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Study of leading Green Finance frameworks and gaps in existing Sustainable Financing Assessment

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Abstract: - In the current landscape of investment decision-making, Environmental, Social, and Governance (ESG) factors have emerged as crucial determinants of risk and value. As global consciousness shifts towards sustainability and responsible business practices, investors increasingly recognize the significance of incorporating ESG considerations into their portfolios. This recognition stems from the understanding that ESG issues can directly impact financial performance and long-term sustainability. ESG risk analysis, ranking, and scoring methodologies play a pivotal role in this paradigm shift. By evaluating a company's ESG performance, these methodologies provide investors with insights into non-financial risks that may not be apparent through traditional financial analysis alone. This comprehensive approach offers a holistic view of a company's operations, assessing its resilience to environmental challenges, social impacts, and governance structures. The importance of ESG risk analysis lies in its ability to enhance decision-making processes, mitigate risks, and ultimately drive sustainable returns. For instance, companies with strong ESG practices tend to exhibit better operational efficiency, lower volatility, and improved long-term prospects (Dan Byrne). Additionally, integrating ESG considerations into investment strategies aligns with stakeholders' values, promotes corporate accountability, and contributes to broader societal and environmental goals. Furthermore, the evolution of state-of-the-art methodologies in ESG analysis (APlanet, 2023) enables investors to delve deeper into nuanced ESG factors, such as climate change resilience, supply chain management, diversity and inclusion practices, and ethical governance frameworks. This differentiation allows for more precise risk assessments and tailored investment strategies that align with investors' preferences and objectives.

This research aims to ascertain and focus on Environmental; Emissions risk analysis in the context of investment decision-making, highlighting their benefits, and discussing state-of-the-art approaches with examples. We intend to provide valuable insights into the frameworks being used today to ascertain the financed emissions of a given company

Keywords: Carbon Value Chain, Emissions Management, ESG Risk Analysis, Portfolio Risk Assessment, Investor Reporting, Regulatory Emissions Compliance, PCAF, GHG Introduction, Sustainable Finance, Financed Emissions.

1. Introduction

In the wake of escalating climate change concerns and increasing regulatory scrutiny, investors are recognizing the critical importance of emissions-related risks in their investment decisions

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(GHG Chapter 15, n.d.). Traditional financial metrics often fail to capture the full extent of environmental risks associated with greenhouse gas emissions, making it imperative to develop a robust framework for emissions ranking and scoring in ESG risk analysis . One key aspect of ESG investing is understanding the carbon footprint of the companies in a portfolio. Carbon emissions are a major contributor to climate change, and companies with high emissions could face significant regulatory, reputational, and financial risks. Therefore, assessing and managing carbon risk is crucial for sustainable portfolio management. Our motivation stems from the necessity to address this, and while doing so understand the prevalent frameworks being adopted and used for emissions financial impact and scoring.

2. Objectives

1. Identify Standardized Frameworks: Explore and identify transparent and standardized framework for ranking and scoring emissions across companies (Saskia de Vries, Jan Kakes, Guido Schotten, Diederik Dicou, Martijn Regelink, 2022). By establishing clear criteria and methodologies, we aim to enhance the consistency and comparability of emissions data, facilitating more informed investment decisions.

2. Explore Scope-Based Analysis: We recognize the importance of differentiating between Scope 1, Scope 2, and Scope 3 emissions (Rade, n.d.) to provide a nuanced understanding of a company's environmental impact.

3. Portfolio Level Assessment: Beyond individual company analysis, what are the portfolio-level assessments by aggregating emissions data across holdings. By quantifying the overall emissions footprint of a portfolio and identifying high-risk assets, investors can optimize their portfolios to align with sustainability objectives.

3. Methods

Methodology we intend to undertake:

1. Data Availability and Integrity: We intend to study various emissions data from publicly available sources, annual reports, sustainability disclosures, and third-party databases. To ensure consistency and reliability as per established reporting frameworks, such as the Greenhouse Gas Protocol.

2. Scope-Based Analysis: We intend to understand the various categorized emissions like Scope 1 (direct emissions), Scope 2 (indirect emissions from purchased energy), and Scope 3 (indirect emissions from the value chain) being used to assess financial impact on a given industry or company within that industry.

3. Industry Aware Benchmarking: We intend to compare emissions data against industry-specific benchmarks and targets to assess performance relative to peers. This benchmarking exercise will provide insights into a company's relative emissions intensity and its position

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within the industry, and if there is any correlation between the financial impact due to emissions data being repeated, and if yes is there a gap in terms of using the same scale for financial impact across various industries.

By exploring the current frameworks and methodologies, we aim to identify potential improvements and gaps in the current frameworks around emissions-related risks leading to their ESG risk analysis and portfolio assessment processes effectively. Through transparent methodologies and industry-specific insights, we aim to eventually facilitate more informed and sustainable investment decisions in line with stakeholders' values and objectives. The 2015 Carbon Act, more commonly known as the Paris Agreement, is a significant milestone in the global effort to combat climate change. Adopted by 196 Parties at the UN Climate Change Conference (COP21) in Paris, France, on 12 December 2015, it is a legally binding international treaty (UNFCCC, n.d.). The Paris Agreement's overarching goal is to limit the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels. In our current research we have studied the below frameworks to understand their coverage and methodology for calculating the cost of emissions and thereby helping investors and financial institutions drive their emissions charter of ESG reporting:

a) PCAF – Partnership for Carbon Accounting Financials (carbonaccountingfinancials.com/, n.d.): is a global partnership of financial institutions that are working to implement a comprehensive approach to assess and disclose the greenhouse gas (GHG) emissions associated with their portfolios (loans and investments)

b) GHG Category 15 – Investments: Category 15 is designed by GHG protocol primarily for private financial institutions (e.g., commercial banks) however extends its application to public financial institutions (e.g., multilateral development banks, export credit agencies) and other entities with investments not included in Scope 1 and Scope 2. (GHG Chapter 15, n.d.)

c) EU Climate Transition Benchmark (EU CTB) – are suitable for institutional investors such as pension funds (re) insurance companies, who have an interest in protecting their investments from adverse climate changes and want to transition to a low carbon economy. (SSGA, 2020)

d) EU Paris Aligned Benchmark (EU PAB) – are for institutional investors that want to drive and be at the forefront of the immediate transition towards as +1.5º C mandate. Both EU CTB and EU PAB provide a framework for investors to implement their views on climate risk mitigation and associated opportunities across their asset classes within a given portfolio. The disclosures are guided by the Paris Agreement, to keep the temperatures below 2º c.

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This research aims to identify some of the leading concepts around financed emissions, frameworks, organizations, protocols, and its gaps w.r.t its implementation challenges and make recommendations on addressing them.

A. Exploratory Study and Functional Analysis of the Existing frameworks

The topic of portfolio carbon emissions has seen significant research and discussion over the years. The research by MSCI was one of the pioneering works in this field, presenting a comprehensive framework that allows investors to understand the various factors influencing changes in a portfolio's carbon footprint. This includes companies' real-world decarbonization efforts, a portfolio manager's investment decisions, and changes in companies' financing (MSCI, 2015) In one of the papers titled "Hedging Climate Risk" the researchers have explored how investors seek to limit the carbon emissions of the firms in their portfolios. Their research provides valuable insights into various portfolio decarbonization strategies. (Mats Anderson, 2016)

In 2024, the Morgan Stanley Investment Management Portfolio Solutions Group emphasized the importance of understanding climate transition in a portfolio context. They noted that decarbonization, or the systematic effort of governments and companies to align themselves with a low-carbon economy through the reduction in carbon emissions, has moved to the forefront of business and investment conversations. The work by Nagy, Giese, & Wang (Zoltan Nagy, 2023) complements these discussions by presenting a framework that allows investors to understand the extent to which changes in a portfolio's carbon footprint are due to companies' real-world decarbonization efforts, a portfolio manager's investment decisions, or changes in companies' financing.

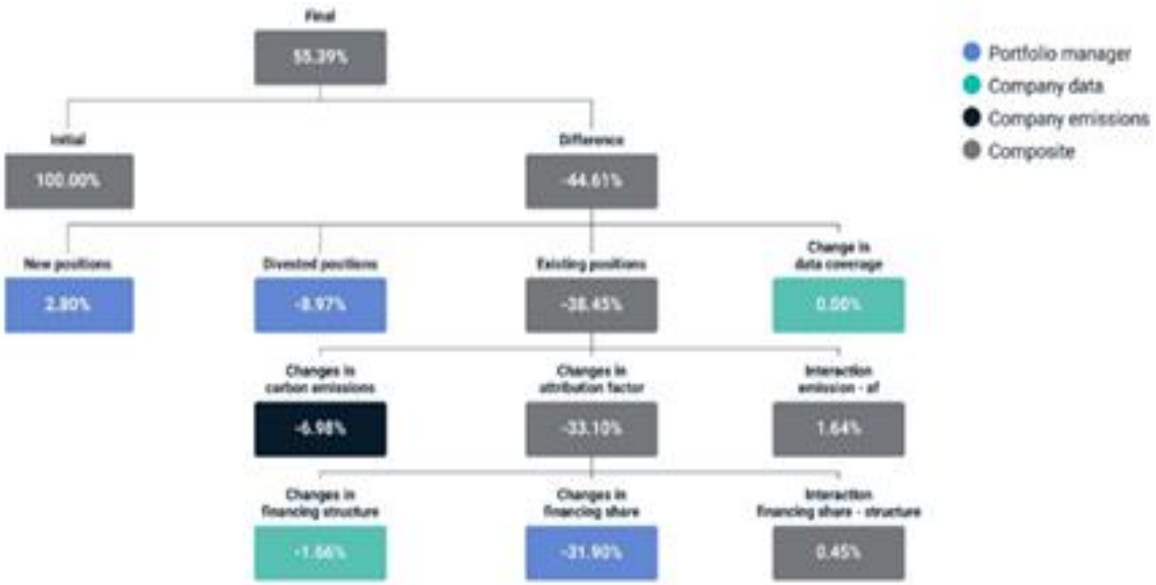

Fig. 1. Financed Emissions – example (Zoltan Nagy, 2023)

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Lastly, the Amundi Research Center confirms the shift from traditional carbon emissions metrics to net zero carbon metrics in portfolio construction. This highlights the evolving strategies in managing portfolio carbon emissions and the increasing importance of net zero targets. (AMUNDI Investment Institute, 2022)

4. Results

To date, a meaningful and comprehensive review of green finance for lending does not exist (Saskia de Vries, Jan Kakes, Guido Schotten, Diederik Dicou, Martijn Regelink, 2022) Different data sets for the banking sector are accessible via international data providers such as BIS, Bloomberg, Bureau van Dijk, IFC, IMF and Thomson Reuters. At a country level, aggregated data is available on total loans issued, the share of non-performing loans, outstanding debt, return on assets, etc. At the bank level, information on ownership structures of individual banks, mergers & acquisitions and total loans is provided.

Figure 2.0 below shows the various scopes of emissions and how the same weights across an industry type. Key observations, being Scope 3 emissions across contribute highly to the overall emissions, and this calls for a way to have these indirect emissions part of the overall portfolio emissions and weight must reflect that.

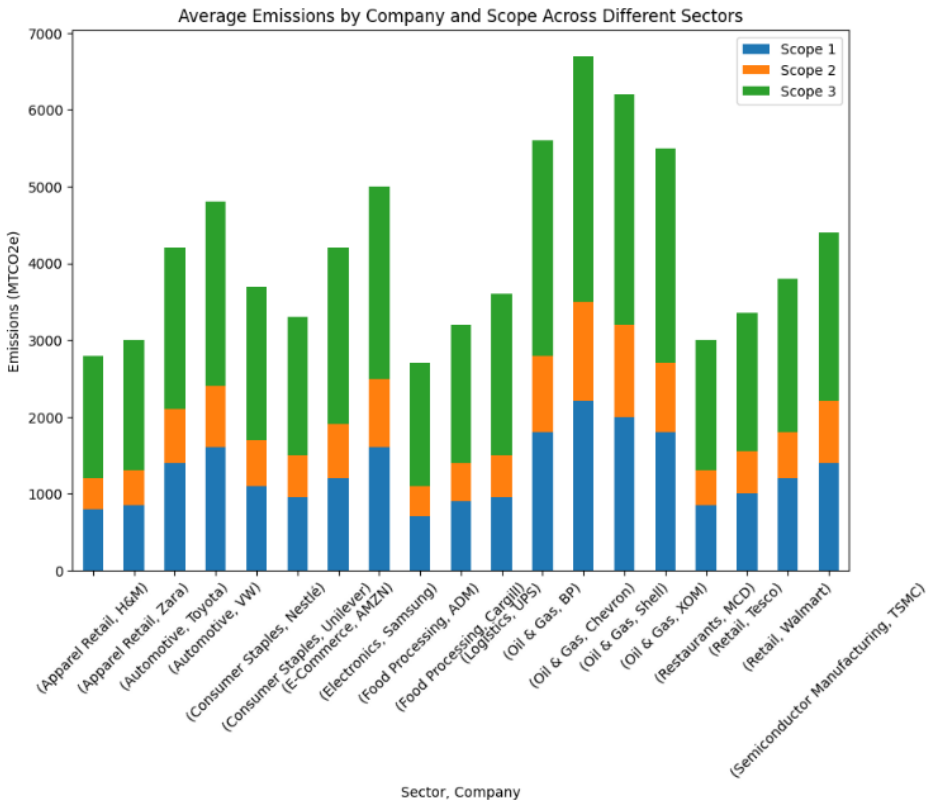

Fig. 2. Industry emissions and scope type.

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We further deep dive into two of the most sought-after sectors i.e. Oil and Gas and Automotive, where we see Scope 1 and 3 emissions taking center stage. They also if included in a portfolio might skew the entire portfolio to look not so attractive given their nature of emissions are high. Hence, there needs to be a better way of portfolio emissions ranking that takes these factors into account.

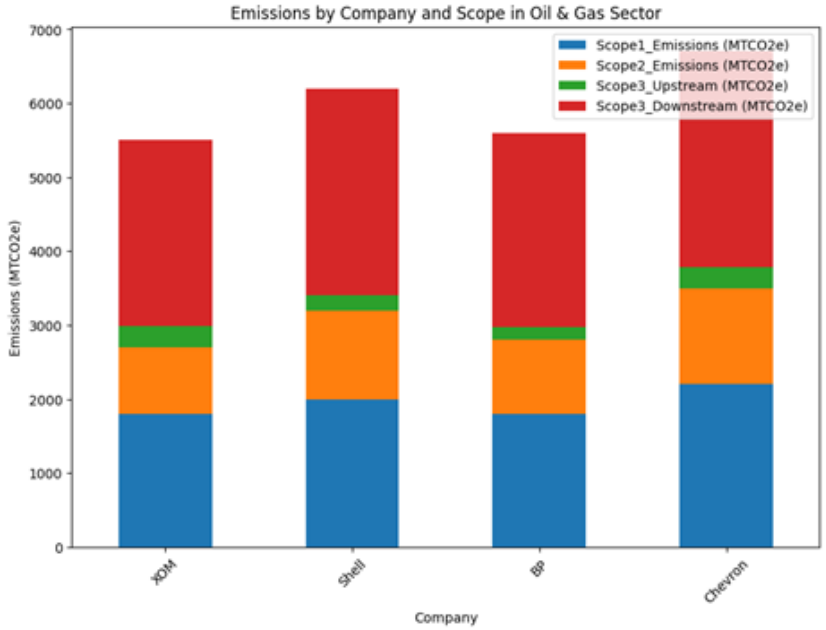

Fig. 3. Oil & Gas emissions break up.

Data Driven Analysis

To illustrate some of the financed emissions calculations for a given FI, here are two prevalent models proposed by GHG in chapter 15.

Investment Specific Method: involves collecting scope 1 and scope 2 emissions directly from investee companies and allocating these emissions based upon the proportion of the investment.

To be able to calculate this for any given portfolio we need:

- Activity data

Companies should collect:

- o Scope 1 and scope 2 emissions of investee company
- o The investor's proportional share of equity in the investee

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o If significant, companies should also collect scope 3 emissions of the investee company (if investee companies are unable to provide scope 3 emissions data, scope 3 emissions may need to be estimated using the average-data method described in option 2).

- Emission factors

If using the investment-specific method, the reporting company collects emissions data from investees, thus no emission factors are required. However, the Government of UK, Department for Energy Security and Net Zero, released the GHG conversion factors and Company reporting in 2023, which can be used. (Government of UK, 2023)

- Data collection

Sources for data may include:

o GHG inventory reports of investee companies

o Financial records of the reporting company.

Average-data Method: uses Environmentally-extended input-output (EEIO) data to estimate the scope 1 and scope 2 emissions associated with equity investments. The revenue of the investee company should be multiplied by the appropriate EEIO emission factor (Government of UK, 2023) that is representative of the investee company's sector of the economy. For example, an apparel manufacturer should use an EEIO emission factor for apparel manufacturing. The reporting company should then use its proportional share of equity to allocate the estimated scope 1 and scope 2 emissions of the investee company.

To drive this, we will need to have:

- Activity data:

The reporting company should collect:

o Sector(s) the investee company operates in

o Revenue of investee company (if the investee company operates in more than one sector, the reporting company should collect data on the revenue for each sector in which it operates)

o The investor's proportional share of equity in the investee

- Emission factors:

EEIO emission factors for the sectors of the economy that the investments are related to (kg CO2 e/$ revenue). The minimum boundary for reporting is the scope 1 and scope 2 emissions of the investee company. However, EEIO databases provide emission factors that include all upstream emissions (Government of UK, 2023). Therefore, if the investor is reporting only scope 1 and scope 2 emissions of the investee company, the EEIO emissions factor will need

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to be disaggregated to separate scope 1 and scope 2 emissions from all other upstream scope 3 emissions. Disaggregating the EEIO emission factor enables reporting companies to separate the scope 1 and scope 2 emissions from all other upstream scope 3 emissions, although sufficient information to do this may not be available. If disaggregation of the EEIO emission is not possible, reporting companies should use the full EEIO emission factor (i.e. include all upstream emissions). Reporting companies should clearly disclose the boundary used (either scope 1 and scope 2, or all upstream emissions).

- Data collection

Data may be collected from the following sources:

o Revenue data and equity share data will be available from the financial records of the reporting company and the investee company.

o Emission factors are available from EEIO databases (a list of databases is provided on the GHG Protocol website (http://www.ghgprotocol.org/Third-Party-Databases).

It was additionally observed that there is a high correlation between financial performance attributes, like Market Cap, Revenue of a company and its associated Scope 1, 2 and 3 emissions.

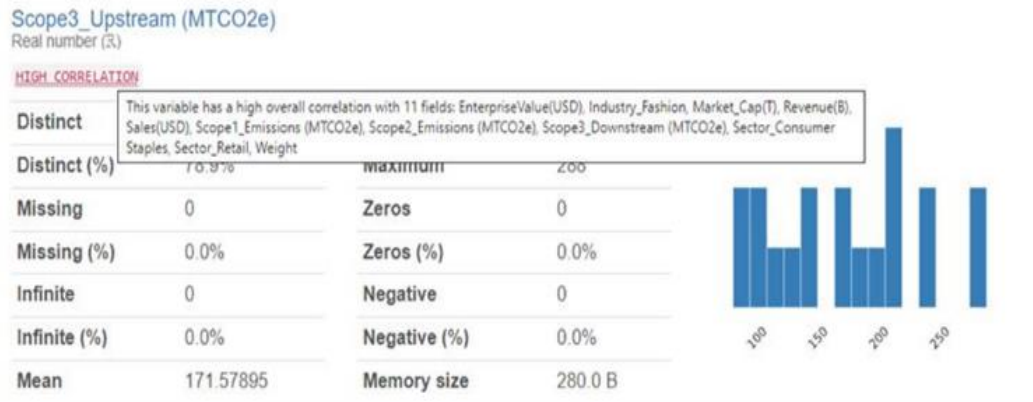

Fig. 4. Financial performance vs Scope 3 Emissions.

Some key observations for Investment Specific Method:

a. We must compare the emissions data with industry benchmarks, to provide "relative emissions intensity, rather than seeing a company in its silo, and include Scope 3, which makes 60-70% of the emissions.

b. The significance of emissions from various sources needs to be smoothened and weighted out, which is not in practice today.

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c. Portfolio Level Aggregation is great; however, we must distribute the emissions in its right proportion for the emitter vs balancing portfolio overall.

d. Introduce a Emissions ranking and scoring methodology that can help remove biases and imputation gaps, for investors transparent reporting.

Key observations for Average Data Method:

a. Using EEIO data has limitations. EEIO databases contain average emission factors for each sector; therefore, when EEIO data is used to estimate emissions from investments, it is not possible to differentiate between investments within a particular sector.

b. Using EEIO data can enable an investor to identify which sectors contribute most to its scope 3 investments category emissions, but investee-specific data would be required to identify the emissions hotspots within a particular sector. Another limitation is that the use of EEIO data will not enable the investor to track the GHG emissions of investee companies over time.

c. We believe considering PACT framework's suggestions will help us align better with portfolio emission calculations.

d. Steel and Agriculture needs to be adjudged on the same scale of ranking; hence the algorithm needs to smoothen the components and assign right weights to industry and sector further to the process

A. Recommendations

Improving financed emissions calculations is crucial for financial institutions aiming for better transparency and more accurate portfolio assessments. Here are some recommendations:

- Adopt Standardized Methodologies

o Use Established Frameworks: Utilize standardized methodologies such as the Partnership for Carbon Accounting Financials (PCAF) to ensure consistency.

o Align with TCFD and SBTi: Follow the guidelines from the Task Force on Climate-related Financial Disclosures (TCFD) and the Science Based Targets initiative (SBTi) to enhance comparability and credibility.

- Enhance Data Quality and Availability

o Invest in Data Infrastructure: Develop robust data collection and management systems to ensure accurate and comprehensive data.

o Leverage External Data Sources: Use third-party data providers for emissions factors, sector-specific data, and other relevant metrics.

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o Improve Client Disclosure: Encourage and support clients in disclosing their emissions data through enhanced reporting requirements.

- Incorporate Forward-Looking Metrics

o Scenario Analysis: Implement scenario analysis to assess how different climate pathways could impact financed emissions.

o Transition Risk Assessment: Evaluate the potential risks and opportunities associated with the transition to a low-carbon economy.

- Increase Granularity and Scope

o Sector-Specific Approaches: Develop tailored methodologies for different sectors to account for unique emissions profiles and risks.

o Expand Asset Classes: Include a broader range of asset classes, such as private equity, real estate, and project finance, in emissions calculations.

- Enhance Transparency and Reporting

o Regular Reporting: Provide regular, detailed disclosures on financed emissions, including methodologies, assumptions, and data sources.

o Third-Party Verification: Engage independent third parties to verify emissions calculations and disclosures to enhance credibility.

- Utilize Technological Innovations

o Advanced Analytics: Employ advanced analytics and machine learning to enhance the accuracy and efficiency of emissions calculations.

o Blockchain for Transparency: Explore blockchain technology for secure and transparent tracking of emissions data.

If used, the above recommendations a financial institution can enhance the accuracy, transparency, and effectiveness of their financed emissions calculations, thereby contributing to more informed decision-making and a more sustainable financial system).

5. Discussion

Challenges and Bottlenecks

Data availability for Scope 3 is a major challenge, and while Scope 1 and 2 are available sparsely, it remains to be vetted. One of the key challenges for carbon accounting leading to its financial impact remains to be the data scarcity and its integrity in public domain.

Some of the key bottlenecks for financial institutions are:

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a) Understand and evaluate the various carbon metrics that can be used for reporting – The selection of carbon metrics varies in case of debt vs equity investments. For debt portfolios the data will be collected from secondary data providers, who collect and collate various ESG related information disclosure from global firms across various sectors. However, for equity portfolios, the private equity investment will involve gathering data directly from their portfolio companies. (Manifest Climate, 2021)

b) Quality of the accessible data – Actual data will improve the overall lending credibility and accuracy to the assessment process, however access to this actual data will not be possible most of the time. This is where proxy data is being leveraged today. This is impacting the overall credibility of emissions cost. Ex: Based on the mortgage portfolio, financial institutions (FIs) can either use an average regional energy figure or collect individual energy purchases from the mortgage customers, in either of the approaches effort and quality of data are key tradeoffs (Manifest Climate, 2021)

C. Benchmark

PCAF guidance suggests four key metrics for financed emissions which include the below.

a) Total Financed Emissions (TFE): Financed emissions are the greenhouse gas (GHG) emissions linked to the investment and lending activities of financial institutions like investment managers, banks and insurers. It measures the total emissions (tonnes of CO2e) attributed to a portfolio where the company emissions are apportioned based on a relevant ownership/ financing share and is defined as:

b) Total Financed Emissions (tonnes of CO2e) =∑_(i=1)^n [〖Investment〗 _i/ 〖Market Cap〗 _i * 〖Emissios〗 _i]

c) Carbon Footprint (CF): This metric is defined as the ratio of the TFE and the Total value invested in the given portfolio and is defined as:

Carbon Footprint (tonnes of CO2e/million invested) = TFE/(Total Investment of the portfolio)

d) Weighted Average Carbon Intensity (WACI): Weighted Average Carbon Intensity is a measure of carbon emissions normalized by revenues and is a relevant comparison point across issuers. This metric is useful for portfolio decomposition and attribution analyses across sectors and asset classes. It is useful to compare the carbon efficiency of companies across different industries and is defined as follows:

〖 〖WACI〗 ^((p))〗 _^ =∑_i^n▒ 〖w_i^((p))*(E_i/ 〖Rev〗 _i) 〗

Where:

Ei is the amount of carbon emitted by firm i in year t,

Revi is the revenues generated by the firm, and

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$w_i^{(p)}$ is the weight of ith firm in the portfolio.

The portfolio weight is defined as:

$$w_i^{(p)}=(V_i^{(p)})/V^{(p)} ,$$

Where

$V_i^{(p)}$ is the dollar value invested in firm i

$V^{(p)}=\sum_{i=1}^{n} V_i^{(p)}$ is the dollar value of the portfolio and

n is the number of firms

As part of this research, we used publicly available data for various scope of emissions and financial data disclosed by companies in some of the sectors and studied the financed emissions methodologies while focusing on identifying where gaps exist and how they might impact the overall quality of decision making when financial institutions consider the portfolio emissions and ranking them.

D. Summary and Future Issues

There are some clear needs and gaps we believe need to be addressed for a more balanced and sustainable mode of portfolio emissions and their ranking. Future issues will remain around Scope 3 emissions data collection and identifying the best way forward Financial Institutions can align, identify and assess the impact of their investments on sustainable goals. amet. Non arcu risus quis varius quam quisque id diam vel. Neque laoreet suspendisse interdum consectetur libero id faucibus nisl tincidunt. Platea dictumst vestibulum rhoncus est pellentesque elit ullamcorper. Velit laoreet id donec ultrices tincidunt arcu non sodales. Venenatis urna cursus eget nunc scelerisque viverra. Lectus magna fringilla urna porttitor rhoncus dolor. Proin libero nunc consequat interdum varius sit. Arcu felis bibendum ut tristique et egestas quis.

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