Green Miracle

Portfolio Optimization Strategies Through Sustainability Alignment

Grenfin Summer School - Bertinoro - 2024

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OUR QUESTION

How Do ESG Metrics Impact Portfolio Selection and Performance?

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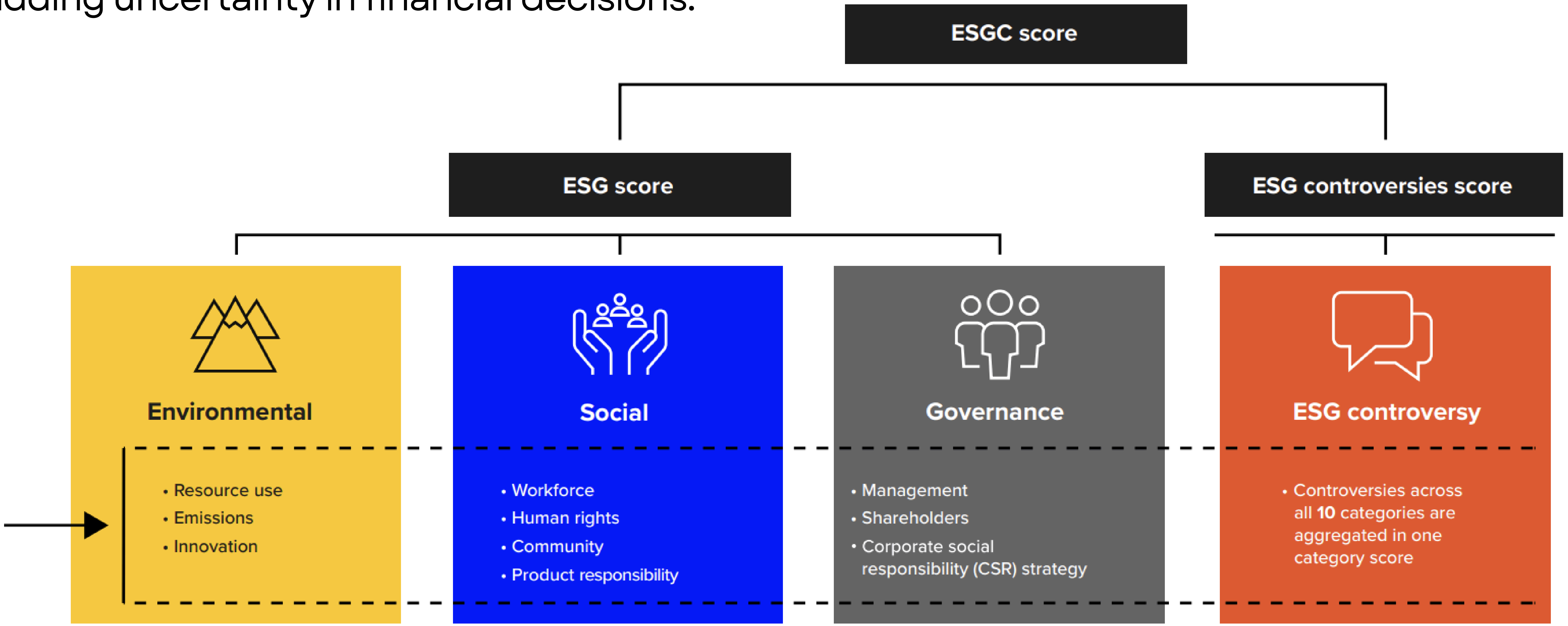
Understanding ESG Scores

- Refinitiv scores measure a company's relative ESG performance, commitment and effectiveness across ten main themes based on publicly-reported data.
- ESG rating agencies have grown into significant market shapers but the different ratings often vary, adding uncertainty in financial decisions.



ESG FALLACIES

01 Lack of comparability for firms across different sectors

02 Discordance among scores of different rating agencies for the same company

03 Tendency to be rewritten ex-post

04 Unclear regulatory framework

Preparing the data & handling missing values

Weekly prices for 150 large European companies

- We disregard stocks that started trading after 2010, for better comparison.

Yearly ESG scores

- We set any missing initial values to 0 (worst score) and re-use the last rating if we have missing information for years in between (assuming their ESG rating does not change).
- Our dataset of 150 large European companies is only a subset of the ESG dataset based on 12,500 global public and private companies.
- Any missing values set to the worst value across companies for every year.

Yearly Alternative metrics

- CO2-equivalent Emissions Indirect Scope 3 (tons) per Revenue (USD millions)
- Any missing values set to the worst value across companies for every year.

Portfolio Construction

PURE FINANCIAL

$$\begin{aligned} \underset{w}{\text{argmin}} \quad & w^T \Sigma w \\ \text{subject to} \quad & w^T \beta \geq 1 \end{aligned}$$

- No short-selling
- Maximum weight: 5%

ESG SCORE

Additional constraint:

$$w^T \text{ESG} \geq Q_3(ESG)$$

EMISSIONS PER REVENUE

Additional constraint:

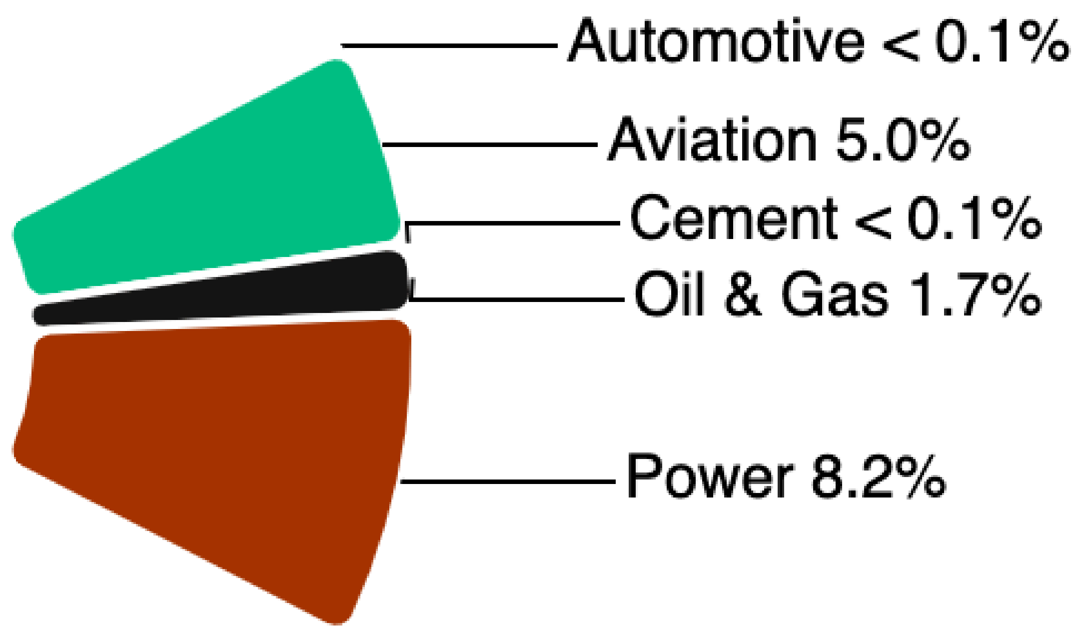
$$w^T(-\text{CO}_2 \text{ per } \$) \geq Q_3(-\text{CO}_2 \text{ per } \$)$$

Pacta Analysis

Portofolios are determined at the end of 2023

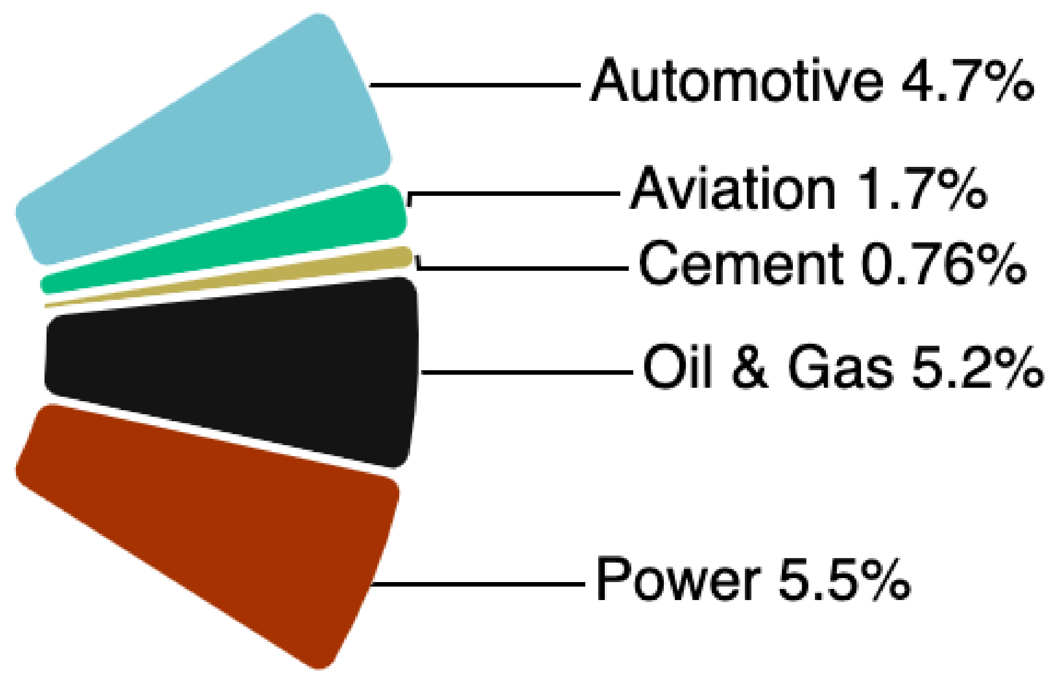
Financial exposure from climate-relevant sectors

Pure Financial



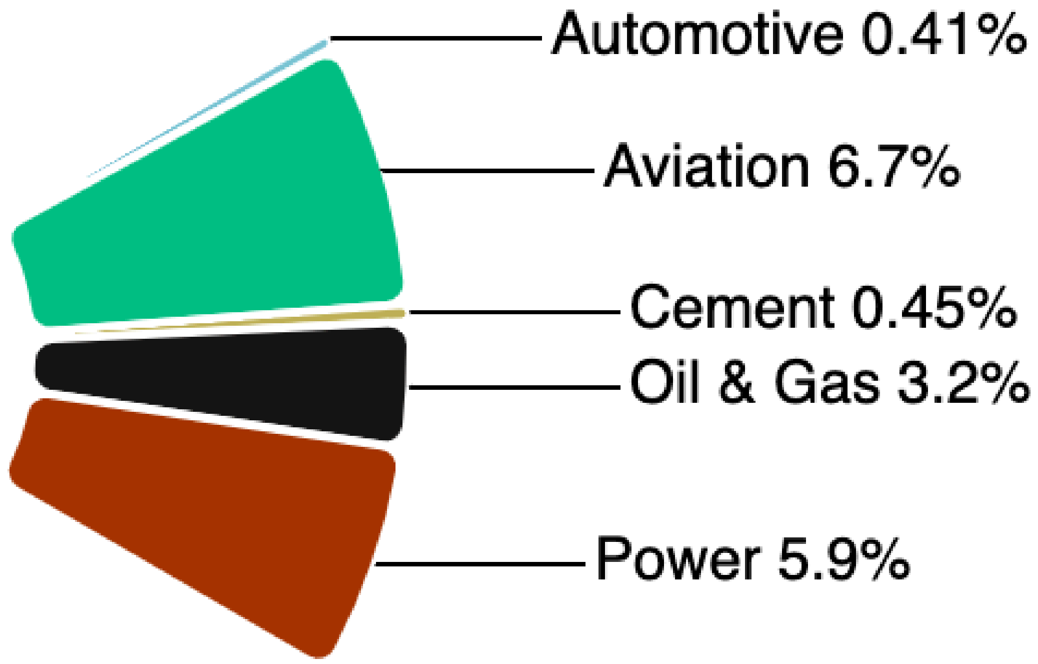
15% of the Equity portfolio covered by PACTA

ESG Score



18% of the Equity portfolio covered by PACTA

Emissions per Revenue



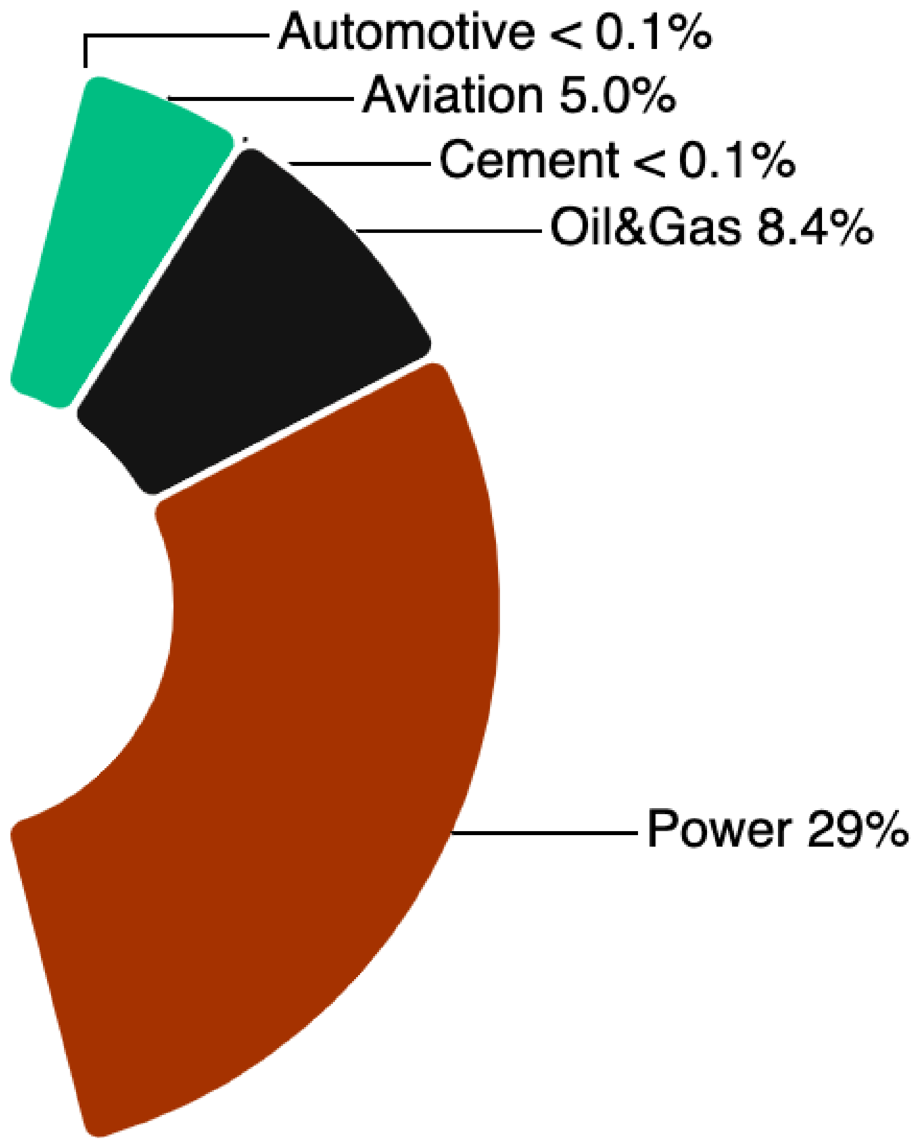
17% of the Equity portfolio covered by PACTA

Pacta Analysis

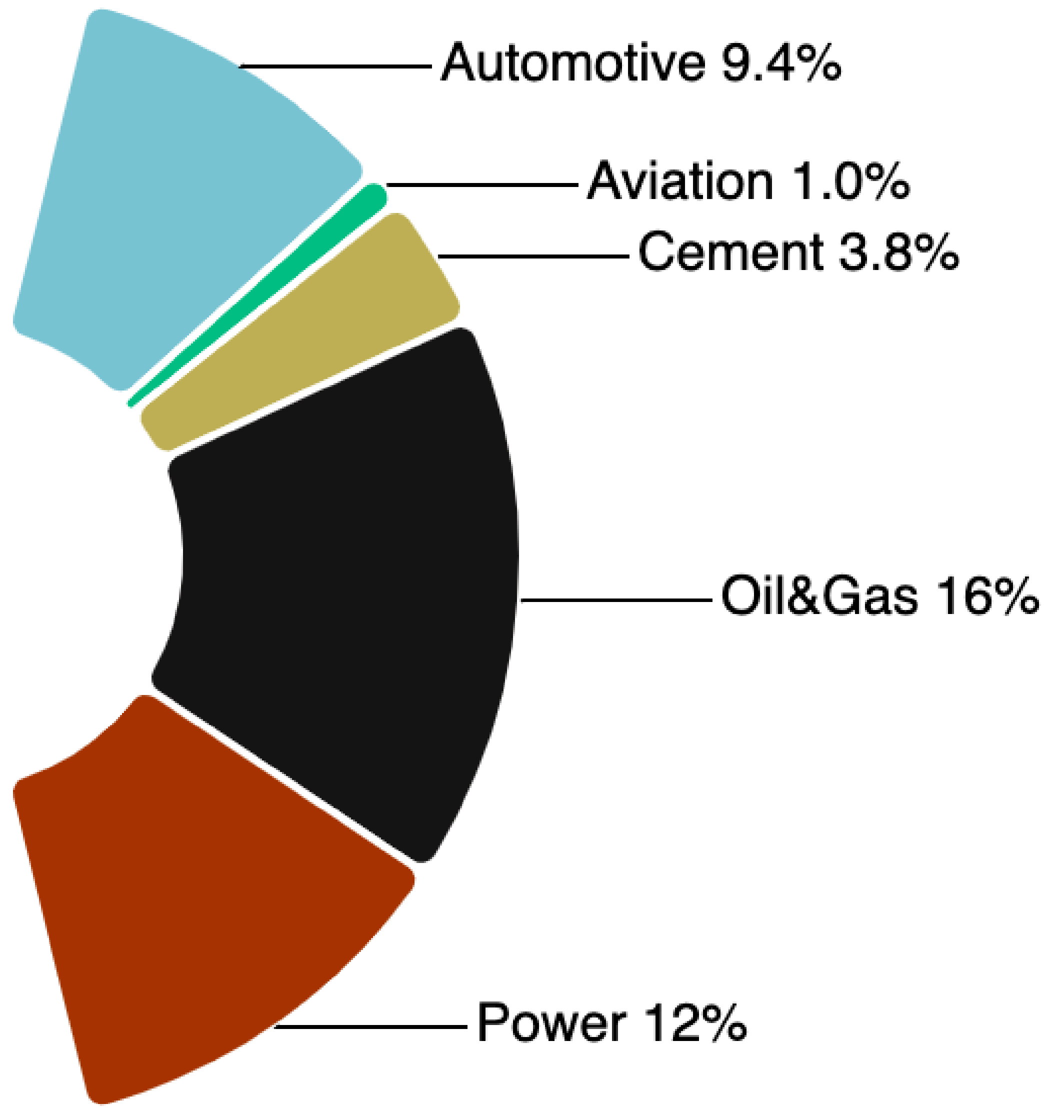
Portofolios are determined at the end of 2023

Emission exposure from climate-relevant sectors

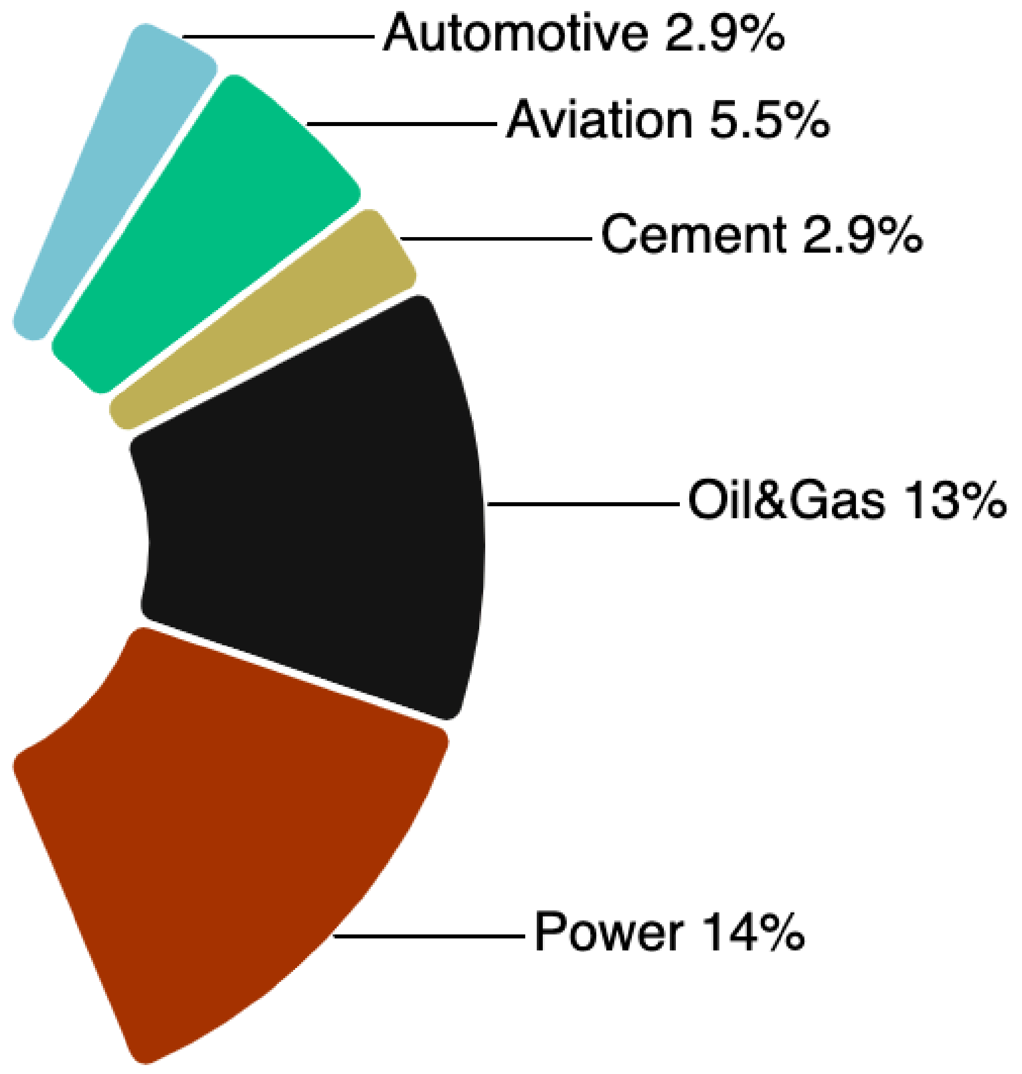
Pure Financial



ESG Score



Emissions per Revenue



Macroeconomic context

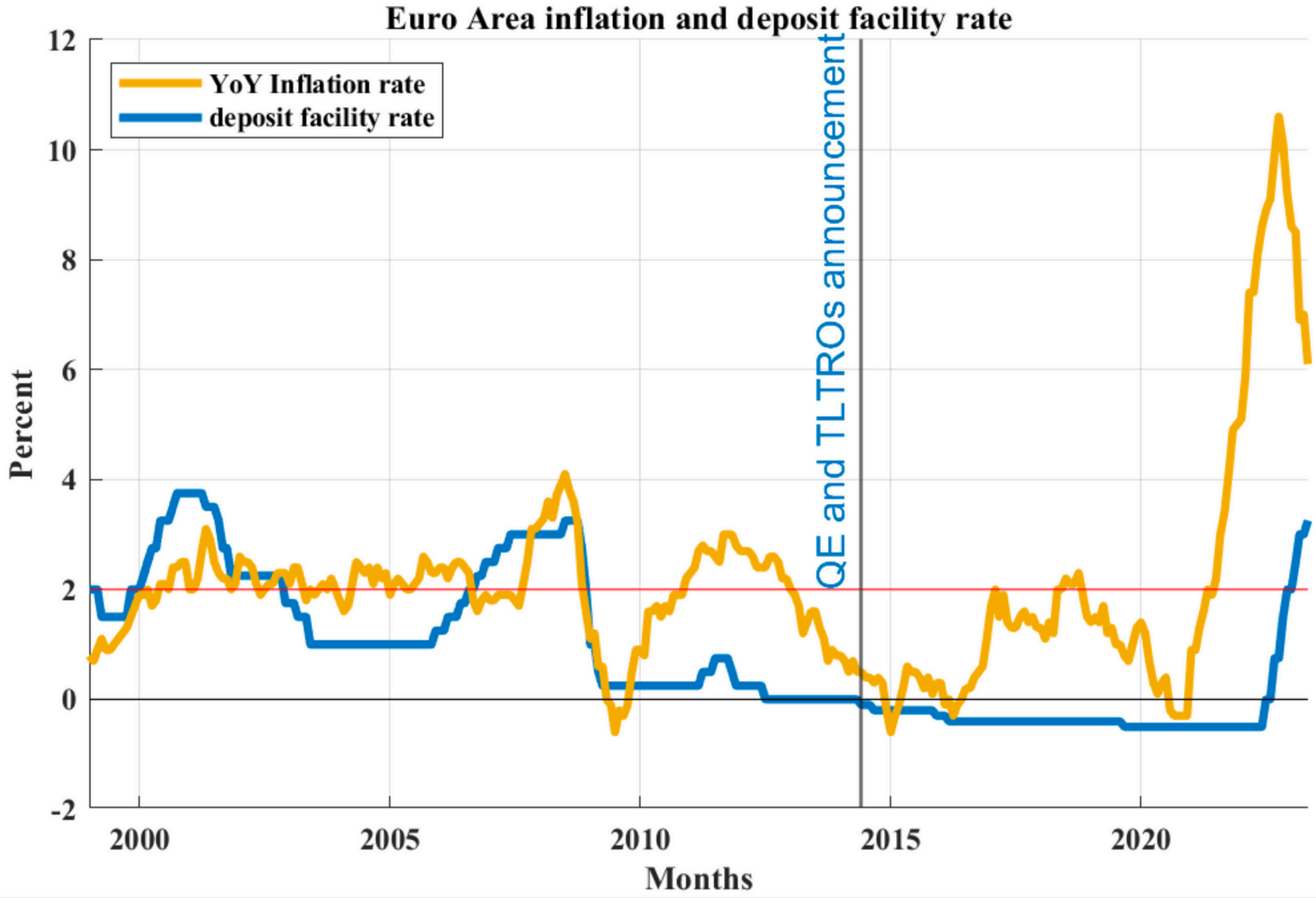
2020-2021: CORONAVIRUS PANDEMIC

- Lockdowns
- Remote work
- Recession
- Interest rates are cut + QE
- Supply chain bottlenecks
- Inflation picks up

2022-2023: ENERGY CRISIS

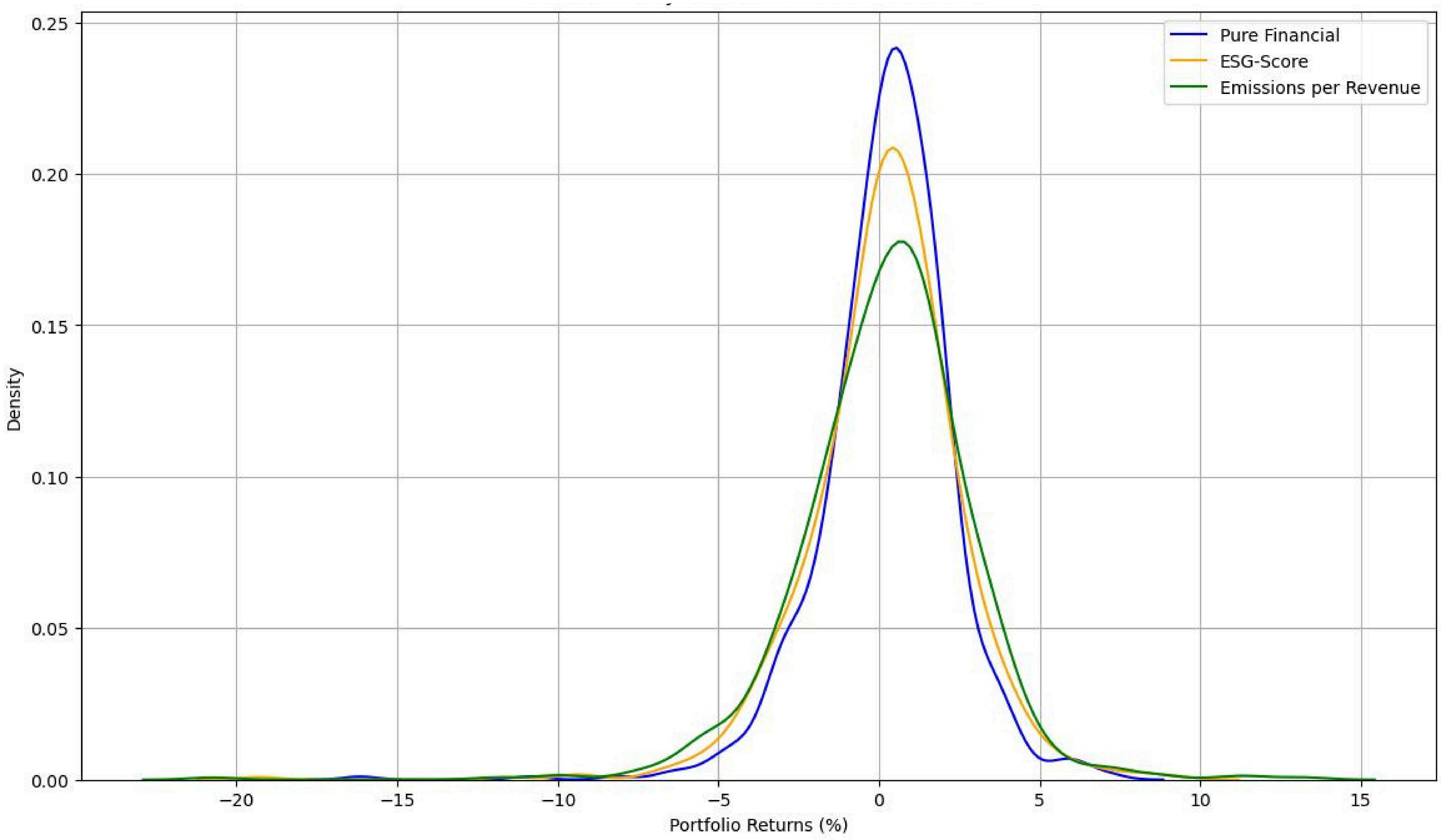
- Rising interest rates
- War in Ukraine
- Rising energy prices
- Inflation accelerates

Macroeconomic context

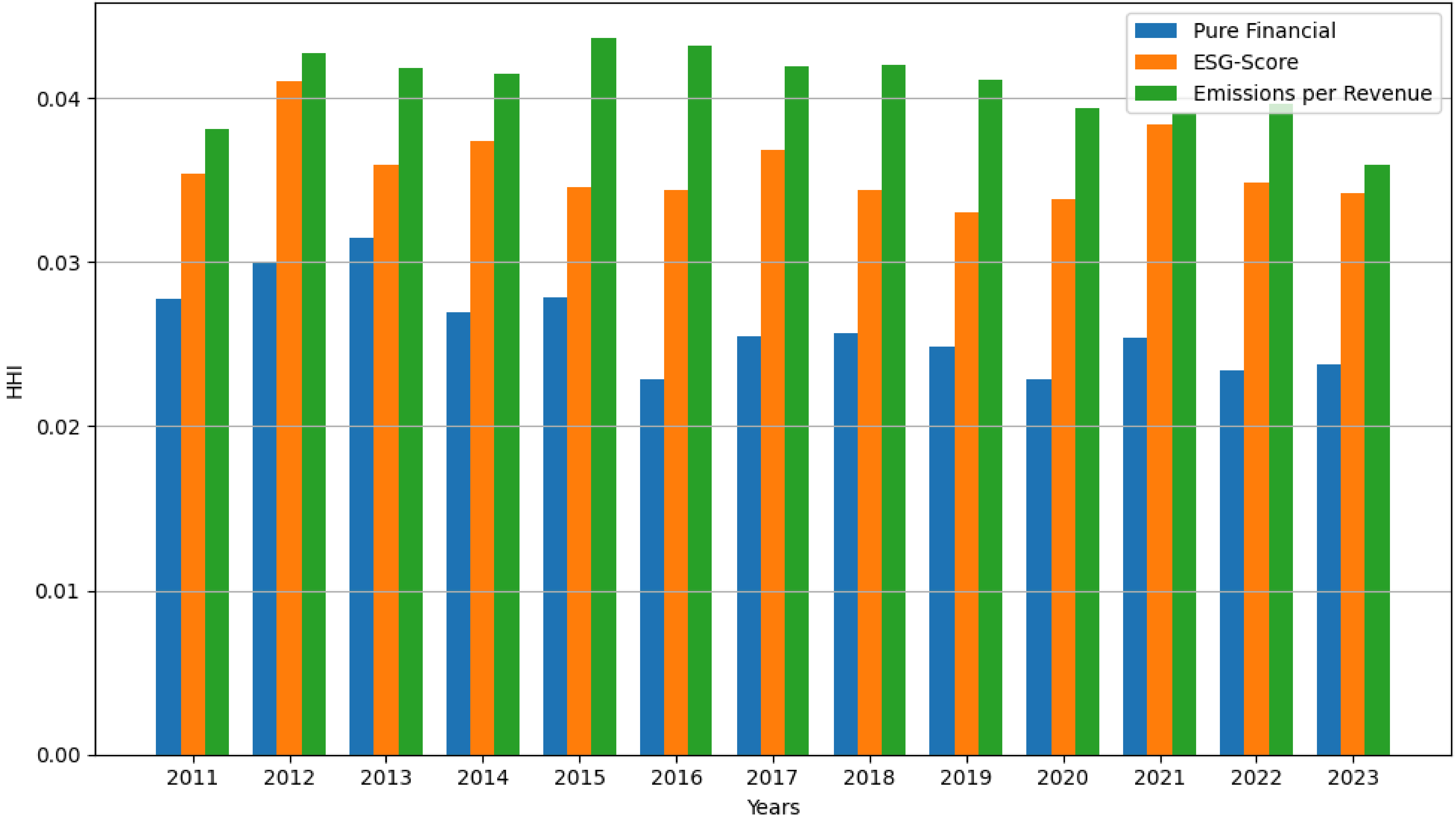


Cumulative Portfolio Returns

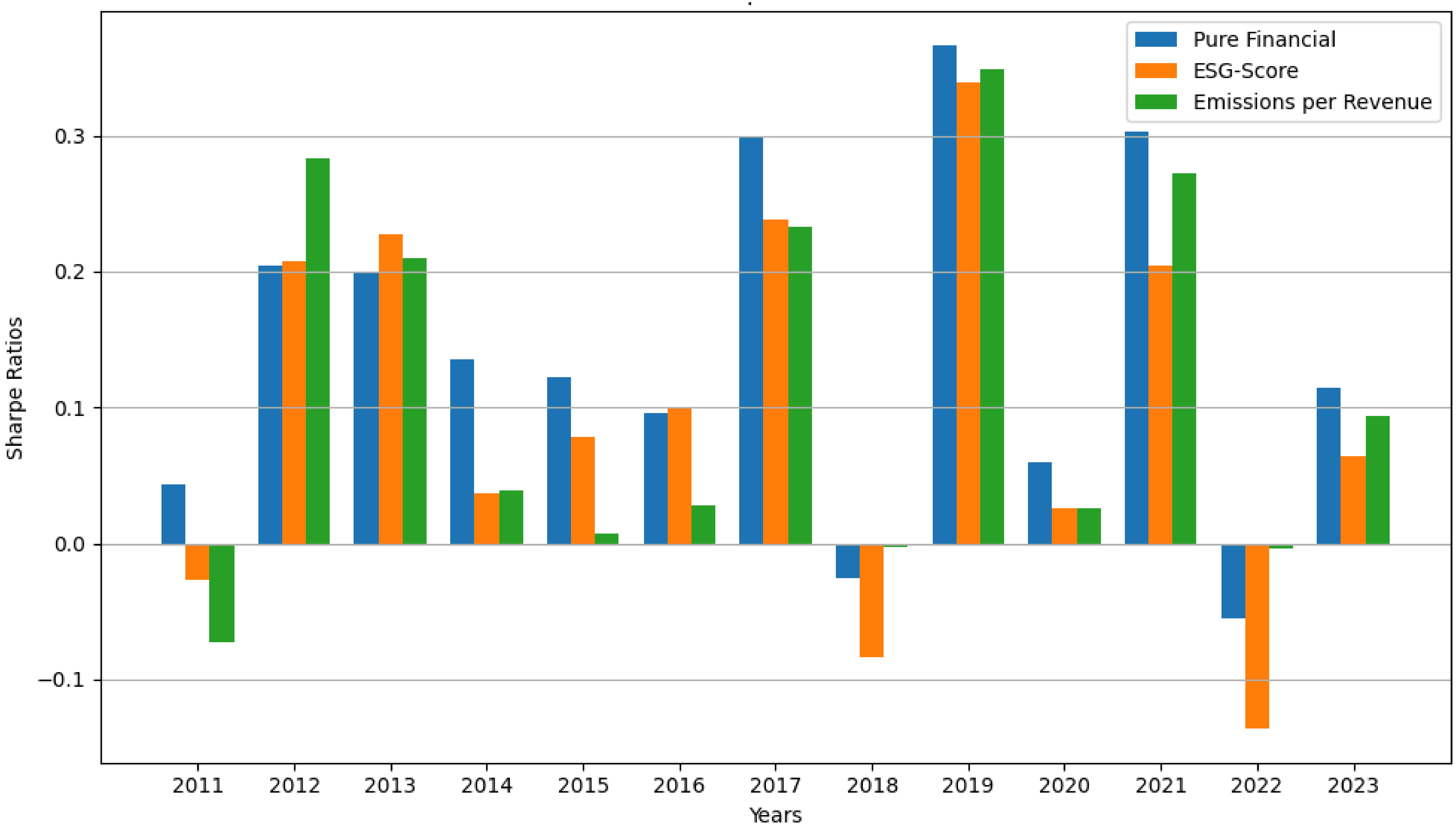
Cumulative Kernel Densiy



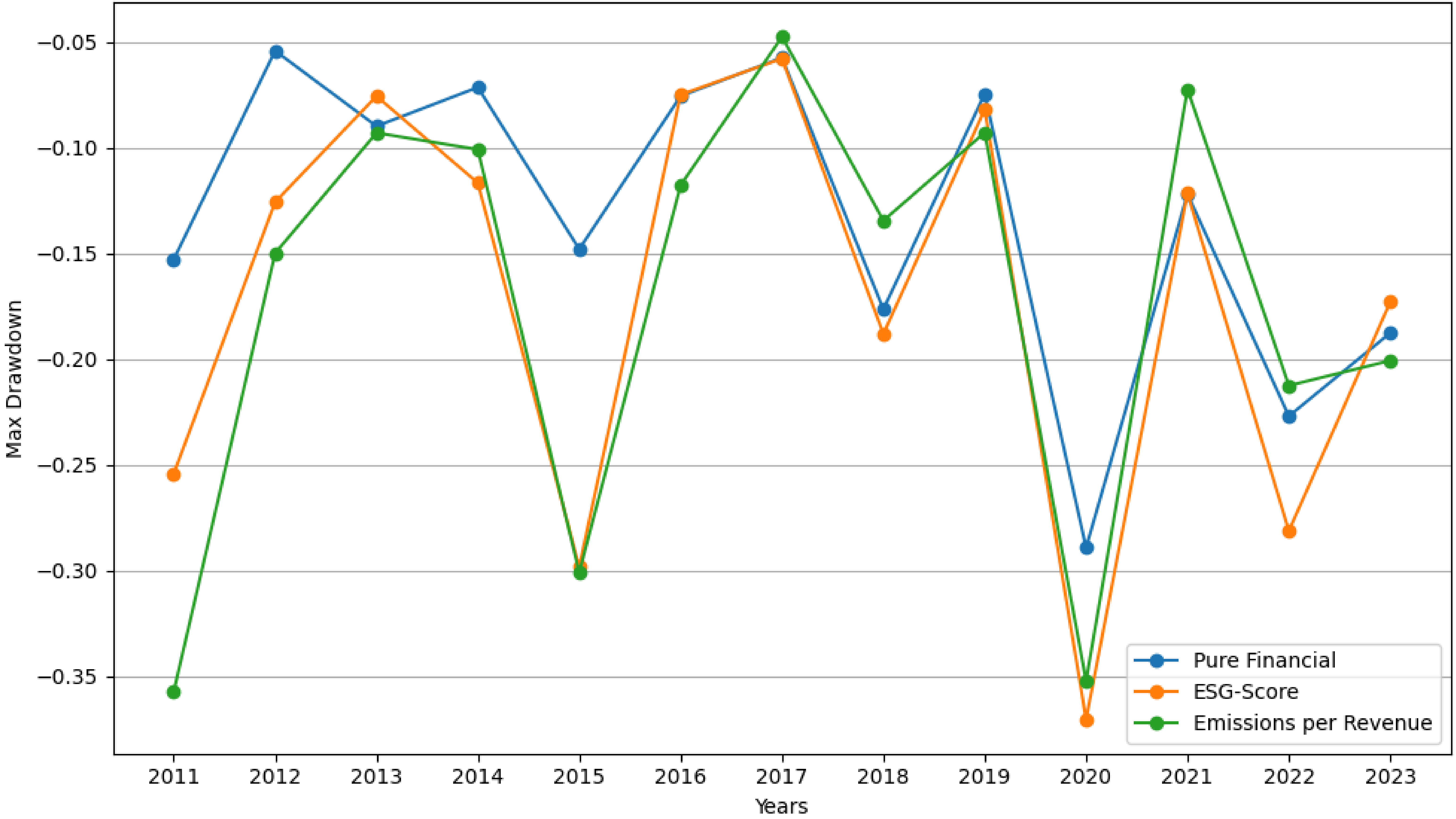
Herfindahl-Hirschman Index (HHI)



Sharpe Ratio

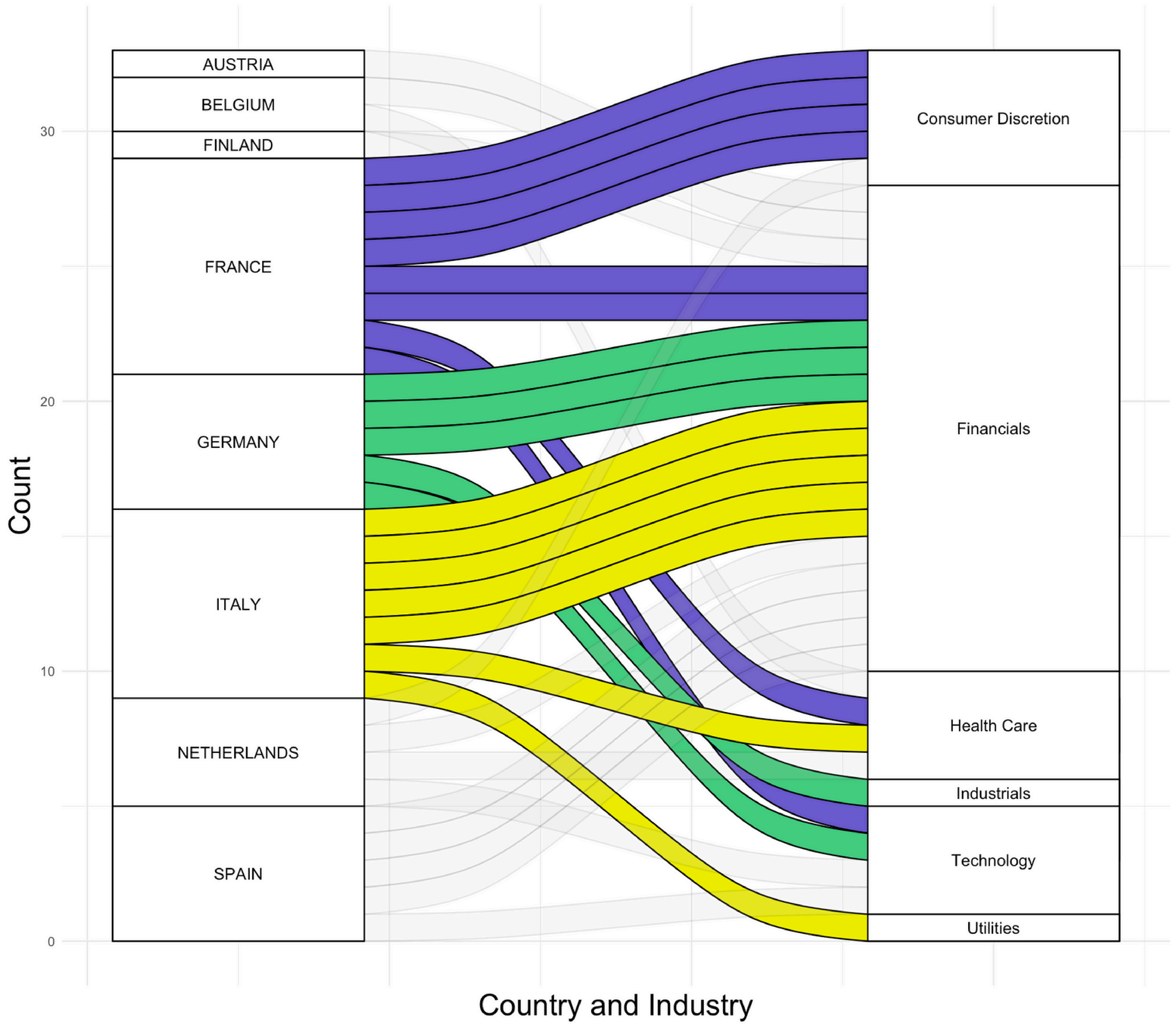


Maximum Drawdowns



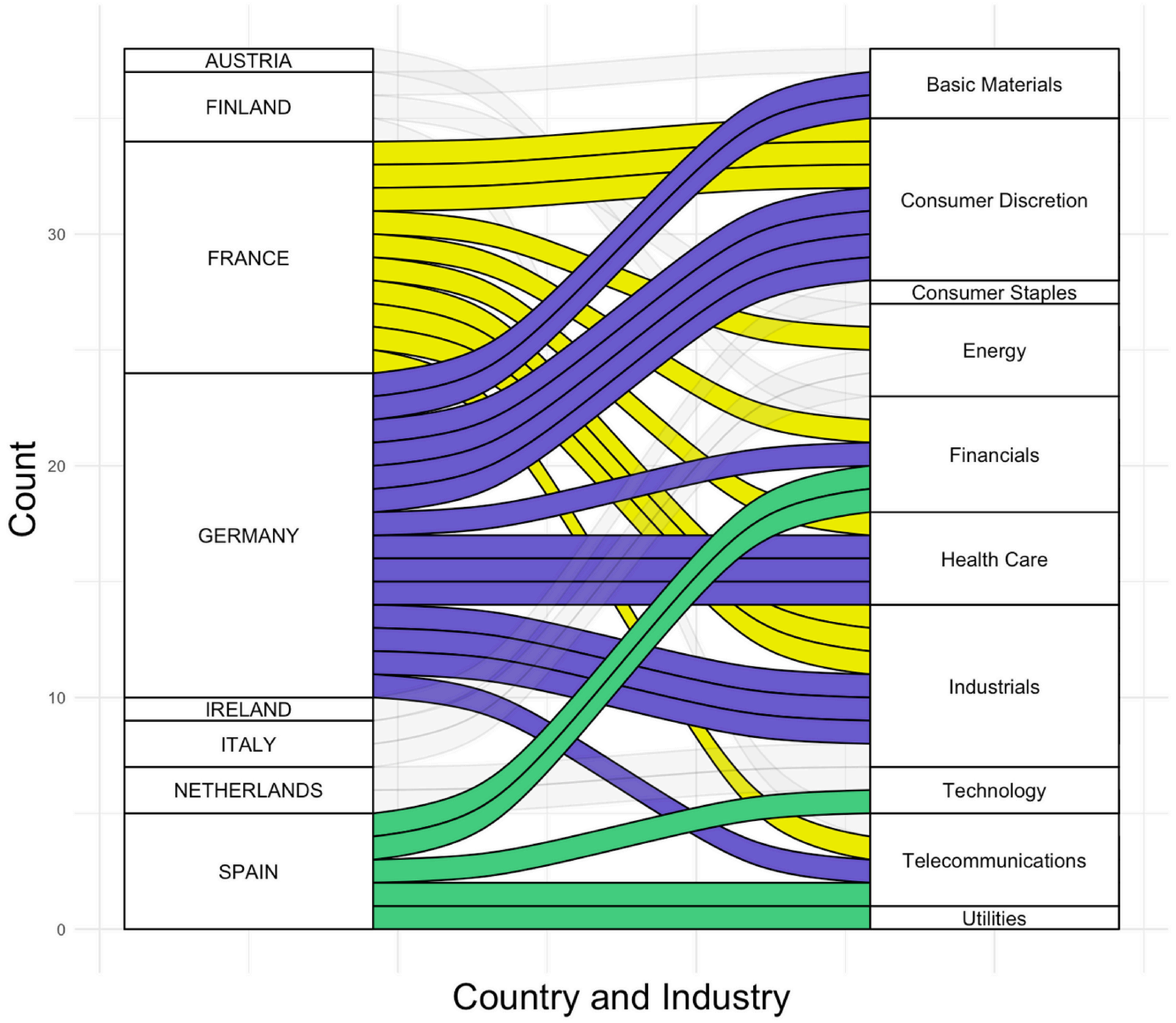
Emissions per revenue portfolio

determined at the end of 2021



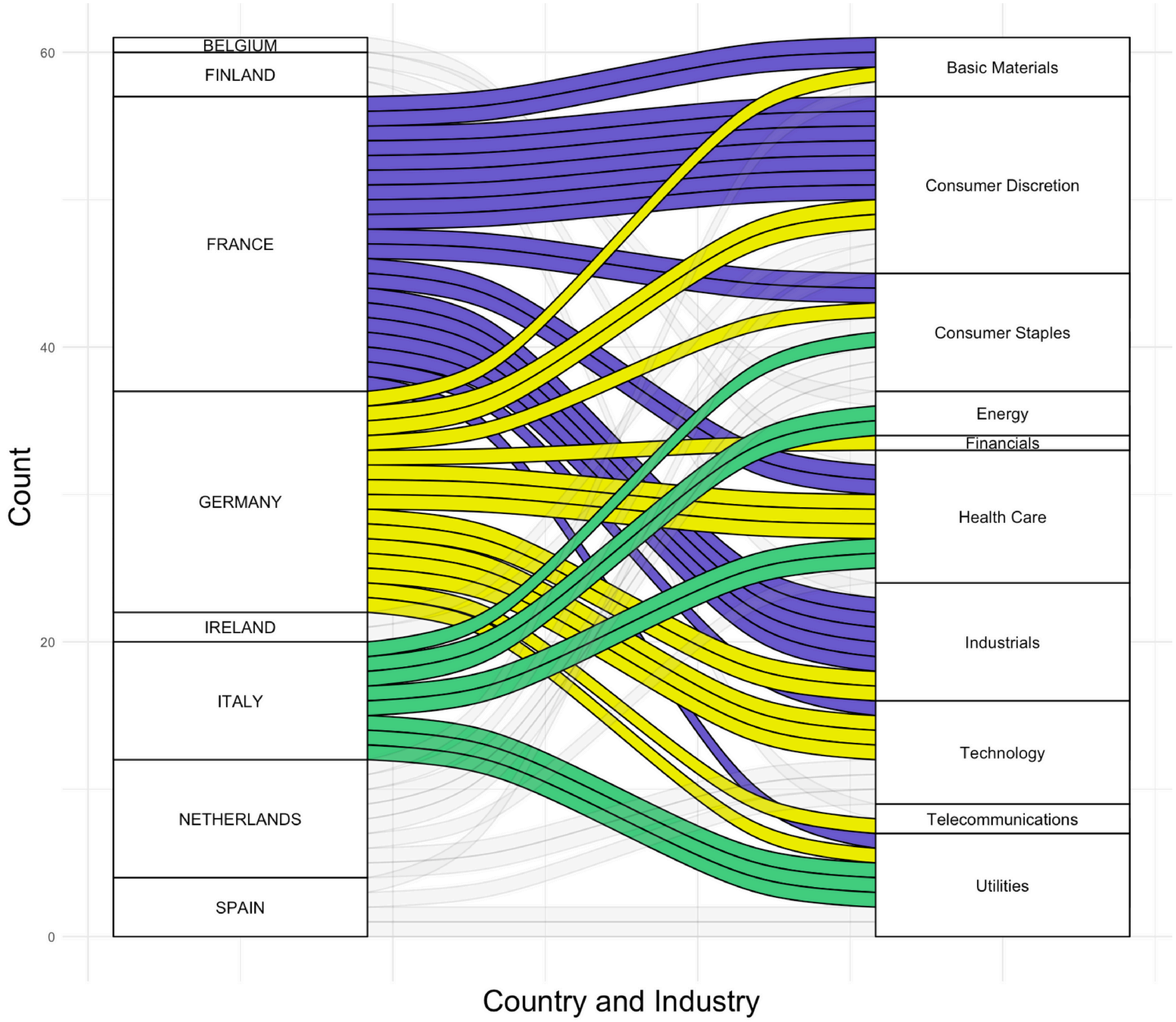
ESG score portfolio

determined at the end of 2021



Pure financial portfolio

determined at the end of 2021



Conclusions

- **Markowitz** limitations.

- Looking backward, **Purely Financial strategy** outperforms the ESG Score and Emissions Per Revenue strategies. Looking forward, there are physical climate risks and transition risks.

- **ESG Score strategy** – We cannot compare ESG Scores between industries. Some highly ranked ESG companies are not in the set of 150 stocks we considered.

- During the COVID-19 crisis, the **CO2 strategy outperforms,** because of high revenue and low emission sectors.

Thank you for your attention!

Danke für die Aufmerksamkeit!

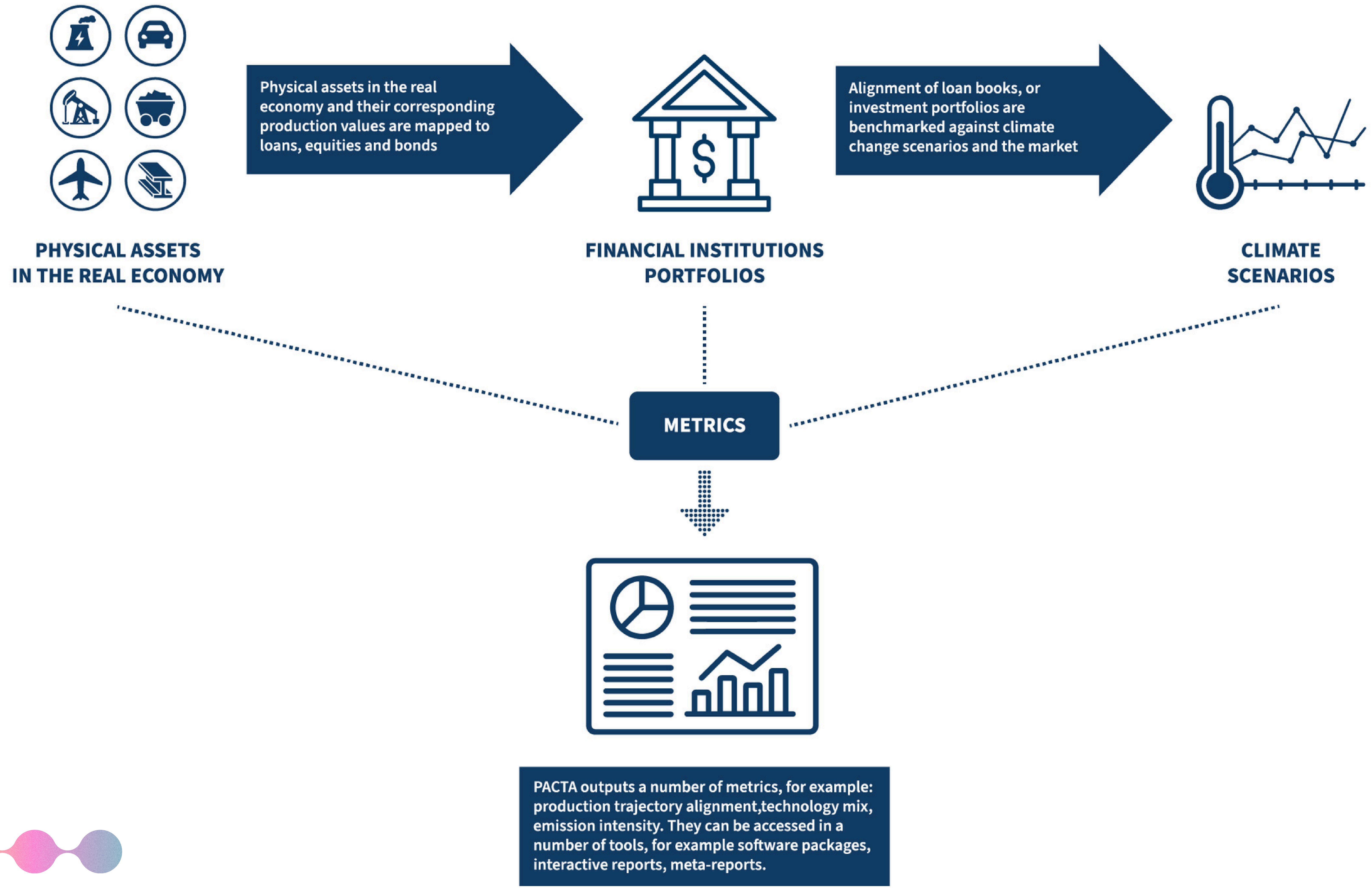
Merci pour l'attention!

Grazie per l’attenzione!

Appendix

Performance Analysis

- PACTA Tool Overview


Physical assets in the real economy and their corresponding production values are mapped to loans, equities and bonds
Alignment of loan books, or investment portfolios are benchmarked against climate change scenarios and the market
PHYSICAL ASSETS IN THE REAL ECONOMY
FINANCIAL INSTITUTIONS PORTFOLIOS
CLIMATE SCENARIOS
METRICS
PACTA outputs a number of metrics, for example: production trajectory alignment,technology mix, emission intensity. They can be accessed in a number of tools, for example software packages, interactive reports, meta-reports.