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The Investment Engineers

Spring follows on Winter:
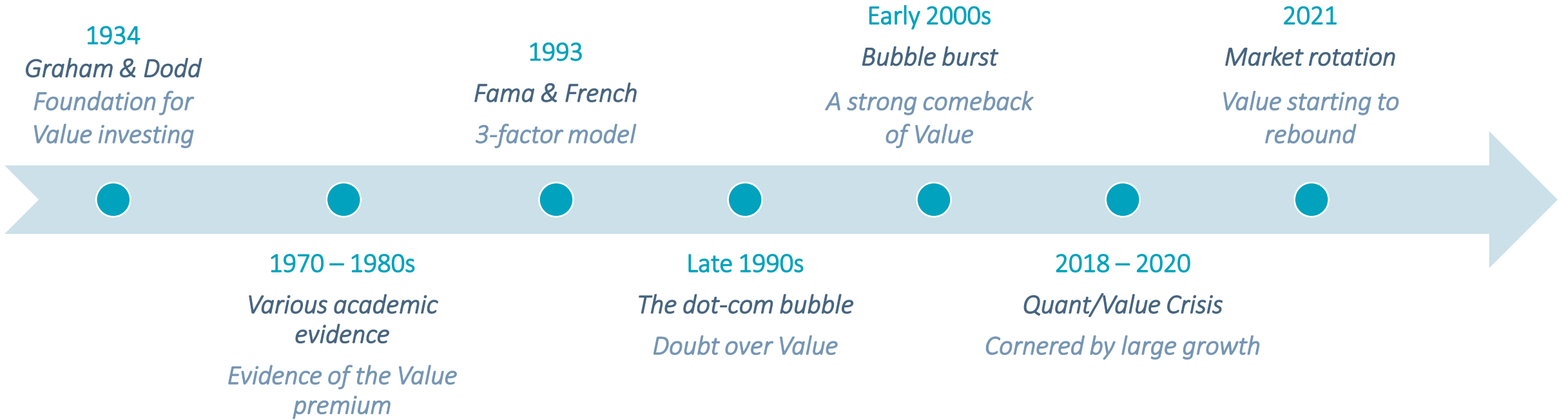Resurrection of the Value Premium and Perspectives for Quant Models

Dr. David Blitz
Dr. Matthias Hanauer

Frankfurt, 29 September 2022

Resurrection of the Value Premium
Dr. Matthias Hanauer

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Value investing is a classic concept

1934
Graham & Dodd
Foundation for Value investing

1970 – 1980s
Various academic evidence
Evidence of the Value premium

1993
Fama & French
3-factor model

Late 1990s
The dot-com bubble
Doubt over Value

Early 2000s
Bubble burst
A strong comeback of Value

2018 – 2020
Quant/Value Crisis
Cornered by large growth

2021
Market rotation
Value starting to rebound

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Rewind back to July 2020

The academic value factor (High-minus-Low) has been weak since it was established 30 years before

US (1926 – 2020)
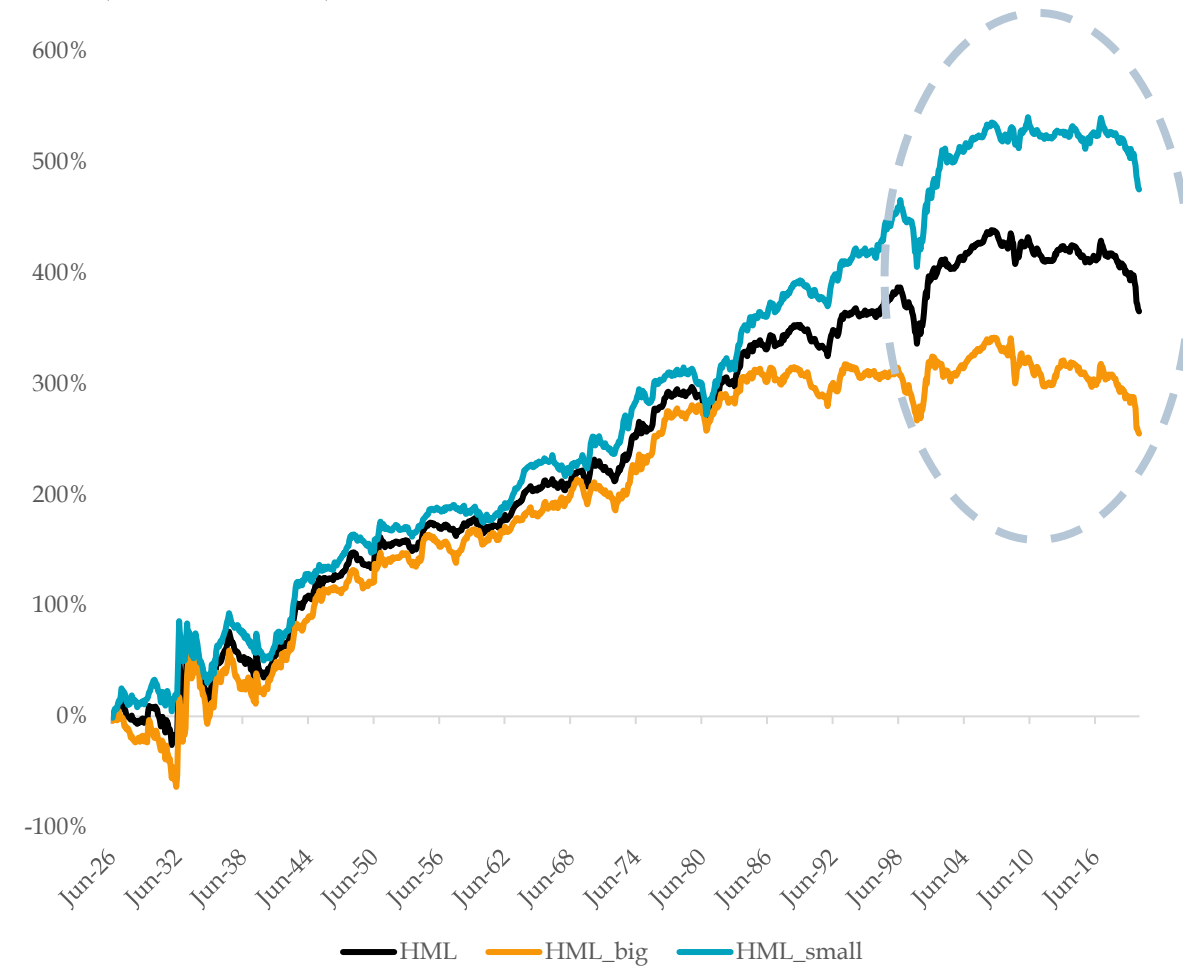
Emerging Markets (1989 – 2020)

Legend: HML, HML_big, HML_small
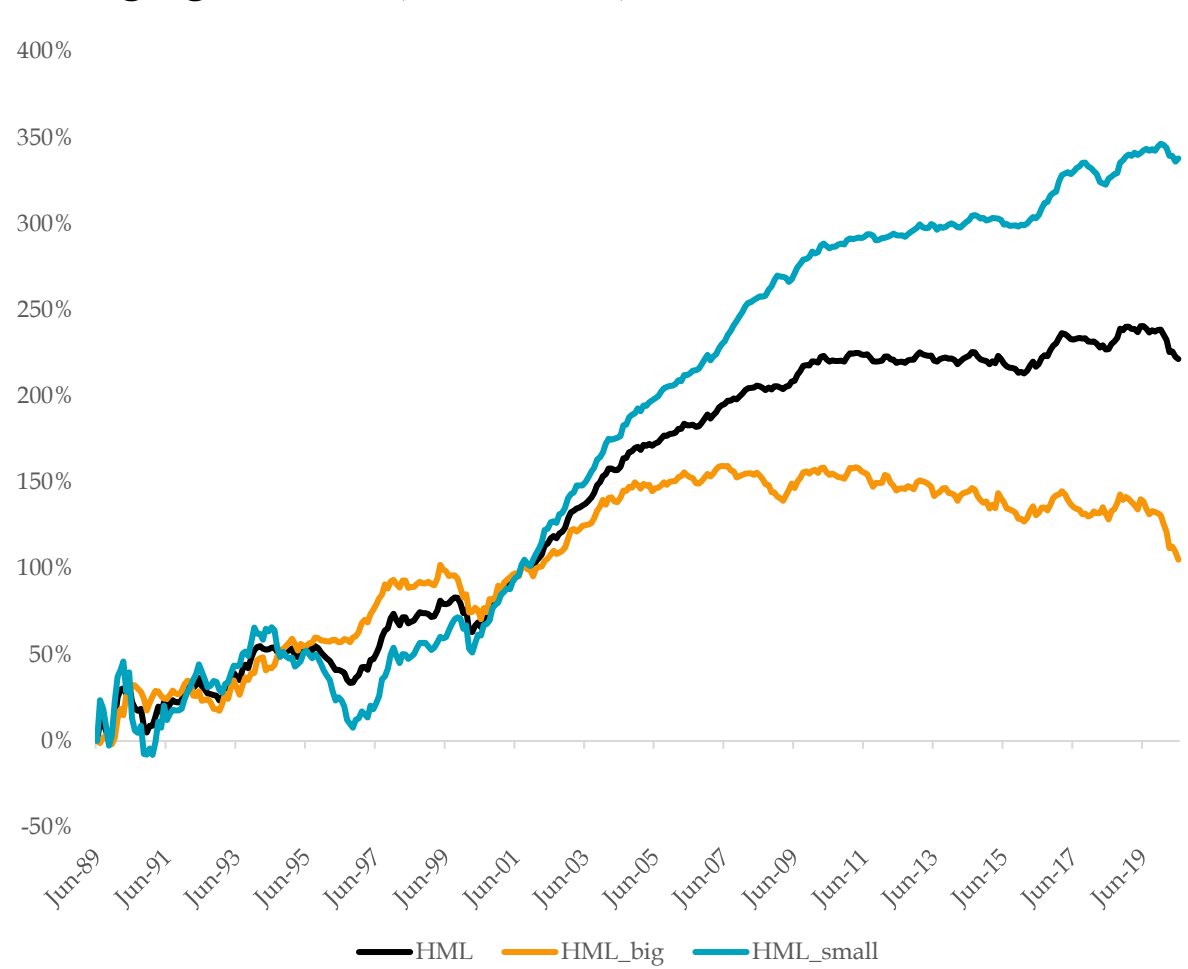
Source: Robeco, Kenneth French Data Library. The two graphs show the cumulated performance of the value factor (HML) that is the average performance of the value factor for big (HML_big) and small (HML_small) stocks. Portfolios are value-weighted, formed at the end of each June and rebalanced yearly. The left graph shows the performance for the US and the right graph shows the performance for Emerging Markets. The sample period for the US and Emerging Markets is July 1926 to December 2020 and July 1989 to December 2020, respectively.

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Is value investing dead?

> The recent performance again triggered questions regarding its existence

> We show that the value premium can be resurrected by an investment strategy that is a bit more sophisticated than the generic HML

The Big Read Investments   (+ Add to myFT)

Coronavirus crisis: does value investing still make sense?

Reports of Value's Death May Be Greatly Exaggerated - SSRN ...

2 dec. 2019 — The underperformance leads many to argue that **value** is **dead**. ... The relative valuation of the **value** factor falls from the top quartile of the historical distribution at the start of 2007 to the bottom percentile as of June 2020. Forthcoming, Financial Analysts Journal. Data for our iHML factor can be downloaded here.

door RD Arnott · 2020 · Geciteerd door 8 · Verwante artikelen

Explaining the Recent Failure of Value Investing - SSRN Papers

14 aug. 2019 — Is "**value dead**," or can it be resurrected? We will answer both questions by showing, based on extensive data analysis, that flaws in the.

Do Value Stocks Really Outperform Growth Stocks Over The Long Run?

Rob Berger
Forbes Advisor Staff

Markets
Is Value Dead? Debate Rages Among Quant Greats From Fama to AQR

Updated: Nov 12, 2020, 3:53pm
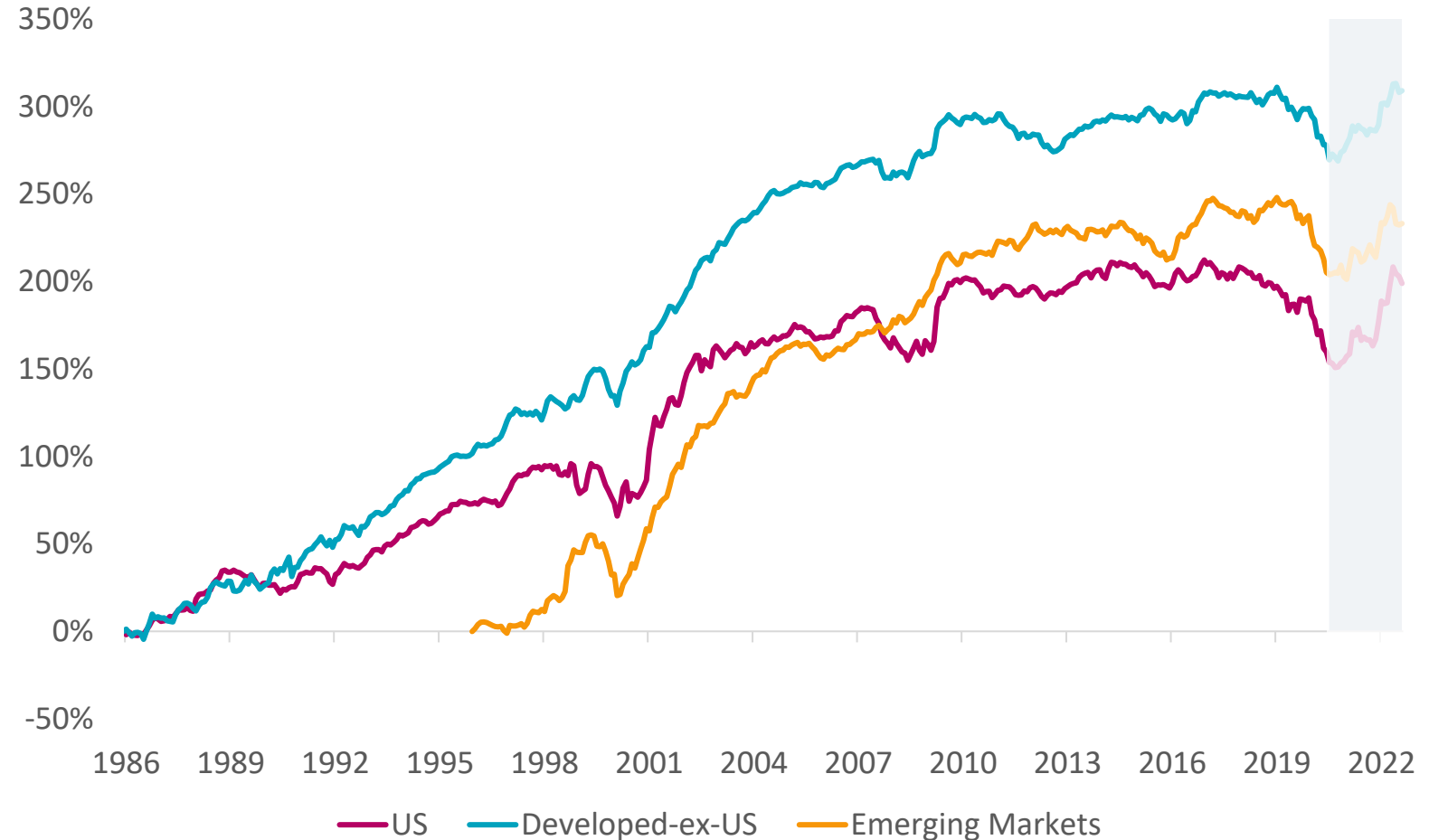
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Defining an enhanced value factor

> Multiple valuation metrics, taking into account not only book value but also earnings, cashflows, payout, and intangibles

- EBITDA/EV, enterprise multiple
- CF/P, cash flow to-price ratio
- NPY, net payout yield
- adj. B/M, by capitalizing R&D expenses

> Apply some basic risk management

- region-sector neutrality for developed markets
- country neutrality for emerging markets

> Make more efficient use of opportunities in the large-cap universe of liquid stocks

- The universe are the constituents of the standard (large/mid-cap) MSCI index at each moment
- To make full use of the breadth that our universe of liquid stocks has to offer, we apply equally weighting

Resurrecting the Value Premium

David Blitz and Matthias X. Hanauer

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Enhancing the Value factor

> The long-term trend of the performance is clearly upward across regions.

> We observe a pronounced drawdown during the quant crisis of 2018 to 2020, due to extreme multiple widening.

> Since the Nov 2020, value investing has seen a remarkable comeback.

Performance of the enhanced Value strategy

Legend: US, Developed-ex-US, Emerging Markets

Source: Robeco, Refinitiv. The graph shows the cumulative return of an enhanced value strategy as in Blitz and Hanauer, 2021, Resurrecting the value premium , Journal of Portfolio Management. The enhanced value strategy is based on a composite of book-to-market (R&D adjusted), EBITDA/EV, CF/P, and NPY metrics. Stocks are sorted into quintile portfolios based on the value composite and the quintile portfolios are equal-weighted. We apply region and sector neutrality for developed markets by independently ranking stocks within each region/GICS level 1 industry (11 sectors) bucket. Developed market regions are North America, Europe, and Pacific. For emerging markets, we apply country neutrality. The investment universe consists of constituents of the MSCI Developed and Emerging Markets indices. Before 2001, we use the FTSE World Developed index for developed markets (going back to December 1985), and for emerging markets, the largest 800 constituents of the S&P Emerging BMI at the semi-annual index rebalance (going back to December 1995).The sample period is January 1986 to August 2022.

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# The Enhanced value factor still trades at the historically attractive level

The Value spread

> Relative valuation of the top basket vs. the bottom basket.

> Average of three metrics and in excess of the full-sample median valuation ratio.

> Recent spreads even exceed 'dot-com' era levels.

> Despite the good performance in 2021, Value is still attractively priced!

Valuation spread for value (AC)

Cheaper than in history

1,94

More expensive than in history

Source: Robeco, Refinitiv. The graph shows the composite valuation spread between the top and bottom quintile portfolios of the enhanced value strategy. The investment universe consists of constituents of the MSCI Developed and Emerging Markets indices. Before 2001, we use the FTSE World Developed index for developed markets (going back to December 1985), and for emerging markets, the largest 800 constituents of the S&P Emerging BMI at the semi-annual index rebalance (going back to December 1995). The value spread is the average spread of the book-to-market (R&D adjusted), EBITDA/EV, and CF/P. The sample period is January 1986 to August 2022.

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Value not only relatively cheap but also on an absolute basis

> The high valuation of the market is primarily driven by expensive (and big) stocks.

> Value stocks with a FWD P/E of 8 seem cheap.

> This holds even more when comparing these absolute valuation with still low interest rates.

FWD Earnings Multiple for Value Quiniles (AC)

Value — Expensive
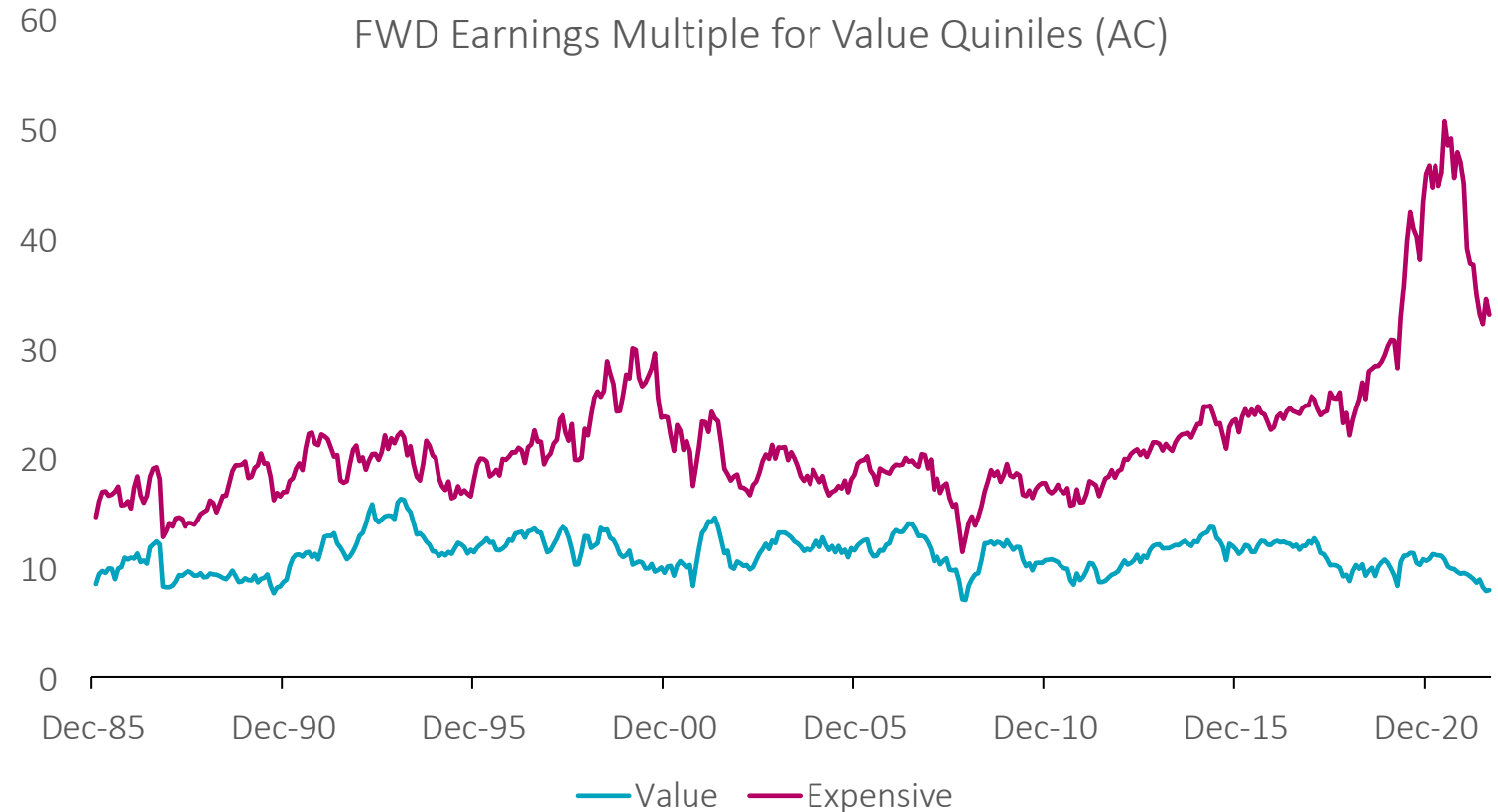
Source: Robeco, Refinitiv. The graph shows the Forward (NTM) Price-to-Earnings ratio for the top and bottom quintile portfolios of the enhanced value strategy. The investment universe consists of constituents of the MSCI Developed and Emerging Markets indices. Before 2001, we use the FTSE World Developed index for developed markets (going back to December 1985), and for emerging markets, the largest 800 constituents of the S&P Emerging BMI at the semi-annual index rebalance (going back to December 1995). The value spread is the average spread of the book-to-market (R&D adjusted), EBITDA/EV, and CF/P. The sample period is January 1986 to August 2022.

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Implications of multiple widening

> Argues against the notion that the value premium may have been arbitraged away due to its popularity.

> If this were the case, it should be reflected in a narrowing instead of a widening of the valuation spread over time.

> Suggests that we may underestimate the 'true' magnitude of the value premium for our sample period.

### Value premium and its sensitivity to value spread changes

$R^2 = 0.49$
Value Ret = 9.75% - 0.69* ΔValue Spread
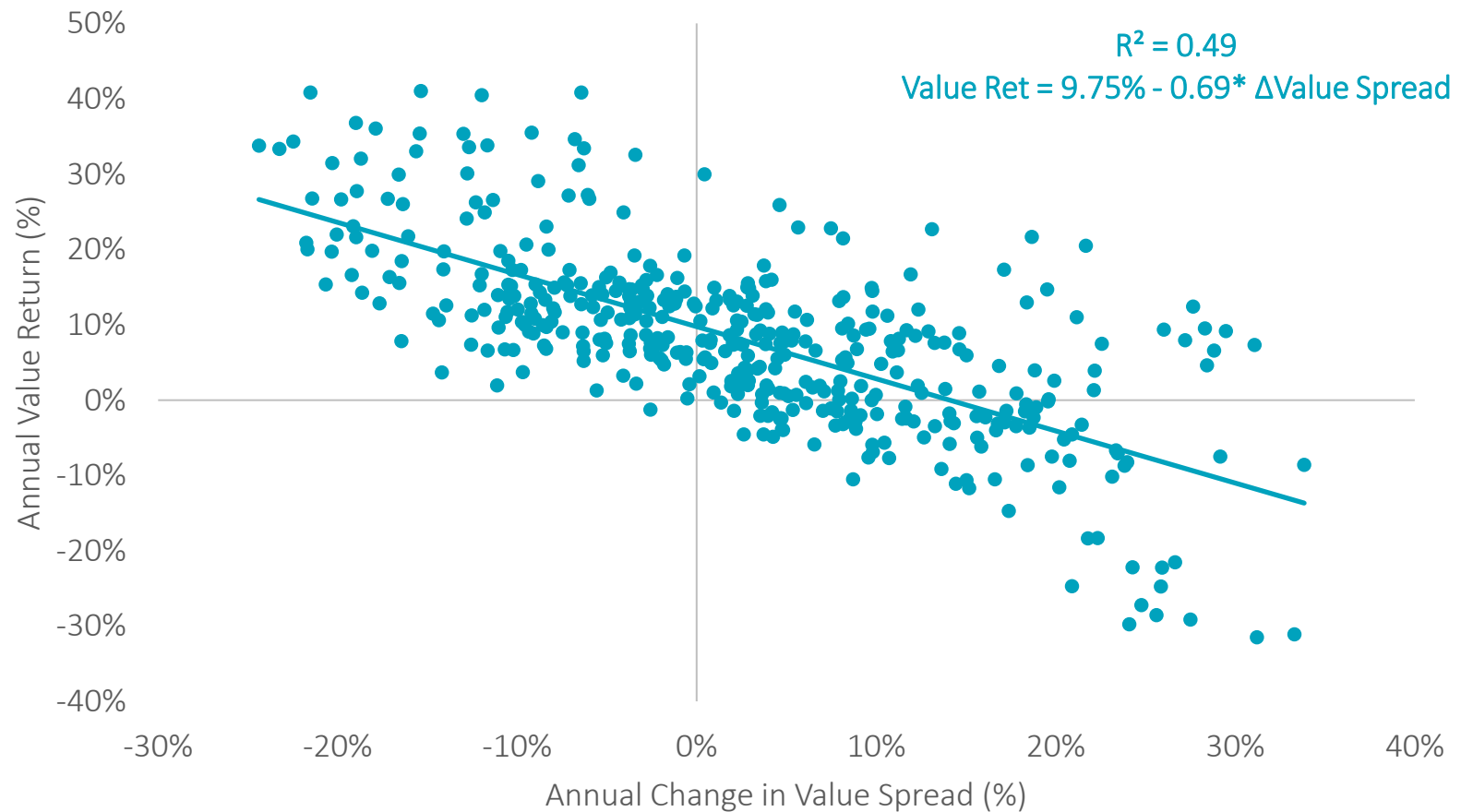
Source: Robeco, Refinitiv. The figure shows the relationship between value returns and changes in value spreads. Value returns are the continuously compounded annual return on the enhanced value factor. The change in value spread is the log of ending minus the log of starting value spread. The investment universe consists of constituents of the MSCI Developed and Emerging Markets indices. Before 2001, we use the FTSE World Developed index for developed markets (going back to December 1985), and for emerging markets, the largest 800 constituents of the S&P Emerging BMI at the semi-annual index rebalance (going back to December 1995). The sample period is January 1986 to August 2022.

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Expected Value returns

> Over our sample period we saw a net widening of the valuation spread.

> Therefore, the structural value alpha is even higher than the realized value premium:

$$\begin{array}{ccccc}
\textbf{8.07\%} & = & \textbf{9.75\%} & + & \textbf{-1.68\%} \\
\textbf{Realized value return} & = & \textbf{structural alpha} & + & \textbf{re-evaluation alpha}
\end{array}$$

> Assuming the value spread (Aug 22: 1.94) converges, the expected return on value is currently high:
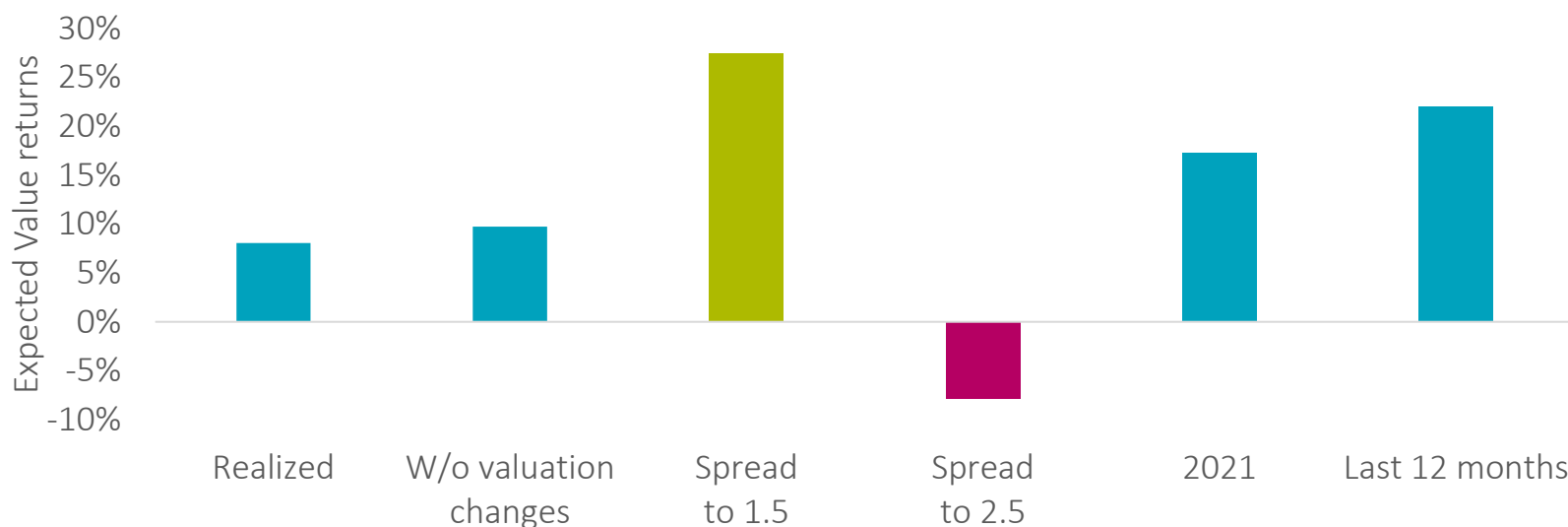
Source: Robeco, Refinitiv. The figure shows the continuously compounded annual value return over the full sample, the expected value return assuming no changes in the value spread and assuming that the value spread will go to 1.5 and 2.5 within the next 12 months. Furthermore, we show the continuously compounded annual value return for 2021 and the last 12 months. The expected value returns are estimated based on the regression from the previous slide. The investment universe consists of constituents of the MSCI Developed and Emerging Markets indices. Before 2001, we use the FTSE World Developed index for developed markets (going back to December 1985), and for emerging markets, the largest 800 constituents of the S&P Emerging BMI at the semi-annual index rebalance (going back to December 1995). The sample period is January 1986 to August 2022.

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Value and interest rates

Coincidence or causality?

> Over the recent years, the outperformance of value coincided with rising yields.

> However, this relationship is relatively new and does not appear to be structural.

> We observe similar finding for Japan and Europe.

> Furthermore, the relationship is weaker for annual returns and is economically small.

Value premium and its sensitivity to yield changes

- 1986-2017
- 2018-2022

$R^2 = 0,25$

$R^2 = 0,01$

Value Return (%)

Change in 10-Year Treasury (%)

Source: Robeco, Refinitiv, FRED. The figure shows the returns of the US enhanced value strategy vs. contemporaneous changes in the 10-year Treasury yield. The investment universe consists of US constituents of the MSCI Developed index. Before 2001, we use the FTSE World Developed index for developed markets (going back to December 1985). The sample period is January 1986 to August 2022.

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Machine learning could boost fundamental analysis

> Linear regression (LR) and machine learning (ML) models can be used to estimate peer-implied fair firm values.

> Mispricing is defined as the difference between model-based fair values and actual market values.

> ML-based signals fare better in predicting fundamental values.

ML-based models generate higher alphas when searching for mispricing
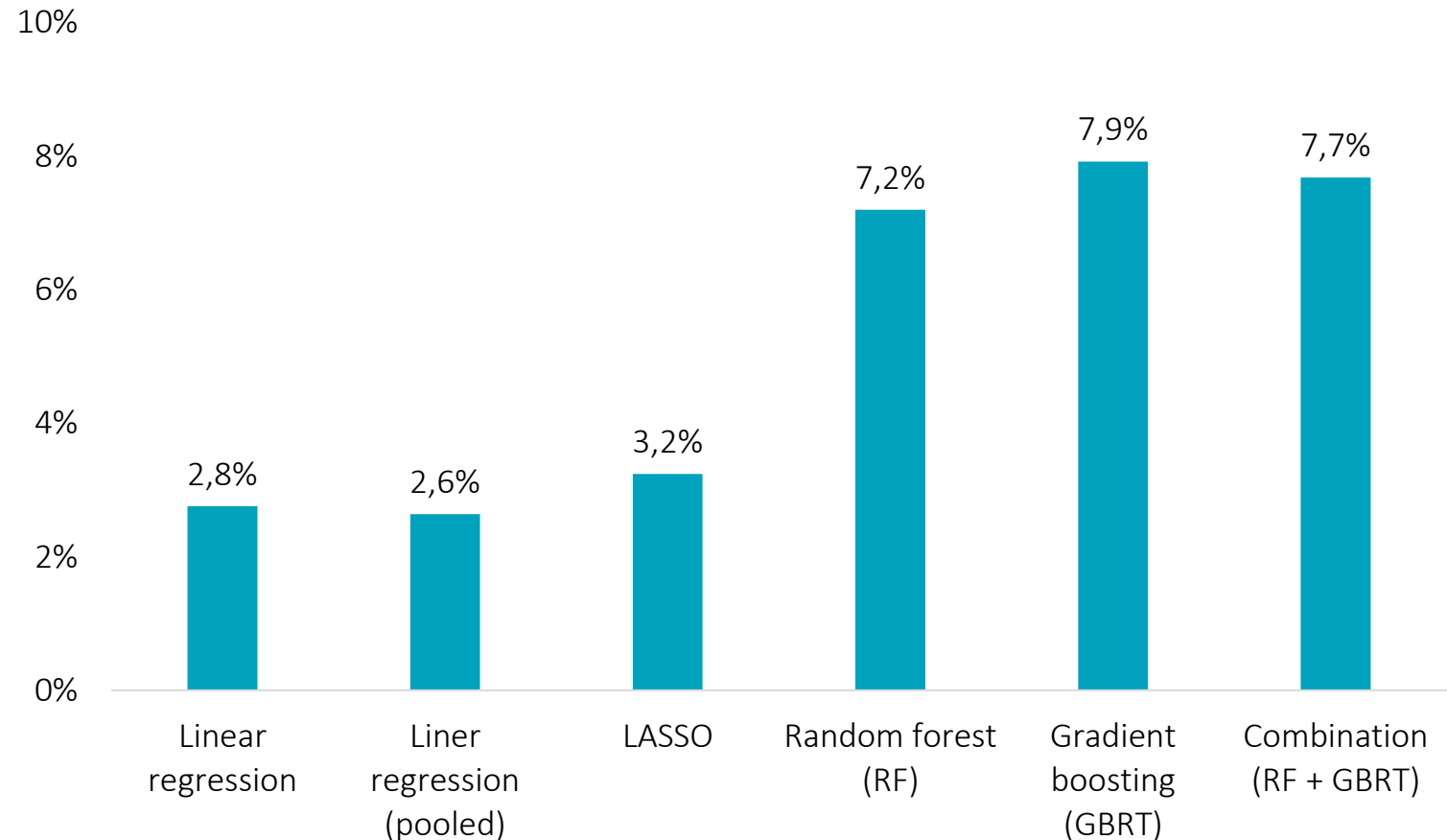
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Key takeaways

> The academic value factor has been struggling for decades, but an enhanced value factor has shown a solid premium.

> The enhanced value factor also suffers during the quant crisis 2018 to 2020, but this is largely explained by an extreme widening of valuation multiples similar to the late 1990s.

> Value investing has seen a remarkable comeback since Nov 2020, whilst the current valuations of value stocks remain attractive with improving fundamentals.

> Value performance coincided with yields changes in recent years, but we find little evidence for a structural relationship. That said, in the market today, an environment of further increasing rates could potentially be a catalyst that unlocks Value's current inherent return potential.

> Machine learning can help to further enhance value definitions.

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New Perspectives for Quant Models
Dr. David Blitz

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Why do we see a need to innovate?

Threats

> Commoditization of generic factors (smart beta)

> Result: erosion of return and increased volatility

Opportunities

> Plenty of ideas based on increased understanding

> Availability of much more data

> Availability of much more computing power

Cumulative performance US factors (1/N)
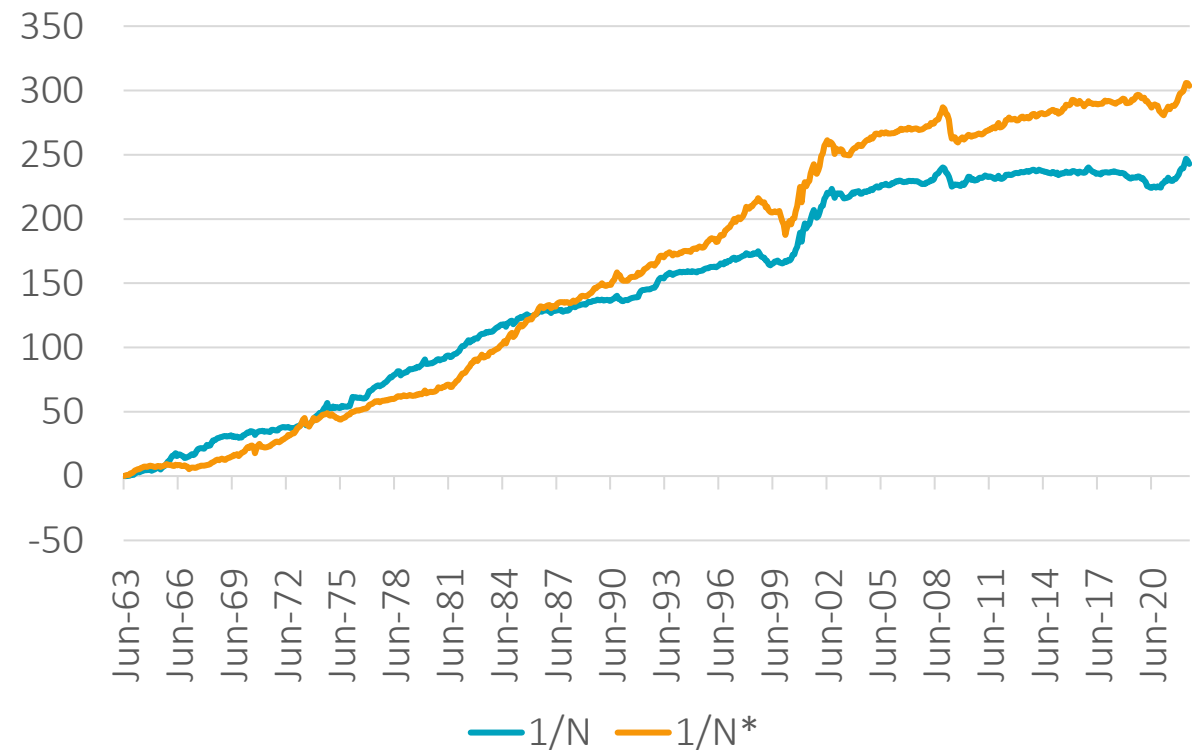
1/N is equally weighted mix of Fama-French factors: size (SMB), value (HML), profitability (RMW), investment (CMA), momentum (WML)
1/N* is equally weighted mix of value (HML and CMA), momentum (WML), quality (RMW), low risk (VOL)

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Transitioning to new technologies

New technologies offer many advantages

> Increased computational power, enabling machine learning and artificial intelligence research

> Increased speed to market

> Processes more scalable, traceable and auditable

New research database leveraging Cloud

> More control on quality and real-time updates

> Direct access to all raw data

> Access to many more alternative data items

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Factor overview

Value	Momentum
Quality	Low risk

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Value

Value	Momentum
Quality	Low risk

Traditional perspective: avoid value traps

> Example: filter out financially distressed stocks

Next-gen value

> Incorporating intangibles, such as knowledge capital, brand capital, human capital, ….

> Better identification of value traps using e.g. short interest

> Remove the inherent bias towards firms with high CO_2 emissions without losing return (Matthias)

> Improved identification of peers compared to standard GICS classification

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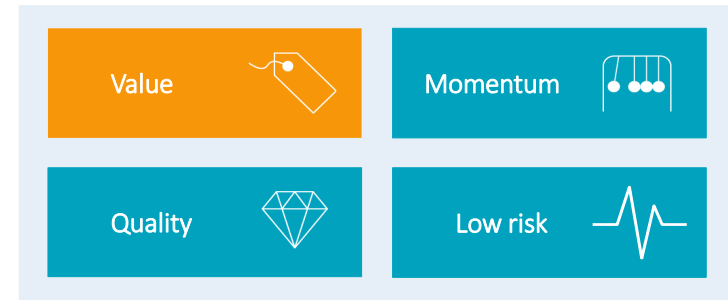
Example: Peer identification

NLP-based clustering analysis to map the connectivity of 7,000+ stocks

> NLP model analyzes detailed business description

> The visualization of the business distance indicates that the standard GICS clustering can be improved

Value		Momentum	
Quality		Low risk	

Financial Sector
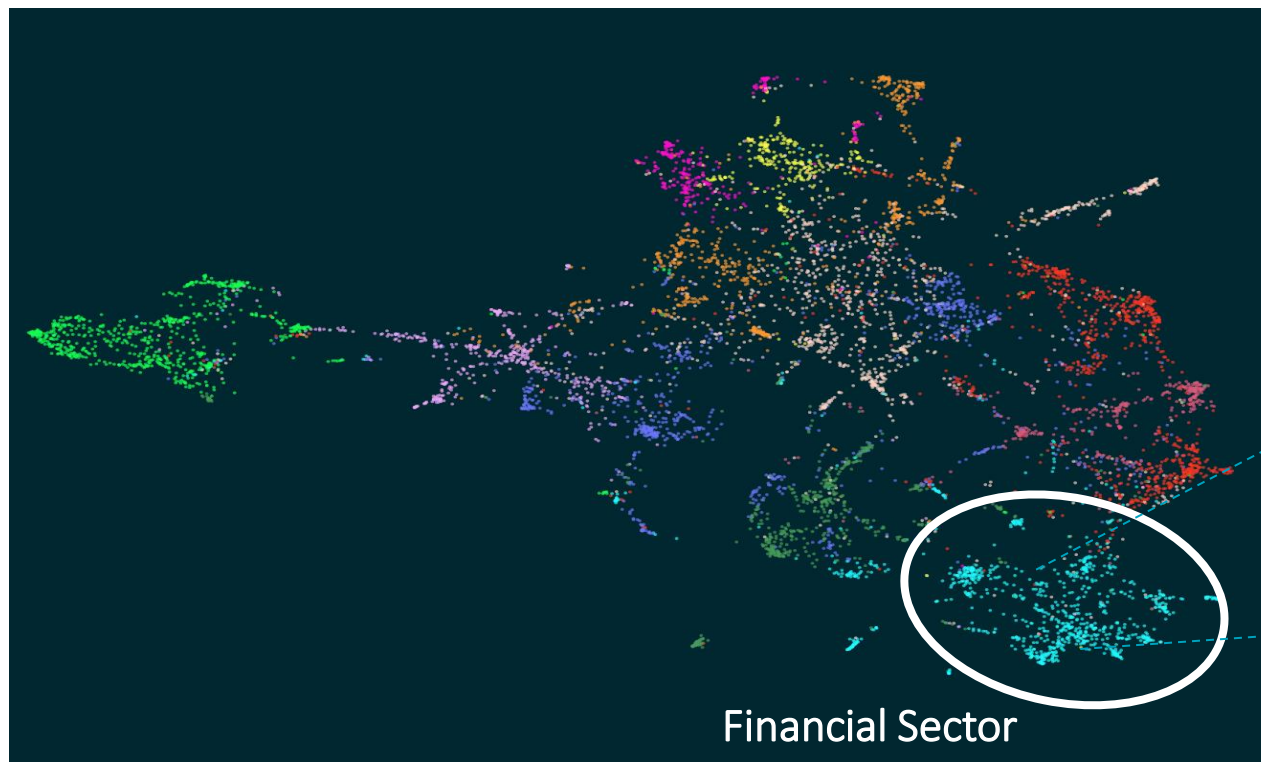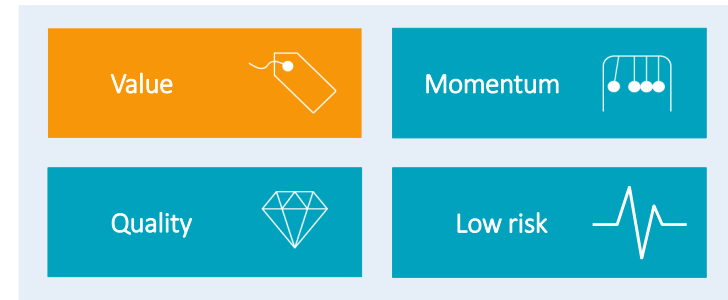
Industrial company: Cash handling services
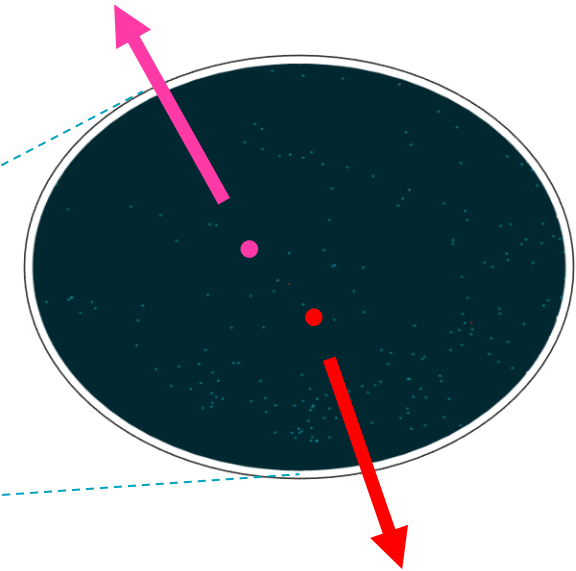
IT company: Transaction processing

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Momentum

Value	Momentum
Quality	Low risk

Traditional perspective: avoid momentum crashes

> Example: apply Robeco residualization technique

Next-gen momentum

> Sentiment via natural language processing, e.g. news articles or earnings call transcripts

> Short-term factor momentum

> Momentum via shared analyst coverage

> Machine learning to pick up interaction effects

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Example: Momentum via shared analyst coverage
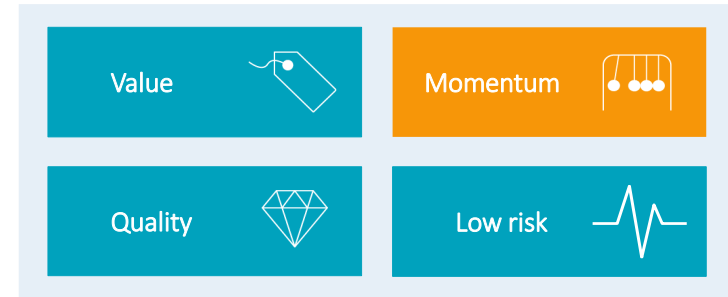
Value	🏷	Momentum	⚙
Quality	💎	Low risk	〰
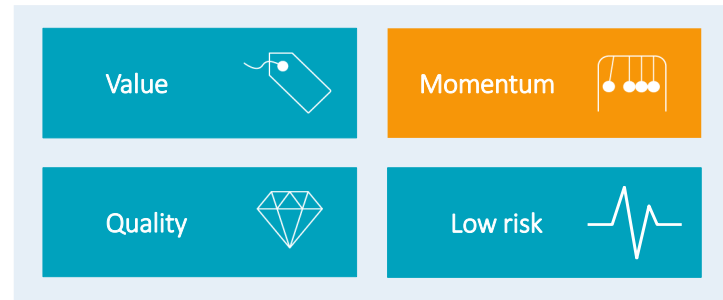
> We continuously map the connectivity of all stocks via the shared coverage based on +100K analysts

> Stocks from different sectors and industries are likely to be classified in one peer group

> Our self-defined peer-group trend signal has strong predictive power for short-term outperformance

Sample stock connectivity map for Apple (AAPL)

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Example: Momentum via shared analyst coverage
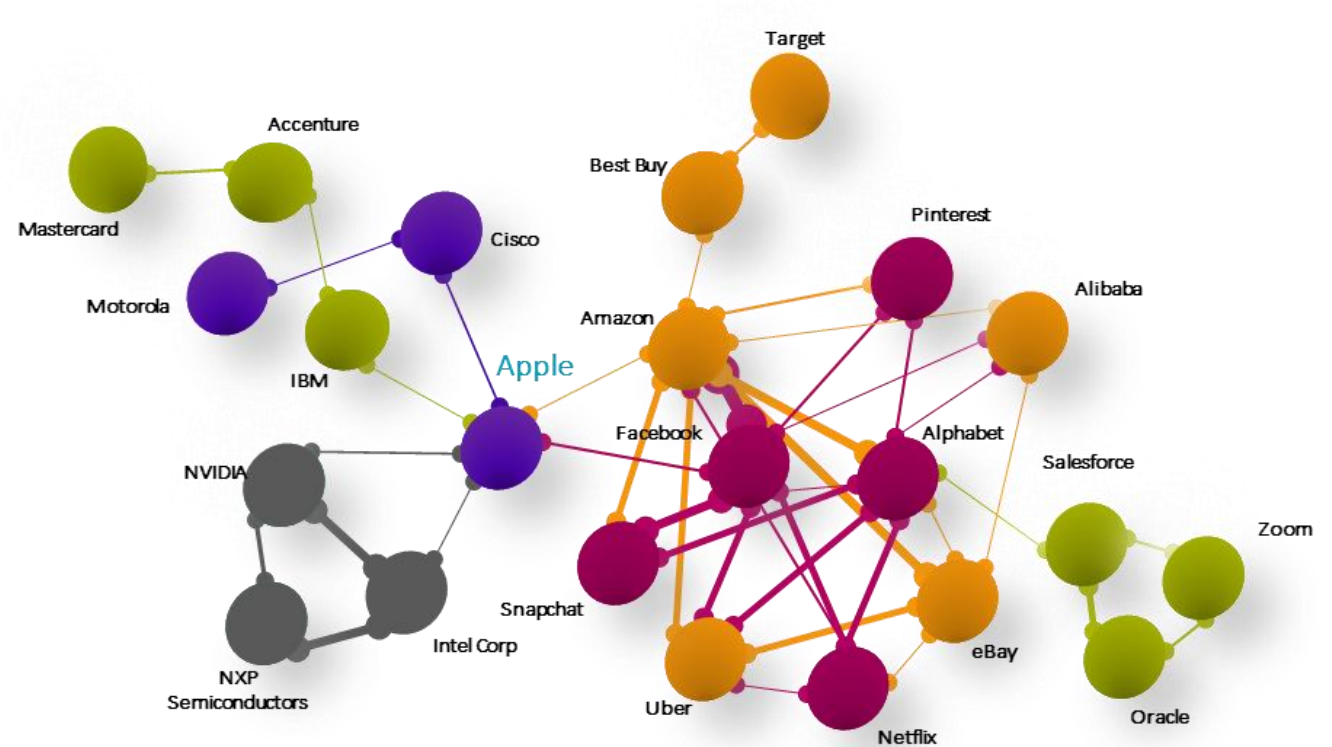
Value	Momentum
Quality	Low risk

"Shared analyst momentum" beats industry momentum

> Predictive power for return is robust over time and when controlling for existing factors

Developed Markets

Emerging Markets

■ Shared Analyst Momentum ■ Industry Momentum

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Example: Short-term reversal and news interaction

Value		Momentum	
Quality		Low risk	

Short-term reversal effect

> Very strong in case of little news

> Virtually absent when accompanied with lot of news

> Concrete example of an interaction effect identified with machine learning

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Quality

Value		Momentum	
Quality		Low risk	
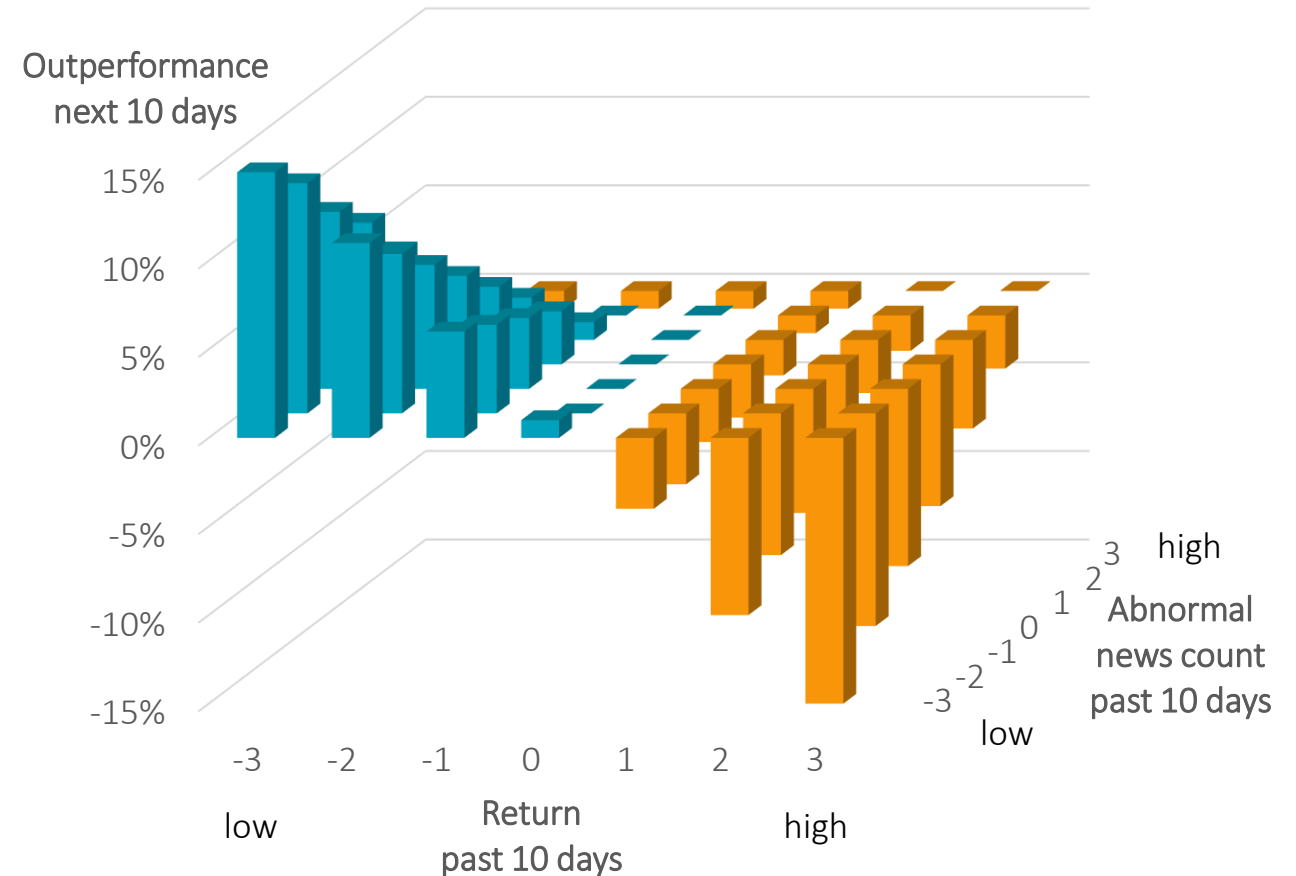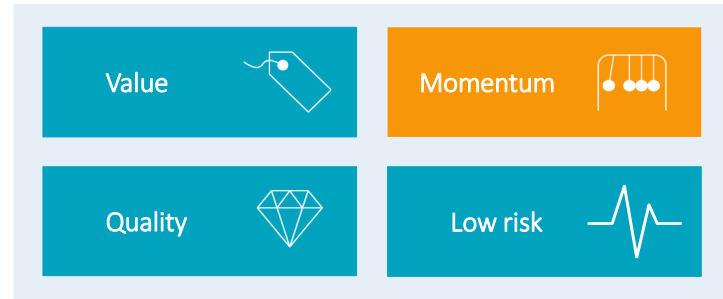
Traditional perspective: identify the quality metrics that work

> Example: academic quality metrics versus the ones used by index providers

Next-gen quality

> Alternative data signals, e.g. firms in hiring mode

> Sector-specific quality signals, e.g. solvency ratios for banks

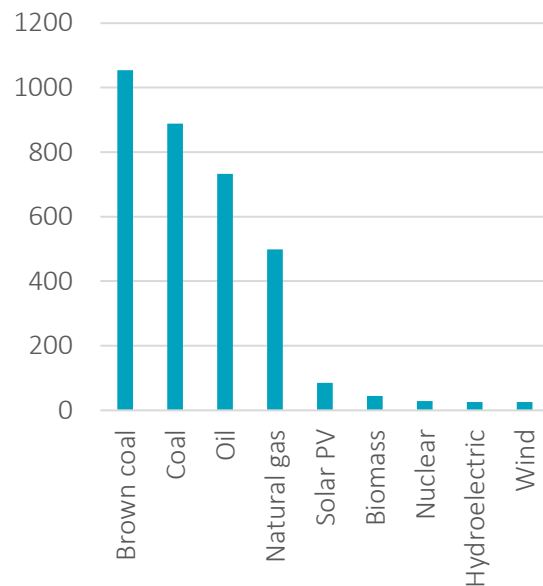> Alpha from ESG/Sustainability, e.g. resource efficiency, employee satisfaction

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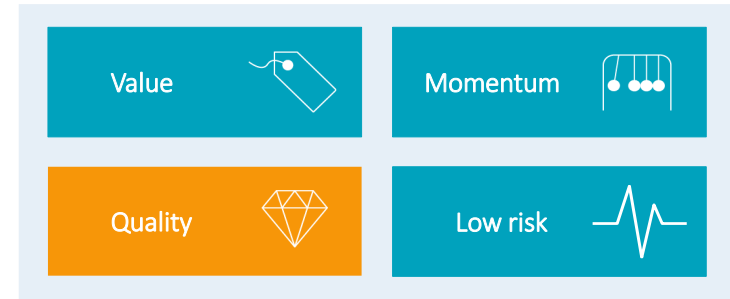
Example: Resource efficiency

> Resource efficiency can vary significantly within industries

Value | Momentum | Quality | Low risk
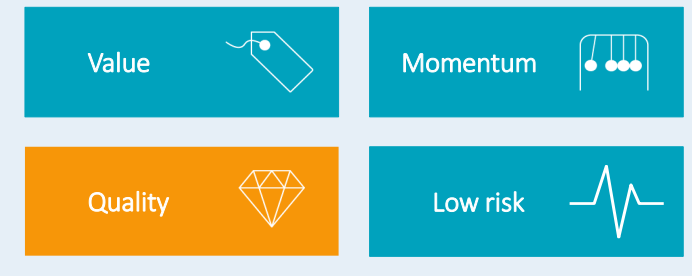
Electricrity production lifecycle emission intensity
in tonnes CO2-e/GWh
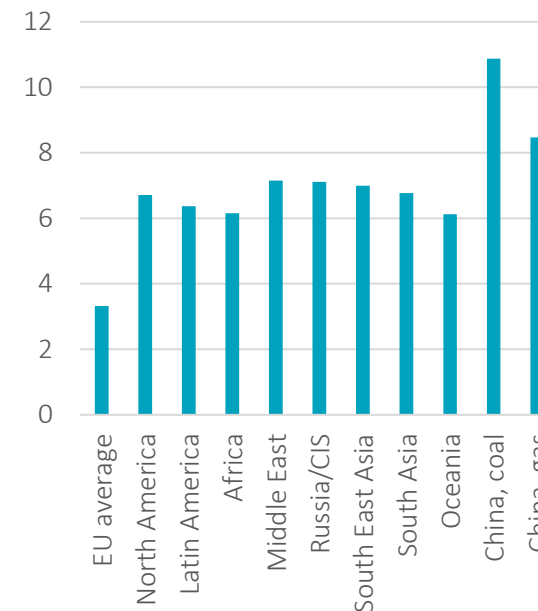source: World Nuclear Organization

Airiline fuel efficiency
seat miles / gallon fuel in 2009
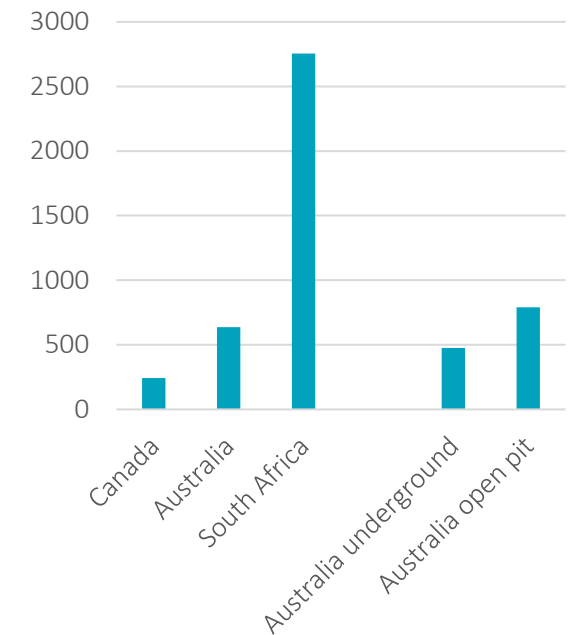source: Wall Street Journal
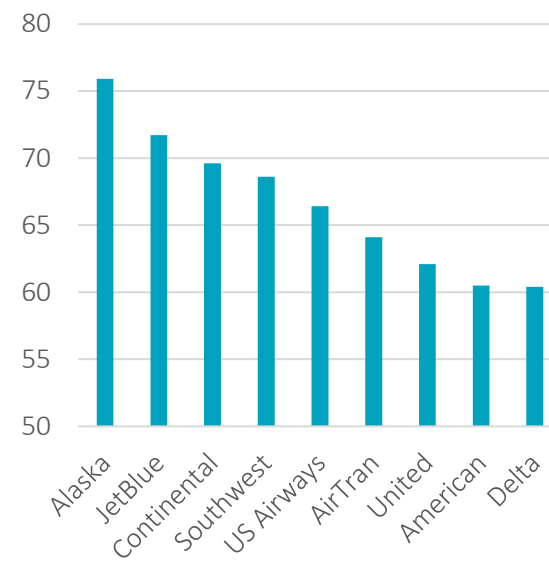
Fertilizer production carbon footprint
in kg CO2-eq/kg nitrogen
source Hoxha & Christensen (2018)

Gold mining carbon footprint
in CO2-e/oz
source: Ulrich et al (2020)

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Example: Employee satisfaction

Value · Momentum · Quality · Low risk

wirecard

Employee reviews in 2018:

> "creativity with finances"

> "no integrity"

> "play favorites"

> "run! one of the worst companies to work for"

> "management should be ashamed of their practices"

> "management should do some deep soul searching"

Major fraud revealed in 2020

DICK SMITH ELECTRONICS

Employee reviews in 2015:

> "stores undermanned"

> "unable to provide appropriate customer service"

> "management are out of touch"

Went bankrupt in 2016, followed by senate inquiry

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Low risk

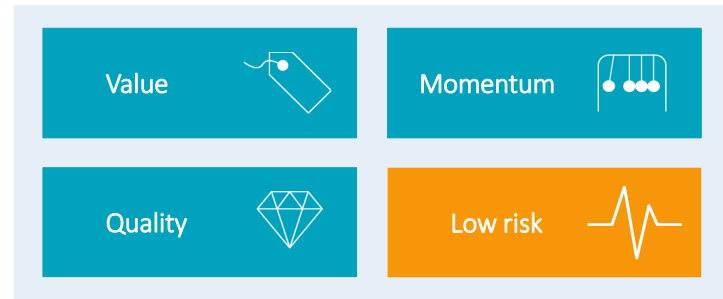| Value	Momentum
Quality	Low risk

Traditional perspective: augment beta/volatility with forward-looking metrics

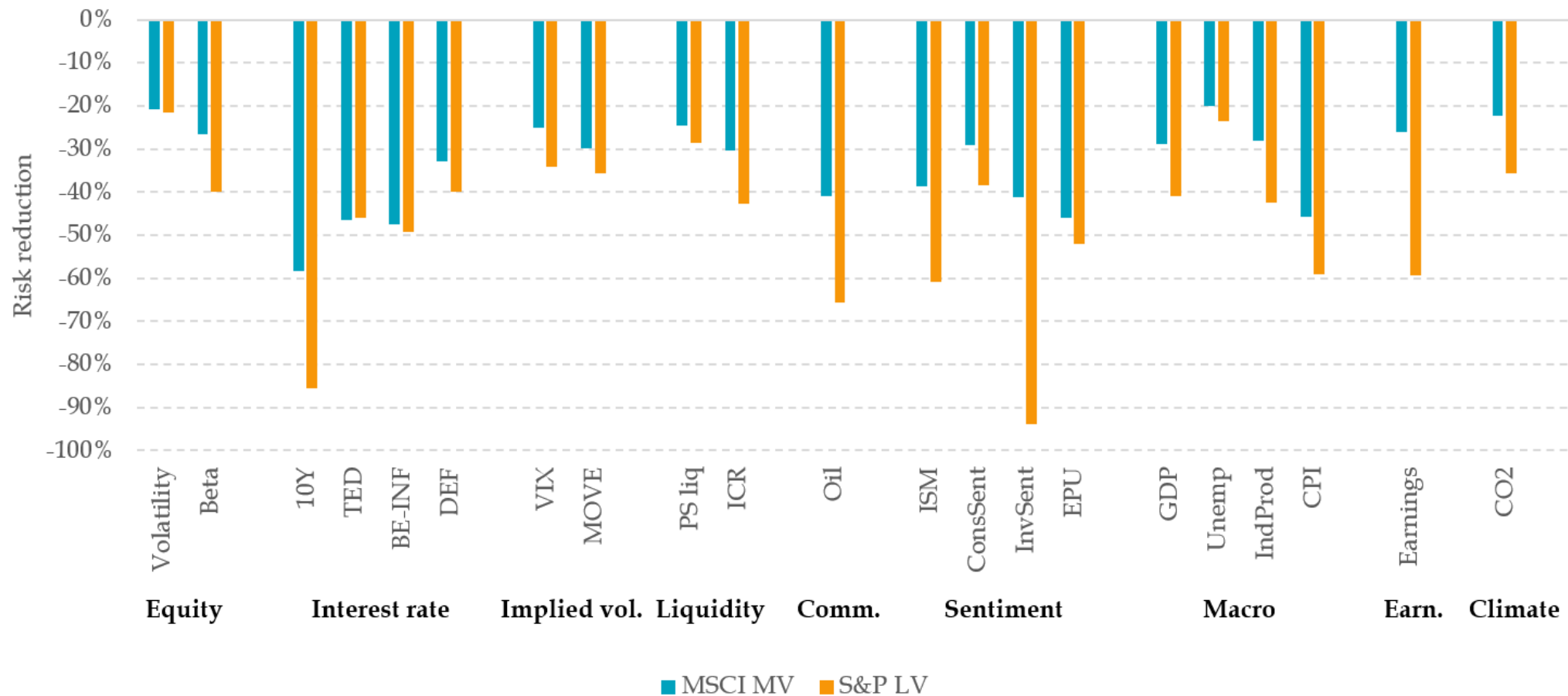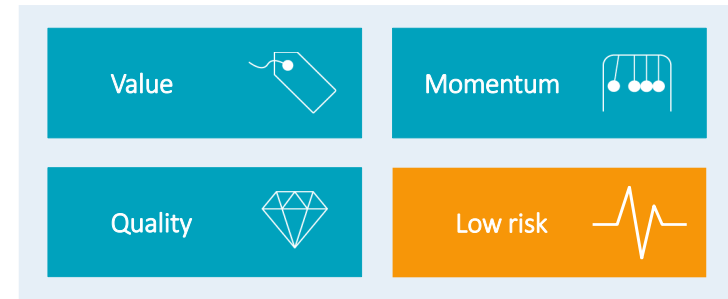> Example: distress risk measures such as CDS spreads and distance-to-default

Next-gen low risk

> Sustainability risk

> Macro risk

> Machine learning to identify nonlinear relations

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# Example: Macro risk of low-volatility strategies

> Low vol reduces exposure to every significant driver of systematic risk

> Even climate risk is reduced, defined here as the beta towards changes in nation-wide CO_2 emissions

Value	Momentum
Quality	Low risk

Risk reduction

Equity: Volatility, Beta
Interest rate: 10Y, TED, BE-INF, DEF
Implied vol.: VIX, MOVE
Liquidity: PS liq, ICR
Comm.: Oil
Sentiment: ISM, ConsSent, InvSent, EPU
Macro: GDP, Unemp, IndProd, CPI
Earn.: Earnings
Climate: CO2

■ MSCI MV ■ S&P LV

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Example: ML for distress risk prediction

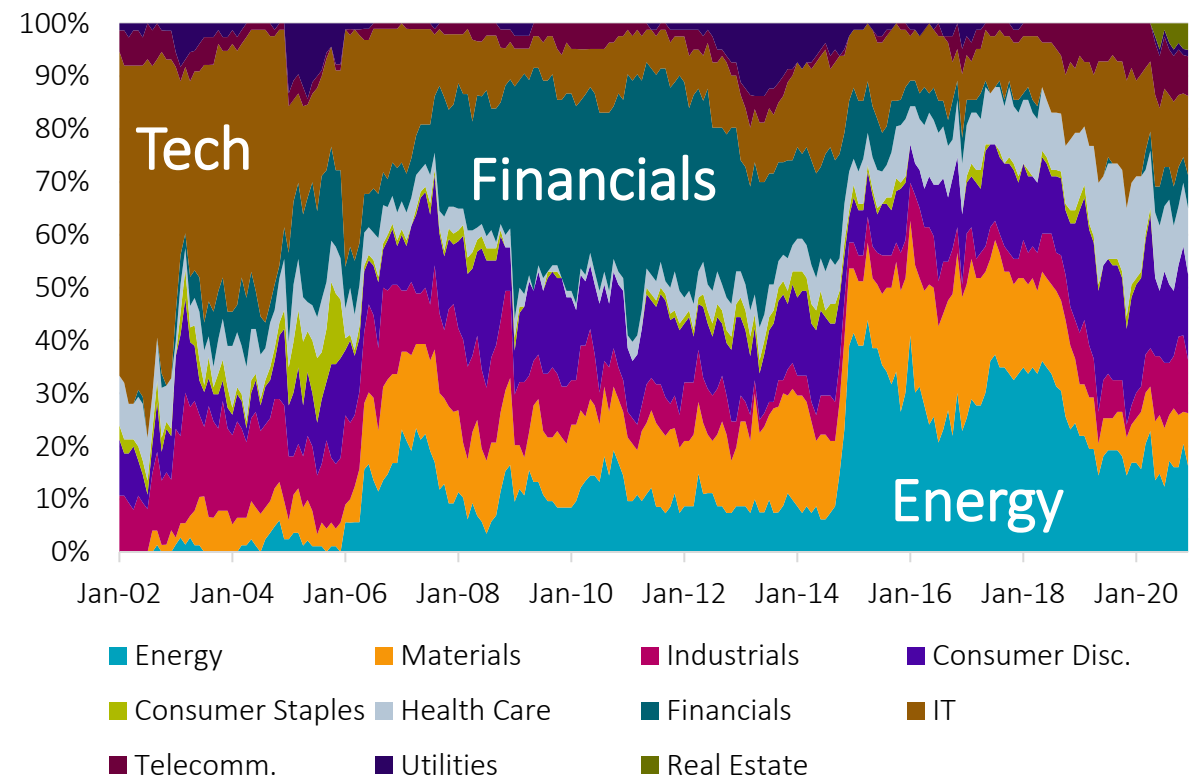| Value	🏷️	Momentum	⚙️
Quality	💎	Low risk	〰️

> ML outperforms traditional indicators for distress risk prediction

> The adaptive nature of the model is reflected by the changes in sector composition
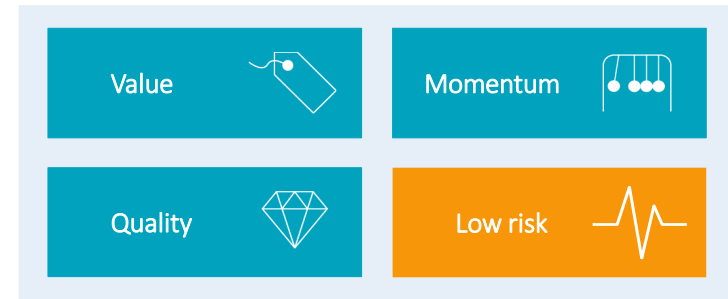
Outperformance excluding 5% most distressed stocks
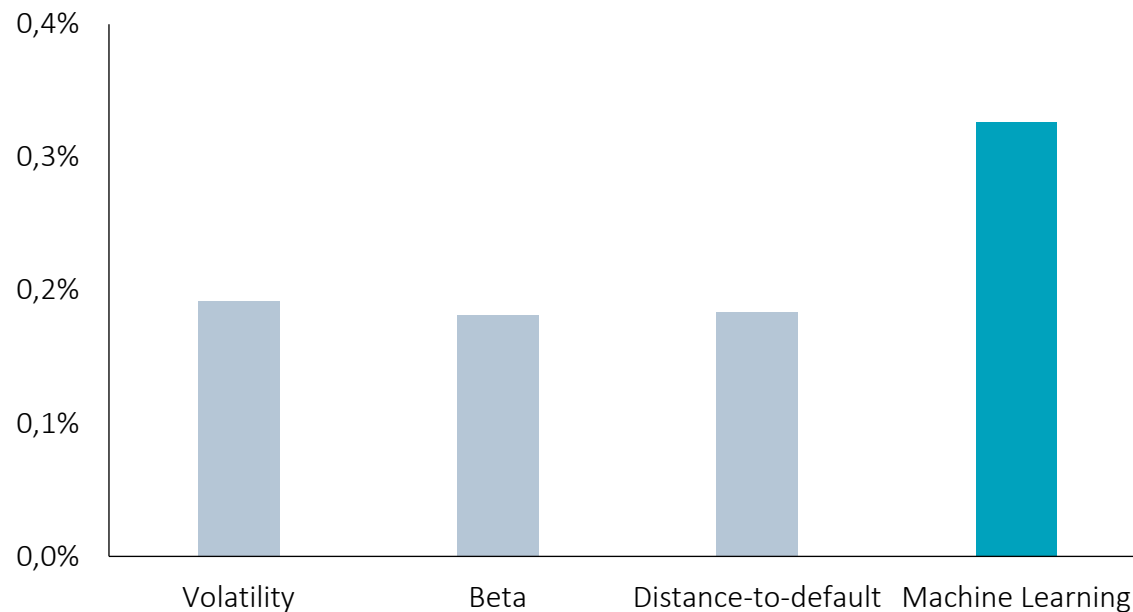
Sector distribution of most distressed stocks

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Combining factors

Value	Momentum
Quality	Low risk

Traditional perspective: equal weighting is hard to beat (1/N)

> Example: factor timing is similarly tough as market timing

Next-gen model building

> Use machine learning to identify nonlinear interaction effects

> Data-driven techniques that adapt to changing factor dynamics

> Use machine learning to create models that provide uncorrelated alpha

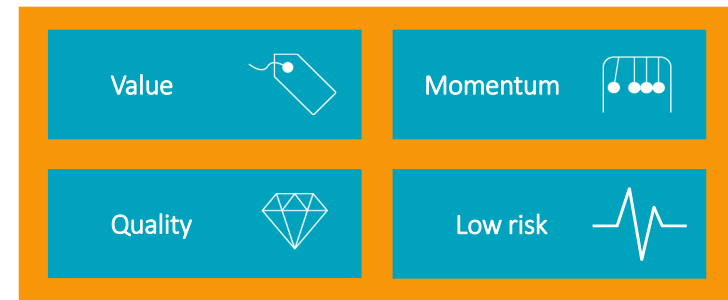ROBECO
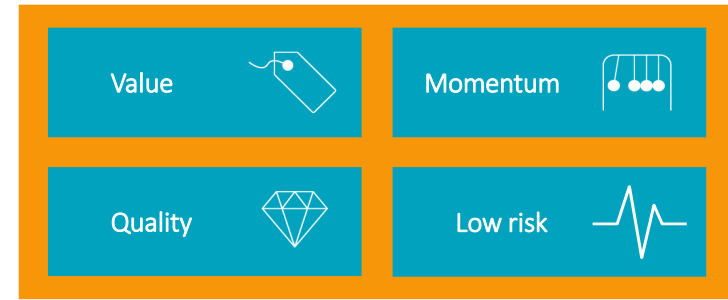
Example: ML for return prediction

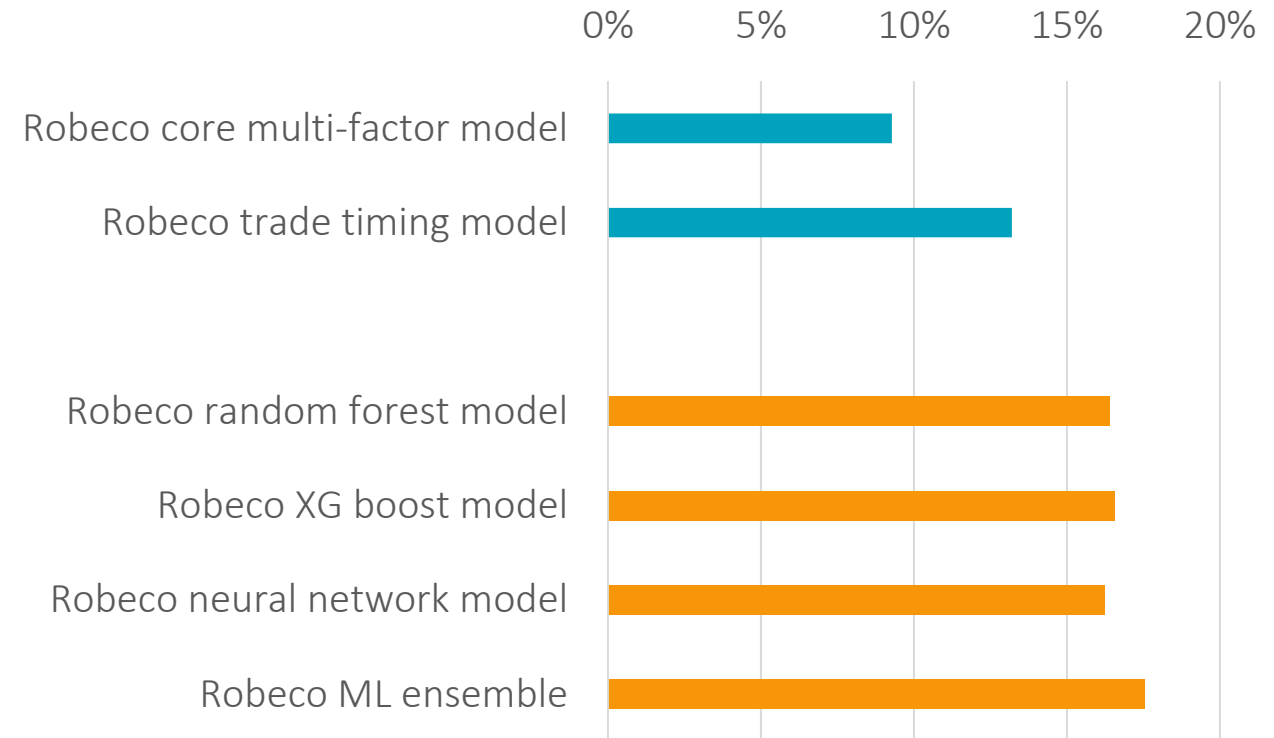| Value	Momentum
Quality	Low risk

ML shows strong power for return prediction

> Results directionally similar, although less extreme than in the literature*

However, there are some important caveats

> ML models give a lot of weight to short-term variables that involve a high turnover

> A big part of the performance comes from exposure to traditional factors

> No built-in risk control

> Performance attribution not straightforward

Top-bottom quintile return with 1M holding period

	0% 5% 10% 15% 20%
Robeco core multi-factor model	
Robeco trade timing model	
Robeco random forest model	
Robeco XG boost model	
Robeco neural network model	
Robeco ML ensemble	

* E.g. Light, Maslov, and Rytchkov (2017), Freyberger, Neuhierl, and Weber (2020), and Gu, Kelly, and Xiu (2020)

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Conclusion

Value

> Value has recovered from its drawdown

> Current valuation spread still offers a lot of further upside potential

Innovation

> Research focus is on taking factors to the next level

> Alternative data and machine learning play a pivotal role in this

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Important information

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Important Information

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