Confidence must be earned

Amundi ASSET MANAGEMENT

September 2020

Factor Investing in Fixed Income

01

Introduction

- Why use Factor Investing techniques in Fixed Income?
- Which market segments can this work in?
- How to build a robust strategy?

Introducing Alternative Betas

Building Risk-Efficient Exposures

Traditional Perspective (Market Model)

BETA	Alpha

Introducing Factor Investing

FACTOR INVESTING	Alpha

Extending to Alternative Risk Premia

RISK PREMIA INVESTING	Alpha

MARKET PREMIA	ALTERNATIVE RISK PREMIA

- Factor Investing challenges traditional alpha / beta split, hence investors allocation framework
- It started with Equity long only factor

And now developing in

- Equity L/S
- Credit
- Cross-Asset (Trend, Carry)

Source: Amundi

What are we expecting from alternative factors when it comes to bond markets ?

They are about:	They are not about:
▪ Achieving long-term outperformance by a strategic allocation, potentially at the cost of higher drawdowns during market turbulences. ▪ Providing clarity and transparency: clear, disciplined process with provable alpha ▪ Enhancing diversification in a portfolio allocation of active strategies: low correlation to traditional active strategies	▪ Timing traditional risk factors: they are not aiming to time an increase in market exposure/duration or liquidity ▪ Minimizing drawdowns: these strategies are not meant to minimize drawdowns in times of market stress ▪ Outperforming in all market conditions: like any strategy, these are not all-weather strategies or magical black boxes that outperform in all market environment

Factors in Fixed Income – key takeaways

Building a model driven strategy requires a 2-step approach:

- **Identifying** consistent factors in the market
  - Prospective work
  - Sound analysis of market data
  - Cross-checking with fundamental ideas from our “traditional funds”
  - Estimating and calibrating the selected factors

- Allocating across the identified factors through a multi strategy investment process
  - Expanding the investment universe
  - Building a risk controlled process
  - Tail risk protection
  - Factor turnover

Factor Investing in Fixed income does not prevent us from having views on the traditional risk factors (duration, credit beta, liquidity) and requires a well-structured technique for combining the selected factors

02

Sovereign Bond Factors

Which factors apply?

Rate Carry Factors

Time series carry

Rationale

- Term structure roll down
- The Carry strategy bears the risk of unexpected positive yield shocks due to interest

Methodology

- Carry signal = $y^{10Y} - D_{mod} (y^{9Y11M} - y^{10Y}) - rt$
- where y^{10Y} and y^{9Y11M} are respectively the 10Y ZC Bond Yield and the interpolated 9Y11M ZC Bond Yield. D_{mod} and rt are respectively the Modified Duration and 1M Interest Rate
- Rank the resulting carry signals and compute a risk budgeting optimization so that positive (resp. negative) carry signal will have a positive (resp. negative) exposures.
- Control the strategy exposure using a duration risk indicator

Cross-section carry

Rationale

- Curve Steepness is a good proxy of the required bond risk premium

Methodology

- Carry Signal = 10Y Government Bond Yield – 3M Deposit Rate
- Rank the resulting carry signals and long highest carry and short lowest carry with equal weights in order to get a duration neutral portfolio.

Momentum Following Model (CTA like investing)

Strategies and Process

Process

- Non discretionary quant model
- Technical models: the only inputs are the daily price action of the underlying securities(open/close/high/low).
- Models based on a combination of technical indicators (momentum, Williams %R, ADX, EMA)

Advantages

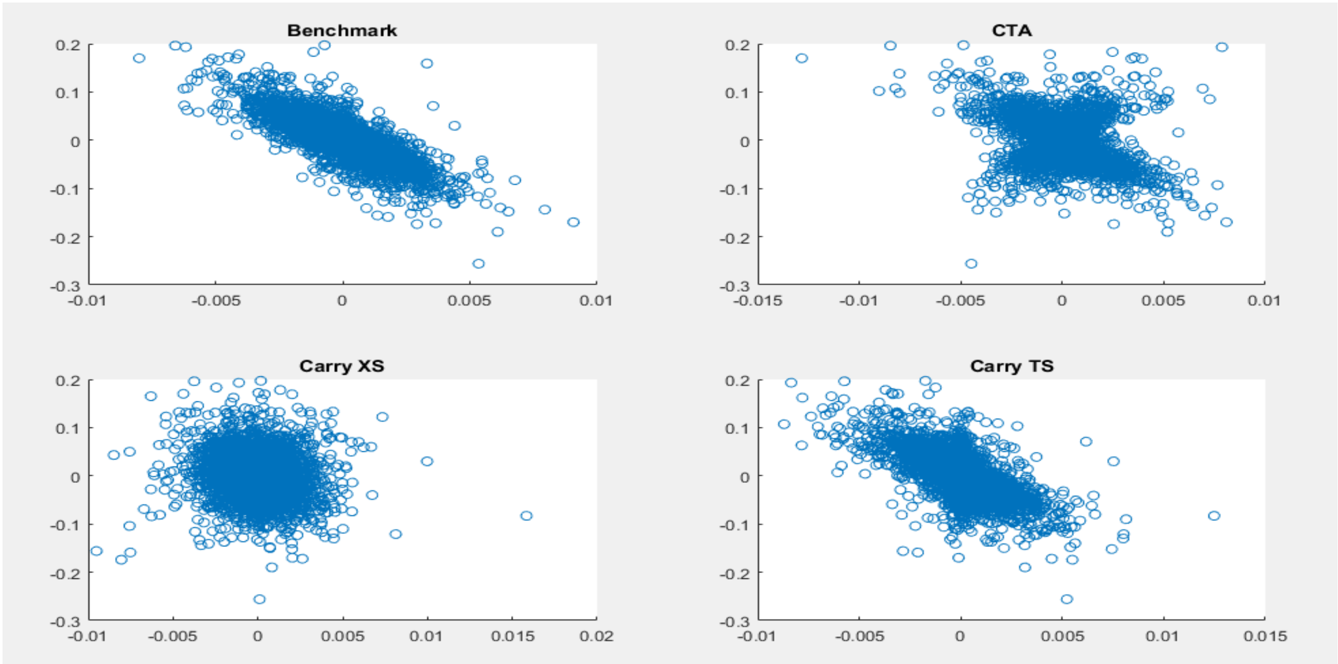
- Tail-risk hedge. Performs well during periods of extreme market stress
- Good diversifier. Frequently takes counter-consensus position
- Disciplined/bias-free
- Back testable. Up to 40 years of historical data available
- Adapts behaviour to trending and non-trending periods

Disadvantages

- Performs poorly in highly volatile non-trending periods.
- Not immune to political events/central bank intervention

Diversification benefits of CTA + Carry models

	CTA	Carry XS	Carry TS	CTA + Carry TS	CTA + Carry XS	CTA + Carry TS + Carry XS
Information Ratio	1.01	0.69	0.94	1.23	1.14	1.24
Return / MDD	0.66	0.34	0.41	0.76	1.08	1.09



Scatter plots of strategy and bmk return vs changes in German 10yr yield
- The benchmark and Carry TS strategy both display a negative correlation to yield changes (long duration)
- The Carry XS has no duration bias and displays low correlation to yield changes
- The CTA model switches between long and short duration positions resulting in an X-shaped return profile

03

Corporate Bond Factor Investing Essentials

A Case for Credit Factor Investing

Systematic Investment Strategy

- New systematic approach, **diversifying existing strategies**
- **Eliminating behavioral biases** due to quantitative approach

Customized and Flexible

- We adapt our solutions based on **your risk-return target**
- Given your investment guidelines and constraints, our systematic approach is **flexible enough to tailor a solution**

High transparency

- Our approach offers **high transparency** on how we aim to generate returns
- **Clear portfolio construction** process that is known in advance

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Traditional and Alternative factors in Credit

Corporate bonds are de facto complex and multifaceted, with three traditional risk factors:

Interest rate risk	Credit spread risk	Liquidity risk
Fixed-rate debt instruments decline in value when interest rates rise	Credit spread volatility related to credit quality	Risk of not being able to buy/sell a bond quickly and in sufficient quantities for a price close to its true underlying value

Academic literature suggests that 4 alternative factors can be also applied to the credit market:

Value	Momentum	Low Risk	Size
Related to credit risk, but rewarded in excess	Relies on the expectation that recent performance trends will carry on in the near future	The shorter the duration and the higher the rating, the lower the volatility of the bond	Relates to the size of a bond by the total debt value of the issuing firm

$\underbrace{\text{Value} \quad \text{Momentum}}$

MOST SIGNIFICANT REWARDED FACTORS ACCORDING TO AMUNDI FINDINGS[1]

Source: Amundi. Information provided for illustrative purposes only.
[1]Traditional and Alternative Factors in Investment Grade Corporate Bond Investing, published in January 2019.

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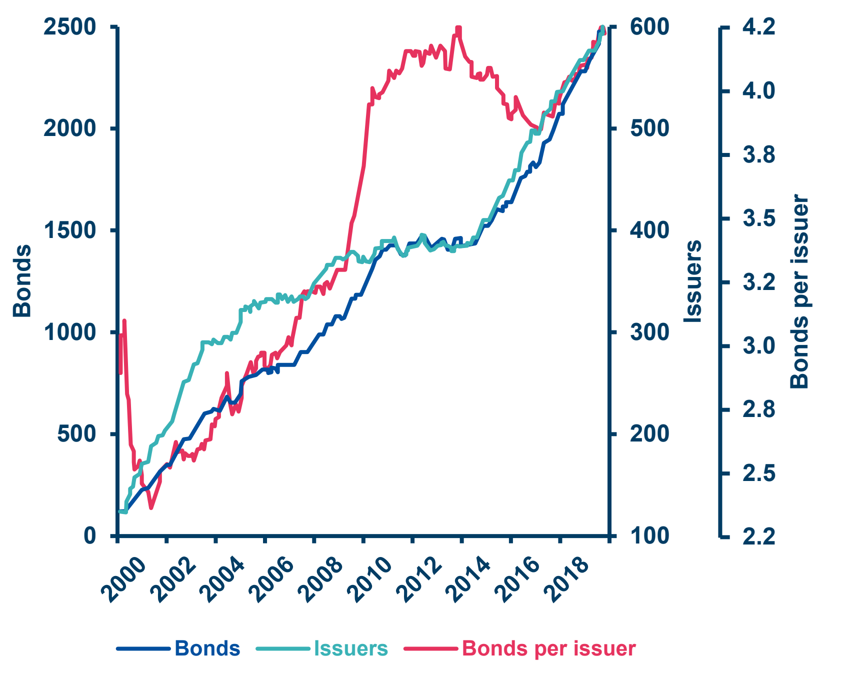
Corporate bonds are ready for a revolution

EUR denominated corporate bonds reach the necessary market depth post 2008



Supportive developments

- Number of bond issues increased significantly, especially in the low interest rate environment
- The market is more diverse, making systematic strategies with low specific risk possible
- Academic research, the rise of data science in portfolio management in combination with a longer history of higher quality data gives rise to new analyses and strategies

Source: ICE BoA Merrill Lynch Euro Large Cap Corporate Bond Index. Author’s calculations.

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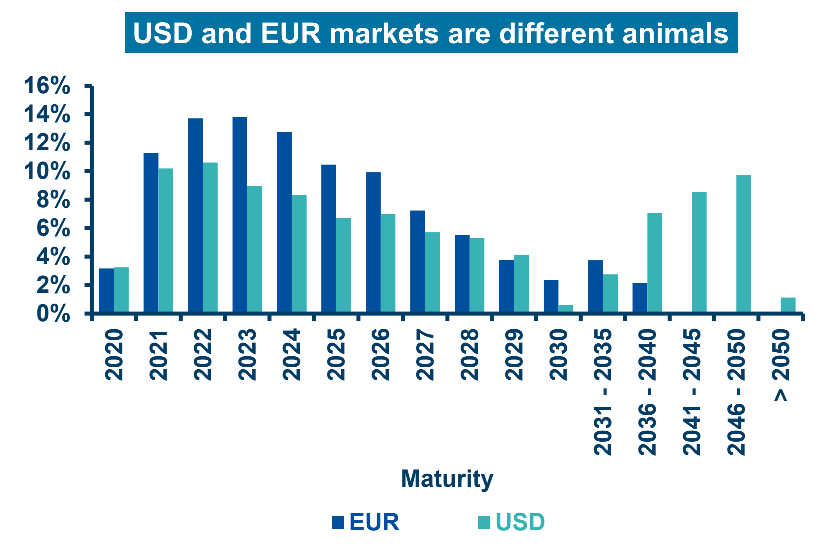
Respect regional differences

Market specificities have to be accounted for in the portfolio construction process



USD Credits vs. EUR Credits

- Securities with “long maturity” are big part of the market
- illiquidity of “run-off” securities
- Financials lower risk contribution in USD

TAKE AWAY

Adapt portfolio construction to the market in question!

Source: ICE BoA Merrill Lynch Euro Large Cap Corporate Bond Index as of 30.09.2019. Authors’ Calculations.

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An active component is key for systematic strategies in credits

Market liquidity

- Additional to liquidity filters, the portfolio managers check the general **liquidity condition** of the market
- Portfolio managers have the flexibility to implement the strategy in best conditions in order to **limit the cost of trading**

Turnover control

- Instead of trading no matter the cost, **reducing turnover while staying consistent** to the approach (by keeping a bond, replacing a bond or avoiding tiny trades)
- **Cash flow management** instead of investing/divesting on a pro rata basis, we decide whether to implement part of the trades early

Management of market events

- Daily analysis of **primary market** to see if investment appropriate ahead of rebalancing
- Managing divestment in case of a **ratings downgrade**
- Deciding on **corporate actions**

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04

Building a Multifactor Strategy

Amundi's Value Factor

COMMON VALUE INVESTING DEFINITION

An investment strategy that selects securities that trade for less than their

- **Intrinsic Value:** by company specifics, fundamental data
- **Relative Value:** relative to similar securities in the universe

AMUNDI'S VALUE DEFINITION

Relative value of a bond directly relates to its Credit spread

A bond is considered cheap if:

Observed Market Spread > Theoretical Spread

For each bond, **theoretical spread** is the output of an econometric model:

- A **cross-sectional regression analysis** is run on the representative market segment (e.g. Euro IG, US IG)
- **Spread is explained by characteristics of the bond** such as its rating, maturity, sector, etc.
- Explanatory variables of the model are **market data only** (no balance sheet metrics or judgmental inputs)

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Assessing the value potential of a bond

1- Collect **bond characteristics**

Rating

Country risk

Seniority

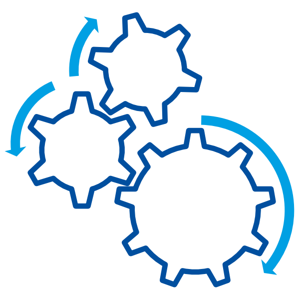
Sector

Optionality

Face value

Maturity

2- Process and feed the **model** with these characteristics



3- Reconcile Observed spread and theoretical spread

Observed market spread

Value potential

=

Observed spread - Theoretical spread

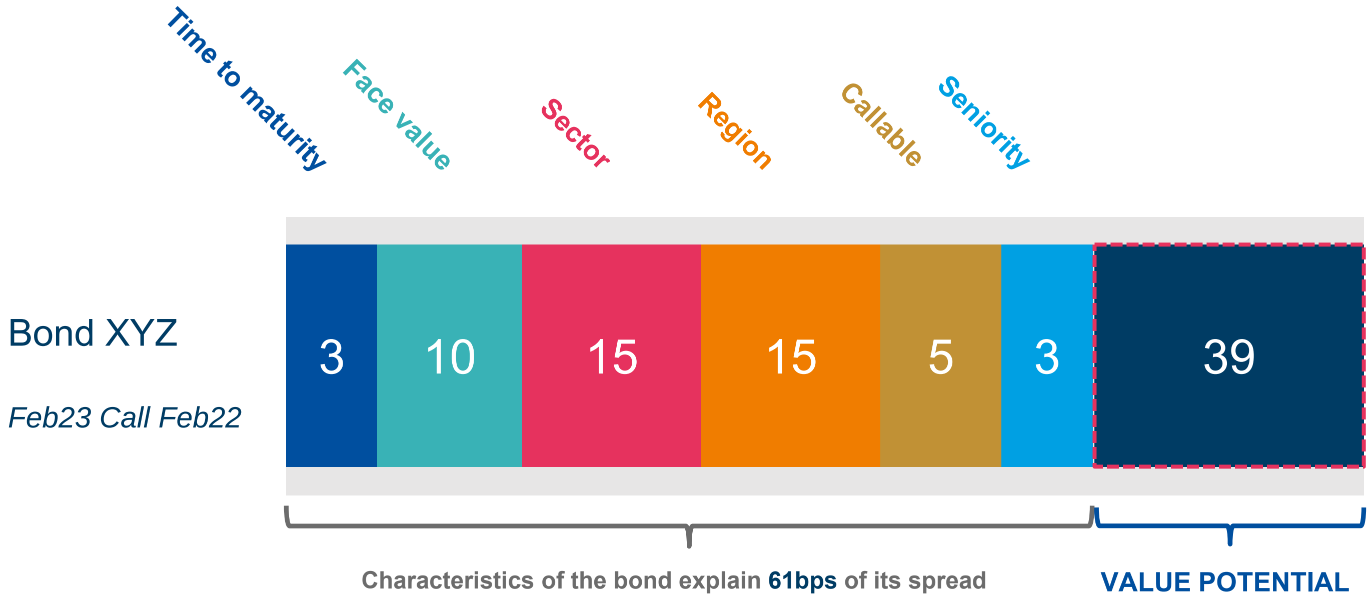
Theoretical spread

Source: Amundi. Information provided for illustrative purposes only.

Assessing Value potential of a bond: illustration

A bond issued by company XYZ offers a credit premium of **90bps** (spread over govies)

The econometric Value model allows to decompose its credit spread in the following way:



There is a Spread-Appreciation potential of **39bps**

Source: Amundi. Information provided for illustrative purposes only.

Value Factor – Portfolio Construction

Exploit the Value strategy by selecting bonds with the highest potential spread appreciation

Issuer & Bond selection

Value score ranking

+

Top 10 bonds
Top 20 bonds
Top […] bonds
Top 90 bonds
Top 100 bonds
…

-

Ranking according to bonds' cheapness, from the **highest** to the **lowest**

Bond selection

- Exclude the 10 first bonds to avoid any **"value trap"** situations
- Select the bonds from the **11th to the 100th**, one bond per issuer

Allocation

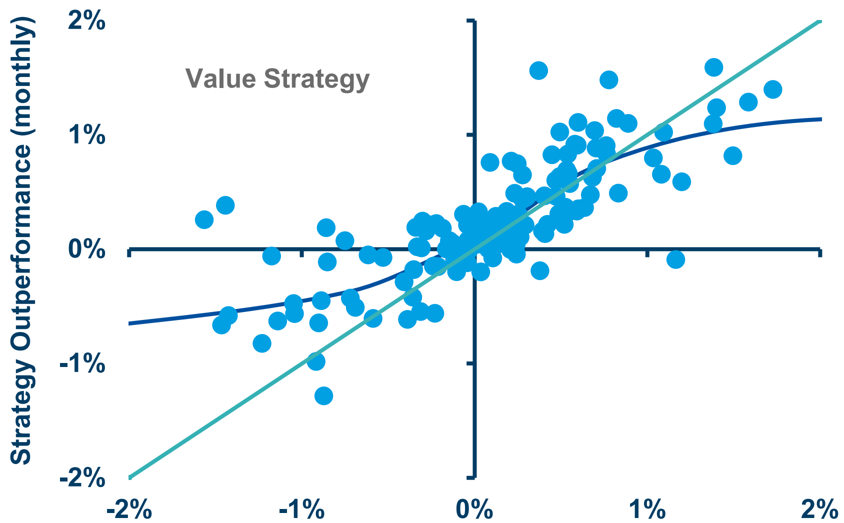
- Apply **equally weighted** allocation
- **Constant portfolio monitoring**
- **Monthly rebalancing** coupled with optimized turnover process

Amundi's Momentum Factor

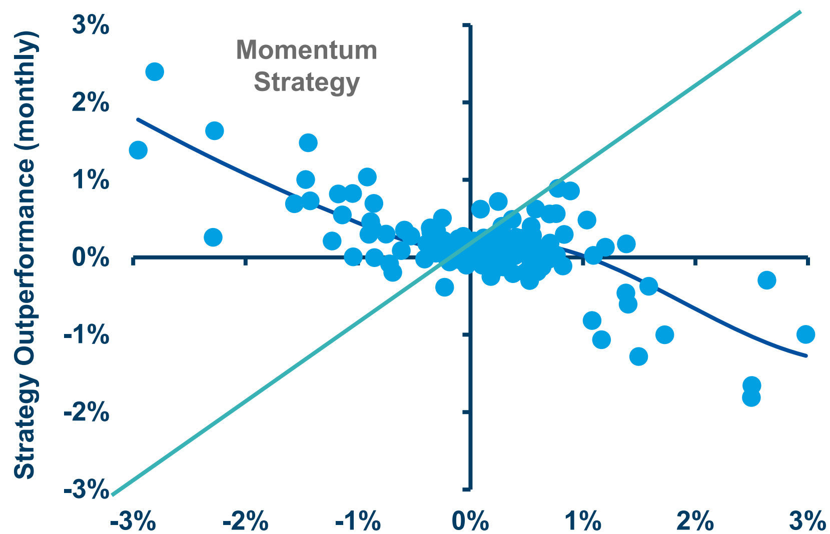
OBJECTIVE	DEFINITION	INVESTIBLE
– Invest in bonds that show strong relative performance – Achieve high beta-adjusted return – Complement Value Factor	Our Momentum Factor is cross-sectional: – 6M trailing excess returns – Scaled by spread duration TAKE AWAY This scaling decorrelates from credit risk.	By minimizing turnover: keep the chosen bonds at the next rebalancing date - if it remains component of the benchmark and Momentum rank good enough

Momentum and Value are complementary

Monthly Outperformance vs. Euro Credit Market - Value



Monthly Outperformance vs. Euro Credit Market - Momentum



- **High beta by design**: investing in cheap bonds with high spreads
- **Asymmetry of performance**: higher beta in bull market beta 1.7 , bear market beta 1.3
- **Additional alpha** in bull market monthly alpha ~16bps, or approx. 1.94% per year.

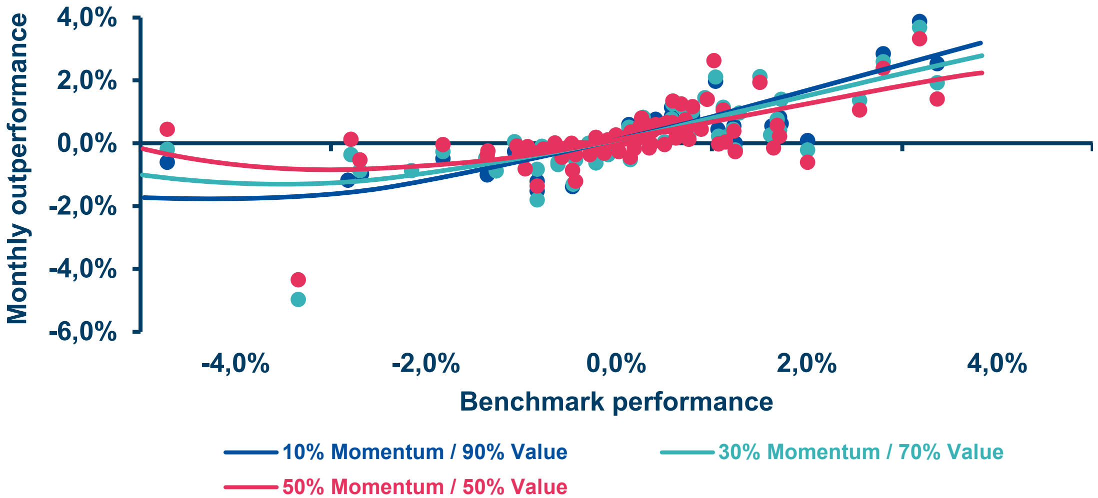
- **Outperform** the market on a risk-adjusted basis
- **Resilient** profile: holding up in bear market

PAYOFF ANALYSIS SHOWS *VALUE & MOMENTUM* ARE **COMPLEMENTARY FACTORS** WITH POSITIVE PREMIA

WE COMBINE BOTH PAYOFFS TO BUILD A MULTI-FACTOR PORTFOLIO.

Source: Amundi. Data as of 12 May 2018. Information provided for illustrative purposes only, may be changed without prior notice.

Mixing factors while keeping alpha



VALUE	MOMENTUM

Selects the value opportunities, if available:

- Brings the core portfolio
- Builds the High Beta exposure in a « smart » way

Increases in uncertain times:

- Keeping momentum factor all the time brings diversification
- Can keep high beta of value opportunities in line

BEST OF BOTH WORLDS – A CLEVER COMBINATION OF TWO PAYOFFS WITH POSITIVE RISK PREMIA.

Source: Amundi. Data as of 12 May 2018. Information provided for illustrative purposes only, may be changed without prior notice.

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