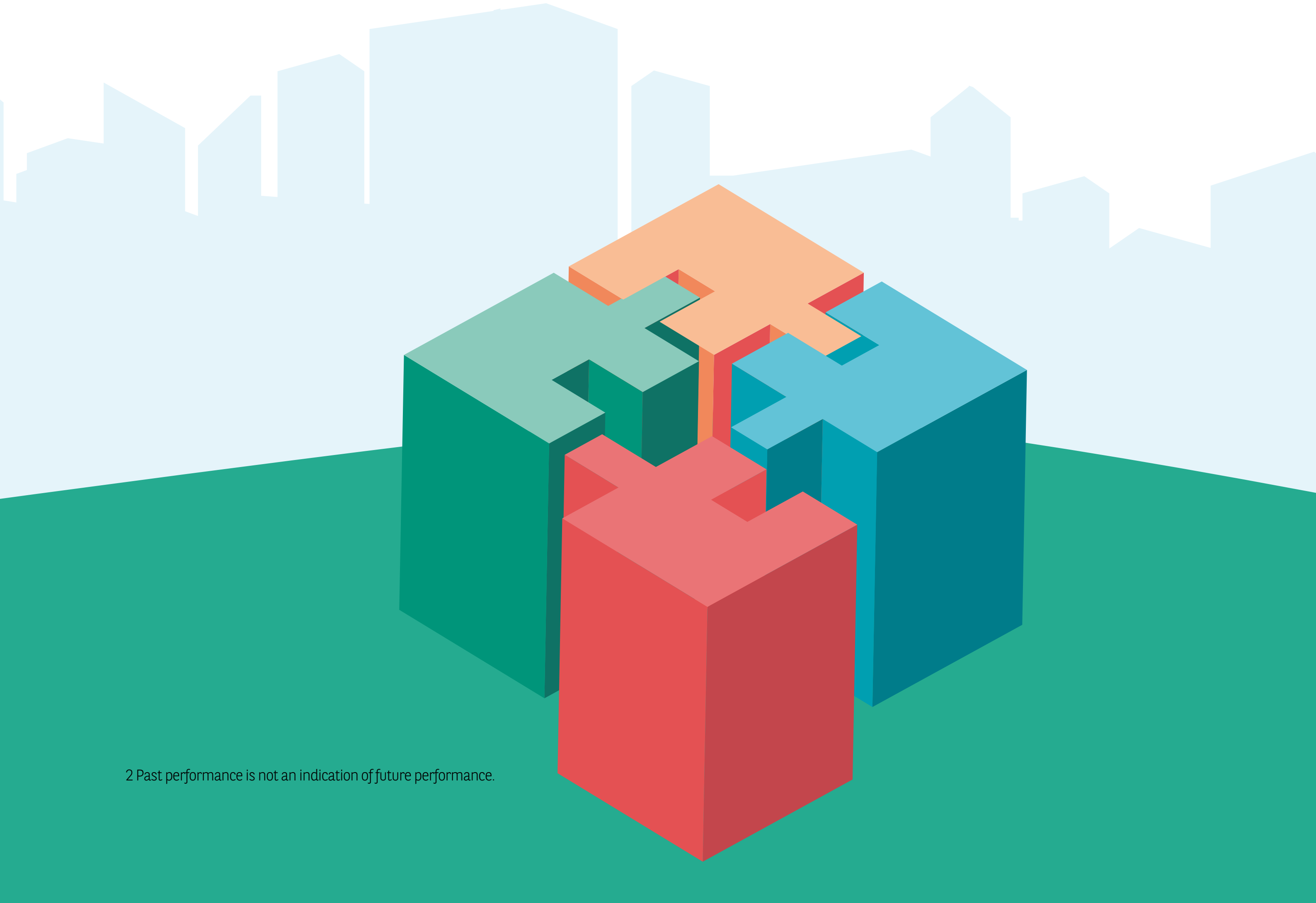
FACTOR PREMIUM

Academic research has long explored the variations in the cross-section of asset returns, i.e. explaining how bonds or stocks move relative to each other.
The traditional way of looking at cross-sectional returns is to separate between *beta* and *alpha*:

- ***Beta*** basically consisting of returns explained by directional market risk
- ***Alpha*** being the product of all returns not explained by beta

What research has shown over time is that a significant part of the alpha component can actually be attributed to exposure to a limited number of *factors*.

- A **factor** can be simply thought of as any characteristic that is important in explaining the return and risk of some securities relative to others.
- Factors such as **value, low risk, quality** and **momentum** have been shown by research to be linked with a sustained 'premium' – **factor premium.**
- Simply put, portfolios tilted towards cheap, profitable, low-risk and trending (i.e. those with momentum) securities have tended to outperform their investment universe.



2 Past performance is not an indication of future performance.

WHERE DO FACTOR PREMIUMS COME FROM?

The existence of factor premiums can be explained by some structural characteristics of markets and the way people invest (see illustration). The fact that these characteristics cannot disappear supports the empirical observation that factor premiums are persistent in time[2].

MARKET STRUCTURE

Some structural characteristics of markets can explain inefficiencies – hence the existence of sustained alpha sources.

- Different objectives from market participants (like central banks)

BEHAVIOURAL BIASES

Investment decisions may be impacted by human behavioral biases

- Home bias
- Anchoring bias

INVESTOR CONSTRAINTS

Market inefficiencies can also be the result of specific constraints by investors

- Inability to use leverage
- Incapacity to short
- Aversion to turnover (e.g. for fiscal reasons)
- Rating / regional constraints

OUR PHILOSOPHY AND PROCESS

The objective of factor-based strategies is to capture as much factor alpha as possible, i.e. build portfolios that maximize the exposure to factors, while keeping directional market risks in line with the investment universe or benchmark (beta, duration, spread etc).

BNP Paribas Asset Management has been developing and managing factor-based strategies for a decade, both in equities and fixed income. Through our experience, we have made a number of key philosophical choices:

TRANSPARENCY

When designing factor-based strategies, we always seek to avoid unnecessary complexity. Not only do we believe this helps build robust solutions, it is also important in making our strategies understandable and transparent for our investors.

Similarly, our strategies are all based on in-house research, we are always willing to publish our research findings and participate in the academic debate.

A SYSTEMATIC PROCESS

We believe in a fully systematic process, for better discipline and efficiency. A systematic approach allows us to produce reliable historical simulations to assess the long-term behaviour of our strategies.

NO FACTOR TIMING

Our research has shown that factor timing does not improve risk-adjusted returns in the long run. Maintaining a balanced exposure to factors that exhibit low correlations is sufficient and leads to significantly higher information ratios.

PURIFIED AND UNBIASED FACTORS

Our research has demonstrated significant benefits of removing unwanted risk exposures from factor investing strategies. Building risk-controlled factors is crucial in order to separate *'pure'* factor premium from market-related *'beta'* returns*.

* *In Diversify and Purify Factor Premiums in Equity Markets – January 2017,* we show that the information ratios for robust 'purified and diversified' factor strategies are significantly increased compared to more basic strategies.

In practice, our multi-factor security strategy is achieved using a systematic investment process comprising of **3 major steps:**

1 Factor calculation:

computing factors on the entire investment universe

- **Factor scores :** Value Momentum, Quality, Low Volatility
- **Purification :** neutralise biases (sector, beta, size) of each individual factor

2 Multi-factor scoring:

scoring and ranking securities relative to each other based on factors

- **Factor Diversification :** combination of factor scores to create a global score
- **Combination of the factor** based on proprietary research

3 Portfolio construction:

building an investable multi-factor portfolio taking into account investment guide-lines, investment risks and sustainability objectives.

- The final portfolio aims to offer **high factor exposure**
- Integration of **ESG objectives**
- The portfolio construction takes into account **Risk Management** and controls

IN DEPTH RESEARCH

Quantitative research is at the heart of our investment process. Our Quantitative Research Group (QRG) actively focuses on the application of ideas and themes into the design of quantitative solutions and development of capabilities. The strength of the team reflects its ability to solve challenges with practical solutions, they work closely with the portfolio management team, refining the strategies further and customising solutions to fit investor needs.

The QRG team is also responsible for conducting ground research, they keep track of external academic research and investigate and analyse themes and ideas which could lead to further innovation and new products. The group promotes innovative ideas arising from internal research by participating in industry and academic conferences and debates.

Copies of academic papers released by the Quant Research Group over the past five years are available on request.

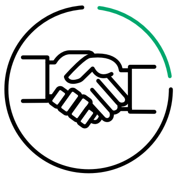
ESG INVESTING

The extent and scope to which investors are integrating sustainability into their investments is escalating rapidly. A few years ago, there was much debate over the benefits of sustainable investing and the risk/return impact it has for an investor. In our view, any such debate is over: Sustainability is now widely recognised as a long-term driver of returns and a mitigator of risk. Integrating environmental, social and governance (ESG) goals when building a portfolio means asset managers acquire a deeper and richer understanding of potential reputational, operational and financial risks. Ultimately they make better-informed investment decisions for our clients.

As such, a core approach to sustainability is now integrated into all our multi-factor strategies. We believe ESG integration helps us achieve better risk-adjusted returns over the long term.

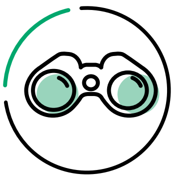
Reasons why sustainability matters to BNP Paribas Asset Management

ESG[1] integration helps us achieve better risk-adjusted returns



Our fiduciary duty is aligned with sustainable investment

Stewardship is an opportunity and obligation



We are long-term, forward looking investors

Sustainable economic future relies on sustainable investment practices

Walking the talk is critical to achieving excellence

Our sustainable investment beliefs further underpin our conviction about embedding ESG objectives into the core of our investment approach.

1 ESG: Environmental Social and Governance.
Source: BNP Paribas Asset Management - As of July 2019.

FROM EXCLUSIONS TO INTEGRATION

Historically, the main focuses of sustainable investing were exclusions, stewardship, thematic investing and awareness. Today, sustainable objectives – and in particular ESG standards – are fully integrated into a wide range of investments: **Sustainability has become a core component of investment strategies; it no longer sits on the periphery.** Integrating sustainability objectives has become crucial in meeting investors' expectations and needs. That is why, at the end of 2018, BNP Paribas Asset Management's Quantitative investment team added an ESG integration objective to the exclusions already in place:

- **Increase the portfolios ESG score by 20%** versus the benchmark ESG score

That ESG considerations have become core to our strategy implies an evolution in our approach. In the case of multi-factor investing, this means going beyond exclusions to focus on ESG integration at the portfolio construction level. The advantage of such an approach is that if a company's expected returns are outstanding from a financial point of view, it can still be part of the portfolio despite a relatively lower sustainability score.
As illustrated, multi-factor investment strategies involve both **exclusions and integrations** as the two main complementary sustainability pillars required by investors.

By adding ESG objectives to factor investing strategies, investors consider sustainability as a third distinguishing feature of their investment, in addition to the return and risk. Looking ahead, investors will be able to tailor their investments based on three major objectives: the return they expect, the risk they are willing to take, and the sustainable objectives they seek.
Quantitative techniques are well suited for integrating sustainability goals: BNP Paribas Asset Management is convinced that by **integrating ESG factors** into our investment process, we will gain a deeper and richer understanding of the risks that we face. Consequently, over the longer term, we will make **better informed decisions** for our clients. Moreover, as we transition from the exclusion-only approach, our integration process now allows us to reach the core investments of our customers and accompany them in having a stronger positive impact on our world.

1. Exclusions

- **UN Global Compact Exclusions** (including watch list) are based on a universal benchmark of assessing companies when concerns have arisen regarding human rights, labor, environment and anti-corruption.
- **BNPP Sector exclusions:** companies which according to BNPP sector policies are significantly involved in palm oil and wood pulp, nuclear energy, coal-fired power stations, controversial weapons, asbestos, mining, oils sands, tar sands, certain agricultural sectors.
- **Companies with an ESG decile ranking of 10** (10 being the worst on a scale of 1-10). This includes the companies that do not comply with the "Carbon Policy".

+

2. ESG Integration

- The overall objective of the ESG integration policy of the fund is to offer investors a portfolio which has an improved ESG score

ESG Portfolio score
+20%
Higher than benchmark score

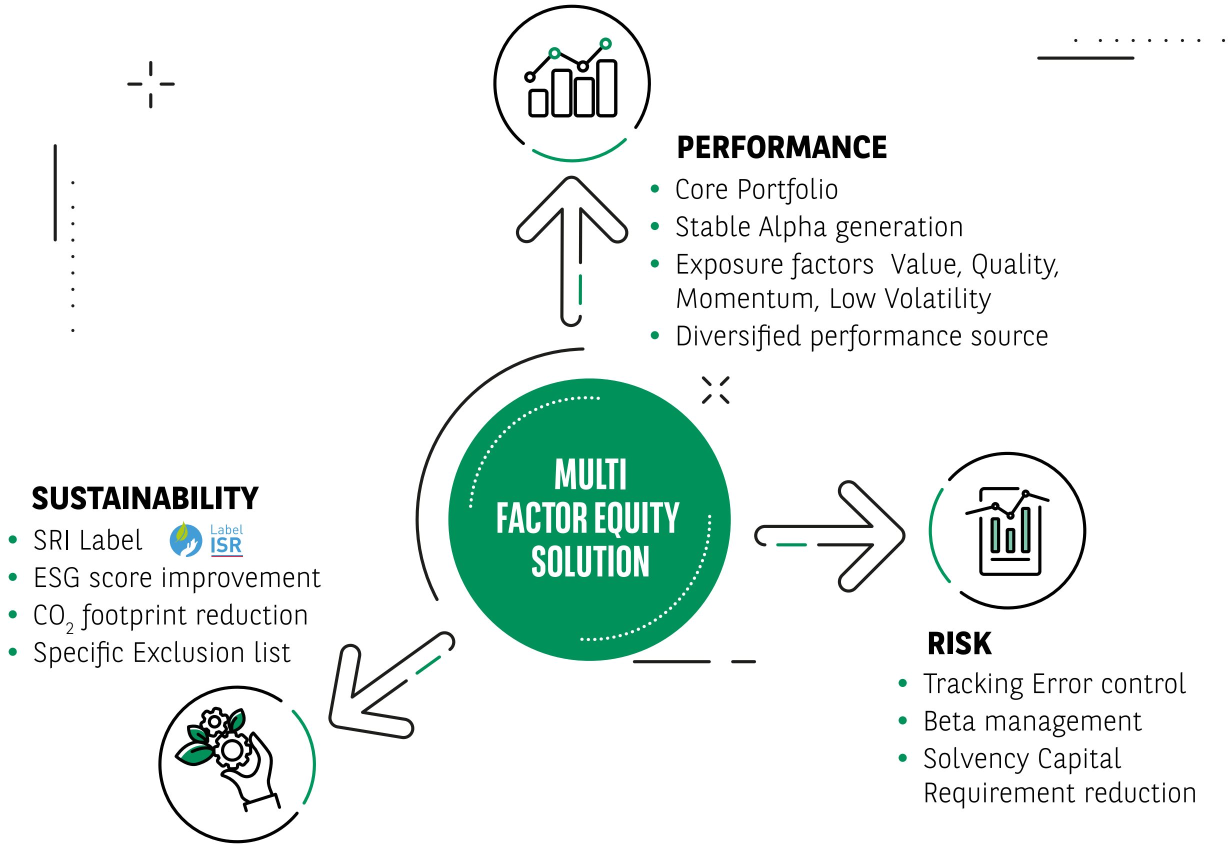
Source: BNP Paribas Asset Management, 2019.

CASE STUDY 1: FLEXIBILITY AND TAILOR-MADE SOLUTIONS THROUGH A MULTI-FACTOR EQUITY FRAMEWORK

Investors are increasingly looking for flexibility, customisation and tailor made solutions. Multi-factor Equity investing is particularly useful for investors wanting to customise their equity investments, because it's a systematic, bottom up investment process which is fully customisable.

Advantages of investing in multi-factor solutions:
- Aim to generate sustainable excess return over the long term
- Controls investment risks in multiple ways
- Diversification, with low correlations to traditional investments
- Sustainable investing through integration and exclusion

At BNP Paribas Asset Management, we tailor multi-factor solutions towards a client's needs using three investment criteria: Performance, Risk and Sustainability.



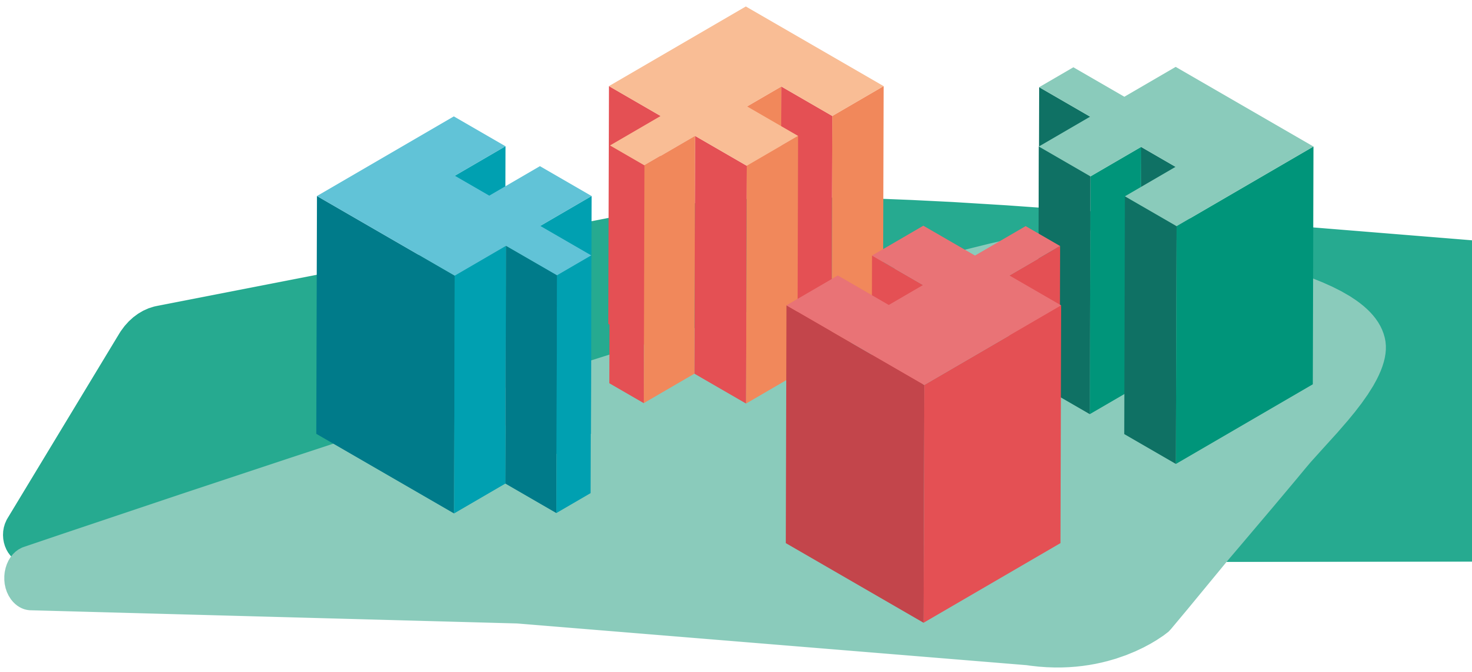
Source: BNP Paribas Asset Management end of July 2019.

PROPOSED SOLUTION

Our equity Solution is built on a multi-factor Equity portfolio, generating equity alpha through the exposure to uncorrelated factors such as Value, Momentum, Quality and Low Volatility. The integrated multi-factor approach, based on factor purification and equal risk contribution to each factors, has been tailored in order to add the following investment objectives:

- Increase portfolio ESG score by 20% compared to the MSCI Europe's ESG score
- Increase portfolio Dividend yield by 20% compared to the MSCI Europe's dividend yield
- Exclusion of specific non- ESG compliant stocks based on investor's specific exclusion list
- Low equity beta to provide a defensive equity portfolio

This multi-factor equity solution has the benefit to generate long-term excess return compared to the MSCI Europe while controlling investment risks, tilting towards dividend stocks and sustainable investor goals.



CASE STUDY 2: DEDICATED SOLUTION FOR MULTI-FACTOR CREDIT

In the fixed income space, our experience in managing multi-factor strategies in Global Government Bonds and Credit markets (Investment Grade or High Yield) was a significant advantage when managing a Global Aggregate bond strategy. The search by an Official Institution in the Global Aggregate space gave our Quantitative Fixed Income team an opportunity to promote our diversification benefits and illustrate new sources of return compared to traditional fixed income strategies. Main goals: diversification, regular outperformance, well controlled risk (maximum 200 bps of Tracking Error ex-ante)

BREAKING DOWN THE DRIVERS OF RISKS & RETURNS

Global Aggregate benchmarks contain thousands of securities, covering treasuries, government-related and corporate, mortgage-backed and asset-backed securities, over multiple countries

In order to extract consistent alpha from such a large and diversified investment universe it is useful to identify the main components of risk and return in a global aggregate index

Our approach aims to extract alpha from each component, while keeping directional risks in line with the benchmark. Indeed, the Beta-1 profile of our Multi-factor Global Aggregate strategy offers no significant duration or spread deviation relative to the benchmark. In addition, our strategy is a pure factor-based bond selection with no top-down sector allocation. This is one of the reasons why our Multi Strategy in Fixed Income space has such low correlation with traditional fixed income investment (which use either duration or credit spread exposure in order to add alpha). Finally our strategy is constructed with strict risk management and controls to ensure a stable risk profile and precise allocation of risk per strategy.

'Disaggregating' global aggregate returns

Global aggregate benchmark returns

=

Interest rates-based returns

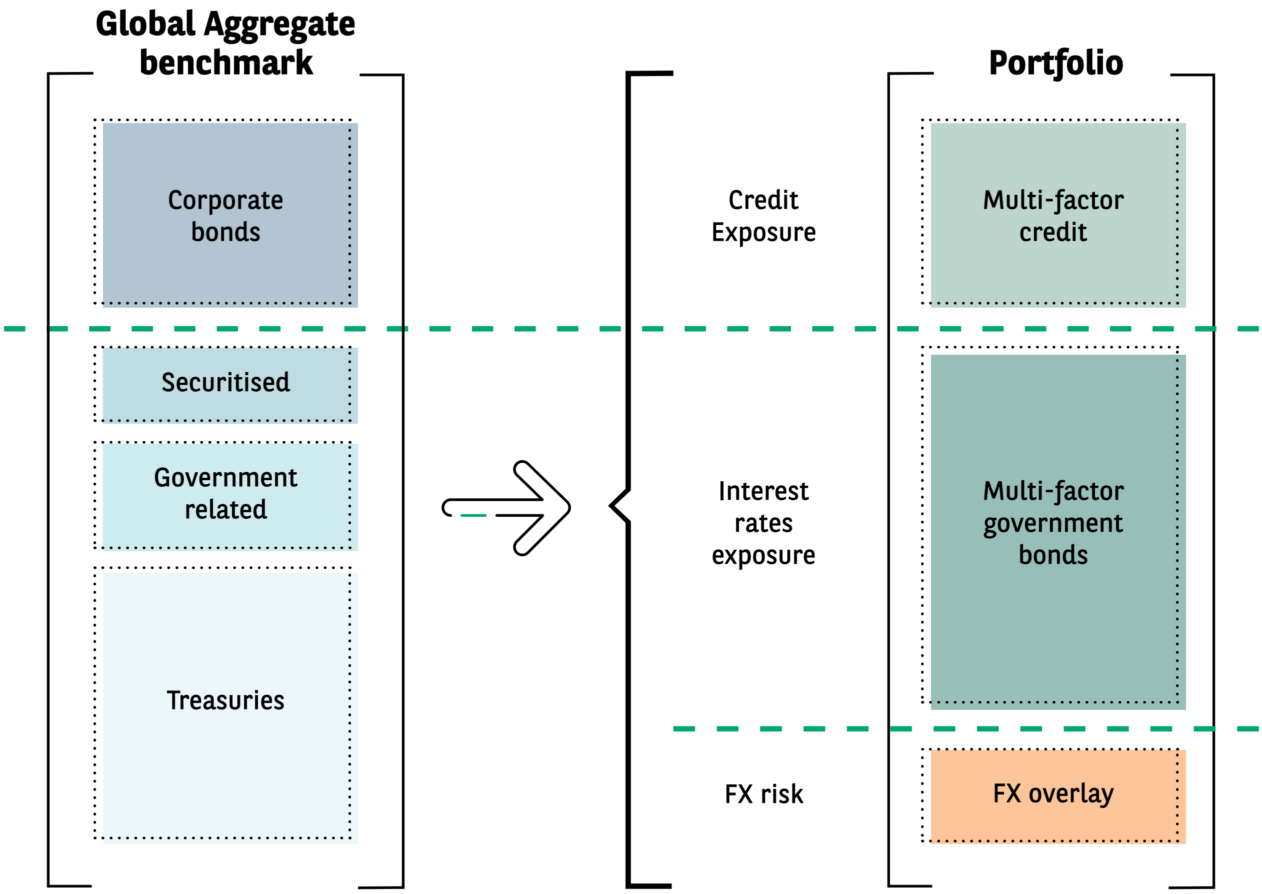
+

Credit-based returns

+

FX-based returns

PROPOSED SOLUTION



Source: BNP Paribas Asset Management, September 2019.

OUR TEAM

MULTI-ASSET, QUANTITATIVE AND SOLUTIONS (MAQS)

Solutions & Advisory

Multi-Asset

Quant & Index

Structured Management

WORKING TOGETHER TO BUILD INNOVATIVE & SUSTAINABLE MULTI-FACTOR SOLUTIONS

QUANTITATIVE RESEARCH GROUP

Quantitative Strategies*

SUSTAINABILITY CENTRE

* Quantitative Strategies forms part of our Quant & Index team

WHY BNP PARIBAS ASSET MANAGEMENT FOR MULTI-FACTOR INVESTING

Dedicated quantitative investment team and proprietary research

Large range of Multi-factor strategies in Equity, Fixed Income and Multi-Asset

Systematic, bottom up and risk controlled source of returns

Robust risk controls in place to maintain the portfolio risk in line with the predefined risk budget

Diversification from traditional active managers

Sustainability is at the heart of what we do

RISKS

Investments are subject to market fluctuations and other risks inherent to investing in securities. The value of investments and the income they generate may rise or fall and it is possible that investors may not recover their initial investment.

Investors may be exposed to other risks defined below:

LOSS OF CAPITAL RISK : Investments are subject to market fluctuations and other risks inherent to investing in securities. The value of investments and the income they generate may rise or fall and it is possible that investors may not recover their initial investment.

COUNTERPARTY RISK : This risk relates to the quality or the default of the counterparty with which the management company negotiates, in particular involving payment for/delivery of financial instruments and the signing of agreements involving forward financial instruments. This risk is associated with the ability of the counterparty to fulfil its commitments (for example: payment, delivery and reimbursement).

LIQUIDITY RISK : This risk arises from the difficulty of selling an asset at a fair market price and at a desired time due to lack of buyers.

OPERATIONS AND CUSTODY RISK : Some markets are less regulated than most of the international markets; hence, the services related to custody and liquidation for the funds on such markets could be more risky.

RISK ASSOCIATED WITH DERIVATIVES : In order to hedge (hedging derivative investments strategy) and/or to leverage the yield of the sub fund (trading derivative investment strategy), the sub fund is allowed to use derivative investments' techniques and instruments under the circumstances set forth in Appendices 1 and 2 of the prospectus (in particular, warrants on securities, agreements regarding the exchange of securities, rates, currencies, inflation, volatility and other financial derivative instruments, contracts for difference [CFDs], credit default swaps [CDSs], futures and options on securities, rates or futures). The investor's attention is drawn to the fact that these derivatives include leveraging. Because of this, the volatility of these sub funds is increased.

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