Gerardo Manzo
Vice President - FI Risk Modeling

April 28, 2023
University of Rome “Tor Vergata”
Qfin@Work 2023 Conference

BlackRock

Systematic Credit Investing

The Role of Doing and Creativity!

About Me
UniRoma2 Alumni – Class 2013

VP in **Risk Modeling** at BlackRock
- Fixed-Income lead modeler
- FI asset class: single-name credits and indices

10+ years of experience in **quantitative research**
- Systematic equity and credit PM & Macro Research
- Two Sigma Inv. → AQR Capital Mngt → Kepos Capital

Research focus on **asset pricing** and ML
- Top tier publications (*Management Science*, *JofFI*)
- USalerno → LUISS → UniRoma2 → UChicago Booth SoB

Certified **Krav Maga** instructor
- 5y in self-defense and martial arts

Gerardo Manzo
Vice President – FI Risk Modeling

April 28, 2023
University of Rome “Tor Vergata”
Qfin@Work 2023 Conference

BlackRock®

Systematic Credit Investing
The Role of Doing and Creativity!

Brief Overview of Systematic Investing

How Systematic is Systematic Investing

Systematic investing spans different asset classes, such as, equity, fixed-income (rates & credit), commodities, and alternatives

Rule-based, Data-driven Approach

- Applied to thousands of securities
- Over different markets and asset classes

Deliberate Scientific Method

- To test and validate ideas
- To fully exploit data and technology

Factors as Building Blocks

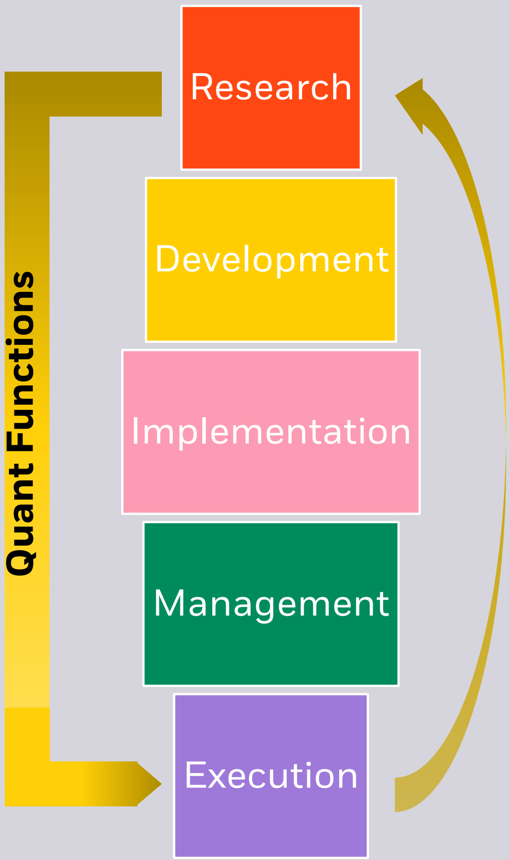
- Possible source of return
- To define attractiveness of securities or markets
- To understand source of risk

Alpha-seeking strategies

- Information advantage
- Market inefficiencies, behavioral bias

The “Modern” Quant and The Technological Evolution

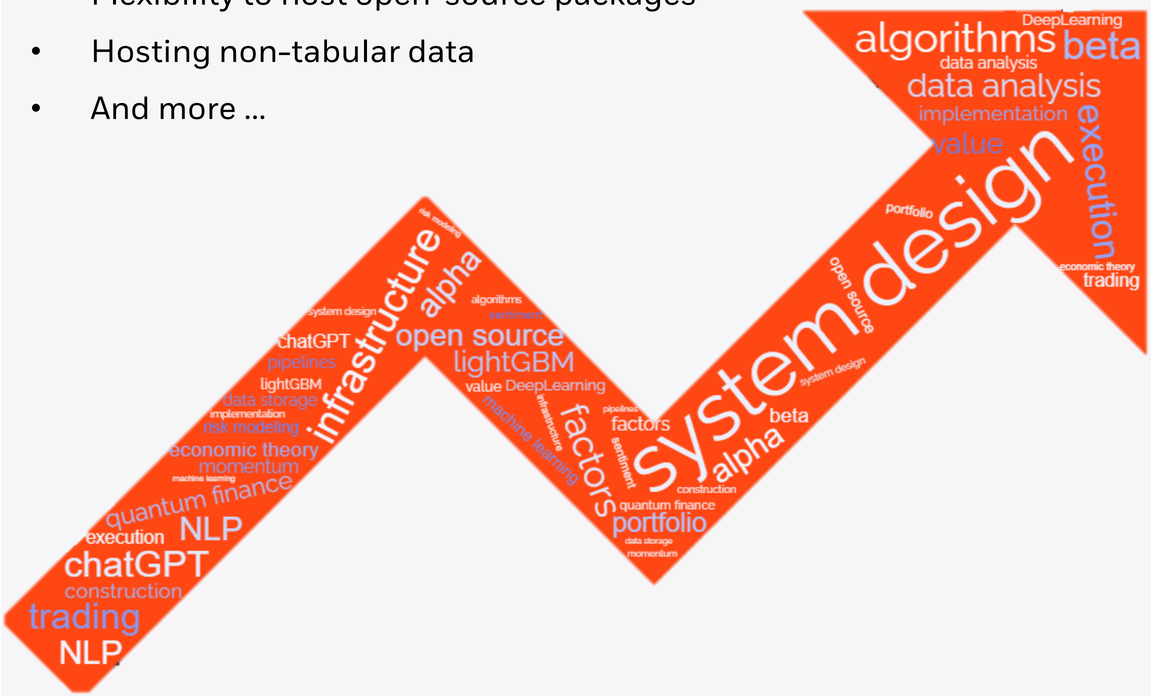
A quant is a hybrid figure: a developer, an engineer, a modeler, and an empiricist



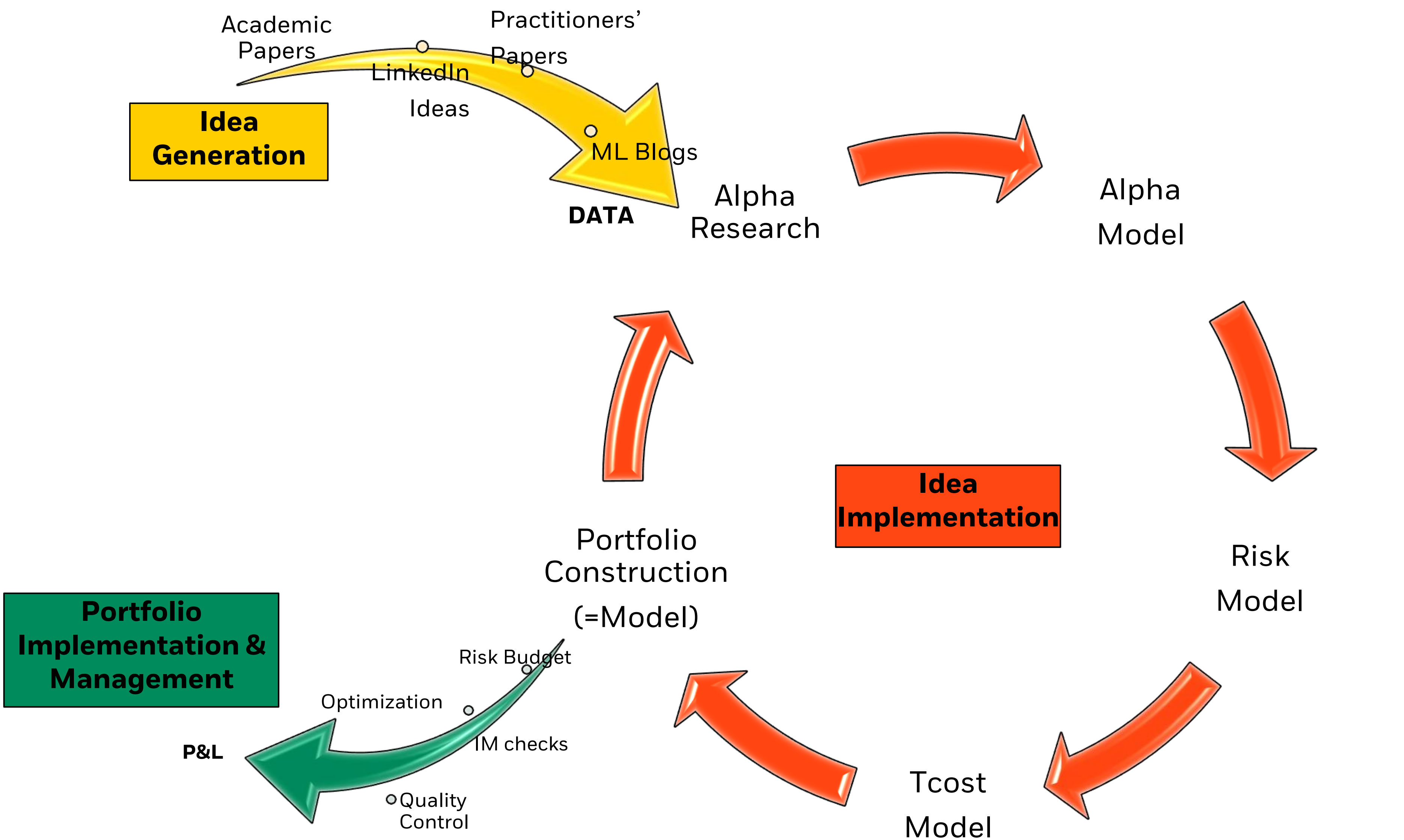
The quant industry has tremendously and quickly evolved over the past 10 years

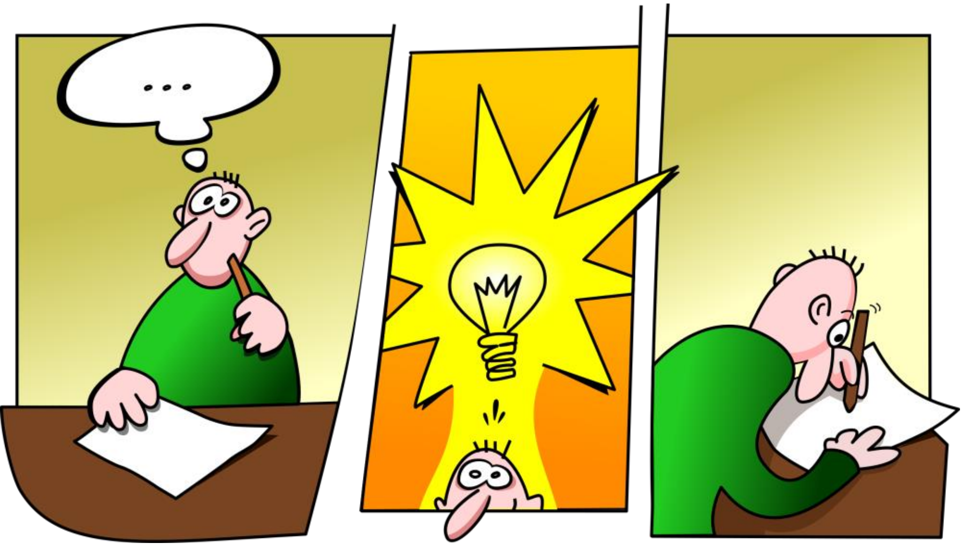
Systematic investing must consider:

- Data storage and computational power
- Flexibility to host open-source packages
- Hosting non-tabular data
- And more …



The Life(style) Cycle of a Quant Portfolio Manager



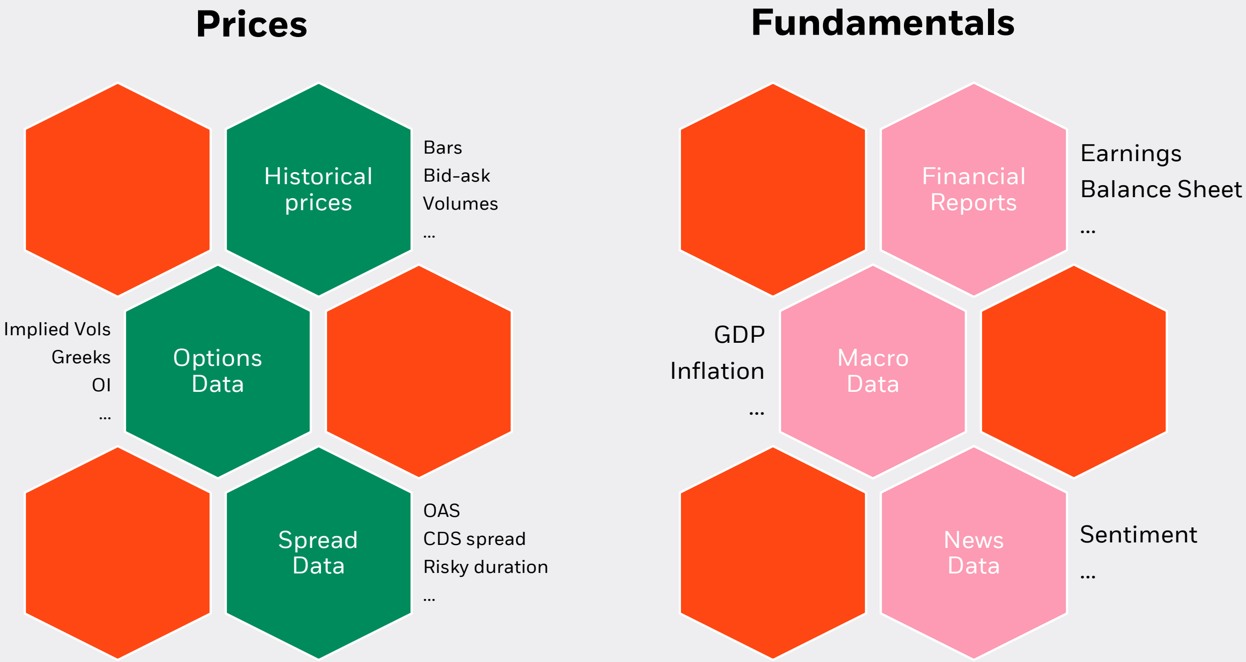


From Idea Generation to Model Construction: Data and Risk Premia

No Data, No Quant!

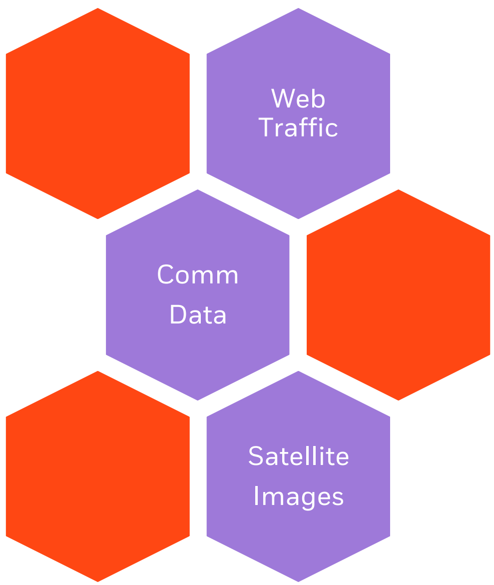
While it's true that we expect about 181 zettabytes of data in 2025 (statista.com), traditional data is still at the core of systematic investing, with alternative data keeping the peace.

Traditional Data



- ❑ Potentially lucrative
- ❑ Relatively not very expensive
- ❑ Noisy but consistent

Alts

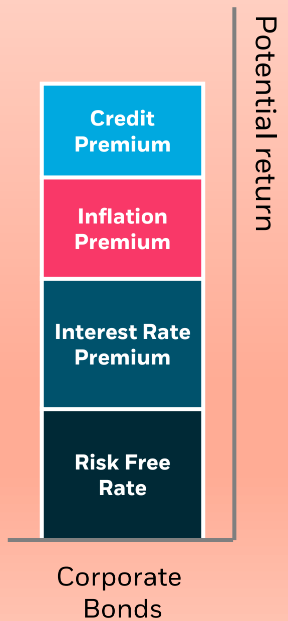


- ❑ Potentially lucrative
- ❑ Very expensive
- ❑ Noisy and inconsistent (e.g. ESG)

Macro and Style Factors are the Building Blocks for Credit

Credit bundles together multiple sources of risk like duration.

The factor decomposition helps understand the drivers of returns and gain the right exposure



Macro Factors

Broad risks existing across asset classes

- Real Rates
- Inflation
- Credit
- Liquidity
- Sovereign

Style Factors

Explain risk and returns within asset classes

Potential source of risk-adjusted returns

- Value
- Momentum
- Quality
- Low Vol
- Carry
- Size

Alpha

Idiosyncratic returns above factor returns

- Security selection
- Country and industry selection
- Market and factor timing
- Execution Alpha

Source: BlackRock as at 30 June 2020. For illustrative purposes only.

Three Source of Return to Access the Credit Premium

Time series and cross-sectional approaches can all help investor gain exposure to credit excess returns.

However, they are characterized by different levels of complexity

1. Timing (TAA)	2. Strategic Tilts	3. Relative Value
Credit performs well during period of positive growth and low default rates. Timing would require forecasting models.	Credit is additive to Treasury (duration) and equity: it can potentially offer long-term risk-adjusted returns and diversification (low correlation across asset classes).	Relative value offer opportunities for selecting securities, such as single-name bonds, CDSs, countries and industries.
		

Source: BlackRock, as of 09/30/2021.

Alpha Modeling in Credit

Relative Value Strategies: From Raws to Portfolio Views

Relative value strategies aim to identify securities to include in a portfolio.

Any signal (or alpha idea) must be translated into portfolio views, that is, actual portfolio risk-weights and directions (buy vs sell), that are not necessarily tradable.

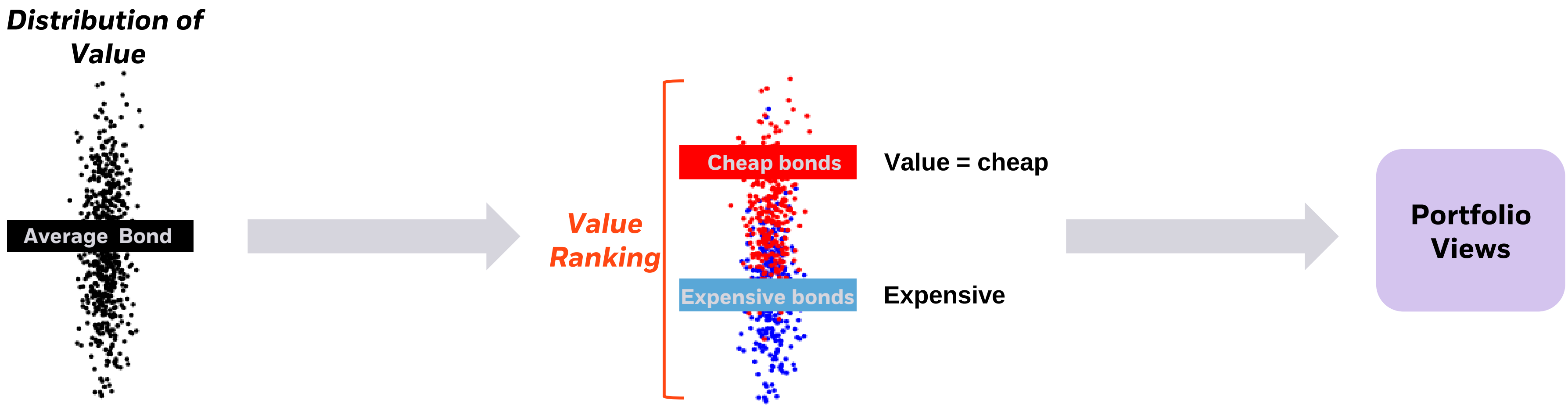
Signal Raw Data
- Momentum
- Value
- Quality
- …

→ **DTS Neutrality**
- DTS (Duration times Spread)
- A way to obtain market neutrality

→ **Industry Neutrality**
- Normalization within industry to avoid industry bets or tilt

→ **Beta Neutrality**
- Enforcing zero correlation with a benchmark (e.g. market)

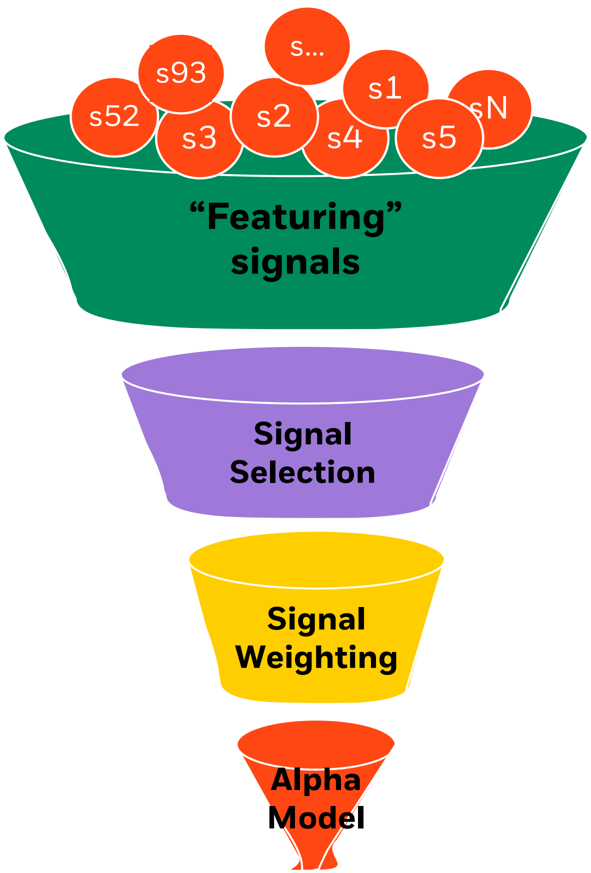
→ **Vol Targeting**
- Ex-ante risk targeting (e.g. 10% risk target)



The Alpha Model as a Bundle of Creativity

The alpha model is the holy grail of systematic investing as it bundles together the selected signals.

- It results into a unique cross-sectional ranking that will be the main input of portfolio construction and implementation. Creativity (and experience) is the main ingredient.



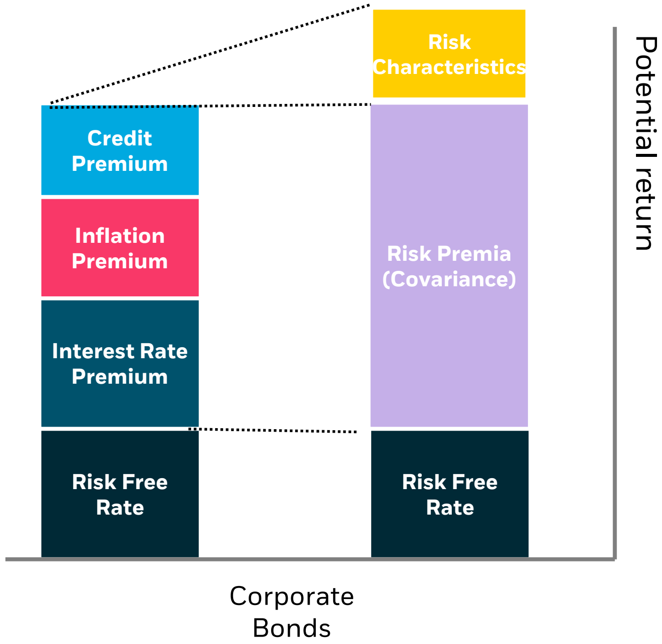
The Curse of Dimensionality	Feature engineering (smoothing, zscoring, adding jumps, etc) may exponentially create "new" signals
The Gift of Creativity I	Selecting signals can be hard and mostly backward looking. It must consider Tcost, turnover/speed, risk premia, trade cancellation, ..
The Gift of Creativity II	The final model is a weighted combination of the selection signals. How do we select the weights? E.g. MVO, lightBGM, DeepLearning, EW, Black-Litterman, ...
A bundle of creativity	The alpha model produces your best bets or security ranking, BUT it is not necessarily tradable.

Risk Modeling in Credit Securities

Risk Forecasting: Characteristics and Covariance

A key feature of risk modeling is to identify systematic sources of risk *and* return, that is, the set of well-behaved and persistent factors (factor decomposition)

- Unlike for alpha modelers, the risk modeler must also include **risk characteristics**, that is, security specific features not necessarily associated with a risk premium (e.g. beta and leverage) for a proper risk attribution.

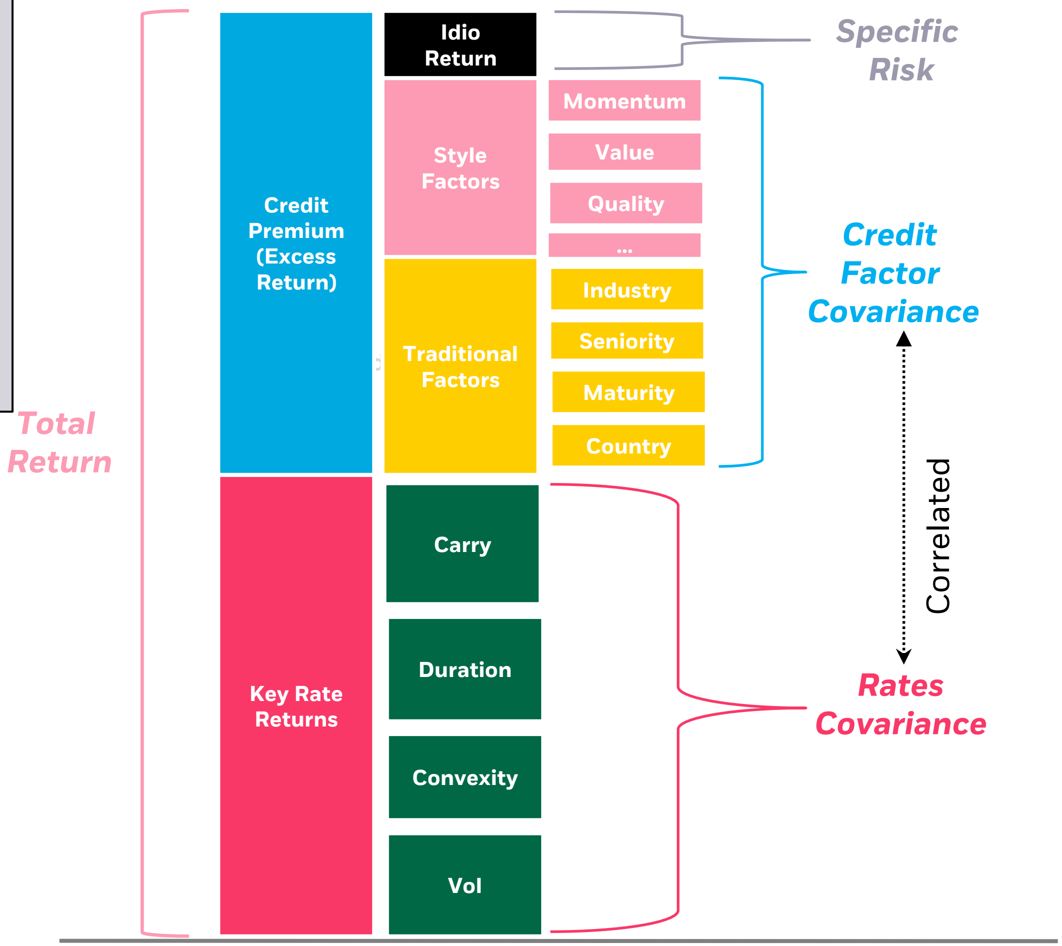


Risk Forecasting: Zooming into Risk Factors

Risk predictability is the result of persistent risk factors.

The technical reason behind a factor structure:

In a cross-section of N=10k bonds and K=40 factors, the underlying factor-based covariance matrix will only require the estimation of 780 correlations vs ~50mm

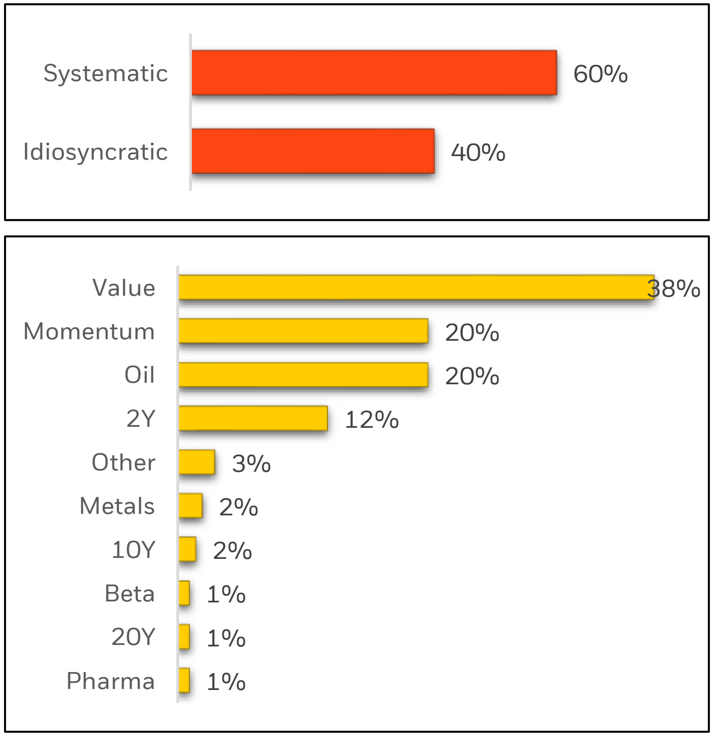


Risk Contribution: The Main Topic of the Risk Committee

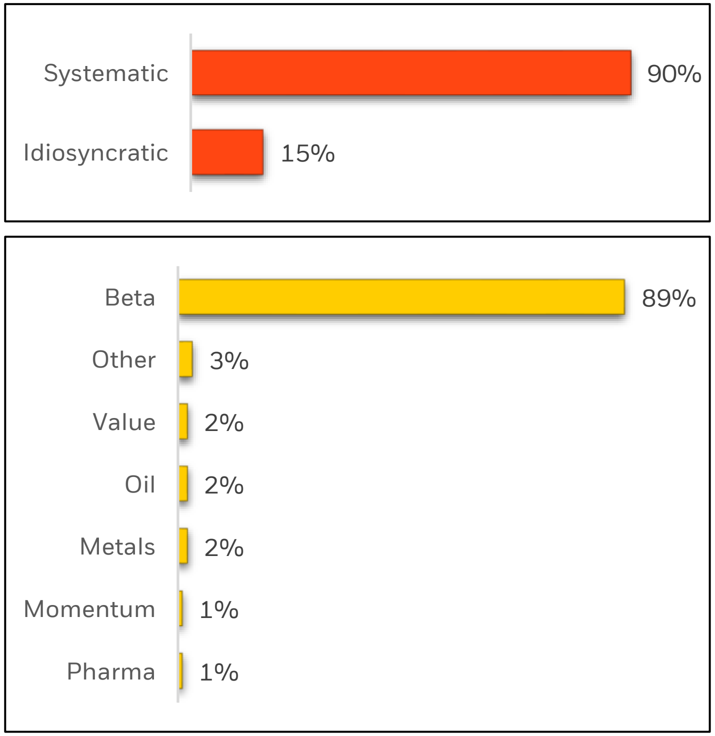
Once a strategy is live, one of the main topics is risk exposures. A Risk Committee oversees risk for each strategy in a fund (e.g. multi-strategy fund).

- Risk contribution helps the CIO and PMs understand main risk (and return) exposures
- What is wrong with those portfolios? (hint: the title is the portfolio mandate)

Risk Profile of a SN-CDS Portfolio*



Risk Profile of a L/S CDS Portfolio*

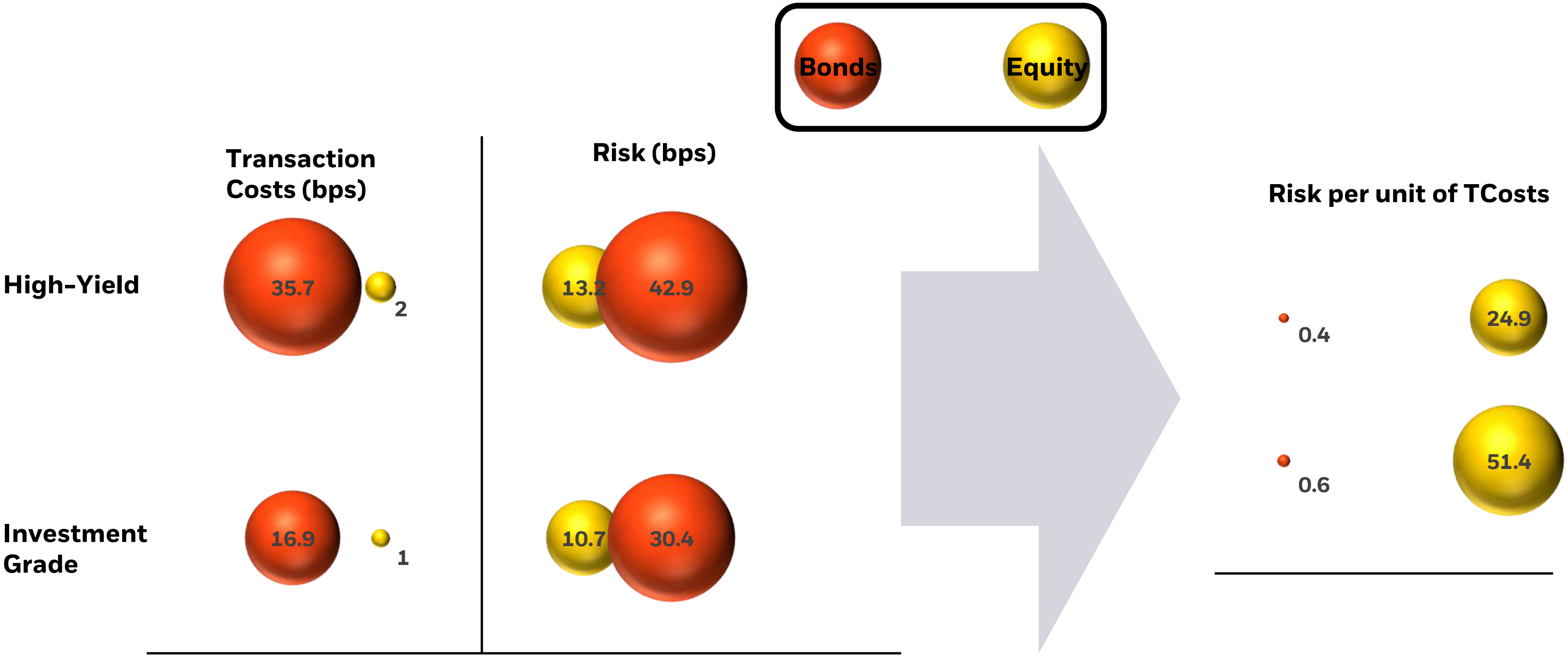


*Hypothetical portfolios

Beyond Alpha and Risk: First Order Importance of Transaction Costs in Credit

Implementation: the Liquidity Constraint

Low volatility and high transaction costs are binding credit characteristics as this combo makes it challenging to implement alpha ideas.



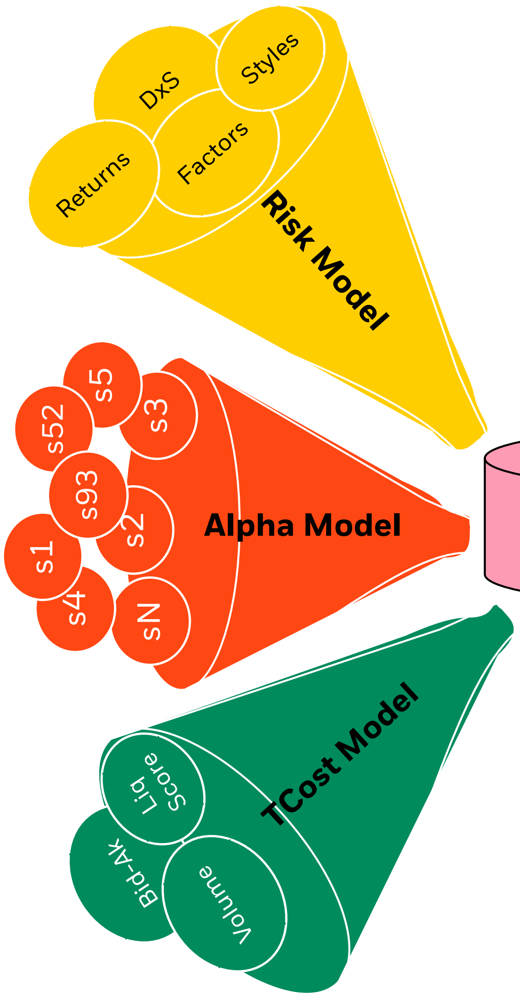
A systematic PM could squeeze the following liquidity metrics into a Liquidity Score to be used in portfolio construction and/or implementation.

Depth (#dealers)	Price/quote staleness	Volume	Crowdedness	Actual prices vs filled quotes	Pricing assumptions	Actual vs interpolated curves

Building the Actual Portfolio: The Decision Making Process

The alpha, risk, and tcost models will all contribute to form the final portfolio.

The PM will need to make several decisions to align the portfolio to risk and return budgets.



Portfolio Construction

Implementation

Management
- Risk Monitoring
- Quality Control
- Risk budget
- Rebalance
- TCost monitoring
- …

Aversion
- Risk aversion
- TCost aversion
- Turnover aversion

Constraints
- Sector constraints
- L/O vs L/S
- Concentration limit
- Factor exposure
- Regulation
- Leverage

… and more:
- Backtest
- Initial Margins (IM)
- Risk / IM
- Leverage
- Alpha decay

Systematic Credit Investing

Conclusions

How To Keep Pace with the Evolving Quant Industry

Systematic portfolio
are characterized by thousands of small bets

- The signal-to-noise ratio may be tiny at the company level
- Systematic investors can generate confidence on aggregate, at the portfolio level.

Portfolio Construction
Must create a "tradable" output

- Creativity is needed to deal with dimensionality curse, signal selection and weighting
- Risk models can play a crucial role once the strategy is live
- TCosts and turnover must be seriously considered

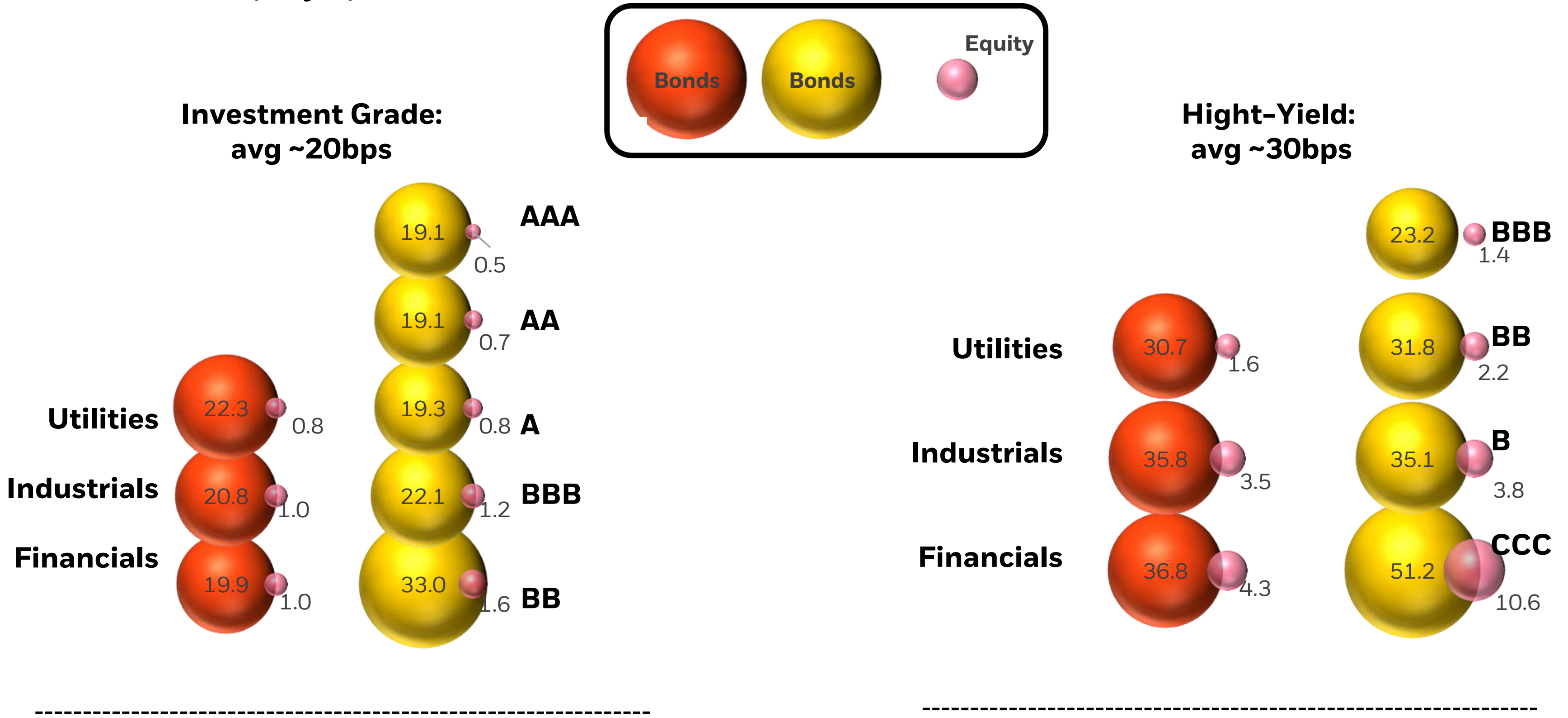
Try It Yourself!
There is no substitute to experience.

- What worked in designing trading strategies?
- Does it still work? In HFT and LFT?
- Will it work?
- Does a factor-based strategy in equity work in credit?
- Do we need a more robust infrastructure, system design, DevOps?

Appendix: Transaction Costs in Details

Trading a corporate bond is significantly more expensive than trading equities

1. The average bond TC is about 20-30bps versus 1-5bps for equities
2. Lower quality bonds trade at a higher TC in both credit and equity space



Important notes

The following notes should be read in conjunction with the attached document:

- This material is provided for information purposes only and is not intended to be an offer or invitation to anyone to invest in any BlackRock products or services. The information and opinions contained herein are not guaranteed as to accuracy or completeness, and are subject to change without notice.
- Past performance is not a guide to future performance.
- All financial investments involve an element of risk. Therefore, the value of your investment and the income from it will vary and your initial investment amount cannot be guaranteed.
- No part of this material may be reproduced, stored in any retrieval system or transmitted in any form or by any means, electronic, mechanical, recording or otherwise, without the prior written consent of BlackRock.
- UNLESS OTHERWISE SPECIFIED, ALL INFORMATION CONTAINED IN THIS DOCUMENT IS CURRENT AS OF 4/28/2023