

ESG Ratings in Banking: Bridging the Gap with Real-World Practices

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Abstract: This study investigates the extent to which ESG scores reflect the actual environmental practices of banks. Starting by calculating a simple correlation between the environmental pillar scores and the total fossil fuel financing of banks, we found that there is a weak positive relationship between the two variables. To gain a deeper understanding of the drivers behind high E scores despite significant fossil fuel financing, using a regression analysis, we have investigated the impact of various financial metrics such as size, on these scores, while also controlling for country-specific and temporal factors. Our findings indicate that larger banks tend to have higher E scores, confirming our literature. The year 2022 showed a significant positive impact on the scores likely due to increased regulatory focus during that year. However, banks from Asian countries exhibited significant negative coefficients, suggesting regional and cultural variations in ESG scoring. Focusing on the emissions subcategory of the E scores, which is supposed to reflect the impact of fossil fuel financing, we have noticed that this impact, even though negative, is underrepresented and not fully captured by the score due to the scoring methodology's focus on comprehensive reporting rather than how much emissions banks actually finance. This study highlights the need for more transparent and comprehensive ESG metrics that accurately represent environmental practices, to help investors make informed decisions. Our findings contribute to the ongoing discussions around ESG transparency and the effectiveness of the current scoring systems in evaluating true environmental performance. Since this study is conducted based on ESG scores provided only by Refinitiv, verification of the conclusions by using ratings from other rating agencies is essential.

Keywords: ESG, ESG Score, banking sector, fossil fuel financing.

Résumé: Cette étude examine dans quelle mesure les scores ESG reflètent les vraies pratiques environnementales des banques. Commencant par un simple calcul de corrélation entre les scores environnementaux et le total de financement des énergies fossiles, nous avons constaté qu'il existe une faible mais positive relation entre les deux variables ce qui a nécessité plus d'investigation sur les moteurs des scores E malgré un financement important des énergies fossiles. A l'aide de multiples régressions, nous avons étudié l'impact de diverses variables financières, telles que la taille, sur ces scores, tout en intégrant les indicateurs temporels et les pays. Nos résultats indiquent que les banques avec une taille plus importante ont tendance à avoir des scores E plus élevés, ce qui confirme les observations de la littérature. L'année 2022 a eu un impact positif sur les scores, probablement en raison des avancées significatives dans le domaine de l'ESG. Toutefois, les banques asiatiques ont présenté des coefficients négatifs, ce qui suggère des variations régionales et culturelles dans la notation ESG. En nous concentrant sur la sous-catégorie des émissions des scores E, qui est censée refléter l'impact du financement des énergies fossiles, nous avons remarqué que cet impact, même s'il est négatif, est sous-représenté dans le score en raison de l'accent mis par la méthodologie de notation sur un reporting complet et transparent plutôt que sur le niveau réel d'émissions financées par les banques. Cette étude souligne la nécessité de disposer d'indicateurs ESG plus transparents et plus complets, qui reflètent avec précision les pratiques environnementales. Puisque cette étude est basée uniquement sur les scores de Refinitiv, ces conclusions devront être vérifiées en utilisant les scores ESG d'autres agences de notation.

Mots-clés: ESG, score ESG, secteur bancaire, financement des énergies fossiles.

Acknowledgments

I would like to express my deepest gratitude to my supervisor, Professor Alexandre GAREL, for his invaluable guidance, suggestions, and support throughout the course of this research. His expertise and patience were instrumental in helping me overcome many obstacles, and his encouragement was a constant source of motivation.

My sincere thanks go to Professor Jad BAZIH, for his efforts in providing a supportive environment for our academic and professional growth. His leadership and vision were crucial in shaping the MS SFIR program and my experience within it.

Special thanks to my professional supervisors at La Banque Postale Consumer Finance, Nans REAU and Laurent BOURGUIGNAT, for their trust and for giving me the opportunity to work directly on significant projects. Their support, insights, and willingness to share their expertise greatly enhanced my learning and professional development.

Gratitude is also extended to Audencia for offering such an interesting and enriching specialized master's program. The knowledge and experiences gained through this program have been invaluable.

Finally, I want to thank my family for their endless support and encouragement. Their belief in me provided the strength and perseverance needed to complete this program.

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1. Introduction

In recent years, there has been an increasing focus on the importance of ESG considerations in the financial sector. This comes from a growing recognition of the need for businesses to operate sustainably in order to ensure long-term viability, meet stakeholder expectations, mitigate risks, and remain competitive in a changing global landscape.

Today, more than before, investors are not only looking for profitable opportunities but are also seeking to give purpose and meaning to their investments by aligning their investment choices with their values, principles, and broader societal and environmental concerns.

ESG ratings are here to provide a structured framework for assessing and communicating a company's extra financial performance and therefore help investors evaluate the sustainability performance of companies and make informed investment decisions.

But researchers have noticed that ESG ratings are often not pertinent in reflecting the real-world practices of companies. The lack of standardization, the reliance on self-reported data, the challenge of capturing dynamic changes over time, the subjectivity in the selection and weighting of factors, coupled with the potential for "greenwashing", are among the complexities that raise questions about the efficiency of these ratings.

Extending this matter to the banking sector is imperative as banks play a pivotal role in shaping the sustainability practices of companies through their investment and lending decisions. Therefore, the choice to focus on banks in this paper is rooted in the understanding that their actions have a far-reaching ESG impact, making them a key area to explore when evaluating the efficiency of ESG ratings.

Banks publish a lot of statements and communications regarding their sustainable footprint, especially concerning their environmental initiatives. In this context, with a particular focus on the "E" component, this paper will seek to answer the following research question: **"To what extent do ESG scores align with and reflect the environmental real-world practices of banks?"**. And to comprehensively address this matter, we will be answering the following specific questions:

- How are ESG scores calculated? What are the key components and criteria used in ESG score calculations for banks, and how do these components reflect the environmental, social, and governance practices of the banks?
- Do these ESG scores align with the actual environmental practices of banks?

- If not, what factors contribute to the discrepancies between ESG ratings and the actual environmental practices of banks?
- What measures or frameworks can be proposed to enhance the accuracy and consistency of ESG scores for banks?

The press has pointed out numerous times to inconsistencies in the ESG scores attributed to companies. In an article published by the Financial Times, it was revealed that companies which are highly rated on ESG metrics do not necessarily exhibit lower carbon footprint, challenging the widely held belief that high ESG ratings equate to lower environmental impact (Johnson, 2023). The research, which was conducted by Scientific Beta, indicated a lack of correlation between ESG scores and carbon intensity, even when focusing only on the environmental criteria.

This disconnection between the ESG Scores and the actual practices of companies was also highlighted in an article published by Capital Monitor, which focused on the persistent disconnection between public outcry over climate change and the actual investment practices of major banks. The article cited the recently published Banking on Climate Chaos report that revealed that, despite global concerns and the adoption of the Paris Agreement, the world's 60 largest banks have collectively financed fossil fuels amounting to \$5.5 trillion over the past seven years (Murdoch, 2023). Notably, 49 of these banks have committed to net-zero targets, yet they provided 81% of the financing to the top 100 companies expanding fossil fuels (Murdoch, 2023). Also, according to analysis by S&P Global Ratings and reported by the Financial Times, since 2010, borrowing costs for oil and gas companies in the US and Europe are similar to those of other industries.

And despite this, there was no notable response from the stock market. In fact, examples such as J.P. Morgan Chase, Mitsubishi UFJ Financial Group (MUFG), and BNP Paribas, all of which, despite substantial fossil fuel financing, saw their shares either rise or remain unaffected (Murdoch, 2023). This suggests that the lack of significant impact on their shares might be attributed to factors such as a favorable ESG score or other financial metrics that investors prioritize, which implies that the current ESG rating system may not be effectively capturing the environmental impact of these banks' activities, allowing them to maintain high scores despite continued financing of fossil fuels (Murdoch, 2023).

These inconsistencies can be due to biased ratings and a lack of public disclosure about the criteria used which was argued in an article published by Forbes (Strobel, 2020). And this

is often influenced by conflicts of interest within the rating agencies. An article by The Financial Times, implies that the companies providing ESG ratings may face pressure to favor their clients or companies that pay for their services (Bryan, 2023). And another challenge is the lack of regulatory scrutiny on these conflicts of interest and the reliance of the ratings on unaudited ESG data (Bryan, 2023). Also, the article points out a market concentration in the field of ESG data and ratings. In fact, only a handful of companies, including MSCI, London Stock Exchange Group, ISS, Morningstar, S&P Global, and Moody's, operate in this market, which raises concerns about how these companies define what is considered "green" or sustainable (Bryan, 2023).

In this regard, an article published by The New York Times, mentioned that rating agencies assess how ESG factors affect financial performance instead of measuring true environmental and social responsibility (Taparia, 2022). And another one published by Forbes explained that ESG ratings measure relative progress instead of absolute impacts and as a result, companies can receive high ESG scores even if their actions contribute to environmental degradation or social issues (Laker, 2023).

Many articles in the press also shed light on another critical issue which is the prevalence of greenwashing. Greenwashing refers to the deceptive practice where companies exaggerate or falsely claim their commitment to environmental and social responsibility. As a result, investors and the public may be misled into supporting entities that, in reality, fall short of the purported green initiatives. An article published by The Economist highlighted the issue of greenwashing and challenges in ESG fund transparency which raises questions about the reliability and effectiveness of ESG metrics and ratings (The Economist, 2021).

Considering the extensive media coverage and critical analyses presented above, it becomes evident that the ESG landscape is filled with challenges. The disconnection between ESG scores and the actual practices of companies underscores the urgency for a more comprehensive understanding of these issues.

Therefore, the **primary objective** of this thesis is to examine the efficacy of current ESG rating systems, exploring how they operate and whether they accurately capture and reflect the real-world practices of banks or not. If discrepancies are identified, the paper will delve deeper into the contributing factors.

Additionally, this research will aim to shed light on the prevalence of greenwashing within corporate strategies, providing an understanding of the deceptive practices adopted by banks in their pursuit of an environmentally conscious image and its potential impact on ESG scores.

Secondary objectives include proposing potential reforms in ESG evaluation methodologies and offering recommendations for a more transparent and effective system.

2. Literature review:

2.1. The role of banks in the green transition

Transitioning to a more sustainable economy is essential in addressing pressing environmental challenges and ensure long term economic prosperity. This requires a reevaluation of the traditional roles of companies in driving this transition. Central to this discussion is the Triple Bottom Line (TBL) framework, a concept that states firms should measure, in addition to their financial performance, their social and environmental impact. This is materialized in the 3 Ps of the TBL: Profit, People and Planet. The TBL framework believes that a company can reach both financial success and positive contributions to society and the environment since companies can benefit financially from sustainable practices and appeal to a growing market of consumers who prioritize sustainability as well as investors who are more and more considering ESG factors in their investment decisions. And in this context, banks emerge as key actors shaping the trajectory of the green transition.

While stock markets may outperform banks in financing green technological innovation and equity investors might pressure companies to reduce carbon emissions more effectively than banks, the reality is that financial systems continue to rely predominantly on banks (De Haas, 2023).

Banks play a crucial role in the green transition by engaging in lending and financing practices that support sustainable initiatives. Through financing renewable energy projects for instance or promoting green bonds or incorporating ESG considerations into their risk assessments, banks contribute to shaping how companies approach ESG and to fostering a financial landscape that prioritizes sustainable development. In fact, banks are more likely to work with companies that share similar ESG values (Houston & Shan, 2019). This means that a company's ESG rating can affect its relationship with banks. Also, when companies borrow from banks with strong ESG profiles, they are more likely to improve their own ESG performance over time and on the other side, companies engaging in risky ESG practices may

face disruptions in their relationships with banks, impacting their reputation and finances (Houston & Shan, 2019). Also, “environmental consciousness of banks could play a positive role in the green transition by granting cheaper loans to firms exhibiting a similar attitude” (Degryse et al., 2023).

All of this reinforces the claim that banks can significantly influence and contribute to the green transition of our economy.

2.2. Adoption of ESG and impact on banking practices

It is interesting to explore how banks responded to the increasing adoption of ESG principles and to examine how they have integrated them into their lending and financing strategies.

Banks worldwide have demonstrated their willingness towards integrating ESG factors into their operations by signing initiatives such as the United Nations Environment Program’s Statement by Banks on the Environment and Sustainable Development and by pledging to incorporate ESG information into their risk assessment and management procedures (Huang et al., 2022).

Multiple studies have reported a change in banking practices. In the USA for instance, larger carbon footprint is associated with lower credit ratings and higher bond yield spreads, especially for firms located in states with strict environmental regulations (Seltzer et al., 2022).

Moreover, an analysis of syndicated loans data spanning from 2011 to 2019 revealed a notable disparity in borrowing costs between firms demonstrating environmental consciousness, commonly referred to as “green firms,” and those with a higher environmental risk profile, termed “brown firms”. In fact, a green-meets-green effect kicked in after the Paris Agreement where green firms are enjoying more favorable lending terms, with borrowing rates averaging approximately 50-59 basis points lower than their brown counterparts when securing financing from environmentally conscious banks (Degryse et al., 2023).

Another study has identified a risk premium for firms with higher carbon intensities after the Paris Agreement as well, suggesting a response from banks to environmental risks. However, the observed premium is relatively small compared to the actual risks (Ehlers et al., 2022). And green banks, those who lend to environmentally responsible firms, are indeed

lending less to high carbon emitters but are not necessarily imposing a higher carbon premium compared to the rest of banks (Ehlers et al., 2022).

Banks in general seem to undervalue transition risks compared to bond markets because non-bank lenders may partially fill the void left by reduced bank lending to carbon-intensive firms (De Haas, 2023). Also, for them, even when overall credit to such firms decreases, there is no guarantee of substantial emission reductions by these entities (De Haas, 2023).

And while green banks demonstrate a noticeable shift in reducing lending to carbon-intensive firms (proactive approach), it is essential to explore the approaches employed by brown banks, which are banks associated with less environmentally responsible practices, in incorporating ESG considerations into their lending strategies.

Contrary to green banks, brown banks, often struggling with the challenges of environmental sustainability, opt for issuing loans with shorter maturities and demanding more collateral (De Haas, 2023) instead of adjusting interest rates based on environmental risks (reactive approach). These banks might also employ another strategy which is to manage ESG or transition risks by securitizing loans to entities operating in less-regulated environments (De Haas, 2023). This poses challenges to the effectiveness of overall climate strategies, particularly when securitization allows banks to provide lower-interest loans to carbon-intensive firms (De Haas, 2023). In fact, findings from Mueller, Nguyen, and Nguyen (2023) argue that banks tend to price transition risk less when they can securitize loans to high-carbon firms (De Haas, 2023).

And amidst growing pressure to align with ESG principles, some banks that could be considered as green, actually resort to deceptive practices known as greenwashing. In a paper discussing greenwashing practices in banks, it was argued that banks with worse ESG performance tend to provide loans to companies with strong ESG profiles at lower interest rates as a strategy to improve their reputation and mask their own deficiencies in ESG performance (Huang et al., 2022).

2.3. Understanding ESG scores

An ESG score is a measurement of a company's commitment to environmental, social and governance responsibility. It is "a rating (expressed in letters or figures) in three main categories: environmental (e.g., environmental impact, resource consumption, impact on biodiversity, and waste management), social (e.g., impact on the community and suppliers, working conditions, and other social impacts), and governance (e.g., the organization's

transparency, its relationship with shareholders and the board of directors, executive compensation, and board diversity)” (Clément et al., 2022).

Originating as a niche concept, ESG ratings have steadily gained importance until they became a critical tool for evaluating a company’s corporate sustainability performance. And today, ESG ratings influence stakeholder perceptions and decision-making.

ESG scores are calculated using various methodologies, and the specific approach can vary among rating agencies. However, they generally involve data collection of environmental, social and governance factors, followed by the assignment of weight to each category based on its perceived importance (materiality), then the normalization of the scores to account for differences in size and nature of the company and finally the aggregation of the score from each category to create the final and global ESG score. Notably, MSCI, Sustainalytics, and Thomson Reuters (ASSET4) are prominent players in this space, employing large teams of ESG analysts who collect and evaluate data (Christensen et al., 2022).

These methodologies are however criticized for their lack of transparency and consistency between the different rating agencies.

2.4. Reliability and consistency of ESG scores

Despite their efforts, ESG ratings of the same company often differ significantly among rating agencies, prompting criticism (Christensen et al., 2022). “Research conducted by Florian Berg of the MIT Sloan School of Management, shows ESG ratings from different sources are aligned in only about 6 out of 10 cases, compared to creditworthiness ratings, which match 99% of the time” (El-Hage, 2021). It is not the case for credit ratings because the main difference between the two “is attributed to the fact that credit ratings use consistent information, in the form of standardized financial disclosures, while ESG ratings do not” (El-Hage, 2021). In fact, the methodology, quantity, and quality of data used by these agencies vary significantly. For example, MSCI evaluates 37 key ESG issues across three pillars and ten themes, while Sustainalytics examines a minimum of 70 indicators categorized into three dimensions (El-Hage, 2021). Also, each one of them prioritizes different aspects, Sustainalytics for instance focuses on ESG risk, others on the impact, while the rest look only at reputation or market sentiment (Bernardelli et al., 2022).

While the diverse methodologies used by ESG rating agencies can still offer some guidance or signals regarding the sustainability performance of companies, the significant

disparities in their results undermine the reliability and quality of the information used by investors to make well-rounded and thorough investment decisions (El-Hage, 2021).

In addition to the used calculation methodologies, most ESG data collected by rating agencies rely heavily on self-reported data (provided by the companies that are being rated) which introduces a level of subjectivity that contributes to the observed variations in ESG ratings among companies. This voluntary reporting is done through annual sustainability reports or responses to surveys initiated by the rating agencies which gives companies considerable freedom in how they present their ESG data and can incentivize them to tailor their disclosures to align favorably with rating methodologies, presenting themselves in a positive light (El-Hage, 2021).

These discrepancies not only exist across rating agencies but also manifest within individual agency assessments where some companies receive favorable ESG scores despite engaging in activities that are against responsible and sustainable practices. For instance, in the USA, a discrepancy between high ESG scores of banks presenting themselves as socially responsible and their actual lending practices in poor areas has been revealed, where it was found that they lend less compared to banks with low ESG scores (Basu et al., 2022).

Another example is the case of Volkswagen, which was found in 2015 guilty of intentionally deceiving emissions tests, resulting in significant environmental harm and financial penalties. We could assume that if ESG scores accurately reflect a company's sustainability practices and performance, they should serve as an early warning system for potential scandals. But Volkswagen had a high ESG score and even was awarded best-in-class ESG ratings prior to the scandal, and “continued to have an ESG rating higher than its peer average” (El-Hage, 2021). “Likewise, Danske Bank, who was involved in the largest money laundering case in European history exceeded ESG ratings of its peers prior to the scandal” (Kjaer & Kirchmaier, 2023). Therefore, the occurrence of scandals in companies with seemingly high ESG scores suggests either flaws in the scoring methodology or limitations in capturing certain risk factors or unethical practices.

2.5. Challenges in ESG rating systems

The calculation of ESG scores is an inherently complex process due to the inherent subjectivity in determining the significance, the interpretation, and the materiality of diverse sustainability factors.

As mentioned previously, there is a substantial disagreement among ESG ratings provided by the different rating agencies. An academic study delved into this issue and has identified three distinct sources: scope divergence (different sets of attributes), measurement divergence (using different indicators for the same attribute), and weight divergence (differing views on the relative importance of attributes) (Berg et al., 2019). So, one of the main challenges in ESG rating systems is the lack of a standardized and universally accepted set of indicators for calculating ESG scores, and “the variation in the financial materiality of different ESG issues across industry sectors” (Lee et al., 2023).

Despite considerable changes in the extra-financial reporting requirements, the format remains less standardized compared to financial reporting “as there is no standardized scheme, only guidelines, recommendations, and frameworks (GRI, IR, SASB, CDP, ISO 26000) regulate the information” (Mayer & Ducsaï, 2023). This lack of standardized reporting frameworks across the banking industry may contribute to the difficulty in verifying the alignment of disclosures with lending practices by market participants especially in the case of larger banks that are subject to increased visibility and scrutiny (Giannetti et al., 2023).

While the absence of standardized reporting frameworks complicates the assessment of banks' disclosures, it also amplifies another challenge: size bias in ESG ratings. In fact, larger companies tend to have higher ESG ratings due to their ability to devote more resources to preparing extra-financial disclosures and improve their ESG profile, unlike smaller firms which need those resources to invest in other crucial areas (El-Hage, 2021).

Another critical issue lies in the fact that aggregating E, S and G factors into a single score may obscure the underlying strengths or weaknesses of a company's sustainability practices and offset shortcomings especially in environmental performance, thereby distorting the overall ESG score. Because “firms are more than likely to manipulate subjective S and G measures over objective E measures to obtain higher rating agency ESG scores” (Lee et al., 2023) which can mislead investors and the general public into thinking that the company is sustainable.

These limitations become more apparent when considering the inability of ESG scores to predict scandals. As stated previously, companies with high ESG scores are expected to exhibit stronger sustainability practices and ethical behavior, reducing the probability of involvement in scandals. Unfortunately, the majority of ESG scores fail to predict corporate scandals which was highlighted in the previous examples of Volkswagen and Danske Bank. In a paper that

used the press release of corporate scandals and tried to analyze ESG assessments before, during, and after the event year, the results showed that aggregated ESG assessments consisting of both retrospective and forward-looking indicators are not effective in predicting corporate scandals (Utz, 2019).

When analyzing the various insights obtained from this literature review, it becomes evident that the environmental component of the ESG score holds particular importance in understanding the sustainability performance of banks. Moreover, the increasing global attention towards environmental issues like climate change, resource depletion, and biodiversity loss is widely acknowledged and have become central to discussions surrounding corporate environmental practices and disclosures.

While all the three components of the ESG score are important, environmental considerations are perhaps the most critical due to their direct impact on ecosystems, international stability, communities, and long-term sustainability. In fact, “80% of the world’s largest companies are reporting exposure to physical or market transition risks associated with climate change and a similar share are engaging in reducing corporate emissions” (S&P Global, s. d.).

Therefore, this paper will be focusing on the evaluation of the environmental dimension of ESG scores. By narrowing the focus on the E component, we will be able to conduct a more targeted and in-depth examination of the alignment of ESG scores with actual practices of banks.

3. Methodology

3.1. *Research approach*

For this study, a quantitative approach will be employed as it is well-suited for analyzing numerical data and identifying patterns and relationships between variables. Our goal is to examine the alignment of ESG scores with actual environmental practices of banks, and to achieve this we will be following three key steps:

- A- Understanding ESG scores: Initially, the ESG scores of the selected banks will be obtained and dissected to gain a comprehensive understanding of the methodology of calculation and the underlying components contributing to each score. A descriptive

analysis will facilitate the identification of factors influencing banks' ESG ratings, distinguishing between positive and negative assessments.

- B- Comparison with environmental footprint: We will confront the Environmental Pillar scores with the banks' actual environmental footprint. This involves using descriptive statistics to compare the “E” scores with empirical data on the banks' environmental impact, and this will provide insights into the consistency and the reliability of ESG scores as indicators of environmental performance.
- C- Regression analysis: A regression analysis will be employed to explore the relationship between “E” scores and other variables that may influence them. By using market and financial variables, we could examine whether the observed “E” scores are driven and explained by factors other than environmental performance. This will help us identify potential biases or confounding variables that may affect the accuracy of ESG scores.

3.2. Data collection

The universe of this study will include publicly listed banks for which we have information on their actual environmental footprint. This is to ensure a comprehensive examination of banks with publicly available financial and ESG data.

The collection of this data base will mainly be through the Refinitiv platform from where the environmental scores of banks can be extracted. Other useful information of banks such as the market and financial variables needed for the regression analysis can also be found in Refinitiv.

As for the actual environmental footprint of these banks, the factual element that will enable us to assess whether a bank fulfills its environmental commitments or not and to which we will confront the “E” scores, is the “total fossil fuel financing by bank” indicator. The “Banking On Climate Chaos” organization works to make this information publicly accessible, and it also accurately adjusts the metric to take into account the financing for diversified companies based on their specific involvement in fossil fuel activities, providing a comprehensive assessment of environmental impact.

And since this indicator is sourced from an impartial organization, this will help us conduct an objective measure of banks' environmental impact, allowing for an unbiased analysis of their practices.

The “Banking On Climate” reports profile the world’s top 60 banks by assets, ranking them according to the financing they have provided to fossil fuel companies since 2016. This paper will be examining the environmental impact of banks from 2018 to 2022, focusing exclusively on publicly traded companies from the report's list. This selection ensures access to their Environmental (E) Pillar Scores from Refinitiv. This leaves us with a sample of 52 publicly traded banks (Table 1).

Table 1. The selected banks

<i>Name of the bank</i>	<i>RIC</i>	<i>Country</i>
Agricultural Bank of China	1288.HK	China
ANZ	ANZ.AX	Australia
Bank of America	BAC	United States
Bank of China	601988.SS	China
Bank of Communications	601328.SS	China
Bank of Montreal	BMO.TO	Canada
Barclays	BARC.L	United Kingdom
BBVA	BBVA.MC	Spain
BNP Paribas	BNPP.PA	France
CaixaBank	CABK.MC	Spain
China CITIC Bank	601998.SS	China
China Construction Bank	601939.SS	China
China Everbright Bank	601818.SS	China
China Merchants Bank	600036.SS	China
China Minsheng Bank	600016.SS	China
CIBC	CM.TO	Canada
Citi	C	United States
Commerzbank	CBKG.DE	Germany
Commonwealth Bank	CBA.AX	Australia
Crédit Agricole	CAGR.PA	France
Danske Bank	DANSKE.CO	Denmark
Deutsche Bank	DBKGn.DE	Germany
Goldman Sachs	GS	United States
HSBC	HSBA.L	United Kingdom
ICBC	601398.SS	China
Industrial Bank	601166.SS	China
ING	ING	Netherlands
Intesa Sanpaolo	ISP.MI	Italy
JPMorgan Chase	BARC.L	United Kingdom
KB Financial	105560.KS	South Korea
Lloyds	LLOY.L	United Kingdom
Mizuho	8411.T	Japan
Morgan Stanley	MS	United States
MUFG	8306.T	Japan
NAB	NAB.AX	Australia

NatWest	NWG.L	United Kingdom
Nordea Bank	04Q.DE	Finland
PNC	PNC	United States
Postal Savings Bank of China	601658.SS	China
RBC	RY	Canada
Santander	SAN.MC	Spain
Scotiabank	BNS.TO	Canada
Shanghai Pudong Development Bank	600000.SS	China
Société Générale	SOGN.PA	France
Standard Chartered	STAN.L	United Kingdom
State Bank of India	SBI.NS	India
TD	TD.TO	Canada
UBS	UBSG.S	Switzerland
UniCredit	CRDI.MI	Italy
US Bancorp	USB	United States
Wells Fargo	WFC	United States
Westpac	WBC.AX	Australia

4. Results

4.1. Descriptive analysis of ESG Scores

A- ESG scoring methodology of LSEG (Refinitiv)

The following explanation of the ESG scoring methodology is based on the LSEG document titled 'Environmental, social and governance scores from LSEG'.

LSEG aggregates ESG data from various sources, including company disclosures, regulatory filings, media reports, and third-party databases. This data includes information related to environmental, social, and governance factors for each company.

Once this data is collected, LSEG calculates individual category scores for environmental, social, and governance pillars based on specific data points relevant to each category. For example, environmental category scores may be based on factors like emissions, resource use, and environmental management systems. Social category scores may include metrics related to workforce diversity, human rights, and community engagement. Governance category scores may be derived from data on board structure, shareholder rights, and transparency. These category scores are calculated using percentile rank scoring methodology, which compares a company's performance against its peers within the same industry or sector.

LSEG also uses a materiality matrix to assess the relative importance of different ESG themes to each industry or sector. The materiality matrix considers factors such as industry-

specific risks, regulatory requirements, and stakeholder expectations to determine the weightings assigned to each ESG theme within a given industry.

Finally, LSEG aggregates the individual category scores for the three pillars to calculate an overall ESG score for each company (Table 2).

The category scores are weighted based on their materiality within each industry, with more significant factors carrying greater weight in the overall score calculation. In the banking services industry, the weights are as follows: **Environment (Weight: 14.4%)**, **Social (Weight: 49.6%)** and **Governance (Weight: 36.0%)**.

Table 2. The conversion from a percentile score to a letter grade

Score range	Grade	Description
0.0 <= score <= 0.083333	D -	'D' score indicates poor relative ESG performance and insufficient degree of transparency in reporting material ESG data publicly.
0.083333 < score <= 0.166666	D	
0.166666 < score <= 0.250000	D +	
0.250000 < score <= 0.333333	C -	'C' score indicates satisfactory relative ESG performance and moderate degree of transparency in reporting material ESG data publicly.
0.333333 < score <= 0.416666	C	
0.416666 < score <= 0.500000	C +	
0.500000 < score <= 0.583333	B -	'B' score indicates good relative ESG performance and above- average degree of transparency in reporting material ESG data publicly.
0.583333 < score <= 0.666666	B	
0.666666 < score <= 0.750000	B +	
0.750000 < score <= 0.833333	A -	'A' score indicates excellent relative ESG performance and high degree of transparency in reporting material ESG data publicly.
0.833333 < score <= 0.916666	A	
0.916666 < score <= 1	A +	

ESG laggards



ESG leaders

Source : (LSEG, 2023)

Since we will be focusing on the “E” component, it is necessary to dissect this pillar.

The Environmental (E) pillar in ESG scoring evaluates a company's performance and initiatives related to environmental sustainability (Table 3).

The Emissions category evaluates the company's emissions footprint and waste management practices. The Innovation category assesses the company's investment in environmental innovation, such as research and development (R&D) expenditure on eco-friendly products and technologies. As for the Resource Use category, it measures the efficiency of resource utilization, including water and energy consumption.

Table 3. A detailed view of the Environmental pillar

Pillars	Categories	Themes	Data points	Weight method
Environmental	Emission	Emissions	TR.AnalyticCO2	Quant industry median
		Waste	TR.AnalyticTotalWaste	Quant industry median
		Biodiversity*		
		Environmental management systems*		
	Innovation	Product innovation	TR.EnvProducts	Transparency weights
		Green revenues, research and development (R&D) and capital expenditures (CapEx)	TR.AnalyticEnvRD	Quant industry median
	Resource use	Water	TR.AnalyticWaterUse	Quant industry median
		Energy	TR.AnalyticEnergyUse	Quant industry median
		Sustainable packaging*		
		Environmental supply chain*		

*No data points available that may be used as a proxy for ESG magnitude/materiality

Source : (LSEG, 2023)

As we have explained before, the data points relevant to each category are collected from public disclosures and industry-specific sources. Each category is assigned a weight based on its materiality and relevance to the company's industry. Industry-specific data points are considered to ensure accuracy and comparability. For the banking services industry, it is as follows: **Emission (Weight : 2,4%), Innovation (Weight : 9,6%) and Resource Use (Weight : 2,4%).**

It is worth reaffirming that a percentile rank scoring methodology is used for calculating the environmental category scores. This approach compares the company's performance to that of its industry peers. The percentile rank score considers:

- How many companies perform worse than the current one?
- How many companies have the same value?
- How many companies report the data point?

In addition to the core ESG data collected and analyzed, several other factors can significantly impact ESG scores. LSEG values transparency and disclosure of ESG-related information. Companies that provide comprehensive and transparent reporting on their environmental, social, and governance practices are likely to receive higher scores in the relevant areas. The extra-financial reporting also contributes to the availability of data points

used in the scoring process. More comprehensive reporting can result in a richer dataset, enabling a more thorough evaluation of a company's ESG performance.

While the presence of reporting is important, Refinitiv also considers the quality of the reported information. High-quality reporting, characterized by clarity, consistency, and adherence to recognized reporting standards or frameworks, may positively influence a company's score.

And finally, while reporting may be a factor in scoring, a company's score is also influenced by how its performance stacks up against others in its sector, regardless of reporting practices.

B- Descriptive analysis of the selected banks' ESG Scores

The table below presents the Environmental scores of the 52 selected banks from 2018 to 2022, alongside summary statistics including the mean, median, standard deviation, minimum, and maximum scores for each bank (Table 4).

Table 4. Environmental Pillar Scores of Selected Banks (2018-2022) with Summary Statistics

Name of the bank	Environmental Pillar Score					Summary Statistics				
	2022	2021	2020	2019	2018	Mean	Median	SD	Minimum	Maximum
Agricultural Bank of China	51,21	53,53	48,72	52,72	49,05	51,04	51,21	1,92	48,72	53,53
ANZ	65,31	66,82	64,25	65,94	62,94	65,05	65,31	1,35	62,94	66,82
Bank of America	81,98	85,03	83,31	86,54	86,94	84,76	85,03	1,89	81,98	86,94
Bank of China	79,44	56,39	56,54	56,46	59,01	61,57	56,54	8,99	56,39	79,44
Bank of Communications	41,11	40,40	58,83	56,26	49,91	49,30	49,91	7,56	40,40	58,83
Bank of Montreal	94,08	95,56	97,14	94,52	95,27	95,32	95,27	1,05	94,08	97,14
Barclays	93,62	93,23	92,98	93,52	89,22	92,51	93,23	1,66	89,22	93,62
BBVA	93,93	93,87	92,83	83,48	84,24	89,67	92,83	4,77	83,48	93,93
BNP Paribas	94,49	94,64	94,52	95,43	95,50	94,91	94,64	0,45	94,49	95,50
CaixaBank	79,98	82,75	83,14	83,20	63,27	78,47	82,75	7,69	63,27	83,20
China CITIC Bank	56,57	58,52	56,14	57,49	56,87	57,12	56,87	0,83	56,14	58,52
China Construction Bank	61,41	63,01	59,34	57,32	58,96	60,01	59,34	1,99	57,32	63,01
China Everbright Bank	72,98	75,98	73,57	53,13	30,26	61,18	72,98	17,51	30,26	75,98
China Merchants Bank	60,61	60,45	56,50	51,36	53,52	56,49	56,50	3,68	51,36	60,61
China Minsheng Bank	32,78	32,50	33,46	36,80	36,19	34,34	33,46	1,79	32,50	36,80
CIBC	80,59	84,07	83,04	86,51	86,96	84,23	84,07	2,34	80,59	86,96
Citi	93,08	94,94	95,23	95,41	96,94	95,12	95,23	1,23	93,08	96,94
Commerzbank	90,92	92,74	91,66	88,62	79,77	88,74	90,92	4,68	79,77	92,74
Commonwealth Bank	93,70	92,71	82,39	85,05	85,16	87,80	85,16	4,53	82,39	93,70
Crédit Agricole	94,69*	94,87	95,17	95,44	93,29	94,69	94,87	0,75	93,29	95,44
Danske Bank	81,09	85,50	84,01	86,60	86,78	84,79	85,50	2,10	81,09	86,78
Deutsche Bank	94,62	95,41	95,58	95,85	96,71	95,64	95,58	0,68	94,62	96,71

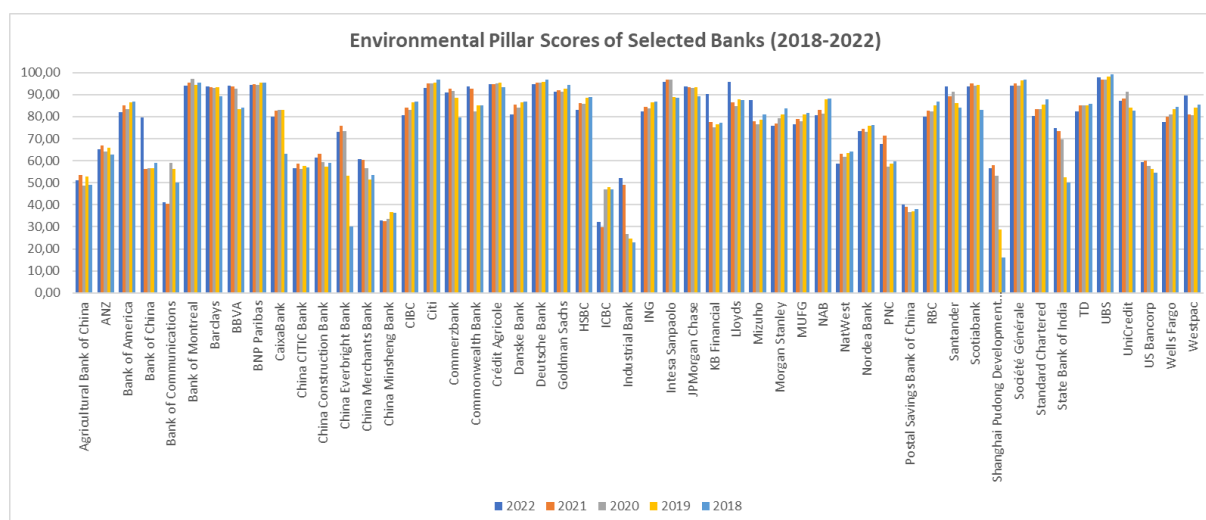
Goldman Sachs	91,32	92,10	91,34	92,82	94,36	92,39	92,10	1,13	91,32	94,36
HSBC	82,95	86,03	85,80	88,63	88,81	86,44	86,03	2,15	82,95	88,81
ICBC	32,35	29,80	47,12	48,13	46,98	40,87	46,98	8,05	29,80	48,13
Industrial Bank	52,16	49,17	26,73	24,73	22,81	35,12	26,73	12,79	22,81	52,16
ING	82,30	84,57	83,73	86,39	86,93	84,79	84,57	1,70	82,30	86,93
Intesa Sanpaolo	95,84	96,90	96,96	88,80	88,70	93,44	95,84	3,85	88,70	96,96
JPMorgan Chase	93,62	93,23	92,98	93,52	89,22	92,51	93,23	1,66	89,22	93,62
KB Financial	90,35	77,41	75,09	76,49	77,07	79,28	77,07	5,59	75,09	90,35
Lloyds	95,81	86,49	84,64	87,82	87,38	88,43	87,38	3,85	84,64	95,81
Mizuho	87,50	77,72	76,36	78,44	80,89	80,18	78,44	3,95	76,36	87,50
Morgan Stanley	75,76	76,85	79,12	80,98	83,77	79,30	79,12	2,88	75,76	83,77
MUFG	76,52	79,07	77,92	80,93	81,64	79,22	79,07	1,89	76,52	81,64
NAB	80,56	82,88	81,49	87,94	88,09	84,19	82,88	3,21	80,56	88,09
NatWest	58,69	63,12	61,63	63,55	64,32	62,26	63,12	1,99	58,69	64,32
Nordea Bank	73,30	74,52	73,02	75,73	76,08	74,53	74,52	1,24	73,02	76,08
PNC	67,70	71,39	57,19	58,70	59,66	62,93	59,66	5,58	57,19	71,39
Postal Savings Bank of China	40,03	39,14	36,61	36,85	38,04	38,14	38,04	1,31	36,61	40,03
RBC	79,82	82,78	82,40	85,20	86,92	83,42	82,78	2,44	79,82	86,92
Santander	93,87	89,18	91,32	86,10	84,25	88,94	89,18	3,47	84,25	93,87
Scotiabank	93,79	95,16	94,14	94,40	83,14	92,13	94,14	4,52	83,14	95,16
Shanghai Pudong Development Bank	56,48	58,06	53,17	28,73	16,01	42,49	53,17	16,99	16,01	58,06
Société Générale	94,21	95,09	93,89	96,52	96,67	95,28	95,09	1,15	93,89	96,67
Standard Chartered	80,22	83,35	83,55	85,52	87,81	84,09	83,55	2,52	80,22	87,81
State Bank of India	74,86	73,44	69,66	52,64	49,89	64,10	69,66	10,65	49,89	74,86
TD	82,49	84,97	85,06	85,27	85,88	84,73	85,06	1,17	82,49	85,88
UBS	97,97	96,88	96,85	98,16	99,14	97,80	97,97	0,86	96,85	99,14
UniCredit	87,25	88,19	91,38	84,12	82,70	86,73	87,25	3,07	82,70	91,38
US Bancorp	59,38	60,08	57,51	56,37	54,41	57,55	57,51	2,05	54,41	60,08
Wells Fargo	77,54	79,99	80,96	83,35	84,34	81,24	80,96	2,42	77,54	84,34
Westpac	89,64	81,14	80,60	84,10	85,56	84,21	84,10	3,28	80,60	89,64
D	C	B	A							

Source: ESG Scores extracted from Refinitiv

*The 2022 Environmental Pillar Score of Credit Agricole is not available on Refinitiv, a score has been calculated based on the mean of the previous 4 years' scores.

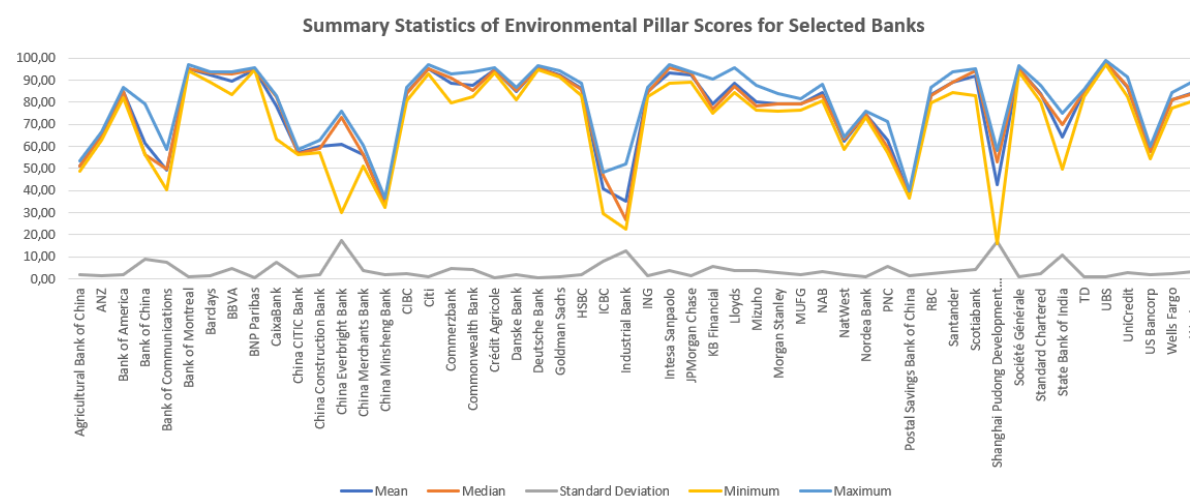
We can immediately notice in this table that Chinese banks such as Bank of Communications, exhibit the lowest environmental scores. While China is currently making efforts in developing its ESG framework, Western countries clearly have more established and stringent ESG regulations. Consequently, Western banks such as BNP Paribas or Citi, might have stronger environmental policies and more comprehensive reporting compared to Chinese banks, aligning well with LSEG's criteria, which is reflected in their high environmental scores.

Figure 1. Environmental Pillar Scores of Selected Banks (2018-2022)



The chart above illustrates the Environmental Pillar Scores for the selected banks from 2018 to 2022. This visualization provides insight into the trends and variations in environmental performance across the banking sector over this period. Banks such as BNP Paribas, Credit Agricole, and Bank of Montreal consistently score high across all years, indicating strong environmental performance. On the other hand, banks like China Minsheng Bank and Bank of Communications exhibit lower scores, highlighting areas for potential improvement. We can also notice that many banks maintain relatively stable scores year-over-year, suggesting consistent environmental practices. And at the same time, we can see that a few other banks show significant improvement in scores, which may indicate shifts in environmental performance or reporting practices.

Figure 2. Summary Statistics of Environmental Pillar Scores for Selected Banks



The chart above illustrates the summary statistics for the Environmental Pillar Scores of

selected banks. The mean and median scores are generally close for most banks, indicating a consistent environmental performance over the years.

The standard deviation line, represented in grey, indicates the variability in the scores. Higher peaks in this line suggest greater fluctuations in the bank's environmental performance. Banks such as China Everbright Bank and Shanghai Pudong Development Bank show higher standard deviations, indicating variability in their environmental performance over the years. This might be attributed to inconsistent environmental practices and reporting or to fluctuations in the regulatory environment.

The minimum and maximum scores provide insights into the range of scores each bank has achieved. The minimum scores for some banks drop significantly, indicating periods of weaker environmental performance. This is mainly observed within Asian banks which aligns with our earlier observations.

Table 5. Frequency table

Year / statistic	A	B	C	D
2022	35	13	4	0
2021	35	12	5	0
2020	34	13	5	0
2019	35	12	4	1
2018	34	9	7	2
Mean	34	12	6	0
Median	34	13	5	0

The frequency table, which calculates the number of banks falling into each grade category from Table 4, reveals that the majority of banks consistently fall into the 'A' category over the five-year period, indicating a generally “excellent relative ESG performance and high degree of transparency in reporting material ESG data publicly” (LSEG, 2023). The mean and median scores further confirm this trend, with 34 banks scoring in the 'A' range, mainly Western banks. The alignment between the mean and the median indicates that the central tendency of the data is not significantly affected by extreme values, reinforcing the reliability of the observed trends.

4.2. Comparison of ESG scores with the actual environmental footprint of banks

Table 6. Total Fossil Fuel Financing by bank in USD (2018-2022)

Rank	Bank	2022	2021	2020	2019	2018
1	JPMorgan Chase	39 239 598 597	67 257 880 854	53 983 317 947	66 133 637 997	69 365 214 391
2	Citi	33 942 812 256	46 945 215 308	51 634 570 085	54 720 729 431	49 734 474 559

3	Wells Fargo	37 398 759 154	49 754 885 509	27 953 968 104	45 532 959 515	62 523 836 176
4	Bank of America	35 466 666 717	35 916 347 853	45 453 892 085	50 188 349 415	35 148 238 405
5	RBC	38 126 126 986	40 437 470 221	20 194 758 153	38 215 497 228	41 959 642 948
6	MUFG	29 514 747 911	33 475 048 455	30 752 300 304	34 235 035 550	37 746 520 256
7	Mizuho	28 830 038 700	30 081 581 338	24 628 087 288	34 082 649 526	29 826 261 614
8	Scotiabank	29 468 825 666	31 665 886 925	17 083 347 247	27 880 808 456	29 231 060 479
9	BNP Paribas	20 036 745 665	16 522 460 096	41 780 828 711	30 258 289 130	19 693 328 237
10	Barclays	16 578 495 812	21 437 262 697	30 322 452 766	31 440 091 837	26 857 340 525
11	TD	29 001 616 095	21 690 871 644	17 598 475 802	28 174 600 898	26 245 942 185
12	HSBC	11 074 181 980	19 777 350 707	25 727 124 907	27 004 091 579	20 928 637 912
13	Morgan Stanley	11 096 063 556	22 368 464 794	21 705 045 405	23 954 290 326	22 994 754 801
14	ICBC	21 658 793 905	17 503 661 889	25 284 291 387	19 735 087 728	14 778 062 653
15	Bank of Montreal	19 309 503 813	19 617 472 864	15 416 422 355	22 387 034 708	21 908 634 791
16	Goldman Sachs	9 959 777 108	21 141 025 436	21 716 112 318	22 948 049 142	22 076 458 040
17	Bank of China	15 578 191 063	14 703 543 349	19 966 386 482	20 688 638 833	22 765 363 131
18	CIBC	17 872 395 538	23 981 531 066	10 188 216 266	21 443 224 089	12 851 771 201
19	Société Générale	11 146 173 067	13 494 400 785	19 619 783 857	14 919 132 348	15 236 007 803
20	Crédit Agricole	11 658 614 348	10 964 538 901	19 613 929 828	12 497 048 687	13 603 786 492
21	Industrial Bank	9 200 152 233	14 931 483 321	14 217 697 832	12 192 255 635	12 630 817 012
22	Agricultural Bank of China	10 590 817 217	17 686 971 889	15 137 476 434	11 995 382 955	7 597 209 165
23	China CITIC Bank	16 909 390 328	12 860 965 000	10 630 763 600	10 890 892 382	9 362 153 236
24	China Construction Bank	9 184 481 620	9 832 862 459	12 460 673 503	14 248 044 868	9 667 383 971
25	Deutsche Bank	7 471 718 139	9 342 118 124	9 442 378 793	11 895 258 354	16 785 906 312
26	Shanghai Pudong Development Bank	7 579 457 323	9 333 175 121	12 324 617 045	8 531 345 207	7 756 099 265
27	ING	5 155 789 180	10 970 572 571	6 578 480 043	9 068 772 029	12 106 652 269
28	China Merchants Bank	9 124 186 327	11 661 439 911	8 304 332 076	6 691 278 043	7 828 416 989
29	Santander	6 640 003 665	8 065 380 415	10 243 487 153	9 457 921 270	5 010 062 018
30	PNC	12 606 105 412	7 108 394 636	5 075 229 647	5 981 761 488	8 004 790 457
31	China Everbright Bank	7 232 637 280	10 157 813 004	11 521 571 565	4 969 683 175	4 865 633 459
32	Standard Chartered	5 110 652 385	7 123 931 858	7 086 626 010	8 384 451 533	10 246 480 306
33	US Bancorp	8 792 694 440	9 893 606 496	7 959 369 780	4 460 819 901	6 322 633 893
34	Bank of Communications	9 190 057 944	9 664 646 886	7 146 142 644	5 621 126 664	5 168 554 551
35	UniCredit	5 728 749 973	4 894 645 069	8 882 880 059	5 527 162 383	5 037 745 121
36	China Minsheng Bank	1 887 749 794	2 369 285 957	10 686 884 440	10 214 603 379	2 782 202 482
37	UBS	2 843 172 219	4 194 524 876	2 549 849 573	6 326 274 149	11 433 877 800
38	BBVA	2 496 544 728	3 593 826 233	5 071 905 457	4 980 660 950	4 974 431 840
39	ANZ	3 749 323 899	1 508 733 409	3 157 042 436	3 536 179 018	4 264 043 112
40	State Bank of India	1 080 446 043	4 693 492 055	2 833 015 825	6 244 492 803	1 057 917 566
41	Intesa Sanpaolo	3 250 751 203	3 575 176 566	1 994 669 807	1 566 540 492	4 371 853 240
42	Postal Savings Bank of China	2 527 546 051	3 743 737 453	2 223 979 824	3 197 829 691	1 667 701 938
43	KB Financial	995 930 209	888 405 155	1 915 949 402	1 886 381 585	5 609 335 986
44	Commerzbank	1 168 060 029	1 270 864 324	2 229 371 552	3 674 665 128	2 513 614 324
45	NatWest	1 167 345 903	1 925 515 823	2 109 695 120	1 625 410 992	3 511 631 790

46	Lloyds	1 806 312 472	1 306 203 359	2 302 922 283	1 507 120 067	2 364 292 756
47	Nordea Bank	927 075 087	1 072 236 170	1 492 509 060	2 178 423 603	1 324 787 319
48	Westpac	807 766 911	1 092 537 512	826 901 449	3 092 960 695	1 088 293 737
49	CaixaBank	2 215 845 967	476 682 746	682 157 884	1 864 856 517	1 385 163 611
50	Commonwealth Bank	494 468 207	1 063 486 234	1 757 436 962	956 067 154	1 905 561 913
51	NAB	837 495 971	1 786 263 045	724 661 349	1 367 005 470	1 226 960 859
52	Danske Bank	585 634 971	1 131 171 363	854 500 834	1 774 976 998	1 290 053 096

Source : (Banking On Climate Chaos, 2023)

The table above is extracted from the 2023 Fossil Fuel Finance Report of Banking On Climate Chaos, and only focuses on the years 2018 to 2022. Our 52 banks are ranked from the highest financier of fossil fuel companies to the lowest based on the level of “financing for approximately 2,000 group-level companies that are either independent or parent company — totaling 3,210 companies when including relevant subsidiaries — that are involved in the extraction, transportation, transmission, distribution, combustion, trade, or storage of any fossil fuels or fossil-based electricity, globally” (Banking On Climate Chaos, 2023).

Table 7. Grand Total of Fossil Fuel Financing over 2018-2022 in Billion USD and “E” Score Mean

Rank	Bank	Grand Total of Fossil Fuel Financing	Mean “E” Score
1	JPMorgan Chase	295,98	92,51
2	Citi	236,98	95,12
3	Wells Fargo	223,16	81,24
4	Bank of America	202,17	84,76
5	RBC	178,93	83,42
6	MUFG	165,72	79,22
7	Mizuho	147,45	80,18
8	Scotiabank	135,33	92,13
9	BNP Paribas	128,29	94,91
10	Barclays	126,64	92,51
11	TD	122,71	84,73
12	HSBC	104,51	86,44
13	Morgan Stanley	102,12	79,30
14	ICBC	98,96	40,87
15	Bank of Montreal	98,64	95,32
16	Goldman Sachs	97,84	92,39
17	Bank of China	93,70	61,57
18	CIBC	86,34	84,23
19	Société Générale	74,42	95,28
20	Crédit Agricole	68,34	94,69
21	Industrial Bank	63,17	35,12
22	Agricultural Bank of China	63,01	51,04

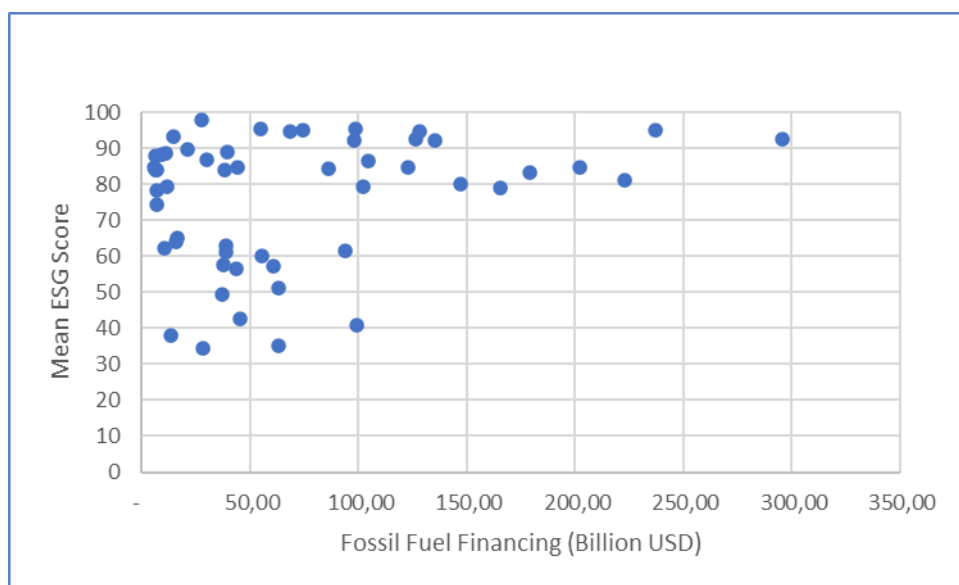
23	China CITIC Bank	60,65	57,12
24	China Construction Bank	55,39	60,01
25	Deutsche Bank	54,94	95,64
26	Shanghai Pudong Development Bank	45,52	42,49
27	ING	43,88	84,79
28	China Merchants Bank	43,61	56,49
29	Santander	39,42	88,94
30	PNC	38,78	62,93
31	China Everbright Bank	38,75	61,18
32	Standard Chartered	37,95	84,09
33	US Bancorp	37,43	57,55
34	Bank of Communications	36,79	49,30
35	UniCredit	30,07	86,73
36	China Minsheng Bank	27,94	34,34
37	UBS	27,35	97,80
38	BBVA	21,12	89,67
39	ANZ	16,22	65,05
40	State Bank of India	15,91	64,10
41	Intesa Sanpaolo	14,76	93,44
42	Postal Savings Bank of China	13,36	38,14
43	KB Financial	11,30	79,28
44	Commerzbank	10,86	88,74
45	NatWest	10,34	62,26
46	Lloyds	9,29	88,43
47	Nordea Bank	7,00	74,53
48	Westpac	6,91	84,21
49	CaixaBank	6,62	78,47
50	Commonwealth Bank	6,18	87,80
51	NAB	5,94	84,19
52	Danske Bank	5,64	84,79

The table above presents the total fossil fuel financing in billions of USD for each bank from 2018 to 2022, as well as their corresponding mean environmental pillar scores for the same period. The data provides a basis for analyzing the relationship between banks' fossil fuel financing activities and their overall environmental performance.

To investigate this relationship, we have calculated the correlation coefficient between the mean environmental scores and the total fossil fuel financing to get a first insight into our research question. The correlation coefficient obtained is equal to **0,26**. Typically, one might expect that a higher fossil fuel financing which is associated with higher carbon emissions and environmental impact, would correspond to poor environmental performance, indicating a

strong negative correlation. However, the correlation coefficient obtained of 0,26 suggests a weak positive relationship between the mean environmental scores and the total fossil fuel financing by the banks. This finding suggests that banks with substantial fossil fuel financing are not necessarily penalized in their environmental scores as expected.

Figure 3. Correlation Between Mean Environmental Scores and Fossil Fuel Financing (Billion USD)



The chart above further illustrates the relationship between fossil fuel financing and the environmental scores. While there are a few banks with high fossil fuel financing and relatively low environmental scores such as ICBC, this rule does not apply to all banks. For instance, we can clearly see that the first 14 banks which are the largest fossil fuel financiers, all have excellent “E” Scores. This overall weak correlation highlights the need to explore the factors contributing to high environmental scores despite significant fossil fuel financing.

4.3. Regression analysis

To gain a deeper understanding of the drivers behind high E scores despite significant fossil fuel financing, we need to consider additional variables and control for their effects. Therefore, we will conduct a regression analysis to explore the relationship between the environmental scores and several key financial and banking variables, including size, book to market value, financial leverage and return on equity. By analyzing these variables, we aim to identify the factors that significantly impact and drive the “E” Scores.

A- Data and variables

To conduct a thorough analysis, we used a dataset for our 52 banks over the period from 2018 to 2022, sourced from Refinitiv.

Our dependent variable is the Environmental (E) score, which we aim to explain using several independent variables.

Dependent Variable:

Environmental Score: Represents the bank's environmental performance score.

Independent Variables:

Total Assets (in billion USD): A measure of the bank's size transformed using the natural logarithm to account for non-linearity.

ROE (%): Return on Equity, indicating the bank's profitability.

Financial Leverage (%): The ratio of the bank's total debt to its total assets.

Book to Market Value (%): Book value % of market capitalization.

Years: Dummy variables for each year from 2018 to 2022, with 2018 as the reference category as it is a year not marked by any major economic or financial event.

Countries: Dummy variables for each country where the banks are headquartered, with Australia as the reference category as it is considered as a stable economy with intermediate ESG characteristics.

Total Fossil Fuel Financing (in billion USD): The total amount of financing provided by the bank to fossil fuel projects, transformed using the natural logarithm to account for non-linearity.*

*Note: This amount has already been adjusted by Banking On Climate Chaos, based on the proportion of the financed companies' activities dedicated to fossil fuels. More specifically, these transactions have been adjusted based on each company's overall fossil fuel-based assets, revenue, or operating income. This adjustment provides a more accurate reflection of banks' involvement in fossil fuel financing, independent of their overall size.

Standardization of Variables:

Before running the regression analysis, all variables were standardized in Excel using the STANDARDIZE formula. This formula adjusts the variables to have a mean of zero and a standard deviation of one, ensuring they are on the same scale as the environmental scores. Standardizing the variables allows for direct comparison of the regression coefficients.

The detailed calculations can be found in the appendices.

B- Regression Model Specification

To explore the determinants of the E scores, we employed the following multiple regression model:

Environmental Score

$$= \beta_0 + \beta_1 \text{Total Assets} + \beta_2 \text{ROE} + \beta_3 \text{Book To Market Value} \\ + \beta_4 \text{Financial Leverage} + \beta_5 \text{Total Fuel Financing} + \beta_6 \text{Year} \\ + \beta_7 \text{Country} + \epsilon$$

No need to mention that we used a variable for each country and for each year except the year 2018 and Australia, as mentioned before.

C- Base Regression Analysis Results

We first conduct a base regression analysis excluding the Total Fuel Financing variable for the E Score. We also extended this analysis to its three subcategories: Resource Use Score, Environmental Innovation Score, and Emissions Score. By excluding the total fuel financing, we aim to understand how the financial variables and various country and time specific factors influence the environmental scores. This isolation allows us to identify significant predictors and understand the broader context of environmental performance among banks.

Environmental (E) Score:

- R-squared: 0.790
- Adjusted R-squared: 0.770

Table 8. Base Environmental Score regression

	Coefficient	Standard Error	t Value	p Value
const	85,380	3,079	27,733	0,000
Total Assets	13,335	2,074	6,428	0,000

ROE	1,059	1,079	0,982	0,327
Book to Market Value	0,922	1,200	0,769	0,443
Financial Leverage	4,729	0,861	5,490	0,000
Year 2022	2,381	1,825	1,305	0,193
Year 2021	2,631	1,807	1,456	0,147
Year 2020	2,315	1,904	1,216	0,225
Year 2019	1,421	1,790	0,794	0,428
Country China	-47,814	4,403	-10,860	0,000
Country United States	-3,458	2,562	-1,350	0,178
Country Canada	8,448	2,966	2,848	0,005
Country United Kingdom	5,535	3,075	1,800	0,073
Country Spain	11,426	3,481	3,282	0,001
Country France	16,693	4,222	3,954	0,000
Country Germany	16,911	5,164	3,275	0,001
Country Denmark	-16,042	5,243	-3,060	0,002
Country Netherlands	7,906	4,672	1,692	0,092
Country Italy	11,443	3,812	3,002	0,003
Country South Korea	-52,085	9,244	-5,634	0,000
Country Japan	-46,910	7,999	-5,864	0,000
Country Finland	-10,962	4,835	-2,267	0,024
Country India	-39,958	6,648	-6,010	0,000
Country Switzerland	14,974	4,528	3,307	0,001

Comments:

- ➔ 79% of the data can be explained by this model, suggesting a strong fit and that the included predictors are highly relevant.
- ➔ The significant variables with p-values < 0.05 are the ones that affect the E scores and are highlighted in grey:
 - Total Assets: A significant positive coefficient of 13.33 indicates that for each unit increase in the log of total assets, the E score increases by 13.33 points. This suggests that larger banks tend to have higher environmental scores.
 - Financial Leverage: A significant positive coefficient of 4.73 indicates that higher financial leverage is associated with an increase of 4.73 points in the E score.
 - China: A significant negative coefficient (-47.81, $p < 0.001$) suggests that banks in China have E scores that are on average 47.81 points lower than those in Australia (reference country).
 - South Korea: A significant negative coefficient (-52.09, $p < 0.001$) indicates that banks in South Korea have E scores that are 52.09 points lower than those in Australia.

- Japan: A significant negative coefficient (-46.91, $p < 0.001$) indicates that banks in Japan have E scores that are 46.91 points lower than those in Australia.
- India: A significant negative coefficient (-39.96, $p < 0.001$) indicates that banks in India have E scores that are 39.96 points lower than those in Australia.
- Canada: A significant positive coefficient (8.45, $p = 0.005$) indicates that banks in Canada have E scores that are 8.45 points higher than those in Australia.
- Spain, France, Germany, Italy, Switzerland: Positive and significant coefficients indicate that banks in these countries have higher E scores compared to those in Australia.
- Denmark, Finland: Negative coefficients suggest that banks in these countries have E scores that are on average lower than those in Australia.

Resource Use Score:

- R-squared: 0.684
- Adjusted R-squared: 0.653

Table 9. Base Resource Use Score regression

	Coefficient	Standard Error	t Value	p Value
const	99,506	3,752	26,524	0,000
Total Assets	12,121	2,528	4,795	0,000
ROE	0,767	1,315	0,583	0,560
Book to Market Value	1,746	1,462	1,194	0,234
Financial Leverage	0,639	1,050	0,609	0,543
Year 2022	4,948	2,224	2,224	0,027
Year 2021	4,878	2,202	2,215	0,028
Year 2020	4,233	2,320	1,824	0,069
Year 2019	2,968	2,181	1,360	0,175
Country China	-52,941	5,365	-9,868	0,000
Country United States	-8,600	3,121	-2,755	0,006
Country Canada	-6,601	3,615	-1,826	0,069
Country United Kingdom	-6,815	3,747	-1,819	0,070
Country Spain	-1,010	4,242	-0,238	0,812
Country France	-13,525	5,145	-2,629	0,009
Country Germany	-10,636	6,293	-1,690	0,092
Country Denmark	-12,164	6,388	-1,904	0,058
Country Netherlands	4,222	5,693	0,742	0,459
Country Italy	-11,228	4,645	-2,417	0,016
Country South Korea	-88,463	11,265	-7,853	0,000
Country Japan	-78,442	9,748	-8,047	0,000
Country Finland	3,932	5,892	0,667	0,505
Country India	-78,220	8,102	-9,655	0,000

Country Switzerland	3,706	5,518	0,672	0,502
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Environmental Innovation Score:

- R-squared: 0.752
- Adjusted R-squared: 0.728

Table 10. Base Environmental Innovation Score regression

	Coefficient	Standard Error	t Value	p Value
const	85,459	4,052	21,092	0,000
Total Assets	19,907	2,730	7,291	0,000
ROE	1,668	1,420	1,175	0,241
Book to Market Value	1,156	1,579	0,732	0,465
Financial Leverage	5,510	1,134	4,860	0,000
Year 2022	2,211	2,402	0,920	0,358
Year 2021	1,735	2,378	0,730	0,466
Year 2020	1,902	2,506	0,759	0,449
Year 2019	1,107	2,356	0,470	0,639
Country China	-60,134	5,794	-10,378	0,000
Country United States	-1,266	3,371	-0,376	0,708
Country Canada	11,523	3,904	2,952	0,003
Country United Kingdom	6,118	4,047	1,512	0,132
Country Spain	16,483	4,581	3,598	0,000
Country France	20,663	5,557	3,719	0,000
Country Germany	25,558	6,797	3,760	0,000
Country Denmark	-20,350	6,899	-2,949	0,004
Country Netherlands	10,677	6,149	1,736	0,084
Country Italy	15,717	5,017	3,133	0,002
Country South Korea	-69,282	12,166	-5,695	0,000
Country Japan	-61,493	10,528	-5,841	0,000
Country Finland	-11,409	6,363	-1,793	0,074
Country India	-49,743	8,750	-5,685	0,000
Country Switzerland	17,557	5,959	2,946	0,004

Emissions Score:

- R-squared: 0.590
- Adjusted R-squared: 0.550

Table 11. Base Emissions Score regression

	Coefficient	Standard Error	t Value	p Value
const	91,318	4,496	20,309	0,000
Total Assets	11,481	3,030	3,790	0,000
ROE	1,574	1,576	0,999	0,319
Book to Market Value	3,584	1,753	2,045	0,042
Financial Leverage	0,438	1,258	0,348	0,728

Year 2022	5,278	2,666	1,980	0,049
Year 2021	4,015	2,639	1,521	0,129
Year 2020	2,648	2,781	0,952	0,342
Year 2019	3,402	2,615	1,301	0,195
Country China	-51,024	6,430	-7,935	0,000
Country United States	-6,964	3,741	-1,861	0,064
Country Canada	5,749	4,332	1,327	0,186
Country United Kingdom	-7,183	4,491	-1,599	0,111
Country Spain	-6,210	5,084	-1,221	0,223
Country France	2,165	6,167	0,351	0,726
Country Germany	-4,594	7,543	-0,609	0,543
Country Denmark	-8,523	7,657	-1,113	0,267
Country Netherlands	-0,623	6,824	-0,091	0,927
Country Italy	7,402	5,568	1,329	0,185
Country South Korea	-56,432	13,501	-4,180	0,000
Country Japan	-38,768	11,683	-3,318	0,001
Country Finland	-7,008	7,062	-0,992	0,322
Country India	-60,119	9,710	-6,191	0,000
Country Switzerland	9,266	6,613	1,401	0,162

Comparison across all scores:

- ➔ Total Assets: Across all subcategories (Resource Use, Environmental Innovation, Emissions), Total Assets consistently show a significant positive impact, indicating that larger banks tend to have higher scores in all environmental dimensions.
- ➔ ROE: Remains insignificant across all regressions, suggesting that profitability does not have a noticeable impact on the environmental scores of banks.
- ➔ Book to Market Value: Shows a significant positive impact for the Emissions score.
- ➔ Financial Leverage: Shows a consistent significant positive impact for the E score and the Environmental Innovation score, indicating that banks with higher leverage tend to have higher environmental scores.
- ➔ Year Effects: Year 2022 and year 2021 show a significant positive impact on the Resource Use score. Year 2022 is also significant for the Emissions score, suggesting that changes in year 2022 significantly affect the mentioned scores.
- ➔ Country Effects:
 - Negative Impacts: China, South Korea, Japan, and India consistently show significant negative coefficients across all environmental scores, indicating that banks in these countries tend to have lower environmental scores.

- Positive Impacts: Canada, Spain, France, Germany, Italy, and Switzerland consistently show significant positive coefficients, indicating that banks in these countries tend to have higher environmental scores.
- Variations: The magnitude of country effects varies slightly between different subcategories, but the overall pattern remains consistent.

D- Regression Analysis Results after the introduction of the Total Fuel Financing variable

The regressions were rerun with Total Fuel Financing added as a variable.

Environmental (E) Score:

- R-squared: 0.797
- Adjusted R-squared: 0.777

Table 12. Environmental Score regression with Total Fuel Financing

	Coefficient	Standard Error	t Value	p Value
const	86,460	3,055	28,298	0,000
Total Assets	8,077	2,741	2,947	0,004
ROE	1,175	1,063	1,105	0,270
Book to Market Value	0,645	1,186	0,544	0,587
Financial Leverage	4,077	0,878	4,642	0,000
Total Fuel Financing	3,576	1,243	2,877	0,004
Year 2022	3,748	1,860	2,016	0,045
Year 2021	3,282	1,794	1,829	0,069
Year 2020	2,945	1,888	1,560	0,120
Year 2019	1,351	1,763	0,766	0,444
Country China	-45,530	4,408	-10,328	0,000
Country United States	-10,736	3,573	-3,005	0,003
Country Canada	0,003	4,142	0,001	1,000
Country United Kingdom	1,082	3,401	0,318	0,751
Country Spain	8,318	3,595	2,314	0,022
Country France	11,026	4,602	2,396	0,017
Country Germany	13,738	5,205	2,639	0,009
Country Denmark	-9,257	5,677	-1,631	0,104
Country Netherlands	3,019	4,905	0,616	0,539
Country Italy	8,951	3,853	2,323	0,021
Country South Korea	-32,295	11,412	-2,830	0,005
Country Japan	-37,970	8,470	-4,483	0,000
Country Finland	-10,916	4,762	-2,292	0,023
Country India	-29,887	7,425	-4,025	0,000
Country Switzerland	12,482	4,543	2,748	0,006

Comments:

- ➔ Total Assets and Financial Leverage remain significant but reduced in importance.
- ➔ A positive coefficient of 3.576 for the Total Fuel Financing shows that for each unit increase in the fuel financing, the E score increases by 3.576 points. This indicates that banks involved in fuel financing might be compensating through other environmental efforts.
- ➔ Year 2022 shows a positive impact on the Environmental Scores, suggesting general environmental enhancements compared to year 2018.
- ➔ The significant negative impact of certain countries (like China, the United States, South Korea, Japan, and India) is consistent with the base regression, indicating geographical differences in environmental performance.

Resource Use Score:

- R-squared: 0.693
- Adjusted R-squared: 0.662

Table 13. Resource Use Score regression with Total Fuel Financing

	Coefficient	Standard Error	t Value	p Value
const	98,275	3,731	26,337	0,000
Total Assets	18,116	3,348	5,411	0,000
ROE	0,634	1,299	0,488	0,626
Book to Market Value	2,062	1,448	1,424	0,156
Financial Leverage	1,383	1,073	1,290	0,198
Total Fuel Financing	-4,077	1,518	-2,686	0,008
Year 2022	3,389	2,271	1,492	0,137
Year 2021	4,136	2,191	1,888	0,060
Year 2020	3,514	2,306	1,524	0,129
Year 2019	3,047	2,154	1,415	0,158
Country China	-55,545	5,384	-10,317	0,000
Country United States	-0,302	4,364	-0,069	0,945
Country Canada	3,029	5,058	0,599	0,550
Country United Kingdom	-1,738	4,154	-0,418	0,676
Country Spain	2,533	4,390	0,577	0,564
Country France	-7,063	5,620	-1,257	0,210
Country Germany	-7,018	6,356	-1,104	0,271
Country Denmark	-19,901	6,933	-2,871	0,004
Country Netherlands	9,794	5,990	1,635	0,103
Country Italy	-8,386	4,706	-1,782	0,076
Country South Korea	-111,029	13,936	-7,967	0,000
Country Japan	-88,636	10,344	-8,569	0,000
Country Finland	3,878	5,816	0,667	0,506

Country India	-89,703	9,068	-9,892	0,000
Country Switzerland	6,547	5,548	1,180	0,239

Comments:

- ➔ The significance and positive impact of Total Assets remain consistent, reaffirming the importance of bank size in resource use practices.
- ➔ The negative coefficient of the Total Fuel Financing suggests that higher fuel financing is associated with poorer resource use practices, aligning with the expectation that increased financing of fossil fuels would detract from sustainable resource use.
- ➔ Years 2022 and 2021 did not maintain significance when accounting for fuel financing compared to the base regression of this score.

Environmental Innovation Score:

- R-squared: 0.759
- Adjusted R-squared: 0.735

Table 14. Environmental Innovation Score regression with Total Fuel Financing

	Coefficient	Standard Error	t Value	p Value
const	86,767	4,032	21,520	0,000
Total Assets	13,542	3,617	3,744	0,000
ROE	1,808	1,403	1,289	0,199
Book to Market Value	0,820	1,565	0,524	0,601
Financial Leverage	4,720	1,159	4,073	0,000
Total Fuel Financing	4,328	1,640	2,639	0,009
Year 2022	3,866	2,454	1,575	0,116
Year 2021	2,522	2,367	1,065	0,288
Year 2020	2,665	2,491	1,070	0,286
Year 2019	1,022	2,327	0,439	0,661
Country China	-57,369	5,817	-9,862	0,000
Country United States	-10,076	4,715	-2,137	0,034
Country Canada	1,300	5,465	0,238	0,812
Country United Kingdom	0,727	4,488	0,162	0,871
Country Spain	12,721	4,744	2,682	0,008
Country France	13,802	6,072	2,273	0,024
Country Germany	21,717	6,868	3,162	0,002
Country Denmark	-12,136	7,491	-1,620	0,107
Country Netherlands	4,761	6,473	0,736	0,463
Country Italy	12,700	5,085	2,498	0,013
Country South Korea	-45,325	15,059	-3,010	0,003
Country Japan	-50,670	11,177	-4,534	0,000
Country Finland	-11,352	6,285	-1,806	0,072
Country India	-37,552	9,799	-3,832	0,000

Country Switzerland	14,542	5,995	2,426	0,016
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Comments:

- ➔ Total Assets and Financial Leverage stay significant, showing that such banks are significantly more likely to score higher in environmental innovation.
- ➔ The significant positive coefficient for Total Fuel Financing suggests that banks involved in fuel financing are also investing in environmental innovation.

Emissions Score:

- R-squared: 0.600
- Adjusted R-squared: 0.559

Table 15. Emissions Score regression with Total Fuel Financing

	Coefficient	Standard Error	t Value	p Value
const	89,977	4,484	20,065	0,000
Total Assets	18,005	4,023	4,475	0,000
ROE	1,430	1,561	0,916	0,361
Book to Market Value	3,928	1,740	2,257	0,025
Financial Leverage	1,247	1,289	0,968	0,334
Total Fuel Financing	-4,437	1,824	-2,432	0,016
Year 2022	3,581	2,729	1,312	0,191
Year 2021	3,208	2,633	1,219	0,224
Year 2020	1,866	2,771	0,673	0,501
Year 2019	3,489	2,588	1,348	0,179
Country China	-53,858	6,470	-8,324	0,000
Country United States	2,067	5,244	0,394	0,694
Country Canada	16,229	6,079	2,670	0,008
Country United Kingdom	-1,657	4,992	-0,332	0,740
Country Spain	-2,353	5,276	-0,446	0,656
Country France	9,198	6,754	1,362	0,175
Country Germany	-0,656	7,639	-0,086	0,932
Country Denmark	-16,942	8,332	-2,034	0,043
Country Netherlands	5,441	7,199	0,756	0,451
Country Italy	10,494	5,655	1,856	0,065
Country South Korea	-80,989	16,748	-4,836	0,000
Country Japan	-49,862	12,431	-4,011	0,000
Country Finland	-7,066	6,990	-1,011	0,313
Country India	-72,616	10,898	-6,663	0,000
Country Switzerland	12,357	6,667	1,853	0,065

Comments:

- ➔ Total Assets and Book to Market Value remain significant, suggesting larger banks and undervalued banks are associated with higher emissions scores.
- ➔ The Total Fuel Financing variable introduces a complex dynamic, where banks involved in fuel financing show lower emissions scores, indicating efforts to balance their environmental footprint.
- ➔ Year 2022 did not maintain significance when accounting for fuel financing compared to the base regression.

5. Discussion

5.1. Interpretation of results

The aim of this thesis is to investigate the extent to which environmental scores reflect the real practices of banks, particularly in relation to their involvement in fossil fuel financing. The study began with a simple correlation analysis between environmental scores (E scores) and total fossil fuel financing, revealing a weak but positive correlation (0.26) which suggests that higher E scores are not necessarily indicative of lower involvement in fuel financing, prompting further investigation. To do so, eight regressions were conducted: four base regressions to explain the E scores and their three subcategories (Resource Use, Environmental Innovation, and Emissions) and four additional regressions incorporating total fossil fuel financing as an independent variable.

This two-step regression approach aimed at providing a comprehensive analysis by allowing for a detailed examination of the relationship between traditional financial metrics and environmental scores, while also integrating a factual element that should significantly impact environmental performance.

The results of the regression confirm what we observed in the literature review: larger banks generally achieve better environmental scores. Despite including fossil fuel financing in the regression, it seems to have a positive impact on the overall environmental scores. This indicates that the scores might not accurately reflect the banks' real environmental footprints, except in the resource use and emissions subcategories. However, even in these subcategories, the total assets variable continues to have a significant positive impact.

The positive effects of total assets on E scores suggest that larger banks can still achieve higher environmental scores despite their heavy involvement in fossil fuel financing. This could be due to their ability to invest in substantial environmental initiatives, potentially offsetting the negative impacts of fuel financing. They may have more resources to allocate towards sustainability projects, influencing their scores positively.

Another possibility is that larger banks might report better ESG scores due to sophisticated risk management and comprehensive reporting practices, aligning with regulatory expectations. This may reflect advanced financial strategies rather than genuine improvements in environmental practices, aligning with literature on greenwashing and reporting transparency.

A high level of financial leverage is normally seen as a constraint on financial flexibility, but here we can notice that it has a significant positive effect on the environmental scores. It is important to note that our sample consists of large publicly traded companies. Therefore, the observed phenomenon of higher leveraged banks still managing to achieve high E scores is expected. Leverage does not limit their ability to invest in sustainability initiatives, possibly due to their size as explained, better access to capital markets or a strategic emphasis on ESG performance.

Given these findings, it is crucial to focus on the Emissions Score, which is the score that should most directly reflect the environmental impact of banks' financing activities, particularly those related to fossil fuels.

As presented before, the Emissions Score from Refinitiv evaluates a company's emissions footprint and waste management practices. This score includes various metrics that “measure a company's commitment and effectiveness towards reducing environmental emission in the production and operational processes” (LSEG, 2023), such as “Targets Emissions” and “Environmental Partnerships”. Among these, scope 3 emissions labelled as “CO2 Equivalent Emissions Indirect, Scope 3 To Revenues USD In Million”, are particularly critical as they encompass indirect emissions from a company's value chain, including financed emissions, which are highly relevant for banks due to their lending and investment activities.

We considered adding Scope 3 emissions as an independent variable in our regressions to gain further insights, but consistent data was unavailable. In fact, while LSEG Environmental scores include scope 3 emissions, not all banks in our sample have reported these emissions.

This inconsistency in reporting may impact the overall comparability and comprehensiveness of the emissions scores. Since the scores are influenced by peer performance, banks that report their scope 3 emissions, like Citi, may achieve higher scores compared to those that do not.

For instance, Citi, which is the second-largest fossil fuel financier globally, as reported by Banking On Climate Chaos, has a high score of 85 for ‘CO2 Equivalent Emissions Indirect, Scope 3 to Revenues USD in Million’. This high score appears to be contradictory given Citi’s significant fossil fuel financing activities. However, this score likely reflects Citi’s relative efficiency in managing its scope 3 emissions per unit of revenue, its initiatives to offset or reduce these emissions, and the quality and comprehensiveness of its emissions reporting. Because as explained before, the LSEG score is influenced by how the bank’s performance stacks up against others in its sector and whether it reports the relevant information. Banks that report their emissions comprehensively and manage them efficiently tend to score higher, even if their absolute emissions are significant.

This relative performance approach means that even banks with high fossil fuel financing can achieve high emissions scores if they manage their emissions more efficiently compared to their peers and provide comprehensive emissions data. Thus, while fossil fuel financing is a critical factor, it does not solely determine a bank’s emissions score.

But when looking back at the regression analysis, we can notice that fossil fuel financing is still a significant variable and it negatively impacts the emissions score, suggesting a partial reflection of environmental practices. However, the full extent of the impact is underrepresented which further supports our earlier observation that larger banks, due to their comprehensive reporting and resources for mitigation strategies, might still report high emissions scores despite significant fuel financing activities.

An additional significant variable that can be observed in the emissions score’s regression is the book-to-market value. It indicates that banks with higher book values relative to their market values tend to have higher emissions scores. This might imply that undervalued banks are likely focusing on sustainability to improve their long-term market position and comply with regulatory standards.

In analyzing the impact of specific years on environmental scores, the year 2022 emerges as particularly significant in the regression that includes fossil fuel financing which highlights the influence of recent regulatory and market shifts.

“In the realm of what is mainly called sustainability or ESG now, the pressures on business to do more and better expanded rapidly this year” (Winston, 2022). In fact, in 2022, the focus on ESG issues intensified with several significant regulations related to ESG that were implemented or proposed. For example, the EU Taxonomy Regulation which became more prominent in 2022 and the expansion of the scope of the CSRD pushed companies, including banks, towards enhanced sustainability disclosures and alignment with ESG friendly practices. In the USA, the SEC proposed new rules for climate-related disclosures, signaling efforts towards transparent ESG reporting. Additionally, the IFRS Foundation’s efforts to establish the ISSB drove anticipation for global sustainability reporting standards. Furthermore, the growing impact investment market and the increased demand for responsible investments as well as the rising activism pressured banks to improve their ESG transparency. These combined factors likely contributed to the observed improvements in ESG scores for banks in 2022.

The inclusion of country variables in our regression reveals important regional influences on environmental scores. Across the regressions that were conducted, we constantly notice that the Asian countries in our dataset (China, South Korea, Japan and India) show significant and negative coefficients. This could be due to the structure of their economies which are heavily reliant on manufacturing and industrial activities. Another reason may be the pace and enforcement of sustainability regulations which are much lower compared to European countries. Regarding European countries, several of them, such as Spain, France, and Germany, show positive and significant coefficients in many models. This suggests that European banks generally have higher environmental scores, likely due to rigorous EU regulations and a strong cultural emphasis on sustainability.

The variation of coefficients across these countries highlights the importance of considering regional regulations and market conditions when evaluating environmental scores. Banks in countries with stricter environmental regulations or greater public scrutiny might have higher environmental scores due to better compliance and reporting standards.

Another interesting aspect to consider is the low weight of the emissions score in the overall environmental score, as previously presented in the LSEG methodology. In fact, the innovation score has a weight that is four times larger than that of the emissions or resource use scores. This suggests that the emissions and resource use scores are relatively less significant, or material compared to the innovation score, which is unusual since they are the ones that reflect environmental impact. This suggests that banks might be focusing more on investing in

environmental innovations in terms of technologies or products rather than solely reducing emissions or resource use which might also explain their high environmental scores.

In addressing our research question, "To what extent do ESG scores align with and reflect the environmental real-world practices of banks?", our findings indicate a complex relationship. While the regression analyses show that variables such as total assets, financial leverage, and fossil fuel financing are significant predictors of E scores, the influence of fossil fuel financing is nuanced. The underrepresentation of fossil fuel financing in the emissions scores suggests that these scores do not fully capture the environmental impact of banks' financing activities. The influence of comprehensive reporting practices and peer performance further complicates this relationship, indicating that higher scores can sometimes reflect better reporting rather than purely better environmental performance.

5.2. Study Limitations

While the findings of this study enrich the current literature and provide valuable insights into what drives the environmental scores, it is important to acknowledge some limitations that may affect them.

Even though the inclusion of the fossil fuel financing in the emissions scores' regression has improved its R-squared value, we can still see that the model only explains 60% of the variance in the emissions score, which is lower than the other scores' regressions. While 60% is a significant portion, it also indicates that 40% of the variance in the dependent variable is not explained by the model. This could imply that the relationship between fossil fuel financing and environmental scores is more complex and not fully captured by the current set of variables. There could be non-linear relationships, interactions with other variables, or other factors not included in the model that affect the emissions score.

Also, despite our efforts, the completeness of our analysis was constrained by the inconsistency in Scope 3 emissions data across banks which limits the ability to fully assess their environmental impact. This affects the accuracy and comprehensiveness of the analysis. Additionally, the reliance on LSEG/Refinitiv scores alone, further restricts the evaluation of banks' total environmental footprint. Together, these issues highlight the need for more comprehensive data and scoring methodologies to truly reflect banks' environmental practices.

6. Conclusion

The aim of the study in question was to examine whether the ESG scores accurately reflect banks' real environmental practices, especially in the context of their fossil fuel financing activities. To address this question, the study focused on the 52 world's largest banks in fossil fuel financing to which we conducted a series of regression analyses on their environmental scores, over the period from 2018 to 2022.

This involved analyzing the relationship between the E scores and various financial and regional factors, as well as delving into the specific subcategories of these scores, which are Resource Use, Environmental Innovation, and Emissions. The independent variables included size, ROE, financial leverage, book-to-market value, years, and countries, with Australia and the year 2018 serving as reference categories. We also included total fossil fuel financing as a factual element to assess its impact on the scores.

Our findings revealed that size and financial leverage are significant variables that explain environmental scores, which indicates that larger banks with more resources tend to have higher scores. In addition to these variables, the year 2022 positively influenced the environmental scores, reflecting the increased regulatory activity and environmental awareness during that year. However, country variables showed different impacts, with Asian countries generally having negative coefficients, as opposed to European countries. This highlights the importance of considering regional regulations and market conditions when analyzing environmental scores.

When focusing on emissions scores, which are the ones that should reflect the negative impact of fossil fuel financing, our findings underscored the complexity of assessing environmental impact. We found that the inclusion of total fossil fuel financing as an independent variable in the regression was significant, but its impact was underrepresented, suggesting that these scores do not fully capture the environmental impact of banks' financing activities. This might be explained by comprehensive reporting practices. In fact, banks that provide detailed and transparent emissions data, like Citi, tend to achieve higher scores, underscoring the significance of reporting.

Another important insight from our study is the low weight given to emissions and resource use scores in the overall environmental scores compared to the innovation subcategory. This suggests that banks might get high environmental scores simply by focusing their investments

on environmental innovations in terms of technologies or products rather than solely reducing their emissions.

In conclusion, we can say that these findings support critiques in the literature about ESG scoring methods lacking accuracy and consistency. An ESG score must comprehensively reflect the true impact of companies on the environment. This score should be accurate, complete, and easily understandable to investors, ensuring that they can make informed decisions. The underrepresentation of certain critical factors, such as fossil fuel financing, suggests a need for more comprehensive data integration.

It is also important to suggest important avenues for future research. The ISSB's framework for measuring Scope 3 GHG emissions could provide a useful foundation for future research as it could address some of the gaps previously pointed at as part of our study limitations. Also, verification of our conclusions with the use of scores from other rating agencies is crucial.

Appendices

Appendix 1. Raw data

Total Assets: in Billion USD

ROE: Return on Average Common Equity - %

Book to Market Value: Book Value of % of Market Capitalization

Financial Leverage: Total Debt / Total Assets - %

Total Fuel Financing: in Billion USD

Bank name	Environmental Score	Resource Use Score	Environmental Innovation Score	Emissions Score	Total Assets	ROE	Book to Market Value	Financial Leverage	Total Fuel Financing	Year	Country
Agricultural Bank of China	51,21	62,44	52,16	49,02	33925,49	11,30	221,64	8,33	10,59	2022	China
Agricultural Bank of China	53,53	53,90	49,86	38,93	29069,16	11,54	204,07	7,92	17,69	2021	China
Agricultural Bank of China	48,72	67,77	52,22	50,11	27205,05	11,36	174,79	8,19	15,14	2020	China
Agricultural Bank of China	52,72	57,20	51,90	37,13	24877,49	12,43	137,11	7,16	12,00	2019	China
Agricultural Bank of China	49,05	56,73	54,33	38,69	22609,47	13,50	127,92	6,63	7,60	2018	China
ANZ	65,31	94,06	50,00	96,77	1085,73	11,02	96,68	13,74	3,75	2022	Australia
ANZ	66,82	94,39	52,16	96,99	978,86	9,89	79,44	13,53	1,51	2021	Australia
ANZ	64,25	94,39	49,86	91,83	1042,29	6,02	125,49	13,25	3,16	2020	Australia
ANZ	65,94	93,51	52,22	93,30	981,14	10,49	75,19	15,23	3,54	2019	Australia
ANZ	62,94	91,83	51,90	78,42	1022	9,35	94,20	15,44	4,26	2018	Australia
Bank of America	81,98	98,69	80,45	90,56	3051,38	10,61	92,13	16,34	35,47	2022	United States
Bank of America	85,03	95,72	79,53	86,03	3169,5	12,38	67,39	15,66	35,92	2021	United States
Bank of America	83,31	99,89	83,54	85,21	2819,63	6,73	94,74	16,05	45,45	2020	United States
Bank of America	86,54	99,86	84,22	85,12	2434,08	10,73	76,20	17,67	50,19	2019	United States
Bank of America	86,94	99,83	86,36	83,11	2354,51	10,94	101,99	18,54	35,15	2018	United States
Bank of China	79,44	73,81	52,16	74,62	28893,55	10,76	233,58	9,13	15,58	2022	China
Bank of China	56,39	70,63	49,86	69,51	26722,41	11,23	228,41	9,31	14,70	2021	China
Bank of China	56,54	68,68	52,22	67,55	24402,66	10,60	205,54	9,46	19,97	2020	China
Bank of China	56,46	75,21	51,90	76,81	22769,74	11,41	160,90	9,53	20,69	2019	China
Bank of China	59,01	67,51	54,33	61,48	21267,28	11,91	149,98	9,44	22,77	2018	China
Bank of Communications	41,11	70,89	20,91	95,73	12991,57	10,34	259,08	16,55	9,19	2022	China
Bank of Communications	40,4	61,50	49,86	92,00	11665,76	10,76	250,50	15,22	9,66	2021	China
Bank of Communications	58,83	56,61	52,22	72,23	10697,62	10,36	247,18	15,63	7,15	2020	China
Bank of Communications	56,26	56,65	51,90	35,66	9905,6	11,20	175,84	14,76	5,62	2019	China
Bank of Communications	49,91	45,79	54,33	36,23	9531,17	11,36	153,84	13,95	5,17	2018	China
Bank of Montreal	94,08	93,16	96,25	95,17	1139,2	22,80	76,16	16,06	19,31	2022	Canada
Bank of Montreal	95,56	98,95	96,43	98,15	988,18	14,73	59,67	16,67	19,62	2021	Canada
Bank of Montreal	97,14	91,69	97,15	87,13	949,26	10,13	98,01	16,41	15,42	2020	Canada
Bank of Montreal	94,52	92,94	97,53	88,61	852,2	12,74	73,39	17,26	22,39	2019	Canada
Bank of Montreal	95,27	85,35	98,70	90,00	773,29	13,97	65,66	16,46	21,91	2018	Canada
Barclays	93,62	98,08	96,25	76,43	1513,7	8,99	218,69	16,48	16,58	2022	United Kingdom
Barclays	93,23	96,67	96,43	76,01	1384,29	11,14	181,29	15,94	21,44	2021	United Kingdom
Barclays	92,98	96,92	97,15	75,64	1349,51	2,82	214,53	14,31	30,32	2020	United Kingdom
Barclays	93,52	83,52	94,11	74,93	1140,23	4,62	172,12	15,61	31,44	2019	United Kingdom
Barclays	89,22	57,07	54,33	75,90	1133,28	2,96	205,22	16,67	26,86	2018	United Kingdom

BBVA	93,93	98,29	94,94	84,71	712,09	13,31	130,32	9,28	2,50	2022	Spain
BBVA	93,87	98,39	96,25	79,93	662,89	9,07	125,43	10,05	3,59	2021	Spain
BBVA	92,83	94,20	96,43	77,59	733,8	6,51	167,79	10,10	5,07	2020	Spain
BBVA	83,48	96,24	83,54	70,53	695,47	8,91	148,60	10,81	4,98	2019	Spain
BBVA	84,24	97,37	84,22	71,45	676,69	11,56	154,45	10,31	4,97	2018	Spain
BNP Paribas	94,49	88,86	96,25	94,06	2663,75	7,18	184,45	3,37	20,04	2022	France
BNP Paribas	94,64	88,69	96,43	93,23	2634,44	7,22	157,16	6,95	16,52	2021	France
BNP Paribas	94,52	86,22	97,15	97,98	2488,49	5,67	209,38	6,43	41,78	2020	France
BNP Paribas	95,43	85,46	97,53	97,45	2164,71	7,41	162,74	6,73	30,26	2019	France
BNP Paribas	95,5	81,65	98,70	98,85	2040,84	7,13	205,67	5,40	19,69	2018	France
CaixaBank	79,98	90,37	76,62	80,69	598,85	8,30	113,77	8,79	2,22	2022	Spain
CaixaBank	82,75	91,01	80,45	82,17	680,04	16,42	181,90	7,94	0,48	2021	Spain
CaixaBank	83,14	96,10	79,53	84,45	451,52	4,92	200,95	7,99	0,68	2020	Spain
CaixaBank	83,2	80,52	83,54	84,57	391,41	6,36	150,11	8,72	1,86	2019	Spain
CaixaBank	63,27	78,81	51,90	93,97	386,55	8,05	128,58	7,67	1,39	2018	Spain
China CITIC Bank	56,57	72,73	52,16	69,58	8547,54	10,80	253,91	15,92	16,91	2022	China
China CITIC Bank	58,52	69,68	49,86	67,93	8042,88	10,73	257,86	15,57	12,86	2021	China
China CITIC Bank	56,14	68,22	52,22	67,98	7511,16	10,08	218,21	13,89	10,63	2020	China
China CITIC Bank	57,49	67,17	51,90	67,43	6750,43	11,06	162,50	15,01	10,89	2019	China
China CITIC Bank	56,87	66,50	54,33	49,02	6066,71	11,27	162,12	15,81	9,36	2018	China
China Construction Bank	61,41	87,79	52,16	80,77	34600,71	12,31	247,83	8,82	9,18	2022	China
China Construction Bank	63,01	72,15	49,86	84,62	30253,98	12,54	222,65	7,81	9,83	2021	China
China Construction Bank	59,34	69,36	52,22	65,85	28132,25	12,17	180,34	7,64	12,46	2020	China
China Construction Bank	57,32	73,55	51,90	73,06	25436,26	13,16	137,96	8,97	14,25	2019	China
China Construction Bank	58,96	79,97	54,33	74,59	23222,69	13,94	132,79	7,66	9,67	2018	China
China Everbright Bank	72,98	66,90	80,45	67,90	6300,51	10,36	255,81	16,87	7,23	2022	China
China Everbright Bank	75,98	66,25	79,53	57,03	5902,07	10,76	225,22	16,38	10,16	2021	China
China Everbright Bank	73,57	63,21	52,22	46,70	5368,16	10,80	174,58	13,17	11,52	2020	China
China Everbright Bank	53,13	63,57	18,44	45,44	4733,43	11,94	144,81	13,75	4,97	2019	China
China Everbright Bank	30,26	28,45	18,83	21,80	4357,33	11,59	154,77	17,30	4,87	2018	China
China Merchants Bank	60,61	79,03	52,16	63,71	10138,91	17,06	86,15	4,66	9,12	2022	China
China Merchants Bank	60,45	76,33	49,86	63,01	9249,02	16,96	59,42	8,39	11,66	2021	China
China Merchants Bank	56,5	55,81	52,22	43,72	8361,45	15,73	58,37	9,96	8,30	2020	China
China Merchants Bank	51,36	55,96	51,90	58,04	7417,24	16,84	61,44	13,65	6,69	2019	China
China Merchants Bank	53,52	73,57	54,33	48,03	6745,73	16,57	79,63	13,43	7,83	2018	China
China Minsheng Bank	32,78	75,19	20,91	58,25	7255,67	6,30	355,13	12,56	1,89	2022	China
China Minsheng Bank	32,5	73,10	18,27	63,88	6952,79	6,58	305,54	15,01	2,37	2021	China
China Minsheng Bank	33,46	71,64	18,35	62,45	6950,23	6,82	213,44	19,08	10,69	2020	China
China Minsheng Bank	36,8	70,22	18,44	63,94	6681,84	12,40	167,80	16,88	10,21	2019	China
China Minsheng Bank	36,19	61,78	18,83	65,41	5994,82	12,78	169,05	17,82	2,78	2018	China
CIBC	80,59	90,25	80,45	93,08	943,6	13,97	80,74	11,21	17,87	2022	Canada
CIBC	84,07	87,74	79,53	92,71	837,68	15,90	61,82	12,51	23,98	2021	Canada
CIBC	83,04	88,04	83,54	97,34	769,55	10,03	84,94	12,61	10,19	2020	Canada
CIBC	86,51	88,23	84,22	97,18	651,6	14,61	71,19	11,35	21,44	2019	Canada
CIBC	86,96	83,33	86,36	92,30	597,1	16,72	65,01	8,61	12,85	2018	Canada
Citi	93,08	93,60	94,75	95,44	2416,68	7,63	207,97	21,56	33,94	2022	United States
Citi	94,94	93,58	94,88	95,74	2291,41	11,43	152,70	20,67	46,95	2021	United States
Citi	95,23	93,78	96,88	93,39	2260,09	5,57	140,19	22,16	51,63	2020	United States

Citi	95,41	94,68	98,56	95,16	1951,16	10,30	100,49	23,58	54,72	2019	United States
Citi	96,94	96,90	99,44	95,74	1917,38	9,23	139,82	23,06	49,73	2018	United States
Commerzbank	90,92	85,64	96,25	86,22	477,43	4,73	243,38	9,17	1,17	2022	Germany
Commerzbank	92,74	82,60	96,43	81,99	467,41	1,15	307,25	9,38	1,27	2021	Germany
Commerzbank	91,66	71,41	97,15	72,66	506,61	11,09	376,59	9,10	2,23	2020	Germany
Commerzbank	88,62	71,88	84,22	69,84	463,45	2,13	409,87	9,77	3,67	2019	Germany
Commerzbank	79,77	71,89	86,36	85,08	462,39	3,07	389,60	10,03	2,51	2018	Germany
Commonwealth Bank	93,7	98,57	94,94	83,50	1215,26	12,77	47,23	15,03	0,49	2022	Australia
Commonwealth Bank	92,71	98,85	96,25	73,36	1091,98	11,74	44,43	14,76	1,06	2021	Australia
Commonwealth Bank	82,39	99,33	79,53	77,07	1015,47	10,44	58,53	18,83	1,76	2020	Australia
Commonwealth Bank	85,05	96,47	83,54	79,89	976,5	12,21	47,49	21,25	0,96	2019	Australia
Commonwealth Bank	85,16	94,04	84,22	79,76	975,17	13,89	52,48	21,67	1,91	2018	Australia
Crédit Agricole	94,69	89,26	96,43	96,22	2143,33	7,08	222,39	7,14	11,66	2022	France
Crédit Agricole	94,87	87,59	97,15	96,49	2073,96	8,22	174,58	8,31	10,96	2021	France
Crédit Agricole	95,17	72,99	97,53	95,84	1961,06	3,96	216,67	9,17	19,61	2020	France
Crédit Agricole	95,44	72,56	98,70	93,61	1767,64	7,06	168,76	10,43	12,50	2019	France
Crédit Agricole	93,29	79,21	87,56	96,44	1624,39	6,83	217,57	10,50	13,60	2018	France
Danske Bank	81,09	95,31	80,45	96,71	3790,56	-2,82	135,40	31,36	0,59	2022	Denmark
Danske Bank	85,5	94,96	79,53	91,12	3935,83	7,53	175,81	34,63	1,13	2021	Denmark
Danske Bank	84,01	95,33	83,54	90,11	4109,23	2,55	184,57	33,79	0,85	2020	Denmark
Danske Bank	86,6	95,71	84,22	88,34	3761,05	9,36	168,14	37,63	1,77	2019	Denmark
Danske Bank	86,78	88,05	86,36	72,95	3578,47	9,30	129,00	37,92	1,29	2018	Denmark
Deutsche Bank	94,62	95,47	96,25	92,10	1336,79	8,41	283,14	14,66	7,47	2022	Germany
Deutsche Bank	95,41	94,01	96,43	93,76	1323,99	3,55	254,82	15,93	9,34	2021	Germany
Deutsche Bank	95,58	93,28	97,15	93,51	1325,26	0,26	296,21	15,62	9,44	2020	Germany
Deutsche Bank	95,85	94,60	97,53	95,31	1297,67	-9,66	390,72	15,27	11,90	2019	Germany
Deutsche Bank	96,71	94,78	98,70	95,57	1348,14	-0,04	434,01	17,02	16,79	2018	Germany
Goldman Sachs	91,32	99,81	85,75	99,45	1441,8	10,47	91,58	32,12	9,96	2022	United States
Goldman Sachs	92,1	99,78	84,64	98,88	1463,99	21,72	85,89	36,34	21,14	2021	United States
Goldman Sachs	91,34	99,73	87,50	99,21	1163,03	10,89	93,38	37,86	21,72	2020	United States
Goldman Sachs	92,82	99,65	90,38	99,03	992,97	9,99	97,11	41,03	22,95	2019	United States
Goldman Sachs	94,36	99,56	91,11	99,61	931,8	12,55	127,11	40,42	22,08	2018	United States
HSBC	82,95	97,47	80,45	96,43	2949,29	8,84	126,91	12,83	11,07	2022	United Kingdom
HSBC	86,03	99,52	79,53	95,87	2953,79	7,40	135,20	9,08	19,78	2021	United Kingdom
HSBC	85,8	99,66	83,54	96,91	2984,16	2,31	164,94	13,67	25,73	2020	United Kingdom
HSBC	88,63	98,75	84,22	96,38	2715,15	3,65	102,30	16,75	27,00	2019	United Kingdom
HSBC	88,81	95,45	86,36	97,54	2558,12	7,60	99,12	17,00	20,93	2018	United Kingdom
ICBC	32,35	50,46	52,16	44,13	39610,15	11,46	211,73	4,18	21,66	2022	China
ICBC	29,8	50,48	49,86	32,78	35171,38	12,16	186,12	3,48	17,50	2021	China
ICBC	47,12	50,91	52,22	29,26	33345,06	11,95	155,75	3,53	25,28	2020	China
ICBC	48,13	48,20	51,90	26,81	30109,44	13,05	120,45	3,44	19,74	2019	China
ICBC	46,98	45,79	54,33	22,95	27699,54	13,68	121,15	4,09	14,78	2018	China
Industrial Bank	52,16	43,86	52,16	41,33	9266,67	13,85	139,39	17,54	9,20	2022	China
Industrial Bank	49,17	45,53	18,27	41,74	8603,02	13,90	119,15	17,38	14,93	2021	China
Industrial Bank	26,73	42,71	18,35	31,91	7894	12,62	122,19	17,28	14,22	2020	China
Industrial Bank	24,73	24,52	18,44	39,81	7145,68	13,91	118,04	17,67	12,19	2019	China
Industrial Bank	22,81	23,74	18,83	7,70	6711,66	14,23	141,78	18,14	12,63	2018	China

ING	82,3	99,16	80,45	86,78	1035,76	6,73	121,27	11,66	5,16	2022	Netherlands
ING	84,57	98,57	79,53	85,68	1081,43	8,82	116,62	11,53	10,97	2021	Netherlands
ING	83,73	99,20	83,54	85,00	1144,69	4,46	181,24	10,58	6,58	2020	Netherlands
ING	86,39	99,31	84,22	85,66	999,65	9,02	128,40	15,32	9,07	2019	Netherlands
ING	86,93	99,16	86,36	84,75	1017,33	9,33	140,84	15,05	12,11	2018	Netherlands
Intesa Sanpaolo	95,84	96,85	96,25	99,65	974,59	7,86	136,58	13,51	3,25	2022	Italy
Intesa Sanpaolo	96,9	96,48	96,43	99,38	1069	7,22	130,12	11,71	3,58	2021	Italy
Intesa Sanpaolo	96,96	98,97	83,54	99,68	1002,61	3,88	157,23	12,77	1,99	2020	Italy
Intesa Sanpaolo	88,8	95,43	84,22	99,87	816,1	8,09	126,13	17,67	1,57	2019	Italy
Intesa Sanpaolo	88,7	92,42	86,36	99,84	787,79	7,85	146,98	19,31	4,37	2018	Italy
Barclays	93,62	98,08	96,25	76,43	1513,7	8,99	218,69	16,48	16,58	2022	United Kingdom
Barclays	93,23	96,67	96,43	76,01	1384,29	11,14	181,29	15,94	21,44	2021	United Kingdom
Barclays	92,98	96,92	97,15	75,64	1349,51	2,82	214,53	14,31	30,32	2020	United Kingdom
Barclays	93,52	83,52	94,11	74,93	1140,23	4,62	172,12	15,61	31,44	2019	United Kingdom
Barclays	89,22	57,07	54,33	75,90	1133,28	2,96	205,22	16,67	26,86	2018	United Kingdom
KB Financial	90,35	56,14	80,45	86,92	688664,83	8,65	244,21	20,48	1,00	2022	South Korea
KB Financial	77,41	47,05	79,53	85,33	663895,83	10,15	195,12	18,82	0,89	2021	South Korea
KB Financial	75,09	57,97	83,54	66,70	610719,94	8,72	226,36	18,53	1,92	2020	South Korea
KB Financial	76,49	59,14	84,22	66,89	518538,12	8,95	192,47	17,22	1,89	2019	South Korea
KB Financial	77,07	48,99	86,36	77,21	479588,3	8,78	183,64	17,99	5,61	2018	South Korea
Lloyds	95,81	99,77	80,45	98,11	873,39	7,16	142,91	15,54	1,81	2022	United Kingdom
Lloyds	86,49	98,38	79,53	91,48	881,26	10,69	150,17	13,29	1,31	2021	United Kingdom
Lloyds	84,64	99,43	83,54	93,09	871,27	1,79	190,53	12,04	2,30	2020	United Kingdom
Lloyds	87,82	98,48	84,22	89,41	833,89	5,04	108,73	13,94	1,51	2019	United Kingdom
Lloyds	87,38	91,41	86,36	92,62	797,6	8,04	135,30	13,86	2,36	2018	United Kingdom
Mizuho	87,5	57,22	80,45	87,90	254258,2	5,79	228,13	18,93	28,83	2022	Japan
Mizuho	77,72	52,76	79,53	87,26	237066,14	5,29	227,98	19,04	30,08	2021	Japan
Mizuho	76,36	48,63	83,54	88,19	225586,21	5,18	272,56	17,65	24,63	2020	Japan
Mizuho	78,44	54,71	84,22	88,07	214659,08	1,08	201,15	16,67	34,08	2019	Japan
Mizuho	80,89	53,03	86,36	97,87	200792,23	6,56	186,58	19,05	29,83	2018	Japan
Morgan Stanley	75,76	74,61	85,75	56,02	1180,23	11,15	63,60	26,80	11,10	2022	United States
Morgan Stanley	76,85	82,96	84,64	60,31	1188,14	11,34	78,02	25,89	22,37	2021	United States
Morgan Stanley	79,12	82,43	87,50	63,23	1115,86	12,68	74,63	24,68	21,71	2020	United States
Morgan Stanley	80,98	79,08	90,38	71,94	895,43	11,76	88,26	28,52	23,95	2019	United States
Morgan Stanley	83,77	85,40	91,11	68,60	853,53	11,70	105,16	29,45	22,99	2018	United States
MUFG	76,52	67,51	80,45	85,38	386799,48	6,69	168,58	25,33	29,51	2022	Japan
MUFG	79,07	65,49	79,53	84,09	373731,91	4,74	209,08	24,47	33,48	2021	Japan
MUFG	77,92	61,85	83,54	89,68	359473,52	3,28	292,15	26,69	30,75	2020	Japan
MUFG	80,93	61,91	84,22	91,55	336571,38	5,42	215,23	23,34	34,24	2019	Japan
MUFG	81,64	61,11	86,36	85,41	311138,9	6,32	165,40	23,22	37,75	2018	Japan
NAB	80,56	99,11	76,62	78,38	1055,13	11,59	61,92	22,54	0,84	2022	Australia
NAB	82,88	98,23	80,45	78,11	925,97	10,57	66,90	13,03	1,79	2021	Australia
NAB	81,49	97,05	79,53	73,73	866,57	6,12	101,62	24,00	0,72	2020	Australia
NAB	87,94	98,06	83,54	95,43	847,12	11,25	62,66	28,51	1,37	2019	Australia
NAB	88,09	97,65	84,22	94,24	806,51	11,90	65,47	28,29	1,23	2018	Australia
NatWest	58,69	84,10	52,16	85,10	720,05	9,20	142,25	13,56	1,17	2022	United Kingdom
NatWest	63,12	86,60	49,86	83,92	781,99	6,24	189,41	12,34	1,93	2021	United Kingdom

NatWest	61,63	89,41	52,22	83,30	799,49	-2,00	248,95	12,55	2,11	2020	United Kingdom
NatWest	63,55	99,03	51,90	80,03	723,04	6,44	172,95	14,96	1,63	2019	United Kingdom
NatWest	64,32	92,09	54,33	66,39	694,24	3,45	221,46	13,94	3,51	2018	United Kingdom
Nordea Bank	73,3	97,06	65,79	78,87	594,73	11,34	82,11	32,17	0,93	2022	Finland
Nordea Bank	74,52	97,93	69,43	72,10	570,35	11,58	76,55	32,43	1,07	2021	Finland
Nordea Bank	73,02	97,81	67,31	70,91	552,16	7,02	122,06	33,30	1,49	2020	Finland
Nordea Bank	75,73	91,91	71,52	76,91	554,85	4,83	104,84	37,32	2,18	2019	Finland
Nordea Bank	76,08	92,66	72,05	75,20	551,41	9,51	109,18	37,05	1,32	2018	Finland
PNC	67,7	87,48	69,43	63,43	557,26	12,58	62,84	10,54	12,61	2022	United States
PNC	71,39	85,46	49,86	58,44	557,19	10,69	59,81	5,52	7,11	2021	United States
PNC	57,19	87,81	52,22	56,06	466,68	5,67	79,98	7,97	5,08	2020	United States
PNC	58,7	87,67	51,90	63,40	410,3	9,62	64,80	14,69	5,98	2019	United States
PNC	59,66	88,72	54,33	62,79	382,32	9,75	81,09	15,02	8,00	2018	United States
Postal Savings Bank of China	40,03	68,89	20,91	81,61	14067,28	11,89	162,86	2,58	2,53	2022	China
Postal Savings Bank of China	39,14	68,16	18,27	79,00	12587,87	12,01	138,80	1,47	3,74	2021	China
Postal Savings Bank of China	36,61	66,17	18,35	80,96	11353,26	11,88	138,04	1,31	2,22	2020	China
Postal Savings Bank of China	36,85	74,10	18,44	81,37	10216,71	13,21	102,73	2,25	3,20	2019	China
Postal Savings Bank of China	38,04	66,84	18,83	70,33	9516,21	12,92	145,18	2,64	1,67	2018	China
RBC	79,82	88,10	80,45	87,48	1917,22	16,13	57,80	16,93	38,13	2022	Canada
RBC	82,78	86,41	79,53	90,25	1706,32	18,28	50,10	18,44	40,44	2021	Canada
RBC	82,4	84,85	83,54	91,81	1624,55	14,08	60,91	19,62	20,19	2020	Canada
RBC	85,2	88,50	84,22	96,65	1428,94	16,64	51,07	19,00	38,22	2019	Canada
RBC	86,92	95,12	86,36	91,31	1334,73	16,94	53,21	18,60	41,96	2018	Canada
Santander	93,87	93,47	96,25	55,59	1734,66	10,91	189,32	16,16	6,64	2022	Spain
Santander	89,18	95,34	96,43	66,70	1595,84	9,65	170,11	15,43	8,07	2021	Spain
Santander	91,32	95,56	83,54	86,91	1508,25	-9,66	186,73	15,60	10,24	2020	Spain
Santander	86,1	89,61	84,22	79,22	1522,7	6,63	162,84	17,20	9,46	2019	Spain
Santander	84,25	89,73	86,36	88,36	1459,27	8,18	150,85	16,90	5,01	2018	Spain
Scotiabank	93,79	89,94	96,25	96,01	1349,42	14,87	83,05	14,84	29,47	2022	Canada
Scotiabank	95,16	88,88	96,43	90,60	1184,84	14,72	65,67	15,33	31,67	2021	Canada
Scotiabank	94,14	86,90	97,15	90,96	1136,47	10,41	93,69	16,65	17,08	2020	Canada
Scotiabank	94,4	66,07	84,22	96,11	1086,16	13,17	69,14	15,43	27,88	2019	Canada
Scotiabank	83,14	64,48	86,36	95,90	998,49	14,35	70,37	14,58	29,23	2018	Canada
Shanghai Pudong Development Bank	56,48	71,81	52,16	59,23	8704,65	7,98	272,33	21,20	7,58	2022	China
Shanghai Pudong Development Bank	58,06	77,47	49,86	42,09	8136,76	8,76	223,67	21,24	9,33	2021	China
Shanghai Pudong Development Bank	53,17	58,43	18,35	39,68	7958,16	10,81	185,69	20,71	12,32	2020	China
Shanghai Pudong Development Bank	28,73	15,93	18,44	7,64	7013,3	12,20	135,87	20,88	8,53	2019	China
Shanghai Pudong Development Bank	16,01	0,00	18,83	0,00	6289,61	12,95	153,53	18,67	7,76	2018	China
Société Générale	94,21	91,32	96,25	94,76	1484,9	1,86	335,60	3,45	11,15	2022	France
Société Générale	95,09	90,21	96,43	90,07	1464,45	8,90	252,43	11,18	13,49	2021	France
Société Générale	93,89	94,87	97,15	96,28	1444,4	-1,39	424,82	4,39	19,62	2020	France
Société Générale	96,52	95,15	97,53	94,50	1356,3	4,07	240,02	5,24	14,92	2019	France
Société Générale	96,67	95,79	86,36	96,89	1309,43	5,70	271,51	5,23	15,24	2018	France
Standard Chartered	80,22	73,02	85,83	66,57	819,92	5,15	221,02	16,00	5,11	2022	United Kingdom
Standard Chartered	83,35	78,88	89,55	63,85	827,82	3,77	271,80	17,14	7,12	2021	United Kingdom
Standard Chartered	83,55	75,76	90,11	64,76	789,05	0,65	250,70	16,02	7,09	2020	United Kingdom
Standard Chartered	85,52	75,06	93,35	64,79	720,4	3,69	166,77	16,62	8,38	2019	United Kingdom

Standard Chartered	87,81	86,29	94,11	64,48	688,76	1,22	194,71	15,77	10,25	2018	United Kingdom
State Bank of India	74,86	54,45	80,45	64,83	59544,18	12,17	69,38	9,01	1,08	2022	India
State Bank of India	73,44	37,74	79,53	62,65	53608,84	8,51	84,76	9,32	4,69	2021	India
State Bank of India	69,66	44,31	52,22	62,87	48456,19	9,45	142,91	8,58	2,83	2020	India
State Bank of India	52,64	41,41	51,90	51,07	41974,92	0,99	81,92	11,26	6,24	2019	India
State Bank of India	49,89	34,18	54,33	4,59	38884,64	-2,04	103,27	10,94	1,06	2018	India
TD	82,49	96,24	80,45	92,66	1917,53	17,68	63,30	9,92	29,00	2022	Canada
TD	84,97	99,14	79,53	93,06	1728,67	15,27	57,49	11,75	21,69	2021	Canada
TD	85,06	94,42	83,54	83,09	1715,87	13,54	84,74	14,07	17,60	2020	Canada
TD	85,27	93,77	84,22	84,58	1415,29	14,64	60,12	11,75	28,17	2019	Canada
TD	85,88	93,43	86,36	82,79	1334,9	15,40	55,44	10,61	26,25	2018	Canada
UBS	97,97	99,42	97,50	92,15	1104,36	12,98	86,70	20,65	2,84	2022	Switzerland
UBS	96,88	99,34	97,59	91,26	1117,18	12,42	91,02	22,23	4,19	2021	Switzerland
UBS	96,85	98,65	98,61	96,56	1125,77	11,51	109,34	21,47	2,55	2020	Switzerland
UBS	98,16	98,94	99,52	97,74	972,19	8,01	111,80	21,87	6,33	2019	Switzerland
UBS	99,14	98,67	91,11	98,84	958,49	8,57	110,12	22,77	11,43	2018	Switzerland
UniCredit	87,25	50,77	96,25	93,64	857,77	11,31	222,85	18,27	5,73	2022	Italy
UniCredit	88,19	72,34	96,43	90,42	917,23	3,81	184,37	18,56	4,89	2021	Italy
UniCredit	91,38	79,84	83,54	90,53	931,46	-5,45	307,80	19,50	8,88	2020	Italy
UniCredit	84,12	76,59	84,22	82,71	855,65	3,56	191,94	22,02	5,53	2019	Italy
UniCredit	82,7	76,26	86,36	86,72	832,17	7,30	234,66	20,81	5,04	2018	Italy
US Bancorp	59,38	72,27	52,16	78,67	674,81	11,89	65,87	10,31	8,79	2022	United States
US Bancorp	60,08	69,11	49,86	76,89	573,28	15,90	58,29	7,46	9,89	2021	United States
US Bancorp	57,51	57,06	52,22	72,45	553,91	9,94	67,10	9,36	7,96	2020	United States
US Bancorp	56,37	58,59	51,90	60,99	495,43	14,48	49,53	12,63	4,46	2019	United States
US Bancorp	54,41	57,41	54,33	53,61	467,37	15,30	60,99	11,87	6,32	2018	United States
Wells Fargo	77,54	75,04	80,45	84,13	1881,02	7,65	102,19	12,02	37,40	2022	United States
Wells Fargo	79,99	84,13	79,53	89,19	1948,07	12,58	87,58	10,01	49,75	2021	United States
Wells Fargo	80,96	90,77	83,54	75,43	1952,91	1,09	131,07	13,93	27,95	2020	United States
Wells Fargo	83,35	91,00	84,22	77,88	1927,56	10,69	72,78	17,26	45,53	2019	United States
Wells Fargo	84,34	91,08	86,36	83,77	1895,88	11,76	79,73	17,66	62,52	2018	United States
Westpac	89,64	76,57	94,94	81,30	1014,2	7,99	95,66	22,58	0,81	2022	Australia
Westpac	81,14	83,03	80,45	82,87	935,88	7,79	75,52	21,56	1,09	2021	Australia
Westpac	80,6	87,55	79,53	78,82	911,95	3,43	111,84	22,65	0,83	2020	Australia
Westpac	84,1	91,23	83,54	79,68	906,63	10,43	63,28	24,11	3,09	2019	Australia
Westpac	85,56	92,11	84,22	84,32	879,59	12,86	67,26	21,98	1,09	2018	Australia

Source: Refinitiv

Appendix 2. Detailed Calculations

1- Calculations of the logarithmic of Total Assets and Total Fossil Fuel Financing:

Bank name	Total Assets	Total Assets Log	Total Fuel Financing	Total Fuel Financing Log
Agricultural Bank of China	33925,49	4,53053893	10,59	1,06
Agricultural Bank of China	29069,16	4,463447422	17,69	1,27
Agricultural Bank of China	27205,05	4,434665492	15,14	1,21
Agricultural Bank of China	24877,49	4,395824017	12,00	1,11
Agricultural Bank of China	22609,47	4,35430959	7,60	0,93
ANZ	1085,73	3,036121656	3,75	0,68
ANZ	978,86	2,991164029	1,51	0,40
ANZ	1042,29	3,018405045	3,16	0,62
ANZ	981,14	2,992173399	3,54	0,66
ANZ	1022	3,009875634	4,26	0,72
Bank of America	3051,38	3,484638599	35,47	1,56
Bank of America	3169,5	3,501127758	35,92	1,57
Bank of America	2819,63	3,450346121	45,45	1,67
Bank of America	2434,08	3,386513234	50,19	1,71
Bank of America	2354,51	3,372084952	35,15	1,56
Bank of China	28893,55	4,460815935	15,58	1,22
Bank of China	26722,41	4,426891875	14,70	1,20
Bank of China	24402,66	4,387454966	19,97	1,32
Bank of China	22769,74	4,357377144	20,69	1,34
Bank of China	21267,28	4,327732369	22,77	1,38
Bank of Communications	12991,57	4,113695065	9,19	1,01
Bank of Communications	11665,76	4,066950264	9,66	1,03
Bank of Communications	10697,62	4,029327762	7,15	0,91
Bank of Communications	9905,6	3,995924628	5,62	0,82
Bank of Communications	9531,17	3,979191779	5,17	0,79
Bank of Montreal	1139,2	3,056981037	19,31	1,31
Bank of Montreal	988,18	2,995275327	19,62	1,31
Bank of Montreal	949,26	2,977842449	15,42	1,22
Bank of Montreal	852,2	2,931050847	22,39	1,37
Bank of Montreal	773,29	2,88890365	21,91	1,36
Barclays	1513,7	3,180326625	16,58	1,24
Barclays	1384,29	3,141540699	21,44	1,35
Barclays	1349,51	3,130497804	30,32	1,50
Barclays	1140,23	3,05737318	31,44	1,51
Barclays	1133,28	3,054720275	26,86	1,44
BBVA	712,09	2,853144346	2,50	0,54
BBVA	662,89	2,822096127	3,59	0,66
BBVA	733,8	2,866169148	5,07	0,78
BBVA	695,47	2,842902414	4,98	0,78
BBVA	676,69	2,831031077	4,97	0,78
BNP Paribas	2663,75	3,425656471	20,04	1,32
BNP Paribas	2634,44	3,420853133	16,52	1,24
BNP Paribas	2488,49	3,396110386	41,78	1,63
BNP Paribas	2164,71	3,335600302	30,26	1,49

BNP Paribas	2040,84	3,310021707	19,69	1,32
CaixaBank	598,85	2,778042663	2,22	0,51
CaixaBank	680,04	2,83317262	0,48	0,17
CaixaBank	451,52	2,655637778	0,68	0,23
CaixaBank	391,41	2,593740066	1,86	0,46
CaixaBank	386,55	2,588327741	1,39	0,38
China CITIC Bank	8547,54	3,931891948	16,91	1,25
China CITIC Bank	8042,88	3,905465583	12,86	1,14
China CITIC Bank	7511,16	3,875764829	10,63	1,07
China CITIC Bank	6750,43	3,829395769	10,89	1,08
China CITIC Bank	6066,71	3,783024816	9,36	1,02
China Construction Bank	34600,71	4,539097562	9,18	1,01
China Construction Bank	30253,98	4,48079687	9,83	1,03
China Construction Bank	28132,25	4,449219905	12,46	1,13
China Construction Bank	25436,26	4,405470329	14,25	1,18
China Construction Bank	23222,69	4,365931226	9,67	1,03
China Everbright Bank	6300,51	3,79944463	7,23	0,92
China Everbright Bank	5902,07	3,771077933	10,16	1,05
China Everbright Bank	5368,16	3,729906346	11,52	1,10
China Everbright Bank	4733,43	3,6752677	4,97	0,78
China Everbright Bank	4357,33	3,639320111	4,87	0,77
China Merchants Bank	10138,91	4,0060341	9,12	1,01
China Merchants Bank	9249,02	3,966142672	11,66	1,10
China Merchants Bank	8361,45	3,922333534	8,30	0,97
China Merchants Bank	7417,24	3,87030088	6,69	0,89
China Merchants Bank	6745,73	3,82909333	7,83	0,95
China Minsheng Bank	7255,67	3,860737374	1,89	0,46
China Minsheng Bank	6952,79	3,842221571	2,37	0,53
China Minsheng Bank	6950,23	3,842061659	10,69	1,07
China Minsheng Bank	6681,84	3,824961063	10,21	1,05
China Minsheng Bank	5994,82	3,777848586	2,78	0,58
CIBC	943,6	2,975247941	17,87	1,28
CIBC	837,68	2,923596287	23,98	1,40
CIBC	769,55	2,886800825	10,19	1,05
CIBC	651,6	2,814647069	21,44	1,35
CIBC	597,1	2,776773802	12,85	1,14
Citi	2416,68	3,383398818	33,94	1,54
Citi	2291,41	3,360292294	46,95	1,68
Citi	2260,09	3,354317849	51,63	1,72
Citi	1951,16	3,29051541	54,72	1,75
Citi	1917,38	3,282934638	49,73	1,71
Commerzbank	477,43	2,679818404	1,17	0,34
Commerzbank	467,41	2,670626158	1,27	0,36
Commerzbank	506,61	2,705530169	2,23	0,51
Commerzbank	463,45	2,666938967	3,67	0,67
Commerzbank	462,39	2,665946657	2,51	0,55
Commonwealth Bank	1215,26	3,085026424	0,49	0,17
Commonwealth Bank	1091,98	3,038612215	1,06	0,31

Commonwealth Bank	1015,47	3,007094565	1,76	0,44
Commonwealth Bank	976,5	2,990116766	0,96	0,29
Commonwealth Bank	975,17	2,989525457	1,91	0,46
Crédit Agricole	2143,33	3,331291622	11,66	1,10
Crédit Agricole	2073,96	3,317009729	10,96	1,08
Crédit Agricole	1961,06	3,292712284	19,61	1,31
Crédit Agricole	1767,64	3,247639443	12,50	1,13
Crédit Agricole	1624,39	3,210957583	13,60	1,16
Danske Bank	3790,56	3,578817933	0,59	0,20
Danske Bank	3935,83	3,595146662	1,13	0,33
Danske Bank	4109,23	3,613866125	0,85	0,27
Danske Bank	3761,05	3,575424563	1,77	0,44
Danske Bank	3578,47	3,553818727	1,29	0,36
Deutsche Bank	1336,79	3,126387945	7,47	0,93
Deutsche Bank	1323,99	3,122212601	9,34	1,01
Deutsche Bank	1325,26	3,122628672	9,44	1,02
Deutsche Bank	1297,67	3,113498808	11,90	1,11
Deutsche Bank	1348,14	3,130057019	16,79	1,25
Goldman Sachs	1441,8	3,159206134	9,96	1,04
Goldman Sachs	1463,99	3,16583466	21,14	1,35
Goldman Sachs	1163,03	3,065964173	21,72	1,36
Goldman Sachs	992,97	2,997373277	22,95	1,38
Goldman Sachs	931,8	2,969788537	22,08	1,36
HSBC	2949,29	3,469864707	11,07	1,08
HSBC	2953,79	3,470526621	19,78	1,32
HSBC	2984,16	3,474967614	25,73	1,43
HSBC	2715,15	3,43395375	27,00	1,45
HSBC	2558,12	3,408090651	20,93	1,34
ICBC	39610,15	4,597817451	21,66	1,36
ICBC	35171,38	4,546201757	17,50	1,27
ICBC	33345,06	4,523044527	25,28	1,42
ICBC	30109,44	4,478717102	19,74	1,32
ICBC	27699,54	4,442488235	14,78	1,20
Industrial Bank	9266,67	3,966970561	9,20	1,01
Industrial Bank	8603,02	3,934701411	14,93	1,20
Industrial Bank	7894	3,897352134	14,22	1,18
Industrial Bank	7145,68	3,854104337	12,19	1,12
Industrial Bank	6711,66	3,82689465	12,63	1,13
ING	1035,76	3,015678233	5,16	0,79
ING	1081,43	3,03439982	10,97	1,08
ING	1144,69	3,059067122	6,58	0,88
ING	999,65	3,0002822	9,07	1,00
ING	1017,33	3,007888538	12,11	1,12
Intesa Sanpaolo	974,59	2,98926734	3,25	0,63
Intesa Sanpaolo	1069	3,029383778	3,58	0,66
Intesa Sanpaolo	1002,61	3,00156498	1,99	0,48
Intesa Sanpaolo	816,1	2,91227521	1,57	0,41
Intesa Sanpaolo	787,79	2,896961396	4,37	0,73

Barclays	1513,7	3,180326625	16,58	1,24
Barclays	1384,29	3,141540699	21,44	1,35
Barclays	1349,51	3,130497804	30,32	1,50
Barclays	1140,23	3,05737318	31,44	1,51
Barclays	1133,28	3,054720275	26,86	1,44
KB Financial	688664,83	5,838008535	1,00	0,30
KB Financial	663895,83	5,822100595	0,89	0,28
KB Financial	610719,94	5,785842811	1,92	0,46
KB Financial	518538,12	5,714781526	1,89	0,46
KB Financial	479588,3	5,680869485	5,61	0,82
Lloyds	873,39	2,941705182	1,81	0,45
Lloyds	881,26	2,94559659	1,31	0,36
Lloyds	871,27	2,940650936	2,30	0,52
Lloyds	833,89	2,921629259	1,51	0,40
Lloyds	797,6	2,902329306	2,36	0,53
Mizuho	254258,2	5,405276676	28,83	1,47
Mizuho	237066,14	5,37487136	30,08	1,49
Mizuho	225586,21	5,353314473	24,63	1,41
Mizuho	214659,08	5,331751287	34,08	1,55
Mizuho	200792,23	5,302749066	29,83	1,49
Morgan Stanley	1180,23	3,072334468	11,10	1,08
Morgan Stanley	1188,14	3,075232988	22,37	1,37
Morgan Stanley	1115,86	3,047998737	21,71	1,36
Morgan Stanley	895,43	2,952516382	23,95	1,40
Morgan Stanley	853,53	2,931727314	22,99	1,38
MUFG	386799,48	5,587487004	29,51	1,48
MUFG	373731,91	5,572561342	33,48	1,54
MUFG	359473,52	5,555668112	30,75	1,50
MUFG	336571,38	5,527078474	34,24	1,55
MUFG	311138,9	5,492955708	37,75	1,59
NAB	1055,13	3,023717379	0,84	0,26
NAB	925,97	2,967065679	1,79	0,45
NAB	866,57	2,938304526	0,72	0,24
NAB	847,12	2,928457305	1,37	0,37
NAB	806,51	2,907147909	1,23	0,35
NatWest	720,05	2,857965381	1,17	0,34
NatWest	781,99	2,893756215	1,93	0,47
NatWest	799,49	2,903355911	2,11	0,49
NatWest	723,04	2,85976256	1,63	0,42
NatWest	694,24	2,842134751	3,51	0,65
Nordea Bank	594,73	2,775049471	0,93	0,28
Nordea Bank	570,35	2,756902232	1,07	0,32
Nordea Bank	552,16	2,742850768	1,49	0,40
Nordea Bank	554,85	2,74495761	2,18	0,50
Nordea Bank	551,41	2,742261532	1,32	0,37
PNC	557,26	2,746836511	12,61	1,13
PNC	557,19	2,746782052	7,11	0,91
PNC	466,68	2,669948798	5,08	0,78

PNC	410,3	2,61415871	5,98	0,84
PNC	382,32	2,583561479	8,00	0,95
Postal Savings Bank of China	14067,28	4,148241003	2,53	0,55
Postal Savings Bank of China	12587,87	4,099986749	3,74	0,68
Postal Savings Bank of China	11353,26	4,055158835	2,22	0,51
Postal Savings Bank of China	10216,71	4,009353572	3,20	0,62
Postal Savings Bank of China	9516,21	3,978509652	1,67	0,43
RBC	1917,22	3,282898415	38,13	1,59
RBC	1706,32	3,232314928	40,44	1,62
RBC	1624,55	3,211000332	20,19	1,33
RBC	1428,94	3,155317815	38,22	1,59
RBC	1334,73	3,12571868	41,96	1,63
Santander	1734,66	3,239464655	6,64	0,88
Santander	1595,84	3,203261403	8,07	0,96
Santander	1508,25	3,178761185	10,24	1,05
Santander	1522,7	3,182899468	9,46	1,02
Santander	1459,27	3,164433163	5,01	0,78
Scotiabank	1349,42	3,130468861	29,47	1,48
Scotiabank	1184,84	3,074026096	31,67	1,51
Scotiabank	1136,47	3,055939951	17,08	1,26
Scotiabank	1086,16	3,036293465	27,88	1,46
Scotiabank	998,49	2,999778453	29,23	1,48
Shanghai Pudong Development Bank	8704,65	3,939801203	7,58	0,93
Shanghai Pudong Development Bank	8136,76	3,910504877	9,33	1,01
Shanghai Pudong Development Bank	7958,16	3,900867235	12,32	1,12
Shanghai Pudong Development Bank	7013,3	3,845984337	8,53	0,98
Shanghai Pudong Development Bank	6289,61	3,798692761	7,76	0,94
Société Générale	1484,9	3,171989583	11,15	1,08
Société Générale	1464,45	3,165971005	13,49	1,16
Société Générale	1444,4	3,15998805	19,62	1,31
Société Générale	1356,3	3,132675849	14,92	1,20
Société Générale	1309,43	3,117413827	15,24	1,21
Standard Chartered	819,92	2,914300836	5,11	0,79
Standard Chartered	827,82	2,918460222	7,12	0,91
Standard Chartered	789,05	2,897654577	7,09	0,91
Standard Chartered	720,4	2,858176138	8,38	0,97
Standard Chartered	688,76	2,838698006	10,25	1,05
State Bank of India	59544,18	4,774846612	1,08	0,32
State Bank of India	53608,84	4,729244511	4,69	0,76
State Bank of India	48456,19	4,685358226	2,83	0,58
State Bank of India	41974,92	4,623000223	6,24	0,86
State Bank of India	38884,64	4,589789251	1,06	0,31
TD	1917,53	3,282968595	29,00	1,48
TD	1728,67	3,237963253	21,69	1,36
TD	1715,87	3,234737412	17,60	1,27
TD	1415,29	3,151152189	28,17	1,47
TD	1334,9	3,12577395	26,25	1,44
UBS	1104,36	3,043503745	2,84	0,58

UBS	1117,18	3,04851172	4,19	0,72
UBS	1125,77	3,051835275	2,55	0,55
UBS	972,19	2,988197638	6,33	0,86
UBS	958,49	2,982040453	11,43	1,09
UniCredit	857,77	2,933876865	5,73	0,83
UniCredit	917,23	2,962951478	4,89	0,77
UniCredit	931,46	2,969630211	8,88	0,99
UniCredit	855,65	2,932803419	5,53	0,81
UniCredit	832,17	2,920733624	5,04	0,78
US Bancorp	674,81	2,829824614	8,79	0,99
US Bancorp	573,28	2,759123692	9,89	1,04
US Bancorp	553,91	2,744222551	7,96	0,95
US Bancorp	495,43	2,695858019	4,46	0,74
US Bancorp	467,37	2,67058907	6,32	0,86
Wells Fargo	1881,02	3,274624234	37,40	1,58
Wells Fargo	1948,07	3,289827437	49,75	1,71
Wells Fargo	1952,91	3,290904556	27,95	1,46
Wells Fargo	1927,56	3,285233155	45,53	1,67
Wells Fargo	1895,88	3,278039858	62,52	1,80
Westpac	1014,2	3,006551609	0,81	0,26
Westpac	935,88	2,971683968	1,09	0,32
Westpac	911,95	2,960446993	0,83	0,26
Westpac	906,63	2,957908842	3,09	0,61
Westpac	879,59	2,944773749	1,09	0,32

2- Standardization of variables (Log of Total Assets, ROE, Book-to-market value, Financial Leverage and Log Total Fossil Fuel Financing):

Standardization was done using the Standardize Excel Formula (the mean and the standard deviation of each variable were calculated).

Bank name	Total Assets std	ROE Std	Book to Market Value std	Financial Leverage std	Total Fuel Financing std
Agricultural Bank of China	1,45	0,44	0,90	-0,98	0,19
Agricultural Bank of China	1,36	0,50	0,68	-1,03	0,68
Agricultural Bank of China	1,32	0,46	0,29	-1,00	0,53
Agricultural Bank of China	1,26	0,68	-0,19	-1,14	0,31
Agricultural Bank of China	1,21	0,90	-0,31	-1,21	-0,13
ANZ	-0,58	0,39	-0,72	-0,25	-0,74
ANZ	-0,64	0,15	-0,94	-0,28	-1,41
ANZ	-0,61	-0,65	-0,35	-0,32	-0,88
ANZ	-0,64	0,28	-1,00	-0,05	-0,79
ANZ	-0,62	0,04	-0,75	-0,02	-0,64
Bank of America	0,03	0,30	-0,78	0,10	1,38
Bank of America	0,05	0,67	-1,10	0,01	1,39
Bank of America	-0,02	-0,51	-0,75	0,06	1,63
Bank of America	-0,11	0,33	-0,99	0,28	1,74
Bank of America	-0,13	0,37	-0,65	0,39	1,37
Bank of China	1,35	0,33	1,06	-0,87	0,56

Bank of China	1,31	0,43	0,99	-0,85	0,50
Bank of China	1,25	0,30	0,69	-0,83	0,80
Bank of China	1,21	0,47	0,11	-0,82	0,84
Bank of China	1,17	0,57	-0,03	-0,83	0,93
Bank of Communications	0,88	0,24	1,39	0,13	0,05
Bank of Communications	0,82	0,33	1,28	-0,05	0,10
Bank of Communications	0,77	0,25	1,24	0,00	-0,18
Bank of Communications	0,72	0,42	0,31	-0,11	-0,40
Bank of Communications	0,70	0,46	0,02	-0,22	-0,47
Bank of Montreal	-0,55	2,84	-0,99	0,06	0,77
Bank of Montreal	-0,64	1,16	-1,20	0,14	0,79
Bank of Montreal	-0,66	0,20	-0,70	0,11	0,55
Bank of Montreal	-0,72	0,74	-1,02	0,22	0,92
Bank of Montreal	-0,78	1,00	-1,12	0,11	0,90
Barclays	-0,39	-0,04	0,87	0,12	0,62
Barclays	-0,44	0,41	0,38	0,04	0,87
Barclays	-0,45	-1,32	0,81	-0,17	1,22
Barclays	-0,55	-0,94	0,26	0,00	1,26
Barclays	-0,56	-1,29	0,69	0,14	1,10
BBVA	-0,83	0,86	-0,28	-0,85	-1,06
BBVA	-0,87	-0,02	-0,35	-0,75	-0,78
BBVA	-0,81	-0,55	0,20	-0,74	-0,49
BBVA	-0,84	-0,05	-0,05	-0,65	-0,50
BBVA	-0,86	0,50	0,03	-0,71	-0,50
BNP Paribas	-0,05	-0,41	0,42	-1,65	0,81
BNP Paribas	-0,06	-0,40	0,07	-1,16	0,62
BNP Paribas	-0,09	-0,73	0,74	-1,23	1,55
BNP Paribas	-0,18	-0,36	0,14	-1,19	1,22
BNP Paribas	-0,21	-0,42	0,70	-1,37	0,79
CaixaBank	-0,93	-0,18	-0,50	-0,92	-1,15
CaixaBank	-0,86	1,51	0,39	-1,03	-1,96
CaixaBank	-1,10	-0,88	0,64	-1,02	-1,83
CaixaBank	-1,18	-0,58	-0,03	-0,93	-1,27
CaixaBank	-1,19	-0,23	-0,31	-1,07	-1,46
China CITIC Bank	0,63	0,34	1,32	0,04	0,64
China CITIC Bank	0,60	0,33	1,38	-0,01	0,37
China CITIC Bank	0,56	0,19	0,86	-0,23	0,19
China CITIC Bank	0,49	0,40	0,14	-0,08	0,21
China CITIC Bank	0,43	0,44	0,13	0,03	0,07
China Construction Bank	1,46	0,65	1,24	-0,91	0,05
China Construction Bank	1,38	0,70	0,92	-1,05	0,12
China Construction Bank	1,34	0,63	0,37	-1,07	0,34
China Construction Bank	1,28	0,83	-0,18	-0,89	0,47
China Construction Bank	1,22	0,99	-0,25	-1,07	0,10
China Everbright Bank	0,45	0,25	1,35	0,17	-0,17
China Everbright Bank	0,42	0,33	0,95	0,10	0,15
China Everbright Bank	0,36	0,34	0,29	-0,33	0,27
China Everbright Bank	0,29	0,58	-0,09	-0,25	-0,51

China Everbright Bank	0,24	0,50	0,03	0,23	-0,52
China Merchants Bank	0,73	1,64	-0,86	-1,47	0,05
China Merchants Bank	0,68	1,62	-1,20	-0,97	0,28
China Merchants Bank	0,62	1,37	-1,22	-0,76	-0,04
China Merchants Bank	0,55	1,60	-1,18	-0,26	-0,24
China Merchants Bank	0,49	1,54	-0,94	-0,29	-0,10
China Minsheng Bank	0,54	-0,60	2,64	-0,41	-1,26
China Minsheng Bank	0,51	-0,54	2,00	-0,08	-1,10
China Minsheng Bank	0,51	-0,49	0,80	0,47	0,19
China Minsheng Bank	0,49	0,67	0,20	0,17	0,15
China Minsheng Bank	0,42	0,75	0,22	0,30	-0,98
CIBC	-0,66	1,00	-0,93	-0,59	0,69
CIBC	-0,73	1,40	-1,17	-0,42	0,99
CIBC	-0,78	0,18	-0,87	-0,40	0,15
CIBC	-0,88	1,13	-1,05	-0,57	0,88
CIBC	-0,93	1,57	-1,13	-0,94	0,37
Citi	-0,11	-0,32	0,73	0,80	1,34
Citi	-0,14	0,47	0,01	0,68	1,67
Citi	-0,15	-0,75	-0,15	0,88	1,76
Citi	-0,24	0,24	-0,67	1,07	1,82
Citi	-0,25	0,01	-0,16	1,00	1,73
Commerzbank	-1,07	-0,92	1,19	-0,87	-1,56
Commerzbank	-1,08	-1,67	2,02	-0,84	-1,51
Commerzbank	-1,03	-4,21	2,92	-0,87	-1,15
Commerzbank	-1,08	-1,46	3,35	-0,79	-0,76
Commerzbank	-1,08	-1,27	3,09	-0,75	-1,06
Commonwealth Bank	-0,52	0,75	-1,36	-0,08	-1,95
Commonwealth Bank	-0,58	0,54	-1,40	-0,11	-1,61
Commonwealth Bank	-0,62	0,27	-1,22	0,43	-1,31
Commonwealth Bank	-0,64	0,63	-1,36	0,76	-1,67
Commonwealth Bank	-0,64	0,98	-1,30	0,81	-1,26
Crédit Agricole	-0,18	-0,43	0,91	-1,14	0,28
Crédit Agricole	-0,20	-0,20	0,29	-0,98	0,22
Crédit Agricole	-0,23	-1,08	0,84	-0,87	0,79
Crédit Agricole	-0,29	-0,44	0,22	-0,70	0,34
Crédit Agricole	-0,34	-0,48	0,85	-0,69	0,43
Danske Bank	0,15	-2,49	-0,22	2,12	-1,89
Danske Bank	0,18	-0,34	0,31	2,56	-1,58
Danske Bank	0,20	-1,37	0,42	2,44	-1,72
Danske Bank	0,15	0,04	0,21	2,96	-1,30
Danske Bank	0,12	0,03	-0,30	3,00	-1,50
Deutsche Bank	-0,46	-0,16	1,70	-0,13	-0,14
Deutsche Bank	-0,46	-1,17	1,34	0,04	0,07
Deutsche Bank	-0,46	-1,85	1,87	0,00	0,08
Deutsche Bank	-0,48	-3,92	3,10	-0,05	0,30
Deutsche Bank	-0,45	-1,91	3,67	0,19	0,63
Goldman Sachs	-0,41	0,27	-0,79	2,22	0,13
Goldman Sachs	-0,41	2,61	-0,86	2,79	0,86

Goldman Sachs	-0,54	0,36	-0,76	2,99	0,89
Goldman Sachs	-0,63	0,17	-0,71	3,42	0,94
Goldman Sachs	-0,67	0,70	-0,32	3,33	0,90
HSBC	0,01	-0,07	-0,33	-0,37	0,23
HSBC	0,01	-0,37	-0,22	-0,88	0,79
HSBC	0,01	-1,42	0,17	-0,26	1,06
HSBC	-0,04	-1,15	-0,65	0,15	1,11
HSBC	-0,08	-0,33	-0,69	0,19	0,85
ICBC	1,54	0,48	0,78	-1,54	0,89
ICBC	1,47	0,62	0,44	-1,63	0,67
ICBC	1,44	0,58	0,05	-1,62	1,04
ICBC	1,38	0,81	-0,41	-1,64	0,79
ICBC	1,33	0,94	-0,40	-1,55	0,51
Industrial Bank	0,68	0,98	-0,17	0,26	0,05
Industrial Bank	0,64	0,99	-0,43	0,24	0,52
Industrial Bank	0,59	0,72	-0,39	0,22	0,47
Industrial Bank	0,53	0,99	-0,44	0,28	0,32
Industrial Bank	0,49	1,05	-0,13	0,34	0,36
ING	-0,61	-0,50	-0,40	-0,53	-0,47
ING	-0,58	-0,07	-0,46	-0,55	0,22
ING	-0,55	-0,98	0,38	-0,68	-0,26
ING	-0,63	-0,03	-0,31	-0,04	0,04
ING	-0,62	0,04	-0,15	-0,08	0,31
Intesa Sanpaolo	-0,65	-0,27	-0,20	-0,28	-0,86
Intesa Sanpaolo	-0,59	-0,40	-0,29	-0,52	-0,78
Intesa Sanpaolo	-0,63	-1,10	0,07	-0,38	-1,23
Intesa Sanpaolo	-0,75	-0,22	-0,34	0,28	-1,39
Intesa Sanpaolo	-0,77	-0,27	-0,07	0,50	-0,62
Barclays	-0,39	-0,04	0,87	0,12	0,62
Barclays	-0,44	0,41	0,38	0,04	0,87
Barclays	-0,45	-1,32	0,81	-0,17	1,22
Barclays	-0,55	-0,94	0,26	0,00	1,26
Barclays	-0,56	-1,29	0,69	0,14	1,10
KB Financial	3,22	-0,11	1,20	0,65	-1,65
KB Financial	3,20	0,21	0,56	0,43	-1,71
KB Financial	3,15	-0,09	0,97	0,39	-1,25
KB Financial	3,05	-0,04	0,52	0,22	-1,26
KB Financial	3,01	-0,08	0,41	0,32	-0,40
Lloyds	-0,71	-0,42	-0,12	-0,01	-1,29
Lloyds	-0,70	0,32	-0,03	-0,31	-1,50
Lloyds	-0,71	-1,53	0,50	-0,48	-1,12
Lloyds	-0,74	-0,86	-0,56	-0,22	-1,41
Lloyds	-0,76	-0,23	-0,22	-0,24	-1,10
Mizuho	2,63	-0,70	0,99	0,45	1,17
Mizuho	2,59	-0,81	0,99	0,46	1,21
Mizuho	2,56	-0,83	1,57	0,27	1,01
Mizuho	2,53	-1,68	0,64	0,14	1,34
Mizuho	2,49	-0,54	0,45	0,46	1,21

Morgan Stanley	-0,53	0,41	-1,15	1,50	0,23
Morgan Stanley	-0,53	0,45	-0,96	1,38	0,92
Morgan Stanley	-0,57	0,73	-1,01	1,22	0,89
Morgan Stanley	-0,69	0,54	-0,83	1,73	0,99
Morgan Stanley	-0,72	0,53	-0,61	1,86	0,94
MUFG	2,88	-0,51	0,21	1,31	1,20
MUFG	2,86	-0,92	0,74	1,19	1,32
MUFG	2,84	-1,22	1,82	1,49	1,24
MUFG	2,80	-0,78	0,82	1,04	1,35
MUFG	2,75	-0,59	0,17	1,02	1,44
NAB	-0,60	0,51	-1,17	0,93	-1,73
NAB	-0,68	0,29	-1,11	-0,35	-1,30
NAB	-0,71	-0,63	-0,66	1,13	-1,80
NAB	-0,73	0,43	-1,16	1,73	-1,47
NAB	-0,76	0,57	-1,13	1,70	-1,53
NatWest	-0,82	0,01	-0,13	-0,28	-1,56
NatWest	-0,77	-0,61	0,49	-0,44	-1,25
NatWest	-0,76	-2,32	1,26	-0,41	-1,19
NatWest	-0,82	-0,57	0,27	-0,09	-1,36
NatWest	-0,84	-1,19	0,90	-0,22	-0,80
Nordea Bank	-0,94	0,45	-0,91	2,22	-1,68
Nordea Bank	-0,96	0,50	-0,98	2,26	-1,61
Nordea Bank	-0,98	-0,44	-0,39	2,38	-1,42
Nordea Bank	-0,98	-0,90	-0,61	2,92	-1,16
Nordea Bank	-0,98	0,07	-0,56	2,88	-1,49
PNC	-0,97	0,71	-1,16	-0,68	0,35
PNC	-0,97	0,32	-1,20	-1,36	-0,19
PNC	-1,08	-0,73	-0,94	-1,03	-0,49
PNC	-1,15	0,10	-1,14	-0,12	-0,34
PNC	-1,20	0,12	-0,92	-0,08	-0,08
Postal Savings Bank of China	0,93	0,57	0,14	-1,75	-1,05
Postal Savings Bank of China	0,86	0,59	-0,17	-1,90	-0,75
Postal Savings Bank of China	0,80	0,56	-0,18	-1,92	-1,15
Postal Savings Bank of China	0,74	0,84	-0,64	-1,80	-0,87
Postal Savings Bank of China	0,70	0,78	-0,09	-1,74	-1,35
RBC	-0,25	1,45	-1,23	0,18	1,45
RBC	-0,32	1,90	-1,33	0,38	1,51
RBC	-0,34	1,02	-1,19	0,54	0,82
RBC	-0,42	1,55	-1,31	0,45	1,46
RBC	-0,46	1,62	-1,29	0,40	1,55
Santander	-0,31	0,36	0,48	0,07	-0,25
Santander	-0,35	0,10	0,23	-0,03	-0,07
Santander	-0,39	-3,92	0,45	0,00	0,15
Santander	-0,38	-0,53	0,14	0,21	0,08
Santander	-0,41	-0,20	-0,02	0,17	-0,50
Scotiabank	-0,45	1,19	-0,90	-0,10	1,19
Scotiabank	-0,53	1,16	-1,12	-0,04	1,27
Scotiabank	-0,55	0,26	-0,76	0,14	0,65

Scotiabank	-0,58	0,83	-1,08	-0,02	1,14
Scotiabank	-0,63	1,08	-1,06	-0,14	1,19
Shanghai Pudong Development Bank	0,64	-0,25	1,56	0,75	-0,13
Shanghai Pudong Development Bank	0,60	-0,08	0,93	0,76	0,07
Shanghai Pudong Development Bank	0,59	0,34	0,44	0,68	0,33
Shanghai Pudong Development Bank	0,52	0,63	-0,21	0,71	-0,02
Shanghai Pudong Development Bank	0,45	0,79	0,02	0,41	-0,11
Société Générale	-0,40	-1,52	2,39	-1,63	0,24
Société Générale	-0,41	-0,05	1,30	-0,60	0,42
Société Générale	-0,41	-2,19	3,55	-1,51	0,79
Société Générale	-0,45	-1,06	1,14	-1,39	0,52
Société Générale	-0,47	-0,72	1,55	-1,40	0,54
Standard Chartered	-0,75	-0,83	0,90	0,05	-0,48
Standard Chartered	-0,74	-1,12	1,56	0,21	-0,18
Standard Chartered	-0,77	-1,77	1,28	0,05	-0,19
Standard Chartered	-0,82	-1,14	0,19	0,14	-0,03
Standard Chartered	-0,85	-1,65	0,55	0,02	0,15
State Bank of India	1,78	0,63	-1,08	-0,89	-1,60
State Bank of India	1,72	-0,14	-0,88	-0,85	-0,56
State Bank of India	1,66	0,06	-0,12	-0,95	-0,97
State Bank of India	1,57	-1,70	-0,91	-0,59	-0,30
State Bank of India	1,53	-2,33	-0,63	-0,63	-1,62
TD	-0,25	1,77	-1,15	-0,77	1,18
TD	-0,31	1,27	-1,23	-0,52	0,89
TD	-0,31	0,91	-0,88	-0,21	0,68
TD	-0,43	1,14	-1,20	-0,52	1,15
TD	-0,46	1,30	-1,26	-0,67	1,08
UBS	-0,57	0,79	-0,85	0,68	-0,96
UBS	-0,56	0,68	-0,79	0,89	-0,65
UBS	-0,56	0,49	-0,56	0,79	-1,05
UBS	-0,65	-0,24	-0,52	0,84	-0,29
UBS	-0,65	-0,12	-0,55	0,96	0,26
UniCredit	-0,72	0,45	0,92	0,36	-0,38
UniCredit	-0,68	-1,11	0,42	0,40	-0,52
UniCredit	-0,67	-3,04	2,02	0,52	0,02
UniCredit	-0,72	-1,16	0,52	0,86	-0,41
UniCredit	-0,74	-0,39	1,07	0,70	-0,49
US Bancorp	-0,86	0,57	-1,12	-0,71	0,01
US Bancorp	-0,96	1,40	-1,22	-1,10	0,12
US Bancorp	-0,98	0,16	-1,11	-0,84	-0,08
US Bancorp	-1,04	1,11	-1,33	-0,40	-0,60
US Bancorp	-1,08	1,28	-1,18	-0,50	-0,29
Wells Fargo	-0,26	-0,31	-0,65	-0,48	1,44
Wells Fargo	-0,24	0,71	-0,84	-0,75	1,73
Wells Fargo	-0,24	-1,68	-0,27	-0,23	1,14
Wells Fargo	-0,24	0,32	-1,03	0,22	1,64
Wells Fargo	-0,25	0,54	-0,94	0,28	1,96
Westpac	-0,62	-0,24	-0,73	0,94	-1,75

Westpac	-0,67	-0,29	-1,00	0,80	-1,60
Westpac	-0,68	-1,19	-0,52	0,95	-1,74
Westpac	-0,69	0,26	-1,15	1,14	-0,90
Westpac	-0,71	0,77	-1,10	0,86	-1,60

3- Dummy Variables for Years and Countries (removing year 2018 and Australia):

Bank name	Year 2022	Year 2021	Year 2020	Year 2019	Country China	Country United States	Country Canada	Country United Kingdom	Country Spain	Country France	Country Germany	Country Denmark	Country Netherlands	Country ...
Agricultural Bank of China	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Agricultural Bank of China	0	1	0	0	1	0	0	0	0	0	0	0	0	0
Agricultural Bank of China	0	0	1	0	1	0	0	0	0	0	0	0	0	0
Agricultural Bank of China	0	0	0	1	1	0	0	0	0	0	0	0	0	0
Agricultural Bank of China	0	0	0	0	1	0	0	0	0	0	0	0	0	0
ANZ	1	0	0	0	0	0	0	0	0	0	0	0	0	0
ANZ	0	1	0	0	0	0	0	0	0	0	0	0	0	0
ANZ	0	0	1	0	0	0	0	0	0	0	0	0	0	0
ANZ	0	0	0	1	0	0	0	0	0	0	0	0	0	0
ANZ	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bank of America	1	0	0	0	0	1	0	0	0	0	0	0	0	0
Bank of America	0	1	0	0	0	1	0	0	0	0	0	0	0	0
Bank of America	0	0	1	0	0	1	0	0	0	0	0	0	0	0
Bank of America	0	0	0	1	0	1	0	0	0	0	0	0	0	0
Bank of America	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Bank of China	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Bank of China	0	1	0	0	1	0	0	0	0	0	0	0	0	0
Bank of China	0	0	1	0	1	0	0	0	0	0	0	0	0	0
Bank of China	0	0	0	1	1	0	0	0	0	0	0	0	0	0
Bank of China	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Bank of Communications	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Bank of Communications	0	1	0	0	1	0	0	0	0	0	0	0	0	0
Bank of Communications	0	0	1	0	1	0	0	0	0	0	0	0	0	0
Bank of Communications	0	0	0	1	1	0	0	0	0	0	0	0	0	0
Bank of Communications	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Bank of Montreal	1	0	0	0	0	0	1	0	0	0	0	0	0	0
Bank of Montreal	0	1	0	0	0	0	1	0	0	0	0	0	0	0
Bank of Montreal	0	0	1	0	0	0	1	0	0	0	0	0	0	0
Bank of Montreal	0	0	0	1	0	0	1	0	0	0	0	0	0	0
Bank of Montreal	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Barclays	1	0	0	0	0	0	0	1	0	0	0	0	0	0
Barclays	0	1	0	0	0	0	0	1	0	0	0	0	0	0
Barclays	0	0	1	0	0	0	0	1	0	0	0	0	0	0
Barclays	0	0	0	1	0	0	0	1	0	0	0	0	0	0
Barclays	0	0	0	0	0	0	0	1	0	0	0	0	0	0
BBVA	1	0	0	0	0	0	0	0	1	0	0	0	0	0
BBVA	0	1	0	0	0	0	0	0	1	0	0	0	0	0

BBVA	0	0	1	0	0	0	0	0	1	0	0	0	0	0
BBVA	0	0	0	1	0	0	0	0	1	0	0	0	0	0
BBVA	0	0	0	0	0	0	0	0	1	0	0	0	0	0
BNP Paribas	1	0	0	0	0	0	0	0	0	1	0	0	0	0
BNP Paribas	0	1	0	0	0	0	0	0	0	1	0	0	0	0
BNP Paribas	0	0	1	0	0	0	0	0	0	1	0	0	0	0
BNP Paribas	0	0	0	1	0	0	0	0	0	1	0	0	0	0
BNP Paribas	0	0	0	0	0	0	0	0	0	1	0	0	0	0
CaixaBank	1	0	0	0	0	0	0	0	1	0	0	0	0	0
CaixaBank	0	1	0	0	0	0	0	0	1	0	0	0	0	0
CaixaBank	0	0	1	0	0	0	0	0	1	0	0	0	0	0
CaixaBank	0	0	0	1	0	0	0	0	1	0	0	0	0	0
CaixaBank	0	0	0	0	0	0	0	0	1	0	0	0	0	0
China CITIC Bank	1	0	0	0	1	0	0	0	0	0	0	0	0	0
China CITIC Bank	0	1	0	0	1	0	0	0	0	0	0	0	0	0
China CITIC Bank	0	0	1	0	1	0	0	0	0	0	0	0	0	0
China CITIC Bank	0	0	0	1	1	0	0	0	0	0	0	0	0	0
China CITIC Bank	0	0	0	0	1	0	0	0	0	0	0	0	0	0
China Construction Bank	1	0	0	0	1	0	0	0	0	0	0	0	0	0
China Construction Bank	0	1	0	0	1	0	0	0	0	0	0	0	0	0
China Construction Bank	0	0	1	0	1	0	0	0	0	0	0	0	0	0
China Construction Bank	0	0	0	1	1	0	0	0	0	0	0	0	0	0
China Construction Bank	0	0	0	0	1	0	0	0	0	0	0	0	0	0
China Everbright Bank	1	0	0	0	1	0	0	0	0	0	0	0	0	0
China Everbright Bank	0	1	0	0	1	0	0	0	0	0	0	0	0	0
China Everbright Bank	0	0	1	0	1	0	0	0	0	0	0	0	0	0
China Everbright Bank	0	0	0	1	1	0	0	0	0	0	0	0	0	0
China Everbright Bank	0	0	0	0	1	0	0	0	0	0	0	0	0	0
China Merchants Bank	1	0	0	0	1	0	0	0	0	0	0	0	0	0
China Merchants Bank	0	1	0	0	1	0	0	0	0	0	0	0	0	0
China Merchants Bank	0	0	1	0	1	0	0	0	0	0	0	0	0	0
China Merchants Bank	0	0	0	1	1	0	0	0	0	0	0	0	0	0
China Merchants Bank	0	0	0	0	1	0	0	0	0	0	0	0	0	0
China Minsheng Bank	1	0	0	0	1	0	0	0	0	0	0	0	0	0
China Minsheng Bank	0	1	0	0	1	0	0	0	0	0	0	0	0	0
China Minsheng Bank	0	0	1	0	1	0	0	0	0	0	0	0	0	0
China Minsheng Bank	0	0	0	1	1	0	0	0	0	0	0	0	0	0
China Minsheng Bank	0	0	0	0	1	0	0	0	0	0	0	0	0	0

CIBC	1	0	0	0	0	0	1	0	0	0	0	0	0
CIBC	0	1	0	0	0	0	1	0	0	0	0	0	0
CIBC	0	0	1	0	0	0	1	0	0	0	0	0	0
CIBC	0	0	0	1	0	0	1	0	0	0	0	0	0
CIBC	0	0	0	0	0	0	1	0	0	0	0	0	0
Citi	1	0	0	0	0	1	0	0	0	0	0	0	0
Citi	0	1	0	0	0	1	0	0	0	0	0	0	0
Citi	0	0	1	0	0	1	0	0	0	0	0	0	0
Citi	0	0	0	1	0	1	0	0	0	0	0	0	0
Citi	0	0	0	0	0	1	0	0	0	0	0	0	0
Commerzbank	1	0	0	0	0	0	0	0	0	0	1	0	0
Commerzbank	0	1	0	0	0	0	0	0	0	0	1	0	0
Commerzbank	0	0	1	0	0	0	0	0	0	0	1	0	0
Commerzbank	0	0	0	1	0	0	0	0	0	0	1	0	0
Commerzbank	0	0	0	0	0	0	0	0	0	0	1	0	0
Commonwealth Bank	1	0	0	0	0	0	0	0	0	0	0	0	0
Commonwealth Bank	0	1	0	0	0	0	0	0	0	0	0	0	0
Commonwealth Bank	0	0	1	0	0	0	0	0	0	0	0	0	0
Commonwealth Bank	0	0	0	1	0	0	0	0	0	0	0	0	0
Commonwealth Bank	0	0	0	0	0	0	0	0	0	0	0	0	0
Crédit Agricole	1	0	0	0	0	0	0	0	0	1	0	0	0
Crédit Agricole	0	1	0	0	0	0	0	0	0	1	0	0	0
Crédit Agricole	0	0	1	0	0	0	0	0	0	1	0	0	0
Crédit Agricole	0	0	0	1	0	0	0	0	0	1	0	0	0
Crédit Agricole	0	0	0	0	0	0	0	0	0	1	0	0	0
Danske Bank	1	0	0	0	0	0	0	0	0	0	0	1	0
Danske Bank	0	1	0	0	0	0	0	0	0	0	0	1	0
Danske Bank	0	0	1	0	0	0	0	0	0	0	0	1	0
Danske Bank	0	0	0	1	0	0	0	0	0	0	0	1	0
Danske Bank	0	0	0	0	0	0	0	0	0	0	0	1	0
Deutsche Bank	1	0	0	0	0	0	0	0	0	0	1	0	0
Deutsche Bank	0	1	0	0	0	0	0	0	0	0	1	0	0
Deutsche Bank	0	0	1	0	0	0	0	0	0	0	1	0	0
Deutsche Bank	0	0	0	1	0	0	0	0	0	0	1	0	0
Deutsche Bank	0	0	0	0	0	0	0	0	0	0	1	0	0
Goldman Sachs	1	0	0	0	0	1	0	0	0	0	0	0	0
Goldman Sachs	0	1	0	0	0	1	0	0	0	0	0	0	0
Goldman Sachs	0	0	1	0	0	1	0	0	0	0	0	0	0
Goldman Sachs	0	0	0	1	0	1	0	0	0	0	0	0	0
Goldman Sachs	0	0	0	0	0	1	0	0	0	0	0	0	0
HSBC	1	0	0	0	0	0	0	1	0	0	0	0	0
HSBC	0	1	0	0	0	0	0	1	0	0	0	0	0
HSBC	0	0	1	0	0	0	0	1	0	0	0	0	0
HSBC	0	0	0	1	0	0	0	1	0	0	0	0	0
HSBC	0	0	0	0	0	0	0	1	0	0	0	0	0
ICBC	1	0	0	0	1	0	0	0	0	0	0	0	0
ICBC	0	1	0	0	1	0	0	0	0	0	0	0	0

ICBC	0	0	1	0	1	0	0	0	0	0	0	0	0	0
ICBC	0	0	0	1	1	0	0	0	0	0	0	0	0	0
ICBC	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Industrial Bank	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Industrial Bank	0	1	0	0	1	0	0	0	0	0	0	0	0	0
Industrial Bank	0	0	1	0	1	0	0	0	0	0	0	0	0	0
Industrial Bank	0	0	0	1	1	0	0	0	0	0	0	0	0	0
Industrial Bank	0	0	0	0	1	0	0	0	0	0	0	0	0	0
ING	1	0	0	0	0	0	0	0	0	0	0	0	1	0
ING	0	1	0	0	0	0	0	0	0	0	0	0	1	0
ING	0	0	1	0	0	0	0	0	0	0	0	0	1	0
ING	0	0	0	1	0	0	0	0	0	0	0	0	1	0
ING	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Intesa Sanpaolo	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Intesa Sanpaolo	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Intesa Sanpaolo	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Intesa Sanpaolo	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Intesa Sanpaolo	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Barclays	1	0	0	0	0	0	0	1	0	0	0	0	0	0
Barclays	0	1	0	0	0	0	0	1	0	0	0	0	0	0
Barclays	0	0	1	0	0	0	0	1	0	0	0	0	0	0
Barclays	0	0	0	1	0	0	0	1	0	0	0	0	0	0
Barclays	0	0	0	0	0	0	0	1	0	0	0	0	0	0
KB Financial	1	0	0	0	0	0	0	0	0	0	0	0	0	0
KB Financial	0	1	0	0	0	0	0	0	0	0	0	0	0	0
KB Financial	0	0	1	0	0	0	0	0	0	0	0	0	0	0
KB Financial	0	0	0	1	0	0	0	0	0	0	0	0	0	0
KB Financial	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lloyds	1	0	0	0	0	0	0	1	0	0	0	0	0	0
Lloyds	0	1	0	0	0	0	0	1	0	0	0	0	0	0
Lloyds	0	0	1	0	0	0	0	1	0	0	0	0	0	0
Lloyds	0	0	0	1	0	0	0	1	0	0	0	0	0	0
Lloyds	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Mizuho	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Mizuho	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Mizuho	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Mizuho	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Mizuho	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Morgan Stanley	1	0	0	0	0	1	0	0	0	0	0	0	0	0
Morgan Stanley	0	1	0	0	0	1	0	0	0	0	0	0	0	0
Morgan Stanley	0	0	1	0	0	1	0	0	0	0	0	0	0	0
Morgan Stanley	0	0	0	1	0	1	0	0	0	0	0	0	0	0
Morgan Stanley	0	0	0	0	0	1	0	0	0	0	0	0	0	0
MUFG	1	0	0	0	0	0	0	0	0	0	0	0	0	0
MUFG	0	1	0	0	0	0	0	0	0	0	0	0	0	0
MUFG	0	0	1	0	0	0	0	0	0	0	0	0	0	0
MUFG	0	0	0	1	0	0	0	0	0	0	0	0	0	0
MUFG	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NAB	1	0	0	0	0	0	0	0	0	0	0	0	0	0
NAB	0	1	0	0	0	0	0	0	0	0	0	0	0	0
NAB	0	0	1	0	0	0	0	0	0	0	0	0	0	0
NAB	0	0	0	1	0	0	0	0	0	0	0	0	0	0
NAB	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NatWest	1	0	0	0	0	0	0	1	0	0	0	0	0	0
NatWest	0	1	0	0	0	0	0	1	0	0	0	0	0	0
NatWest	0	0	1	0	0	0	0	1	0	0	0	0	0	0
NatWest	0	0	0	1	0	0	0	1	0	0	0	0	0	0
NatWest	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Nordea Bank	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Nordea Bank	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Nordea Bank	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Nordea Bank	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Nordea Bank	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PNC	1	0	0	0	0	1	0	0	0	0	0	0	0	0
PNC	0	1	0	0	0	1	0	0	0	0	0	0	0	0
PNC	0	0	1	0	0	1	0	0	0	0	0	0	0	0
PNC	0	0	0	1	0	1	0	0	0	0	0	0	0	0
PNC	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Postal Savings Bank of China	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Postal Savings Bank of China	0	1	0	0	1	0	0	0	0	0	0	0	0	0
Postal Savings Bank of China	0	0	1	0	1	0	0	0	0	0	0	0	0	0
Postal Savings Bank of China	0	0	0	1	1	0	0	0	0	0	0	0	0	0
Postal Savings Bank of China	0	0	0	0	1	0	0	0	0	0	0	0	0	0
RBC	1	0	0	0	0	0	1	0	0	0	0	0	0	0
RBC	0	1	0	0	0	0	1	0	0	0	0	0	0	0
RBC	0	0	1	0	0	0	1	0	0	0	0	0	0	0
RBC	0	0	0	1	0	0	1	0	0	0	0	0	0	0
RBC	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Santander	1	0	0	0	0	0	0	0	1	0	0	0	0	0
Santander	0	1	0	0	0	0	0	0	1	0	0	0	0	0
Santander	0	0	1	0	0	0	0	0	1	0	0	0	0	0
Santander	0	0	0	1	0	0	0	0	1	0	0	0	0	0
Santander	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Scotiabank	1	0	0	0	0	0	1	0	0	0	0	0	0	0
Scotiabank	0	1	0	0	0	0	1	0	0	0	0	0	0	0
Scotiabank	0	0	1	0	0	0	1	0	0	0	0	0	0	0
Scotiabank	0	0	0	1	0	0	1	0	0	0	0	0	0	0
Scotiabank	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Shanghai Pudong Development Bank	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Shanghai Pudong Development Bank	0	1	0	0	1	0	0	0	0	0	0	0	0	0
Shanghai Pudong Development Bank	0	0	1	0	1	0	0	0	0	0	0	0	0	0

Shanghai Pudong Development Bank	0	0	0	1	1	0	0	0	0	0	0	0	0	0
Shanghai Pudong Development Bank	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Société Générale	1	0	0	0	0	0	0	0	0	1	0	0	0	0
Société Générale	0	1	0	0	0	0	0	0	0	1	0	0	0	0
Société Générale	0	0	1	0	0	0	0	0	0	1	0	0	0	0
Société Générale	0	0	0	1	0	0	0	0	0	1	0	0	0	0
Société Générale Standard	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Chartered Standard	1	0	0	0	0	0	0	1	0	0	0	0	0	0
Chartered Standard	0	1	0	0	0	0	0	1	0	0	0	0	0	0
Chartered Standard	0	0	1	0	0	0	0	1	0	0	0	0	0	0
Chartered Standard	0	0	0	1	0	0	0	1	0	0	0	0	0	0
Chartered Standard	0	0	0	0	0	0	0	1	0	0	0	0	0	0
State Bank of India	1	0	0	0	0	0	0	0	0	0	0	0	0	0
State Bank of India	0	1	0	0	0	0	0	0	0	0	0	0	0	0
State Bank of India	0	0	1	0	0	0	0	0	0	0	0	0	0	0
State Bank of India	0	0	0	1	0	0	0	0	0	0	0	0	0	0
State Bank of India	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TD	1	0	0	0	0	0	1	0	0	0	0	0	0	0
TD	0	1	0	0	0	0	1	0	0	0	0	0	0	0
TD	0	0	1	0	0	0	1	0	0	0	0	0	0	0
TD	0	0	0	1	0	0	1	0	0	0	0	0	0	0
TD	0	0	0	0	0	0	1	0	0	0	0	0	0	0
UBS	1	0	0	0	0	0	0	0	0	0	0	0	0	0
UBS	0	1	0	0	0	0	0	0	0	0	0	0	0	0
UBS	0	0	1	0	0	0	0	0	0	0	0	0	0	0
UBS	0	0	0	1	0	0	0	0	0	0	0	0	0	0
UBS	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UniCredit	1	0	0	0	0	0	0	0	0	0	0	0	0	1
UniCredit	0	1	0	0	0	0	0	0	0	0	0	0	0	1
UniCredit	0	0	1	0	0	0	0	0	0	0	0	0	0	1
UniCredit	0	0	0	1	0	0	0	0	0	0	0	0	0	1
UniCredit	0	0	0	0	0	0	0	0	0	0	0	0	0	1
US Bancorp	1	0	0	0	0	1	0	0	0	0	0	0	0	0
US Bancorp	0	1	0	0	0	1	0	0	0	0	0	0	0	0
US Bancorp	0	0	1	0	0	1	0	0	0	0	0	0	0	0
US Bancorp	0	0	0	1	0	1	0	0	0	0	0	0	0	0
US Bancorp	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Wells Fargo	1	0	0	0	0	1	0	0	0	0	0	0	0	0
Wells Fargo	0	1	0	0	0	1	0	0	0	0	0	0	0	0
Wells Fargo	0	0	1	0	0	1	0	0	0	0	0	0	0	0
Wells Fargo	0	0	0	1	0	1	0	0	0	0	0	0	0	0
Wells Fargo	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Westpac	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Westpac	0	1	0	0	0	0	0	0	0	0	0	0	0	0

Westpac	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Westpac	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Westpac	0	0	0	0	0	0	0	0	0	0	0	0	0	0

- 4- Dataset for the regression is composed of the two tables of appendix 2 (standardized financial variables) and 3 (dummy variables), plus the four scores variables.

Appendix 3. Python Code for Data Analysis

```
import pandas as pd

import statsmodels.api as sm

df = pd.read_csv('C:/Users/Oumaima Ouaros/OneDrive - Audencia/New regression.csv',delimiter=";")

y = df['Emissions Score']

y=y.str.replace(",",".")

y = y.astype(float)

y=y.dropna()

X = df[['Total Assets', 'ROE', 'Book to Market Value', 'Financial Leverage',
        'Year 2022', 'Year 2021', 'Year 2020', 'Year 2019',
        'Country China', 'Country United States',
        'Country Canada', 'Country United Kingdom', 'Country Spain',
        'Country France', 'Country Germany', 'Country Denmark',
        'Country Netherlands', 'Country Italy', 'Country South Korea',
        'Country Japan', 'Country Finland', 'Country India',
        'Country Switzerland']]

for x in X:

    print(x)

    X[x]= X[x].str.replace(",",".")

    X[x]= X[x].astype(float)

X=X.dropna()

X = sm.add_constant(X)

model = sm.OLS(y, X).fit()

print(model.summary())
```

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