

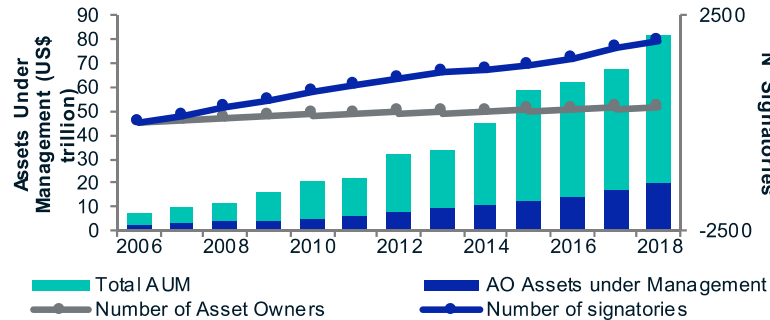
▀ The frontiers of what we can know

**HOW ESG HARNESSSES NEW DATA TO INFORM
INVESTMENT DECISIONS**

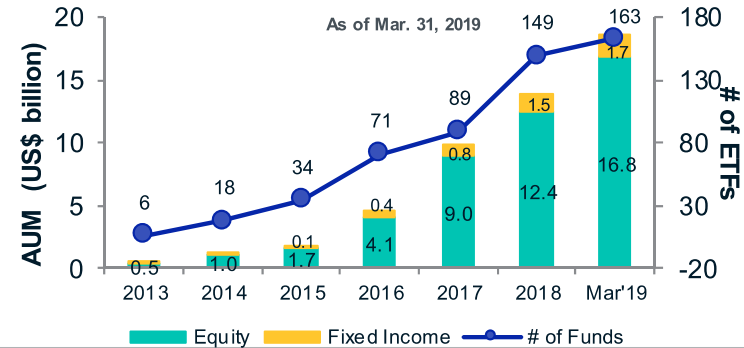
Linda-Eling Lee

ESG is growing fast ... why now?

UN PRI Has Grown to Over 1,900 Signatories with \$81.7 Trillion In AUM



99% CAGR in ETF AUM Tracking MSCI ESG Indexes since 2013



HERE'S WHY:

1. LOWER TOLERANCE OF CORPORATE ESG INCIDENTS

More scrutiny, and emerging ESG risk factors may impact profitability

2. INVESTORS ARE PREPARED TO ACT

Asset Owners are allocating to ESG strategies as more regulation supports it as part of fiduciary duty

3. ESG IS FINANCIALLY RELEVANT

Increasing research suggesting that ESG factors have improved risk-adjusted returns, and longer track records

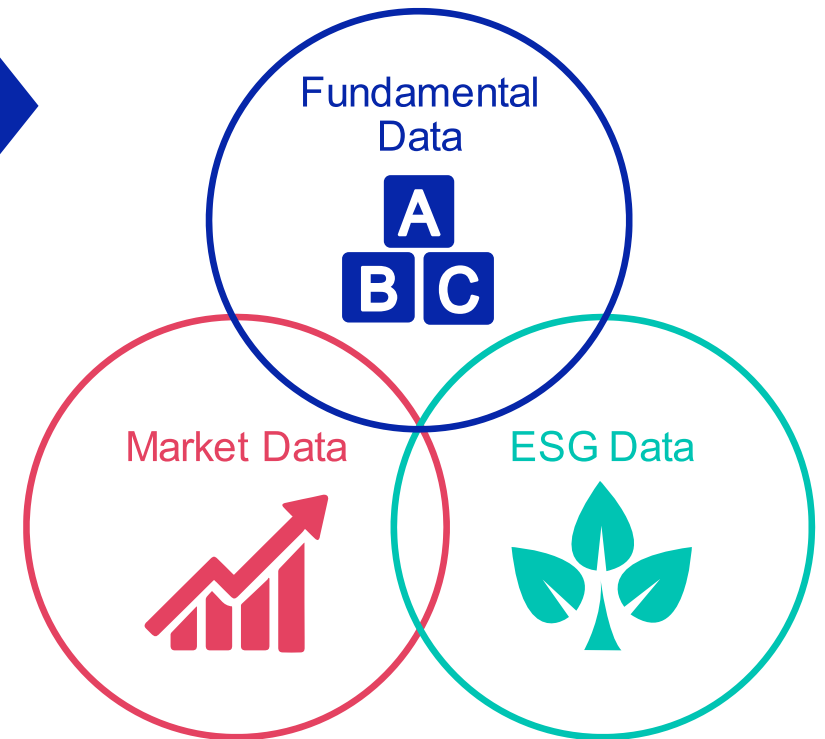
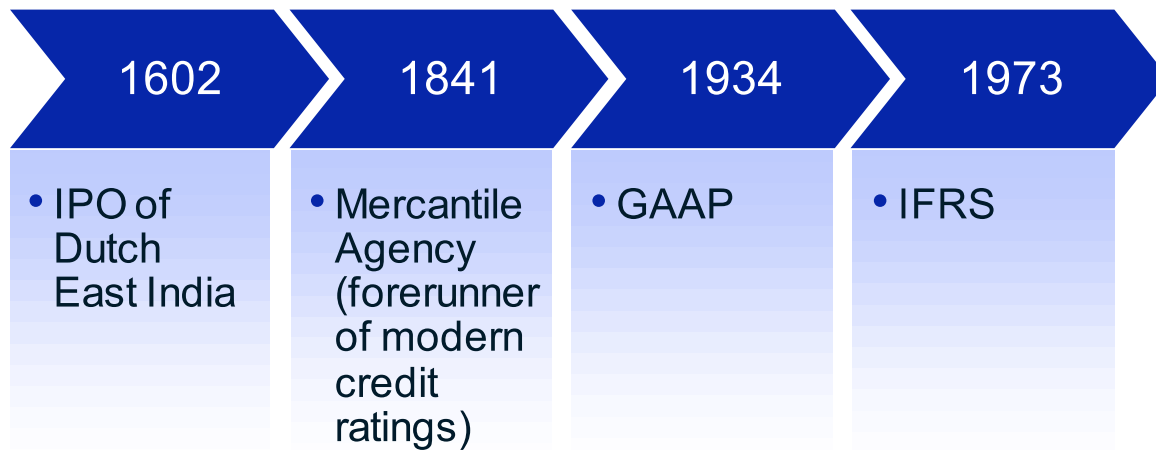
4. IMPROVED ESG RATINGS

Ratings make it possible to assess what was once unmeasurable

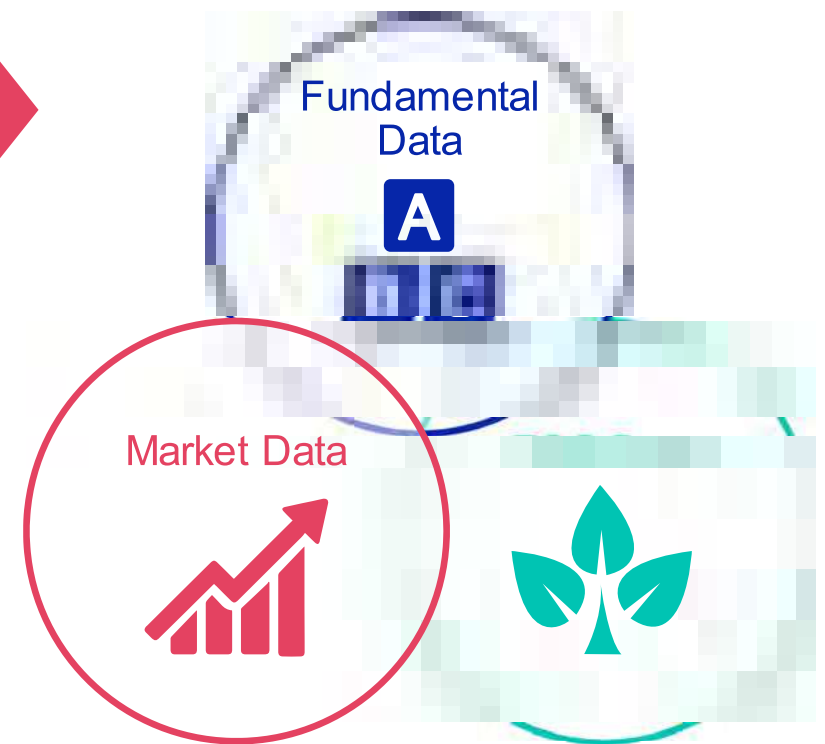
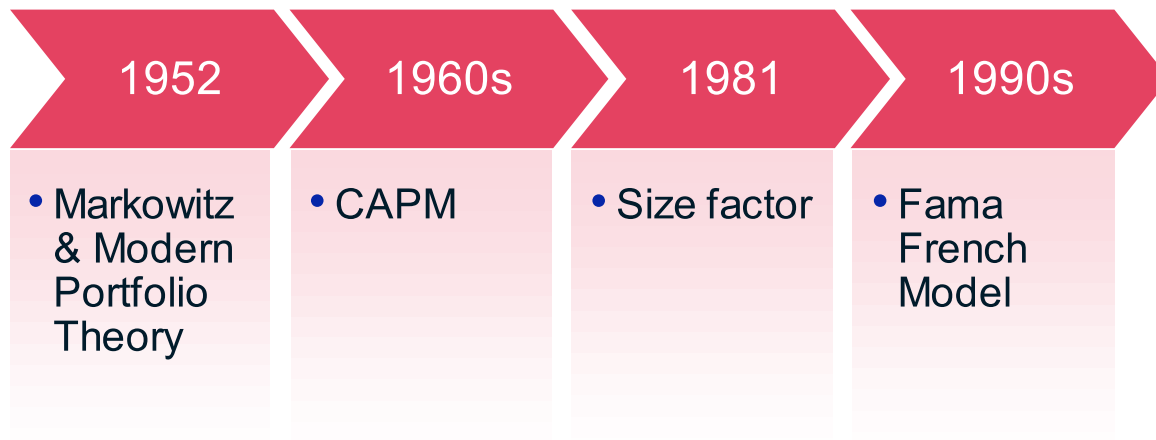


*United Nations Principles for Responsible Investing

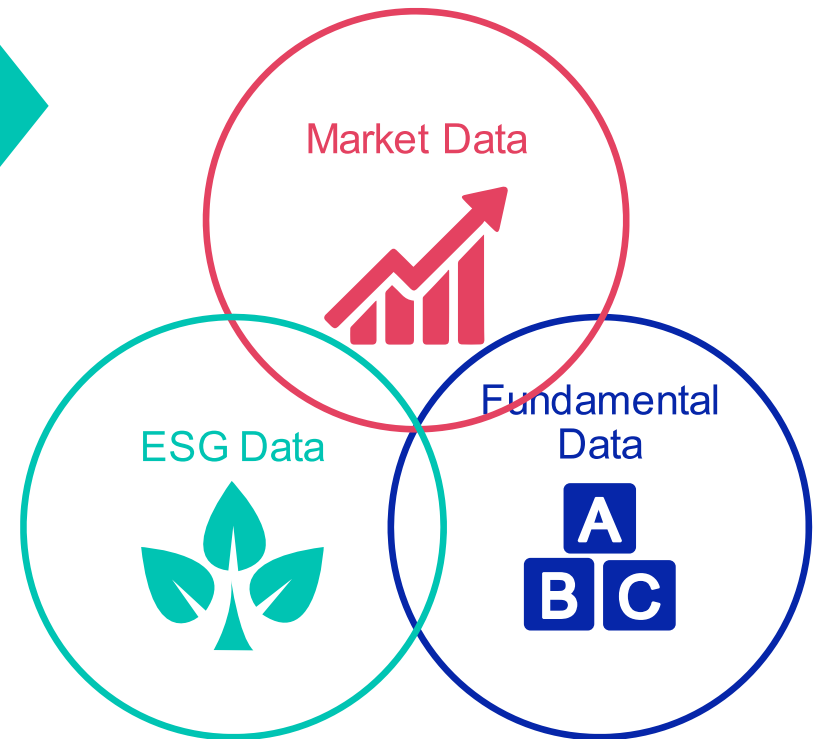
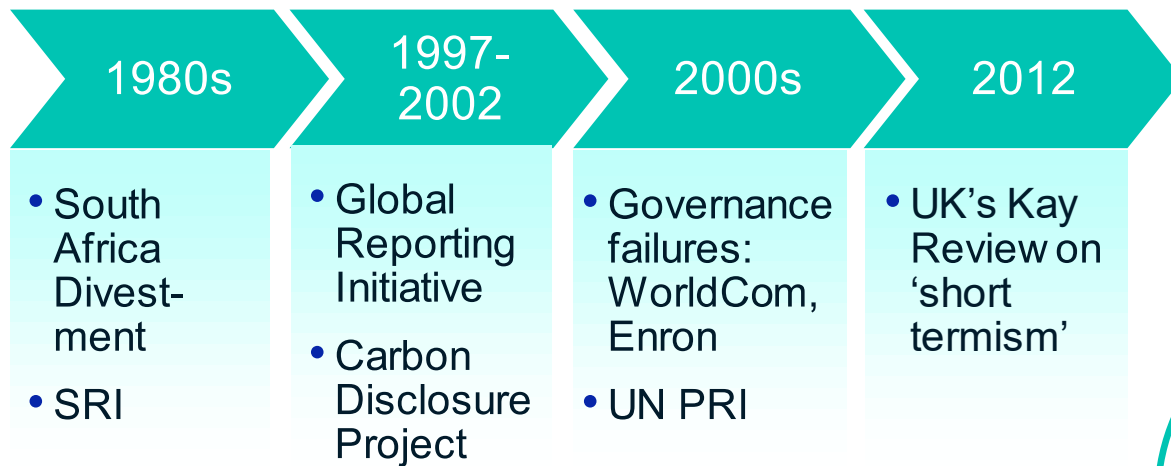
Viewing your investments: An evolution



Viewing your investments: An evolution



Viewing your investments: An evolution

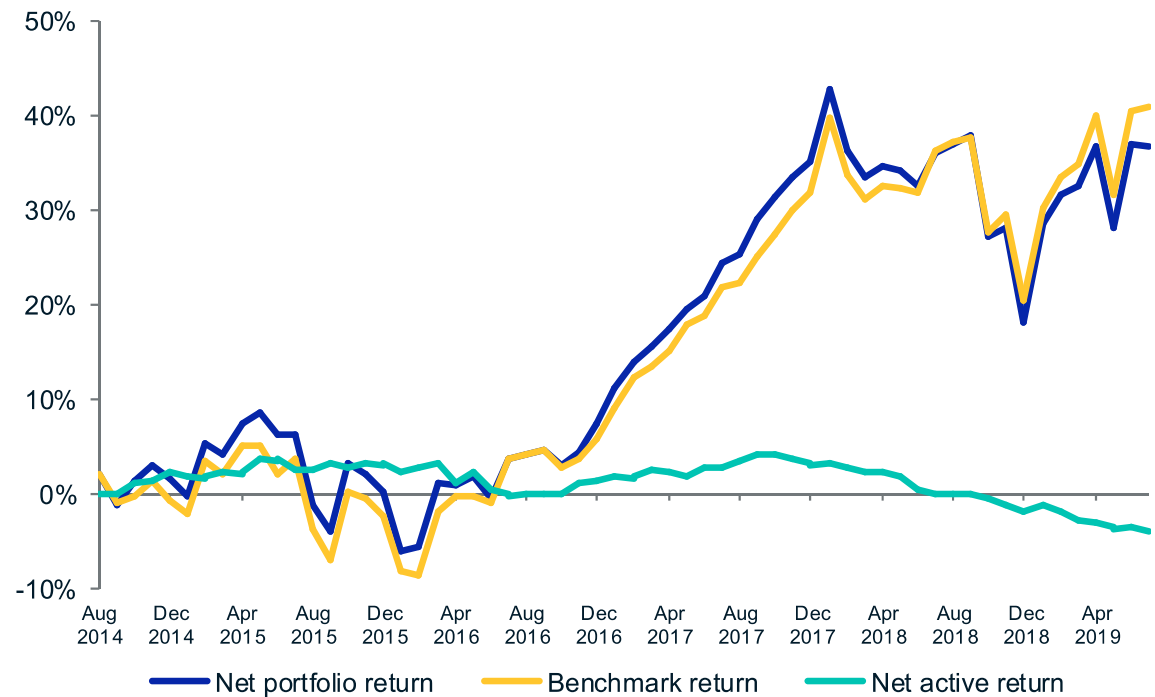


Case study portfolio

Fund description

- ~600 holdings
- ~USD 480 m AUM
- Global equity
- Multi-factor strategy with fundamental overlay
- Aug 2014 – July 2019

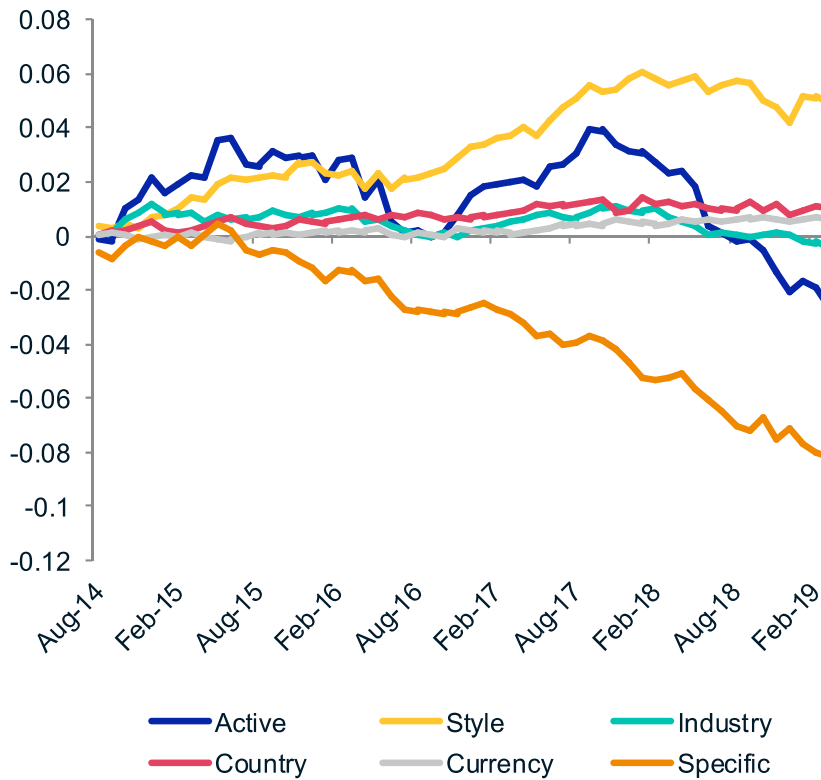
Cumulative returns v. benchmark



Source: MSCI. Sample portfolio versus MSCI ACWI August 1 2014 – July 1 2019 .

Two views

Performance attribution



Source: MSCI. Sample portfolio versus MSCI ACWI August 1 2014 – July 1 2019 .

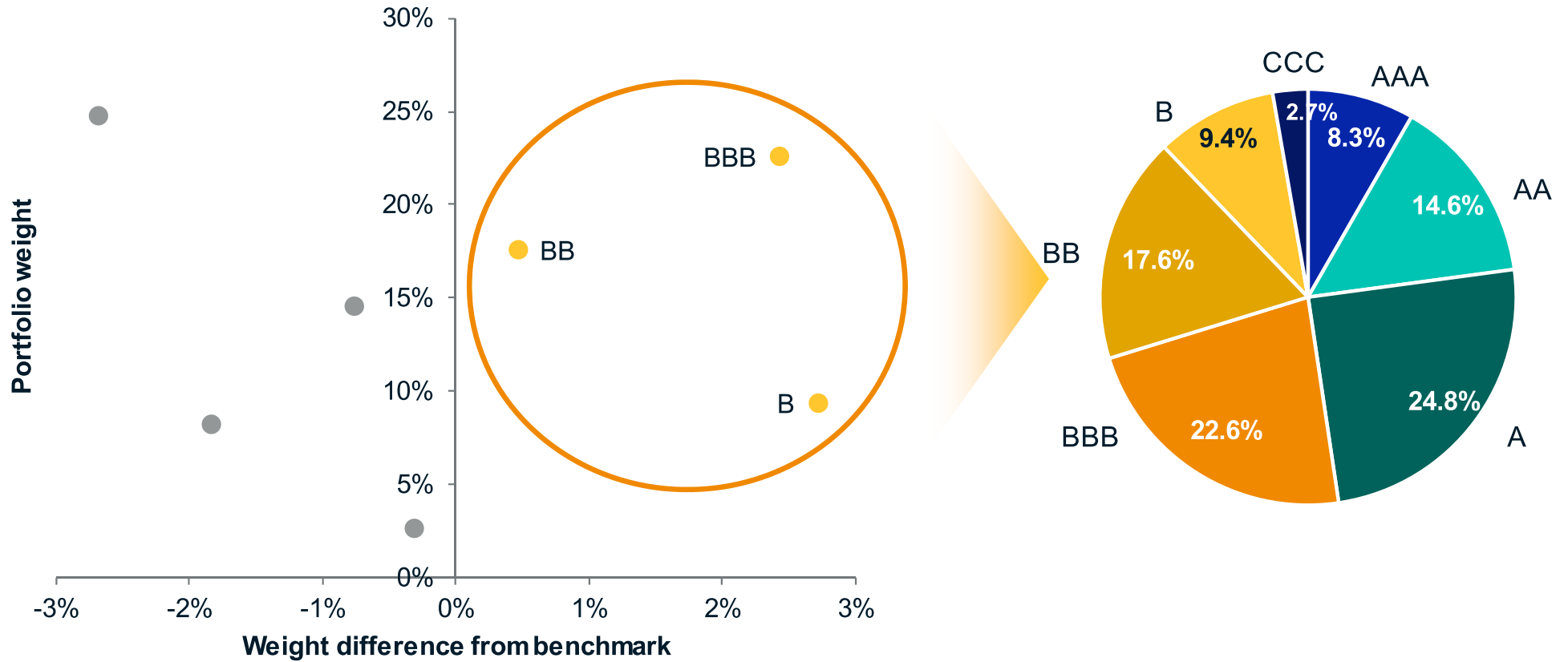
MSCI Factor Box

| | Underweight | Overweight | Exposure summary | | |
|----------------|-------------|------------|------------------|--------|--------|
| | | | Port | Bmk | Active |
| Value | | | 0.241 | 0.019 | 0.222 |
| Low size | | | -0.177 | -0.320 | 0.143 |
| Momentum | | | 0.064 | 0.026 | 0.038 |
| Quality | | | 0.091 | 0.036 | 0.055 |
| Yield | | | 0.101 | 0.047 | 0.054 |
| Low volatility | | | -0.111 | -0.009 | -0.102 |
| Growth | | | 0.026 | -0.004 | 0.030 |
| Liquidity | | | 0.051 | 0.024 | 0.027 |

Top overweighted companies

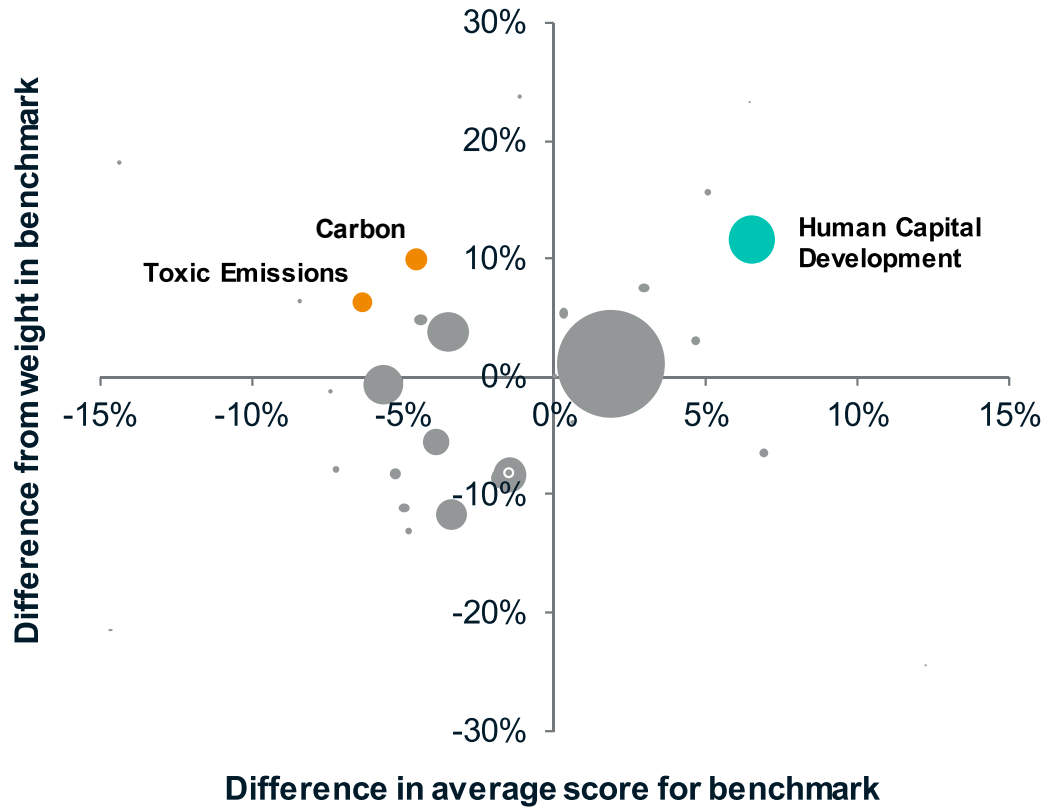
| Top 10 Securities by Weight | | | | |
|-----------------------------|-----------------|-----------------------|-------------|-------------|
| Asset name | Avg active wght | Specific contribution | P/E v peers | ROE v peers |
| Samsung Electronics | 0.47 | 0.02 | 0.38 | 0.46 |
| AT&T Inc. | 0.44 | 0.09 | 0.89 | 1.08 |
| Royal Dutch Shell PLC | 0.41 | -0.10 | 0.64 | 0.27 |
| CVS Health Corp. | 0.40 | -0.30 | 0.64 | 0.52 |
| Anthem Inc. | 0.37 | 0.00 | 0.48 | 0.75 |
| Tyson Foods Inc. | 0.37 | 0.35 | 0.84 | 0.44 |
| Verizon Comm Inc. | 0.36 | 0.11 | 0.66 | 0.59 |
| Johnson & Johnson | 0.35 | -0.15 | 0.53 | 1.94 |
| LAM Research Corp. | 0.33 | 0.09 | 1.01 | 0.84 |
| Kroger Co. | 0.29 | -0.04 | 0.56 | 1.45 |

▀ The third view: ESG Ratings



Source: MSCI ESG Research. Sample portfolio versus MSCI ACWI as of October 31 2018.

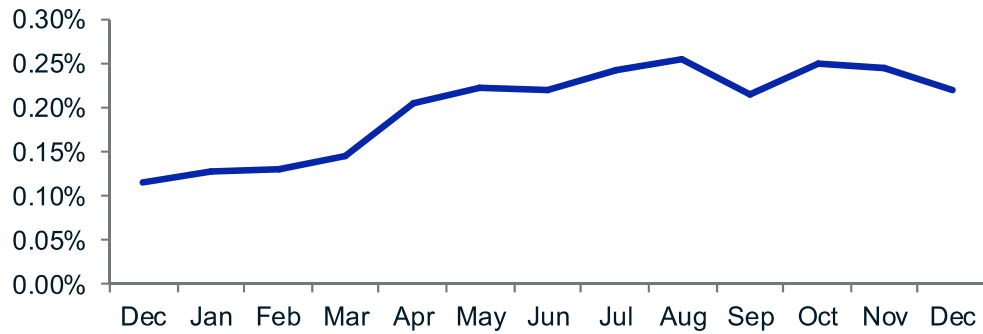
■ The third view: exposures to latent risks



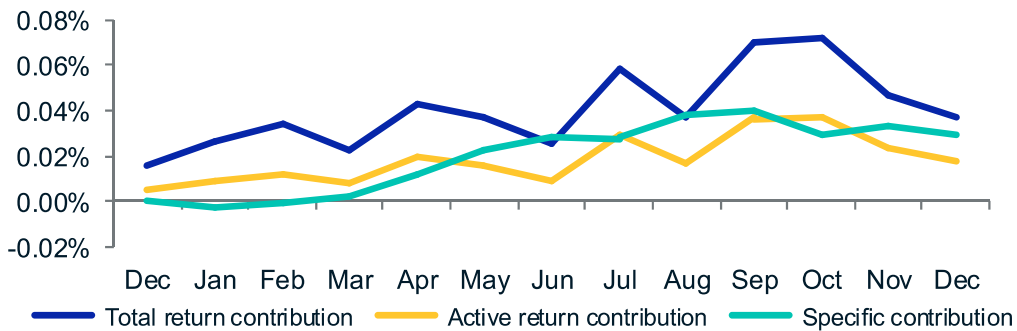
The portfolio was overweight companies where **toxic waste** and **carbon** are key risk factors.

Vale, S.A.

Portfolio weight -- Vale
(December 2017–December 2018)



Contribution to portfolio return - Vale
(December 2017–December 2018)



| | Industry median | 2018 | 2017 |
|------------------------|-----------------|--------|-------|
| Earnings quality score | 60 | 74 | 89 |
| Profitability | | | |
| Gross margin | 34.3% | 39.6% | 38.0% |
| EBITDA margin | 22.8% | 47.2% | 47.7% |
| Operating margin | 14.6% | 32.1% | 31.8% |
| Pretax margin | 12.0% | 18.7% | 22.9% |
| Effective tax rate | 25.5% | (3.8%) | 18.5% |
| Net margin | 7.6% | 19.4% | 18.7% |

Source: MSCI. Sample portfolio Dec 1 2017 – Dec 1 2018. Thomson Reuters, Sept 2019.

■ In January 2019, a dam collapsed



Source: Worldminetailingsfailures.org

■ In January 2019, a dam collapsed

The dam near Brumadinho, Brazil, built for Vale's Corrego do Feijao mine, collapsed on January 25, 2019

- 12 million cubic meters of mine waste slurry released
- Buildings were buried or washed away with the people inside
- As of July 2, 2019, 270 people confirmed killed¹



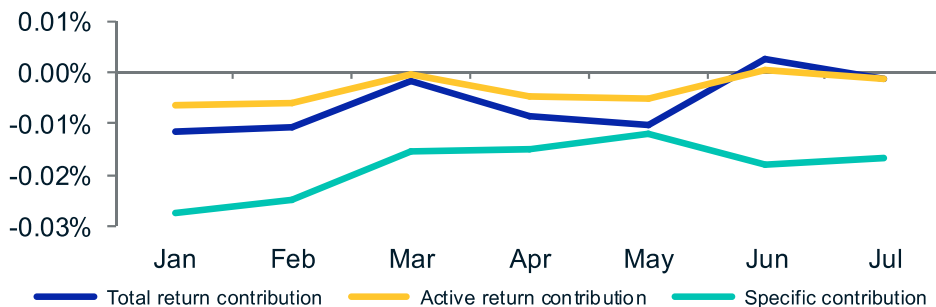
1. Kow smann, P. Magalhaes, L. Pearson, S. "Police probe of dam collapse in Brazil focuses on how much Vale may have know n about Risks." Wall Street Journal. July 2, 2019.
Images: Digitalglobe.

WSJ: “Behind Vale’s Deadly Dam Collapse: Multiple Warnings That Went Unheeded”

Some consequences

- USD 6.3 Billion total impairment charges recorded by end of Q2; suspended dividends
- 24% of iron ore production was suspended
- CEO and other executives stepped down, pending criminal charges

Contribution to portfolio return – Vale
(Jan 2019 – July 2019)

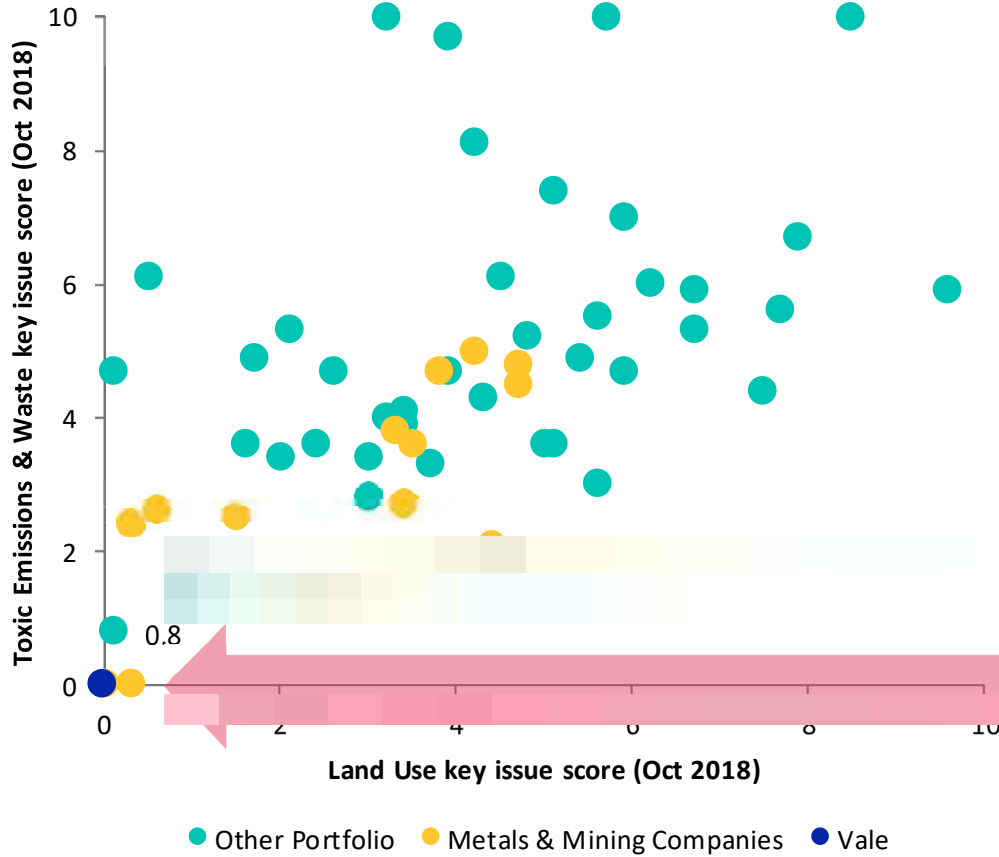


Some warnings

- Poor track record in preventing environmental incidents
 - Samarco Dam collapse, 2015
 - Alleged water contamination in various locales (e.g., Onca Puma)
 - Community Opposition challenged 18% of reserves value at end of 2018¹
- Lack of technical or operational expertise on the board
- MSCI ESG Research rates Vale as 0th percentile for two relevant environmental key issues

Source: <https://www.wsj.com/articles/behind-vales-deadly-dam-collapse-multiple-warnings-that-went-unheeded-11551050768>; Kowsmann, P. Magalhaes, L. Pearson, S. “Police probe of dam collapse in Brazil focuses on how much Vale may have known about Risks.” Wall Street Journal. July 2, 2019; MSCI ESG Research, SNL Metals and Mining, ALOS World 3D – 30m (AW3D30) Version 2.1; Bautzer, Tatiana. “New dam disaster puts Vale CEO, deals, and dividends under scrutiny.” January 26, 2019; <https://www.reuters.com/article/us-vale-sa-disaster-strategy-analysis/new-dam-disaster-puts-vale-ceo-deals-and-dividends-under-scrutiny-idUSKCN1PM08A>; MSCI sample portfolio Jan 1, 2019 – July 1, 2019; Impairment charges: “Q1 2019 Quarterly Results”, Vale.com May 9, 2019; “Q2 2019 Quarterly Results”, Vale.com July 31, 2019. Suspended production: “Q1 2019 Quarterly Results”, Vale.com May 9, 2019. 0th percentile as of December 2018=

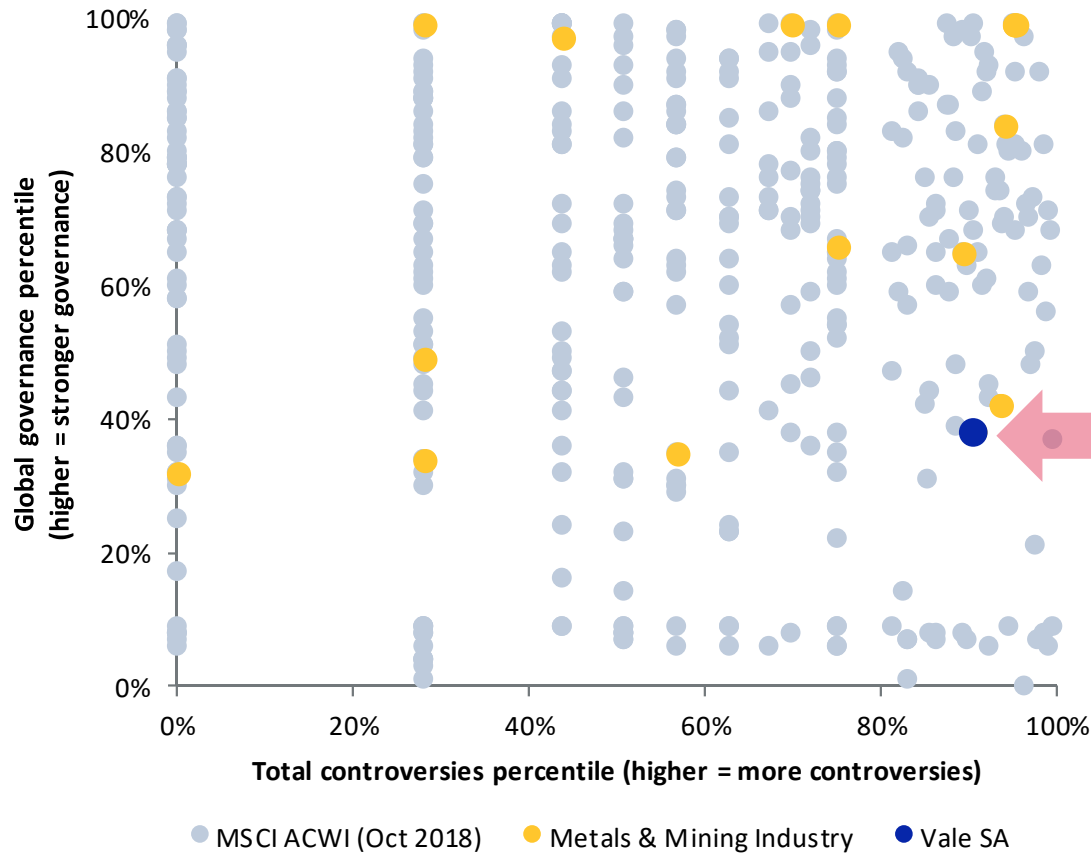
▀ The ESG view: an outlier?



At the time of the dam collapse, Vale was a clear laggard in relevant environmental key issues

Source: MSCI ESG Research. Sample portfolio and MSCI ESG Ratings scores as of Oct 31 2018.

► The ESG view: an outlier on multiple counts?



Vale stands out in industry with a combination of *more controversies* and *poorer governance*

Source: MSCI ESG Research. Sample portfolio and MSCI ESG Ratings scores as of Oct 31 2018.

Mapping the problem

Vale Mines within 100 miles of Corrego do Feijao

- Vale mines with major tailings failure
- Vale mines with other ongoing controversies identified by MSCI ESG Research
- Other Vale mines

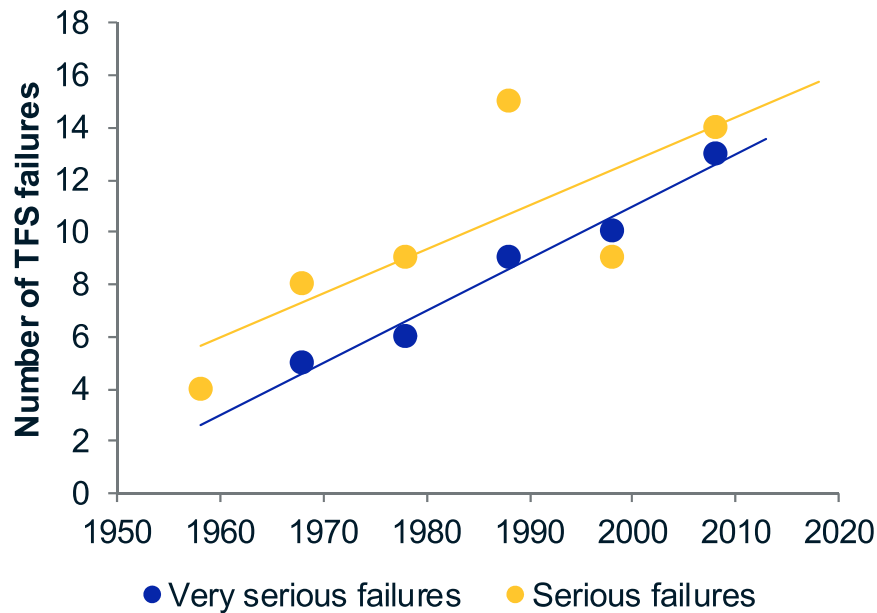
Total dam collapse
January 25, 2019
12 million m³ spilled
270 Killed

Samarco Dam Collapse
November 5, 2015
60 million m³ spilled
19 Killed

Source: MSCI ESG Research.

80% of dam failures are for two reasons

“Very serious” and “Serious” TSF failures 1958–2017



Primary causes

Overtopping

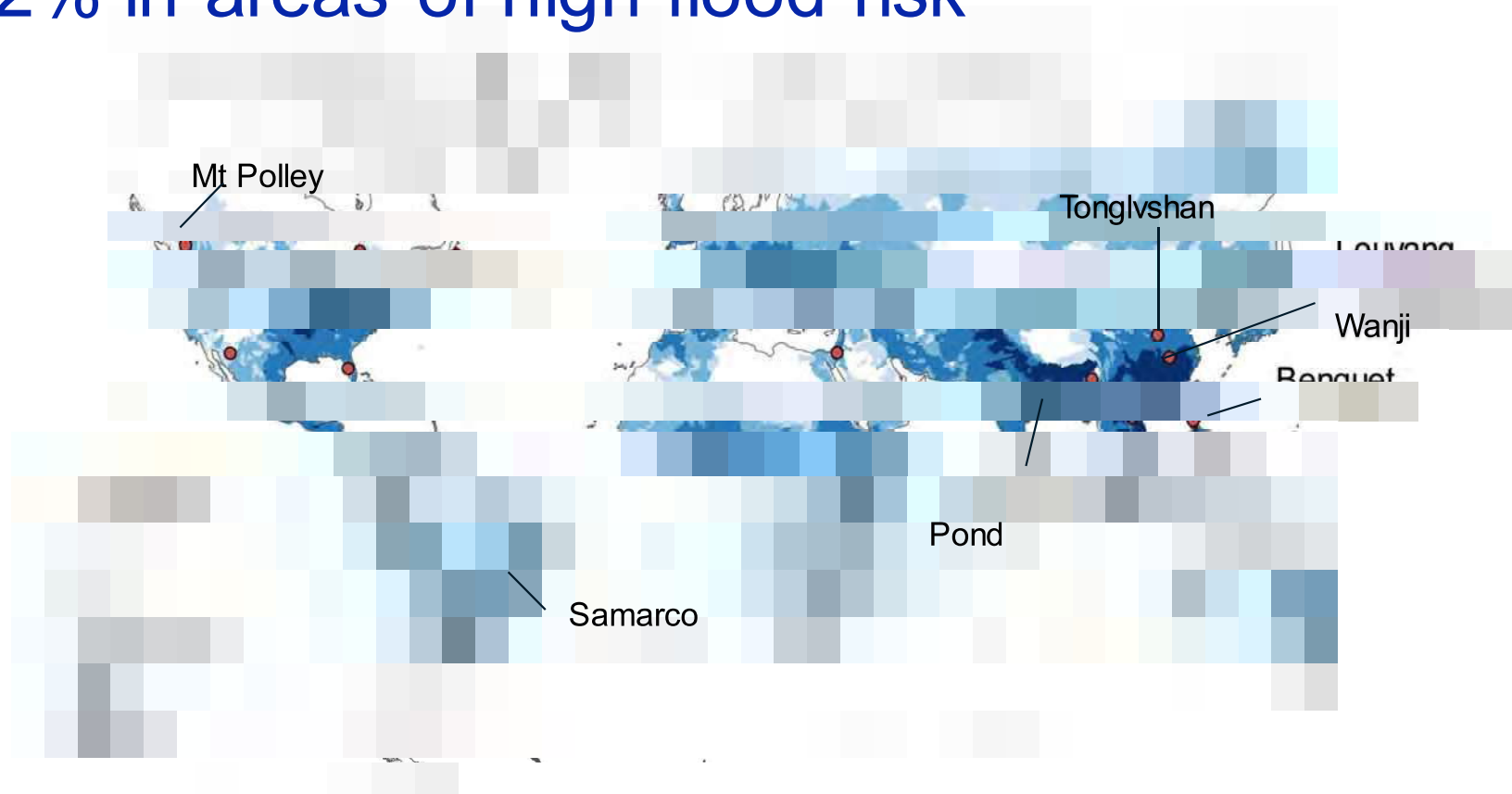
Quality problems

Risk factors

- Pushing capacity limits
- Exposure to flood risks and extreme weather events
- Lagging environmental management commitments
- Failures in governance, oversight and risk management

Source: MSCI ESG Research, World Mine Tailings Failures. January 2019. <https://worldminetailingsfailures.org/>.
 Zhang, L.M. Xu, Yuanhua. "Analysis of Earthen Dam Failures: A Database Approach. September 2009.
https://www.researchgate.net/profile/L_Zhang20/publication/232941358_Analysis_of_earth_dam_failures_A_database_approach/links/5681fb0508ae1975838f994b/Analysis-of-earth-dam-failures-A-database-approach.pdf?origin=publication_detail.

Major tailings dams failures (2012–2018) 42% in areas of high flood risk



Source: MSCI ESG Research, US Association of State Dam Safety <https://damsafety.org/dam-failures>; Global Flood Hazard Frequency and Distribution from Columbia University, and Center for International Earth Science Information Network, SNL Metals and Mining, World Mine Tailings Failures Organization.

Mines in the sample portfolio today: 35% located in high flood risk zones vs 15% for constituents of MSCI ACWI Index*



*MSCI ACWI constituents as of February 5, 2019.

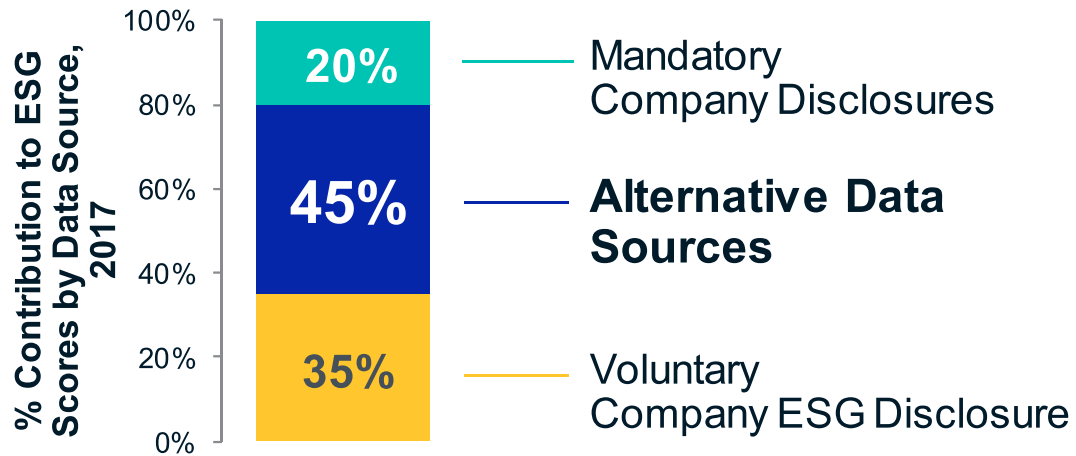
Source: MSCI ESG Research, US Association of State Dam Safety <https://damsafety.org/dam-failures>; Global Flood Hazard Frequency and Distribution from Columbia University, and Center for International Earth Science Information Network, SNL Metals and Mining, World Mine Tailings Failures Organization.

Improved ESG ratings



Our approach focuses on (1) identifying most relevant risks by sector; (2) recording forward-looking management data; and (3) incorporating unique alternative data sources beyond company disclosed (or reported) data

More alternative data beyond company self-reported data (~45% in our model)



2,434 constituents of the MSCI ACWI Index as of November 30, 2017
Source: MSCI ESG Research

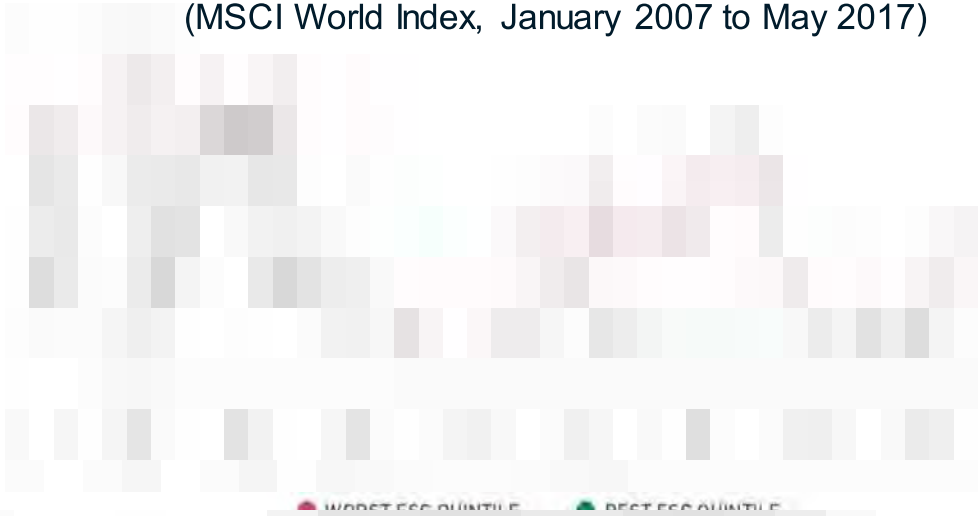
■ The Track Record: Idiosyncratic Risks

Stock-specific risk channel



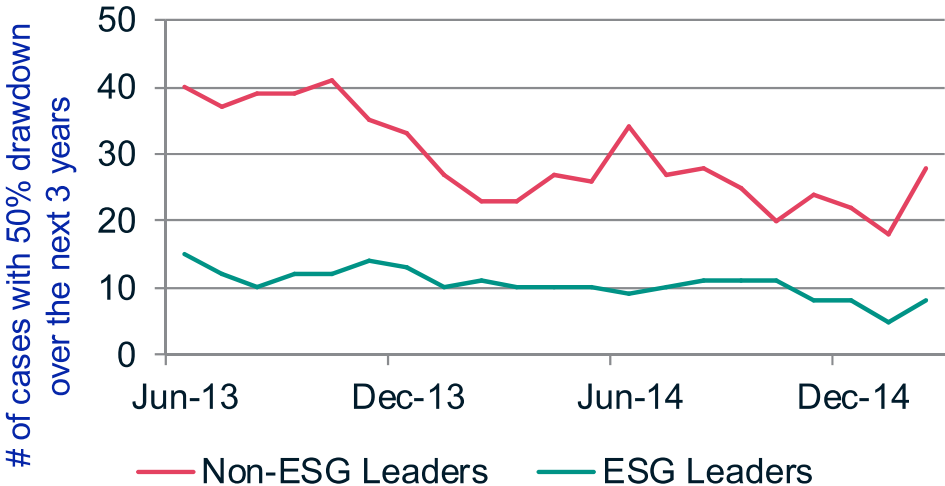
Number of large drawdowns by ESG quintile

(MSCI World Index, January 2007 to May 2017)



Incident Frequency

MSCI EM ESG Leaders v rest of MSCI

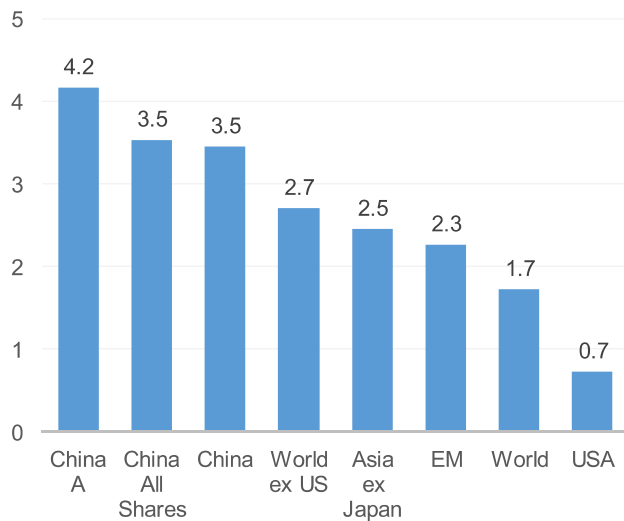


Universe: MSCI Emerging Markets, time period from May 2013 to February 2015 and measure drawdowns over a period of up to 3 years including February 2018; based on constituents of MSCI Emerging Markets ESG Leaders Index constituents versus constituents of the MSCI Emerging Markets Index excluded from the ESG Leaders Index

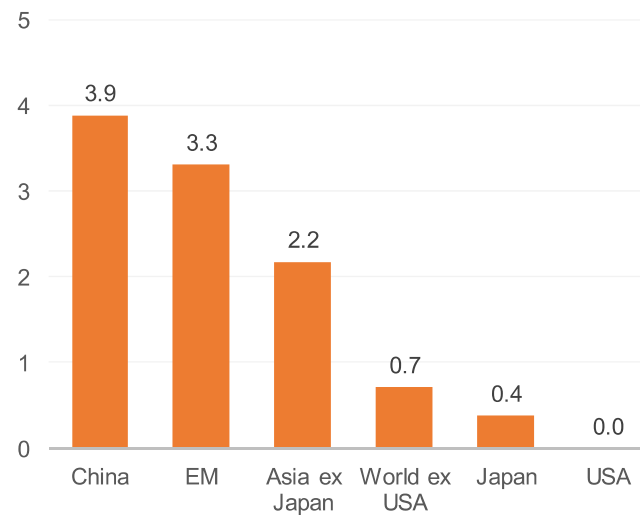
■ The Track Record: Factor and ESG Premium

- Historically, factor-based quantitative strategies delivered better relative performance in the Chinese equity markets than elsewhere in the world
- Integrating ESG historically enhanced return more in the China, emerging-market and Asia ex Japan universes than in developed markets

Historical annual factor premium (%)



Historical annual ESG premium (%)



Diversified Multiple-Factor Indexes from December 2008 to April 2019; historical annual ESG premium is based annualized active return (%) of MSCI ESG Leaders Indexes from December 2008 to April 2019

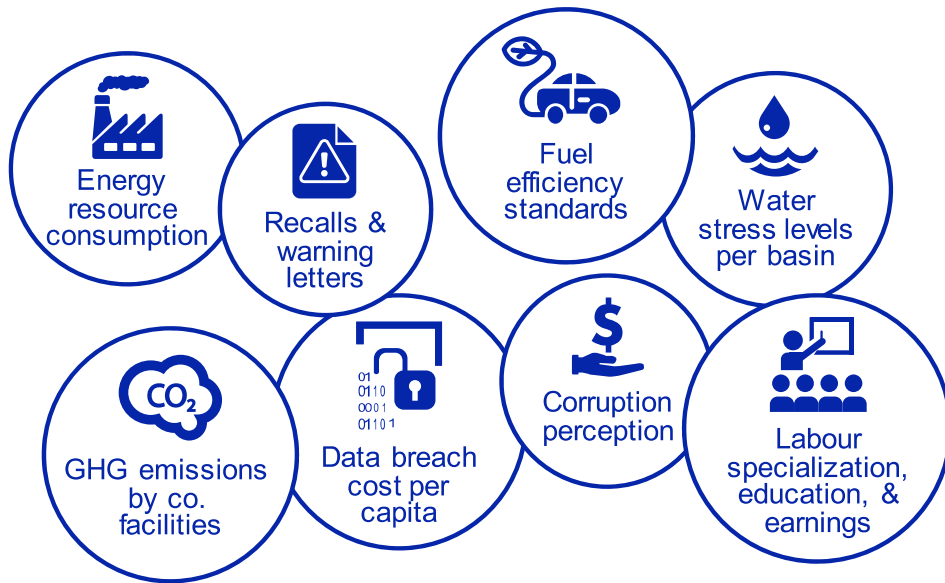
ESG on Beon



Source: MSCI Beon, September 17, 2019

▀ The frontiers of new information

Current inputs into ESG ratings & analysis



Exploratory



■ About MSCI

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