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The impact of Environmental, Social, and Governance-based lending on bank performance: international evidence for the banking sector.

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Abstract: The purpose of this study is to examine the impact of Environmental, Social, and Governance (ESG) score-based lending on bank performance. This study uses a novel sample covering 49 unique banks for the period 2010-2017, containing four bank performance indicators. In line with related literature, this study incorporates non-linear specifications of the relationship in the analysis. The primary analysis shows a positive impact of lending towards excellent performing ESG borrowers on bank performance for two of the four performance indicators. Additionally, suggestive evidence for a non-linear relationship is only found for one performance indicator. Disentangling these findings reveals a few implications. Generally, the positive effect on bank performance is more pronounced for excellent performing borrowers than good performing borrowers. There is no exclusive ESG pillar the most important driver behind the positive relationship between high ESG lending and bank performance. Finally, there exists suggestive evidence that the positive found association between ESG-based lending and bank performance emanates from reputational benefits in lieu of reduced credit risk.

Keywords: ESG, bank performance, international banks, sustainable lending
JEL classifications: G21; G30; F64; M14

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1. Introduction

The sixth assessment report of the intergovernmental panel on climate change (IPCC) revealed that under current conditions, we are far from reaching the Paris agreement' goal of limiting global warming to 1.5 degrees Celsius compared to pre-industrial levels. The increasing number of shrinking ice sheets and extreme weather events, the rising sea level, or the warming of the ocean are signs of the devastating effect environmental degradation entails. Unfortunately, decreased biodiversity, hampered economic growth and human capital, or just generalities such as food supply, natural capital, or physical capital are at stake (Stern, 2008). A recent disclosure project (CDP) study revealed that only 100 single companies have been responsible for already 71% of the global emissions that caused global warming since 1998 (Griffin and Heede, 2017). Similarly, the increased activity and globalization of multinational companies in developed countries spurred social and ethical challenges as rising levels of (income) inequality (Williamson, 1997). Moreover, the 21st century is characterised by numerous corporate scandals associated with governance problems. Their economic relevance has been enormous. Aside from destroyed shareholder's equity, were the economic consequence on other stakeholders and the general society also considerable (Di Miceli, 2015). In sum, businesses must alter how they currently act to overcome any further detrimental impact on the society and economy.

Essential in this process is the involvement of financial institutions (Bolton, Hong, Kacperczyk, and Vives, 2021). Apart from their direct impact on Environmental, Social, and Governance (ESG) factors, is their indirect impact via lending perhaps even more prominent. Their central role in allocating resources to non-financial companies, their ability to impose costs on non-compliant companies, and their power to coordinate actions make them of special importance. Considering the deteriorated trust in financial institutions emanating from the 2008 financial crisis and the LIBOR scandals, it is essential that they act responsible towards ESG standards, and this also provides opportunities (Hurley, Gong, and Waqar, 2014).[1]

In this context, initiatives such as the Science Based Target Initiative (SBTi), Principle for responsible investment (PRI), and the equator principles emerged to help the disclosure and implementation of ESG standards for banks.[2] Sustainable finance developed as a complement to a sustainable economy by providing enhanced risk assessment and a more efficient allocation of capital towards green projects. A reflection of this is provided by the European Central Bank (ECB). According to the ECB's financial stability report, the assets under management of ESG funds soared by 170% from, 500 billion USD in 2015 to 1.3 trillion USD in 2020. Hence, the need to shift towards a sustainable economy to promote sustainable development, eradicate poverty, and enhance welfare, while keeping healthy ecosystems is commonly accepted (Yin, Zhu, Krikulak-Uludag, Zhu, 2021).

[1] The LIBOR scandals refer to a series of fraudulent actions connected to the LIBOR.
[2] Section 2 of this paper provides an extensive description of the content of these initiatives.

The development and incorporation of ESG activities and sustainable finance raise questions such as 'Are the current developments in E, S, and G activities effective enough?' and 'What are the consequences of ESG activities on the performance of a firm?'. The latter is especially essential understand for banks to understand, as they have more capital than non-financial firms (Whu and Shen, 2013). Increased bank risk imposes a systemic threat to the whole financial system considering the position of banks in the national economy.

For over 50 years, the relation between firm performance and ESG performance has been analysed intensively. Two prominent hypotheses form the cornerstones of an ongoing debate. The trade-off theory by Friedman (1970) suggests a negative relationship due to assumed costly corporate social responsibility (CSR) investments. On the other hand, Freeman's stakeholder theory (1984) proposes a positive relationship due to aligned interests. Since the foundation of Friedman (1970) and Freeman (1984), new theories have arisen, various settings have been tested, different econometric models have been employed, and distinct performance indicators have been utilised. All seem to produce different findings. Relatively limited attention has been paid to the banking industry in this relationship. Considering the central position in the world economy and a bank's detrimental ability to achieve sustainable goals, this is an interesting sector to study.

The purpose of this study is to investigate the relationship between ESG lending activities and bank performance. More specifically, this study tests the impact of lending towards excellent performing borrowers in terms of ESG score (ESG>74) on bank performance.[3] To further disentangle this impact, each individual ESG pillar is tested for its comparative effect. Additionally, the association between lending towards goodperforming ESG borrowers (49<ESG<75) and bank performance is tested to investigate whether excellent performing borrowers yield incremental value. In short, this paper tries to provide a clear picture of the recent ESG-oriented activities of financial institutions and their corresponding implications.

Previous literature analysing the relationship between ESG performance and firm or bank performance has obtained mixed results using a variety of econometric models. Remarkably, most studies only consider a linear relationship between the two, while there exists evidence for a nonlinear relationship (see, e.g., Mi, Hassan, Houston, and Karim, 2021; Nollet, Filis, and Mitrokostas, 2016). Two studies investigating the implications of sustainable lending behaviour on indicators of firm performance for China's green credit policy (GCP) are executed by Zhou, Caldecott, Hoepner, and Wang (2021) and Yin et al. (2021). The former finds evidence for a positive relationship between green lending and reduced credit risk, while the latter finds a positive relationship between bank performance and green lending.

[3] ESG scores range from 0 to 100.

The main contribution of this paper is to include ESG lending activity into the ESG-bank performance framework. To the best of my knowledge, this is the first study that analyses the impact of lending conditional on (high) borrower ESG scores on bank performance. Additionally, this study contributes to the scarce literature investigating the linkages between ESG activities and potential increased credit risk (the share in non-performing loans). Altogether, this paper further adds to the literature analysing the increased role of ESG standards in the financial industry. The findings of this paper provide support for financial institutions, policymakers, and society as a whole regarding the implications of ESG lending behaviour.

An eight year annual panel dataset (2010-2017) is constructed by combining several information sources. A Pooled Ordinary Least Squares (POLS) model, including time-invariant fixed effects is applied to this dataset to investigate the relationship between bank performance, ESG lending, and a set of control variables. The empirical findings of this study show the existence of a nonlinear relationship between lending towards excellent performing ESG borrowers and Tobin's Q (TQ) and Net Cash Flow (NCF). Although for TQ, this more closely resembles a monotonically increasing relationship. On the contrary, no association between lending towards excellent performing borrowers and return on assets (ROA) and the share in non-performing loans (NPL) has been found. For lending to good performing borrowers there exists a positive relationship between all bank performance indicators. Generally, the estimates measuring the relationship between lending towards good performing borrowers and bank performance are scaled downwards compared to lending towards excellent performing borrowers. While the estimate for NPL increases. Decomposing the ESG score into separate pillars shows that for TQ, the governance pillar appears to be the driving factor behind the result, while for NCF, this seems to be the social pillar. A battery of sensitivity tests are conducted to clarify this paper's findings further.

The remainder of the paper proceeds as follows. Section 2 describes the relevant literature. Section 3 explains the employed empirical methodology. Section 4 discusses the utilised data. Section 5 shows and describes the obtained results and employed robustness tests. Finally, section 6 summarizes the paper by providing a brief summary, recommendations for future research, and policy advice emanating from the findings of this paper.

2. Literature Review

The relationship between ESG, firm performance, and firm behaviour has been a fiercely debated topic over the years. Various theories and different econometric estimations have resulted in opposing results. Despite their crucial role in resource allocation and thereby ability to influence ESG goals, banks have received much less attention in this relationship. Generally, we can distinguish two nexuses on which this study is built. The first investigates the relationship between bank performance and their own ESG score, while the second analyses the lending behaviour towards the ESG scores of a bank's borrower. This study can be considered a synthesis of the nexuses mentioned above by analysing the impact of ESG lending activities on bank performance. The first part of this section describes the theoretical foundation and empirical results behind the relationship between ESG and firm and bank performance. The subsequent part discusses the changes in a bank's behaviour towards its borrower ESG profile to finally combine the two nexuses and narrow down to the hypothesis development. This section can be considered the foundation for the three hypotheses derived at the end of this section.

2.1 A breakdown of ESG

Since the practice of ESG investing started (i.e., socially responsible investing) in the 1960s, it has experienced an exponential growth pattern (MSCI, 2022). Bloomberg (2021) even recognized that almost every interview with a chief executive office covered something related to 'ESG'. ESG performance gradually developed into a key non-financial indicator of non-financial performance, quality of management, and risk management (Boerner, 2011). To help asset and investment managers in allocating institutional ESG-committed funds, an industry of agencies scoring and rating ESG practices has emerged. They offer ways to quantify and assess ESG characteristics. Up to now, no dominant ESG rating agency has emerged, and all rating agencies' practices are highly correlated in their derivations (Duponcheele and Perraudin, 2021). An ESG score consists of three individual pillars, which are almost exclusively equally weighted. The unique pillars and their coverage look as follows:

The 'E' in ESG measures the environmental impact of a firm. Generally, it considers the energy a company uses and the waste it discharges. The resources it requires for operating and the impact on living beings as a result. Additionally, E includes the impact on climate change (e.g., carbon emissions). Overall, E measures how a company affects and is affected by the environment (Henisz, Koller, and Nuttall, 2019).

The 'S' in ESG reflects the social impact a company has. Generally, it measures how a company operates within a broader and diverse society and how it aligns with those standards. Examples are the diversity, inclusion, and labour relations of a company. Overall, it addresses a company's relationship and the reputation it cherishes with all its stakeholders (Henisz, Koller, and Nuttall, 2019).

The 'G' in ESG covers all internal procedures, rules, and systems a company adopts to govern itself, adhere to the law, make effective decisions, and comply with the expectations of external stakeholders (Henisz, Koller, and Nuttall, 2019).

Even though the rating agencies are highly correlated in their derivations of the ESG scores, there still exist differences in their construction and underlying components. An example of a detailed breakdown, in this particular case Asset4 Refinitv, can be found in Figure A1.[4]

2.2 ESG and financial performance

2.2.1 Theoretical overview

More than 50 years ago, Friedman (1970) spurred an ongoing debate on what the responsibility of a firm is. In his New York Times article, he judges CSR to be a misallocation of shareholder funds, as the inherent responsibility of a firm is to make profit.[5] Social goals were suggested to be financed privately since CSR investments are costly and, thus, offset value enhancement. This view became to be known as the trade-off theory and was supported by an empirical examination by Aupperle, Carrol, and Hatfield (1985). According to these authors, CSR involvement requires expensive investments such as clean technologies or pollution control. They suggest these costs to cause a competitive disadvantage. Therefore, such costs should not be captured by firms but by, e.g., governments or individuals. This argument was supported by Mackey, Mackey, and Barney (2007) and Zivin and Small (2005). The agency theory proposes that ESG investments are a form of reputational improvement by managers at the expense of shareholders (Barnea and Rubin, 2010). This theory seems to especially hold for improper incentivised managers (Jensen and Meckling, 1976). If investors perceive this view, they may associate high ESG profiles with enhanced firm fixed costs and, therefore, restrain from investing in these riskier firms (Drago, Carnevale, and Gallo, 2019).

Contrary to the aforementioned neoclassical view, claiming a negative relationship between ESG and firm performance, alternative hypotheses suggest a positive relationship between ESG and

[4] Thompson Reuters ESG sores are provided as an example since this data has also been employed in this study. A detailed explanation of Figure A1 will follow in the data section.
[5] The terms CSR, CSP, sustainable reporting, green reporting, and ESG will be used interchangeably despite their minor differences.

firm performance. The stakeholder theory, first introduced by Freeman (1984), broadens its focus on all stakeholders (e.g., customers, employees, governmental authorities) instead of only stockholders. The theory suggests that a shift from shareholder-focused to stakeholder-focused governance would harmonize the interests of both the investing and non-investing stakeholders, thereby overcoming extreme risk-taking by executives and preserving bank value. Increased regulation, limited access to capital, a brain drain, and a loss in sales are, for instance, at stake. By maintaining good relationships with their key stakeholders, they boost their profitability, as this theory postulates CSR as an intangible asset promoting more efficient resource usage. A corollary to this theory is the strategic management theory. Typical examples of this theory are avoiding expensive transaction costs (e.g., labour union contracts or close government regulation) or future stringent regulation (e.g., stricter carbon caps). By being currently proactive to ESG compliances, a company is dynamic towards potential future distortions or business opportunities (Jones, 1995; Porter, 1991; Cairncross, 1994). Similarly, Barnett and Salomon (2006) argue that firms that manage their relationship with stakeholders generate a valuable reputation. This reputation protects during periods of crisis and creates a competitive advantage that cannot be attained without being socially active. Finally, the resource-based theory, initiated by Hart (1995), suggests that addressing ESG issues can create a firm unique resource and thereby a competitive advantage.[6]

2.2.2 Empirical overview

As shown before, mixed theories are inconclusive about the relationship between firm performance and ESG. The empirical literature does not differ from this and also produces mixed results. Studies that found a positive relationship were, e.g., Waddock and Graves (1997) and Luo and Bhattacharaya (2006), while Surroca and Tribó (2008) and Brammer, Brooks, and Pavelin (2006) found a negative relationship. Nonetheless, meta-studies by Orlizky, Schmidt, and Rynes (2003) and Friede, Bush, and Bassen (2015) indicate that most literature found evidence for a positive relationship between social and financial performance. The effect seems to be more pronounced for accounting-based than market-based measures.[7] A minority of studies have found both a positive and negative relationship (Cochran and Wood, 1984; Mcguire, Sundgren, and Schneeweis, 1988), while a few studies have found no relationship (McWilliams and Siegel, 2001; Alexander and Buchhol, 1978). McWilliams and Siegel (2001) support their finding with a framework based on a supply and demand theory of the firm assuming shareholder wealth maximization. They argue that as a firm maximizes its profit, it sets a specific level of social performance to achieve this. As firm maximization level differ per firm this leads

[6] Examples of companies where this happened are Ben & Jerry's or The Body Shop.
[7] Accounting-based measures include financial statement based measures, while market-based measures are derived from market based stocks.

each firm to have a different amount of CSP based on their unique demand, while in equilibrium, profitability is maximized and equal.

2.2.3 ESG and bank performance

Contrary to the vast amount of literature written on ESG and firm performance for non-financial firms, the extent of studies focussing on the banking sector is much more scarce. Nonetheless, research in this field is of much interest considering a bank's crucial role in allocating resources and thereby ability to establish environmental, social, and governmental goals. This has led to the fact that bank activities are often more scrutinized by regulators, the media, and the citizens. By 2024, the European banking authority (EBA) intends to replace the patchy and inconsistent ESG data reported by the sector with a comprehensive new set of metrics for assessing the sector's sustainability performance (EBA, 2022). Furthermore, the House Financial Services Committee (HFSC) has already imposed such a requirement by requiring the largest U.S. banks to submit annual ESG reports to the federal reserve (HFSC, 2021). This naturally motivates more research into the relationship between ESG performance and bank performance. Most of the literature in this field suggests that bank's benefit from improved ESG scores in terms of performance. Cornett, Erhemjamts, and Tehranian (2016) test the relationship between CSR and bank performance in the context of the recent financial crisis. Using a two-stage instrumental variable (IV) approach, they show the existence of a positive relation between CSR and bank performance. This result appears to be more pronounced for larger banks. Lower deposit fees and increased service towards the lower income classes were more often observed by larger compared to smaller banks. Using a POLS approach Simpson and Kohers (2002) investigate the relationship between corporate social performance (CSP) and financial performance for 385 U.S. banks. Bank performance is measured by ROA and loan losses, and they use the MSCI KLD STATS ESG (MSCI KLD) database for their ESG scores. Their results provided suggestive evidence for a positive CSP-financial performance relationship. Their extensive and diverse sample supports the idea that a positive relationship between these variables is a universal phenomenon. A more recent paper analysing the effect of ESG activities on a bank's financial and operational performance in emerging markets is executed by Shakil, Mahmood, Tasnia, and Munim (2019). Using a Generalised Method of Moments (GMM) technique, they account for endogeneity and heterogeneity issues. Their sample of 93 emerging market banks from 2015 to 2018 found a positive relationship between ESG and bank performance, where bank performance in measured via ROA and return on equity (ROE). However, no effect is found for corporate governance activities. Potentially this is due to weak corporate governance practices in emerging countries and a lack of regulation inducements by governmental bodies. As the results of this study suggest; not all components of the ESG metric necessarily have the same impact on bank performance. Similarly, Buallay (2018) finds a significant positive association between ESG and three indicators for bank performance (ROA, ROE, and TQ) for a sample of 235 banks for ten years (2017-

2016) using a random effects model. Nonetheless, if the ESG indicators are separately measured, the effect alters for some indicators. Environmental disclosure positively affects the ROA and TQ, social disclosure negatively affects all three dependent variables, and corporate governance only positively affects TQ and negatively affects the ROA and ROE.

Although a large part within this field points towards a positive relationship between ESG and bank performance, opposing results are still observed. A study which findings support the neoclassical and principal-agent thoughts is conducted by Buallay, Alajmi, and Saudagran (2020). To tackle a selection bias, they both incorporated banks in developed and developing countries for 11 years after the financial crisis of 2008. Moreover, they both adopted a POLS and IV-GMM approach in their research. Their findings unanimously show a negative impact of ESG on all performance proxies for every bank (full, developed, and/or developing countries). A similar study by Di Tommaso and Thorton (2020) also focuses on the post financial crisis period (2007-2018), given the introduced reforms that followed. They find that increased ESG scores are strongly associated with a reduction in risk-taking and bank value for a set of European banks. The effect on risk-taking is dependent on board characteristics and is mitigated if boards are smaller, more gender diverse, and more independent. Even though the impact of ESG on bank value via risk-taking is positive, it does not adequately compensate for adverse direct effects.

Only a small extent of the studies support the neutrality position in which an insignificant relationship is found (e.g., Soana, 2011; Matemane and Wentzel, 2009). A potential cause for this phenomenon is suggested to be the supply and demand theory of McWilliams and Siegel (2001).

Remarkable is the fact that almost all studies solely consider a linear relationship between ESG and bank/firm performance, while there exists evidence that this not fully captures the relationship. Considering the two contradicting theorical views, a non-linear relationship is perfectly plausible. Some ESG activities will, on the one hand, be value-enhancing, as they strengthen the relationship with its stakeholders and increase transparency (stakeholder theory). Therefore, high ESG scores can be labelled as low-risk. Nonetheless, after a certain threshold of investments, the number of new profitable high-NPV ESG opportunities will get exhausted. Then, each additional ESG activity will have diminishing returns to scale. The trajectory of diminishing returns is in line with the trade-off theory, where resources are considered scarce and will lead to opportunity costs. A study by Azmi, Hassan, Houston, and Karim (2021) empirically tests this theory for 251 banks in the period 2011-2017 for 44 emerging economies. Their findings support the hypothesized concave relationship. Among all separate ESG factors, environmentally friendly activities appeared to be the only positive significant indicator concerning bank value. Further, a positive relationship between ESG and cash flow and efficiency is found, while ESG negatively affects the cost of equity. For the cost of debt, no significant effect is found. Evidence for a U-shaped relationship has also been obtained (see, e.g., Nollet, Filis, and Mitrokostas, 2016).

2.3 ESG and lending behaviour

The second strand of literature on which this paper is built, concerns the lending behaviour of banks towards the ESG scores of their clients. As already illustrated in the previous subsection, over the years there has established an increased trend in scrutinization by policymakers, the media, and citizens (see EBA, 2022; HFSC, 2021). Similarly, initiatives helping the disclosure of ESG-related information have also increased. Examples of such initiatives are the Science Based Target Initiative (SBTi), the Principle for Responsible Investment (PRI), or the Equator Principles. All with the aim of stimulating increased transparency and comparability of sustainable efforts. SBTi is a well-defined path of carbon reduction in line with the Paris agreement to which banks voluntarily commit. The PRI aims to include ESG instruments voluntarily into their investment strategies by promoting six main principles. Finally, the Equator Principles is a risk management framework for financial institutions that intends to incorporate, manage, and assess environmental and social risk into their project finance.

So far, this paper has illustrated how ESG potentially affects firm value and what initiatives for solid ESG disclosure have emanated. Yet, what question has maintained unresolved is why banks engage in ESG disclosure. According to Wu and Shen (2013), banks undertake ESG activities for three potential reasons: strategic choice, altruism, and greenwashing. Their study indicates that the primary motive for banks to in ESG is strategic since ESG performance was associated with higher financial performance and fewer non-performing loans.

Considering that most of the literature suggests a positive relationship between ESG and bank performance and banks, thus, primarily engage in ESG activities for strategic motives, researchers delved into a bank's lending behaviour towards the ESG profiles of their borrowers. Devalle , Fiandrino, and Cantino (2017) argue that ESG factors are essential to consider in the credit analysis and creditworthiness evaluation of borrowers. This is primarily due to their impact on a borrowers' cash flows and the probability of defaulting on their debt obligations. Therefore, over the past two decades, researchers have tried to answer questions such as 'Is loan pricing affected by the ESG score of the client?', 'Do banks lend less towards low ESG borrowers?', 'Are stricter covenants imposed on low ESG clients?', and 'Do lenders move away from low ESG borrowers?'. A study by Hauptmann (2017) examines the effect of borrowers' sustainability profiles on loan spreads. The results of this study reveal that high sustainability profiles indeed receive lower spreads on their loans. Nonetheless, this only holds true when a bank also enjoys a high sustainability performance. From the ESG pillars, corporate governance appears to be pre-eminently of most importance. Environmental and social performance are on par in terms of importance. The author proposes two potential reasons for this. First, the disclosure and measurement of corporate governance is longer established, which simplifies the screening. Secondly, corporate governance concerns and misaligned incentives can harm the most efficient use of a company's capital flows, thereby increasing credit risk. Three main channels are hypothesized that cause banks with high sustainability performance to price borrowers with low sustainability

performance higher. First, information asymmetries are reduced if banks and borrowers are comparable ESG-wise, driven by a more natural form of trust. Secondly, strong sustainability performance may minimise credit risk, and banks with high sustainable performance are more capable of quantifying this. Lastly, banks with high sustainability performance may care more about the sustainability of their borrowers due to the reputational risk they face. Eliwa, Aboud, and Saleh (2021) also analyse the relationship between ESG practices and the cost of debt. Using a sample comprising 15 European Union countries, they find that lending institutions reward both ESG disclosure and performance. Borrowers with more robust ESG performance or disclosure have a lower cost of debt. Goss and Roberts (2011) also find that firms with more CSR concerns face higher loan costs . Chava (2014) specializes her study with respect to environmental concerns. The results indicate that firms with more environmental concerns pay more for their debt and equity. Shi and Sun (2015) investigate the relation between the number of loan covenants and CSR scores. Their findings reveal that a high CSR score is associated with more financial flexibility, fewer bond covenants, and commonly fewer restrictions. Devalle et al. (2017) pinpoint that ESG performance, particularly the social and governance pillars, positively influences the credit ratings. Kacperczyk and Peydró (2021) examine how firm-level carbon emissions affect bank lending behaviour and how this, subsequently, affects real, financial, and environmental outcomes. They use SBTi commitments to proxy a bank's green preference. The results indicate that firms with lower (higher) scope-1 emissions receive more (less) bank credit from committed banks. Kim, Kumar, Lee, and Oh (2022) delved further into loan volumes by investigating the ESG lending market. Their paper shows that the ESG lending market has experienced rapid growth past decade, primarily fuelled by ESG-linked loans.[8] Nonetheless, the evidence provided by both Kacperczyk and Peydró (2021) and Kim et al. (2022) suggests that the lending towards superior ESG performance is more an act of greenwashing than a stimulus for enhancing the borrowers ESG score. Kacperczyk and Peydró find no improvements in the environmental score for 'brown' firms after loan origination. Similarly, Kim et al. (2022) find ESG score deterioration for borrowers with low-quality disclosure after loan origination. Contrary, Houston, and Shan (2021) show that banks positively influence the ESG profile of the borrower after they granted them a loan.

[8] ESG-linked loans are loans whose interest is contingent on the borrowers ESG performance. Royal Philips NV introduced the first ESG-linked. In an agreement with a group of 16 banks, they agreed upon a new 1 billion Euro revolving credit facility, in which the interest rate depended on the company's year-on-year ESG performance.

2.4. A synthesis of two nexuses

Over the last two decades, with more emphasis on the last decade, the role of ESG in the finance sector has gained a lot of attention by academics and investors. Banks have been of special interest considering two distinct reasons. First, banks have received heavy criticism for their role in the financial crisis of 2009 and are, therefore, now intensively scrutinized. Secondly, banks have a unique position in both advising CSR standards through their own performance and when they incorporate ESG risk into their lending and investment decisions (Buallay et al., 2020). The two main literary strands, the relationship between bank performance and their own ESG score and the relationship between bank lending behaviour and borrower ESG scores, on which this paper is built have generally come to two conclusions. Frist, banks experience a positive performance impact by improving their own ESG score. Secondly, banks adjust their lending behaviour towards ESG related risks by lending lower volumes, asking higher premia, imposing more covenants, or by even moving away from poor ESG performing borrowers. Nonetheless, the effect of these ESG driven changes in their lending behaviour on their own performance has been left open for research. Precisely this is the gap in literature that the paper contributes to.[9] Moreover, this paper further adds on to the increased role and importance of ESG in the finance industry. Finally, the current literature on banks behaviour to CSR is scarce. The current paper can be considered as a synthesis of the formerly proposed nexuses. Most closely related to this study are two studies analysing the implications of the determinants of the Chines green credit policy (GCP) and the impact of the GCP on bank performance indicators.[10] Yin, Zhu, Kirkulak-Uludag, and Zhu (2020) show, using a GMM approach, that increased green lending enhances a bank's profitability and also reduces their risk for non-state owned banks. The authors thereby conclude that non-state owned banks adhering to the GCP, position themselves in a niche market with both higher profitability and lower risk. On the contrary, the GCP negatively affects the profitability of state owned banks. This can be contributed to the fact that China pushes these banks to play a key role in green lending. Zhou, Caldecott, Hoepner, and Wang (2021) analyse the relation between green lending and credit risk. A tendency of ballooning bank balance sheets and the fact that the recent financial instability of 2007-2009 is often being linked to credit risk, make this an interesting field to study. Their results indicate that the portion of green loans has a significant negative association with credit risk for state-controlled major banks. While for non-state controlled banks an opposite results has been found. Therefore, the authors conclude

[9] Figure A1 shows the extensive and complicated structure on the derivation of ESG scores. Additionally, Duponcheele and Perraudin (2021) constructed a strategy, displayed in Figure A2, to develop a ESG score that complies with the future standards. Both Figures indicate that enhancing your ESG score is not an relatively easy process and far from only determined by a bank's lending behaviour. This circumvents the threat that this study is indirectly executing a same analysis as the studies measuring the relation between a bank's ESG score and its performance.

[10] The in 2007 introduced GCP aims and obliges financial institutions to redirect their credit away from heavily polluting and energy intensive industries towards environmental friendly companies that are in compliance with the environmental regulations. Higher financing costs are imposed on banks that are not conform with the policy.

that state-controlled banks outperform commercial banks in implementing the GCP. Contrary to analysing the GCP, this paper executed a relatively similar framework although for shares in high ESG loans. To the best of my knowledge, this is the first paper analysing the effect of ESG based lending behaviour on bank performance.

2.5 Hypothesis development

Clearly, most papers position themselves only on one side of the debate on ESG activities and firm/bank performance. The neoclassical view postulates a negative linear relationship via the trade-off theory and its closely aligned agency theory. Contrarily, a positive linear relationship is supported by strategic arguments such as the stakeholder theory, the strategic management theory, reputation, and the resource-based view. Nevertheless, I believe that this linear relationship does not fully reflect the relationship between ESG and bank performance. To analyse this, I closely follow the procedure of Azmi et al. (2020) and build forth on it with the theoretical framework of Hauptman (2017) and personal expectations. The foundation of my theoretical framework is designed by Hauptman (2017). A borrower's ESG profile influences a bank's performance via two channels: reputational risk and credit risk. Reputational risk implies that part of a bank's own ESG profile is determined by its borrowers' ESG profiles. Lending to low ESG firms can harm their financial performance or access to credit (Hauptman, 2017; Wu and Shen, 2013). Moreover, since their crucial role in financial intermediation and influence on the financial crisis of 2009, banks are intensively scrutinized by the government, media, and citizens. Thus, their reputation is extra sensitive to sustainability shocks and potential future regulation. Secondly, borrower ESG profiles affect bank performance via credit risk. Credit risk impacts a bank's performance by changes in the borrowers' cash flow stability. High ESG borrowers indirectly influence bank performance as they are more long-term oriented. These ESG profiles are characterised by focussing on long-term stable profitability instead of short-term risky share price maximization. While high ESG borrowers' cash flow directly influences bank performance via fines or regulation. Additionally, the stakeholder theory argues that as high ESG profile borrowers are positively covered by the media, their customer loyalty is positively influenced (Cahan, Chen, Chen, and Nguyen, 2015). This, subsequently, reduces consumer price elasticity and, thus, intensifies cash flow stability.

Altogether, lending towards high ESG borrowers positively affects bank performance via reduced credit risk and reputational benefits, thereby generating a competitive advantage. Additionally, commitments such as the net-zero banking alliance anticipate to potential future regulation.[11] However, there are not infinite profitable high ESG lending opportunities. This primarily stems from the fact that the process of enhancing an ESG score is expensive and time-consuming for a borrower. Bloomberg

[11] The net-zero banking alliance is a United Nations organised initiative including 116 global banks and representing almost 40% of global banking assets with the commitment to lend carbon neutral by 2050. Intermediate targets are planned for 2030.

(2021) investigated the actions required to obtain an ESG upgrade by MSCI. Among the most frequently cited causes have (1) protect customer data, (2) adopt anti-corruption policies, or (3) offer diversity training or programs been included in the top ten.[12] Such examples show the time-consuming practices of boosting your ESG score. As the number of high ESG borrowers becomes scarce, the more high ESG borrowers a bank already contains in its portfolio, the more difficult it relatively becomes to find new high ESG borrowers. As a result, banks will be more inclined to decrease their interest rates for high ESG borrowers compared to low ESG borrowers. This is in line with Eliwa et al. (2021) and Goss and Roberts (2011), showing that banks reduce their cost of debt for more sustainable borrowers. Lowering the interest on such loans will negatively affect the profit on those loans. Additionally, in line with the trade-off theory, opportunity costs will develop as the granted loan is a scarce resource,. Therefore, as the number of new profitable high ESG borrowers gets exhausted, each additional high ESG borrower will have diminishing returns to scale. Eventually, this could lead to an inflection point in which the neoclassical view outweighs the conflicting views. As credit risk follows an inverse relationship with performance, the pattern between high ESG borrowers and the number of non-performing loans follows a reverse argumentation. This leads to the first formal hypothesis this paper is testing:

- *Hypothesis 1.1: The relationship between lending towards excellent performing ESG borrowers and bank performance is non-linear.*
- *Hypothesis 1.2: The relationship between lending towards excellent performing ESG borrowers and bank performance follows an inverted U-shaped pattern.*
- *Hypothesis 1.3: The relationship between lending towards excellent performing ESG borrowers and credit risk follows a U-shaped pattern.*

The upward sloping part of this relationship is estimated to be steeper for excellent performing borrowers than for good performing borrowers. Reputational benefits and reduced credit risk are estimated to yield incremental value for *excellent* performing borrowers. Therefore, a similar model is conducted for good performing borrowers to investigate whether the impact of lending to excellent performing borrowers on bank performance indicators is unique in its sign, size, and significance. Formally this hypothesis looks as follows:

- *Hypothesis 2.1: Lending towards excellent performing ESG borrowers has a more positive impact on bank performance than lending towards good performing ESG borrowers.*
- *Hypothesis 2.2: Lending towards excellent performing ESG borrowers has a more negative impact on credit risk than lending towards good performing ESG borrowers.*

[12] Aside from the fact that these frequently executed actions could require time to achieve, becoming a top ESG score firm even requires to excel at various ESG indicators.

Additionally, all separate pillars of the ESG metric will be individually investigated. Among the three components, I expect the environmental pillar to have a positive and larger effect on bank performance than the social and governance pillars. This is primarily due to the increased attention and threat from global warming, which imposes significant business risks. Further, the equator principles and SBTi impose direct restrictions on a banks' behaviour towards the environment. In accordance with this hypothesis, Azmi et al. (2020) found that the environmental component turned out the be the only significant positive indicator of the three. Similarly, Buallay (2018) shows that the environmental pillar is the only significant pillar, if examined separately. Therefore, the last formal hypothesis I analyse in this paper is as follows:

- *Hypothesis 3.1: Relative to the two other ESG pillars, an increase in the environmental pillar has the largest positive influence on bank performance*
- *Hypothesis 3.2: Relative to the two other ESG pillars, an increase in the environmental pillar has the largest negative influence on credit risk*

3. Methodology

This part of the paper is devoted to outlining the principal research methods that are employed in this paper. The essential considerations behind the adopted methods and main econometrical concerns are addressed. After analysing the sign, size, and significance for the estimates measuring the lending share towards excellent performing borrowers (ESG>74), the existence of a nonlinear relationship between lending towards excellent ESG borrowers and bank performance is determined and its potential shape is evaluated. Subsequently, the same procedure is executed for lending shares towards good performing borrowers (49<ESG<75) to see how the results may alter. Finally, the ESG score for excellent performing borrowers is decomposed into separate pillars to analyse what pillar is most important in the relationship. The end of this section comprises of an explanation of the conducted robustness checks in this paper.

3.1 Empirical estimation model

The majority of the studies analysing the relationship between proxies for ESG performance or activity and firm performance only consider a linear relationship (Di Tommaso and Thorton, 2020; Buallay et al., 2020), while only a few studies also consider a nonlinear relationship between the two variable (Azmi et al., 2021; Nollet et al., 2016). Generally, multiple control variables are included to account for the omitted variable bias. The most conventional functional form for estimating this relationship for panel data is as follows:

$$performance_{it} = \beta_1 ESG_{it} + X_{it} + \varepsilon_{it} \quad (1),$$

where i denotes the country and t the time index, *performance* is a proxy for firm performance which can be potentially be measured with e.g. ROA, ROE, and T*Q*, *ESG* reflects the ESG score of the firm, *X* is a set of control variables, and ε_{it} a firm and year specific error term.

Over the years, a various comprehensive econometric models for analysing panel data have been developed. Among the studies examining the relationship between bank performance, the GMM approach (see, e.g., Mahmood et al., 2019) and the POLS (see, e.g., Simpson and Kohers, 2003) have been most adopted. Even though the GMM approach is generally more capable of overcoming endogeneity issues as reverse causality, I opt to make use for a POLS for two specific reasons. First, the utilised dataset (360 observations) is already relatively small. Losing more observations by lagging performance indicators is therefore not preferred.[13] Secondly, this could cause a survival bias towards good performing firms and firms with higher lending activity. Some firms with few annual observations went bankrupt during the time frame, which would tilt the sample towards good performing banks. This

[13] Instrumenting requires at least three lags, indicating that the sample size gets reduced by three years.

could lead to an underestimation of the obtained estimates. A POLS is characterized by running the OLS on observation pooled across i and t (Wooldridge, 2001). Contrary to the fixed effects model, which absorbs all entity time-invariant effects, this study includes separate time-invariant effects. More precisely, year and country fixed effects are included to account for part of these fixed effects. As bank-specific fixed effects would have led to multicollinearity issues, I deliberately opted to exclude bank fixed effects from the estimation model.[14] Following Colin, Cameron, and Miler (2015) and Wooldridge (2012), the standard errors are clustered at country level, as I expect bank group correlation at country level in their performance. As a group structure exists in the error term, estimating the model without accounting for that will yield biased standard errors. Clustering standard errors ensures that the model does not contain heteroskedastic and autocorrelated residuals.

The primary research design of this study approach is closely affiliated with Azmi et al. (2021), who consider a nonlinear relationship between bank performance and ESG scores. The quadratic specification ESG activity, bank performance indicators, and the set of control variables including their rationale are based on Azmi et al. (2021). Four distinct measures for bank performance are incorporated in this paper: ROA, TQ, NCF, and NPL.[15] However, as explained earlier, this study employs a POLS in lieu of a system GMM approach. The estimation of high ESG lending is similar to Zhou et al. (2021) approach' of measuring green lending. Therefore, this research design can be considered as a conjunction between the two above-mentioned papers. To validate the theoretical foundation and rationale behind the nonlinear relationship, a RESET test, as proposed by Ramsey (1969), is employed. The Ramsey RESET test is a general misspecification test to detect both an inappropriate functional form and omitted variables. The test is derived from the Lagrange Multiplier principle and is generally conducted using critical values from the F-distribution. The regression model to test the nonlinear relationship between lending towards excellent ESG performing borrowers and bank performance is represented by equation (2) and looks as follows:[16]

$$Perfomance_{it} = \beta_0 + \beta_1 ESG\_lending\_75_{it} + \beta_2 ESG\_lending\_75_{it}{}^2 + \beta_3 NPL_{it} + \beta_4 Liquidity_{it} + \beta_5 Capitalization_{it} + \beta_6 GDP\_growth_{it} + \beta_7 Efficiency_{it} + \beta_8 DC_{it} + \theta_t + \theta_j + \varepsilon_{it} \quad (2),$$

where i denotes the bank, j th, and t the time index. $Performance$ proxies bank performance via either ROA, TQ, NCF, or NPL. $ESG\_lending\_75$ measures the volume of lending towards excellent ESG performing borrowers. NPL is an indicator for the share of non-performing loans. $Liquidity$ measures a bank its relative amount of deposits. $Capitalization$ reflects a banks relative amount of equity. $Efficiency$ is proxied by a costs-income ratio. GDP_growth measures the annual

[14] In the preliminary analysis this is addressed in more detail, the model including country and year fixed effects appeared to be the most robust.
[15] Contrary, to Azmi et al. (2021), this paper also applies NPL as a response variable.
[16] In equation (2), *NPL* is excluded as an explanatory variable if NPL is set a dependent variable. This is also applicable to equations (3) and (4).

growth in GDP and DC indicator for the financial development of a country measured by the domestic credit to the private sector by banks as a share of GDP. θ_t and θ_j represent respectively year and country fixed effects. β_0 reflects the intercept an ε_{it} illustrates the error term.

After investigating the relationship between excellent performing ESG borrowers and bank performance, the same model is executed for good performing ESG borrowers. The main aim of this second regression is to see whether the (potentially) positive impact between lending towards excellent performing borrowers and performance is unique in its sign and size. Function (3) illustrates this test and looks as follows:

$$Perfomance_{it} = \beta_0 + \beta_1 ESG\_lending\_5075_{it} + \beta_2 ESG\_lending\_5075_{it}{}^2 + \beta_3 NPL_{it} + \beta_4 Liquidity_{it} + \beta_5 Capitalization_{it} + \beta_6 GDP\_growth_{it} + \beta_7 Efficiency_{it} + \beta_8 DC_{it} + \theta_t + \theta_j + \varepsilon_{it} \quad (3),$$

where all specifications are similar as to equation (2), except $ESG\_lending\_5075$, which indicates lending towards borrowers with good ESG scores.

To examine which of the pillars provides the most explanatory power in the relationship between excellent ESG lending and performance, ESG lending is decomposed into three forms of lending: E, S, and G lending. The functional form of this regression is represented by (4) and looks as follows:

$$Perfomance_{it} = \beta_0 + \beta_1 E/S/G\_lending\_75_{it} + \beta_2 E/S/G\_lending\_75_{it}{}^2 + \beta_3 NPL_{it} + \beta_4 Liquidity_{it} + \beta_5 Capitalization_{it} + \beta_6 GDP\_growth_{it} + \beta_7 Efficiency_{it} + \beta_8 DC_{it} + \theta_t + \theta_j + \varepsilon_{it} \quad (4),$$

where all specifications are identical as to equation (2), apart from $E/S/G\_lending\_75$, which proxies lending towards excellent E,S, or G borrowers.

The shape of equation (2) depends on the signs of β_1 and β_2. Eventually, a inverted U-shaped relationship is only one of the five functional forms the relationship can take. Below, all different shapes equation (2) can have are listed:

- If $\beta_1 = \beta_2 = 0$, then the relationship between bank performance and ESG_lending_75 is insignificant, indicating no relationship between the two variables.
- If $\beta_1 > 0$ and $\beta_2 = 0$, then the relationship between bank performance and ESG_lending_75 is monotonically increasing.
- If $\beta_1 < 0$ $\beta_2 = 0$, then the relationship between bank performance and ESG_lending_75 is monotonically decreasing.

No turning point is reached in such cases.

- If $\beta_1 > 0, \beta_2 < 0$, then the relationship between bank performance and ESG_lending_75 is inverted U-shaped.
- If $\beta_1 < 0, \beta_2 > 0$, then the relationship between bank performance and ESG_lending_75 is inverted U-shaped.

The turning point equals:[17]

$$t = -(\frac{\beta_1}{2\beta_2}) \quad (5)$$

3.2 Robustness tests

To test whether the obtained results alter after transformations in the data or sample, a set of robustness checks is conducted. First, in light of the concerns of Baltagi (2005), the panel dataset is transformed into a balanced dataset. Further, to guarantee that extreme values do not drive the findings, all performance indicators get winsorized at both 1% and 5%. Additionally, to further quantify the effect of ESG lending on bank performance, a test including all borrowers with ESG scores above 49 is executed. Subsequently, the impact of greenwashing on the estimates is tested following the implications of Yu, Van Luu, and Chen (2020). Finally, picking up on the debate on whether multicollinearity is problematic in quadratic functions, all explanatory variables get mean-centered. Equation (6) illustrates how the mean-centered modification is derived. However, it should be clear that this paper follows the intuition of Allison (1999) that multicollinearity among quadratic terms is problematic. A more detailed explanation behind the intuition of all robustness tests will follow in the preliminary analysis. Tests analysing the degree of multicollinearity and non-normality will be presented in the section regarding the data and results.

$$x_{ij} = X_{ij} - \bar{X}_j \quad (6)$$

In equation (6), $\bar{X}_j$ represent a bank's group mean and X_{ij} the original value of the variable.

[17] Equation (5) equals the derivate of quadratic function (2), (3), or (4), with respect to all forms of ESG lending and subsequently set equal to zero. This looks for function (2) as follows: $\frac{\partial performance}{\partial ESG\_ledning\_75} = 0 = \beta_1 + 2\beta_2 ESG_{lending_{75}} \equiv t = -(\frac{\beta_1}{2\beta_2})$.

4. DATA

This section provides an extensive description of the data that is utilised throughout the paper. Variable sources and definitions, derivations, and descriptive statistics are explained in detail. All Figures and Tables serve as supplementary material to track trends in the covered variables and for a visualisation and clarification of the utilised data.

The final sample covers 49 unique banks in 19 distinct countries, aggregating loans of 732 unique borrowers. In total, this adds up to 329 observations based on 14,440 issued loans for a period of eight years (2010-2017). In line with Buallay et al. (2020) and Di Tommaso and Thorton (2020), I opted to exclude the financial crisis of 2008 from the final sample for two reasons. First, this economic downturn significantly impacted the issuance of loans. Thereby it would have deteriorated the analysis of this study in an unfavourable way. Secondly, the introduced reforms and increased scrutiny after the financial crisis altered a bank's behaviour towards sustainable performance. All borrowers that did not contain an ESG score were removed while constructing the final sample. As borrowers could deliberately opt not to disclose their ESG scores in case of relatively poor performance, there exists the threat of a selection bias. This, however, appears not to be an issue for the utilised dataset in this study. The derived ESG lending shares for borrowers in the second quartile ($24 < ESG < 50$), which are considered poor performing companies according to Refinitiv (2021) , are derived from more loans (13,105) than the lending shares towards superior performing firms ($49 < ESG < 75$: 5,735 & $ESG > 74$: 2,355). Further, all banks that did not disclose the participation share in a syndicated loan are also excluded from the sample. To overcome a potential survival bias, banks are not selected on a minimum required number of observations. Finally, all financial institutions aside from banks (i.e., insurance and capital investment firms) were manually detected and removed.

4.1 Data sources and operationalisation

The managed dataset is constructed by combining data from Loan Pricing Corporation (LPC) DealScan, WRDS-Reuters Company Legacy, Thomson Reuters EIKON (EIKON), Thomson Reuters Asset4 (Asset4), Orbis Bank Focus, and the World Databank. LPC DealScan is viewed as the world's number one data source for detailed and reliable historical deal information on the global loan market (Reuters, 2015). The database contains comprehensive specifications on the loan contract terms such as the margins, base, tenor maturity, or repayment schedule. Additionally, it includes information on the debt's purpose, tranche type, and seniority. WRDS-Reuters Company Legacy is an addendum to the LPC DealScan database and contains additional lender characteristics as lender tickers, lender CUSIP's,

and lender Global Company Key) GVKEY's.[18] Thomson Reuters EIKON includes reliable, accurate, and up-to-date financial information and indicators for over 400 stock-exchanges and over-the-counter markets (Sikacz & Wolczek, 2018). The borrowing firm ESG scores are extracted from Thomson Reuters Asset4. Asset4 is a Swiss-based company that created, using company reports gathered and verified, more than 630+ ESG metrics over ten categories in a three-pillar structure. Their final ESG combined score is derived by adjusting their ESG metrics with 23 controversy measures (Refinitv, 2022). Asset4 equally weights all separate ESG pillars. A visualisation of this structure can be found in Figure A1 and a decomposition of the individual ESG pillars is displayed in Table A1. Orbis Bank Focus contains information on more than 38,000 banks worldwide. The Orbis Bank Focus database consists per bank of 500 balance sheet and income statement items, information on ownership and subsidiaries, price and stock data, and key financials. The last adopted database is the World Databank and is used for macroeconomic-related control variables. A brief summary of all variable sources, including a short description, can be found in Table A2.

The first indicator measuring bank performance, return on assets (*ROA*), is obtained from EIKON. *ROA* is either directly obtained from EIKON or calculated by dividing net income over total assets if no value was reported. Although EIKON uses a slightly different calculation (see footnote 19 for the formula), the variation is relatively small.[19] Moreover, this type of calculation for ROA is also utilised by Azmi et al. (2021). *ROA* is measured in percentages as initially reported by EIKON.

The second performance-related indicator is a bank's end-of-fiscal year net cash flow (*NCF*). The variable is obtained from EIKON by combining the cash flow from financing, operational, and investing activities. Subsequently, the variable is divided by a bank's total assets and multiplied by 100 to obtain a percentage.

The third indicator for bank performance is Tobin's Q (*TQ)*. This indicator measures the bank's future profitability (Azmi et al., 2021). The variable is less sensitive to earnings management than ROA and NCF (Bennouri, Ciciretti, Nagati, and Nekhili, 2018). The variable is constructed following the procedure of Ali, Mahmud, and Lima (2018) and represents the ratio between the market value of a company and the replacement value of the firm's assets. A value of one indicates that the company is fairly valued, while values above/below one indicate that the company is over-/undervalued. As Ali et al. (2018) illustrate, *TQ* is obtained by dividing the equity market value by the book value of equity.[20] All separate components of TQ are retrieved from EIKON in millions of US Dollars.

[18] GVKEY is a unique six-digit number key assigned to each company in the Capital IQ Compustat database. In contrast, the CUSIP is a nine-digit alphanumeric code that identifies most North American financial instruments.

[19] $Net\ income - Bottom\ Line + ((Interest\ expense\ on\ Debt\ Interest\ Capitalized) * (1 - Tax\ Rate))) + Policyholders' Surplus)\ Average\ of\ Last\ Year's\ (Total\ Assets\ \ Customer\ Liabilities\ on\ Acceptances\ )\ and\ Current\ Year's\ (Total\ Assets - Customer\ Liabilities\ on\ Acceptances) * 100.$

[20] Following Ali et al. (2018): $TQ = \frac{Market\ Malue}{Total\ Asset\ Value} = \frac{Equity\ Market\ Value + Liabilities\ Market\ Value}{Equity\ Book\ Value + Liabilities\ Book\ Value} \approx \frac{Equity\ Market\ Value}{Equity\ Book\ Value}, where\ the\ book\ value\ of\ euqity = Total\ Assets - Total\ Liabilities.$

The last indicator is both a proxy for bank performance and credit risk, is represented by the relative share in non-performing loans (*NPL*). *NPL*, the ratio of non-performing loans to the total loans, is an indicator for the quality of the issued loans and the borrowers. The variable is extracted from Orbis Bank Focus as a percentage. *NPL* measures the annual total impaired loans over a bank's gross loans and advances to customers multiplied by 100.[21] *NPL* is transformed into a natural logarithm to control for asymmetries in the distribution.[22]

To construct the total lending volumes towards distinct ESG profiles, lending shares, lending volumes, and borrower ESG scores are used. The bank participation share in a (syndicated) loan is multiplied by the lending volumes to construct the individual participation in the deal volume per bank. Both variables are obtained from the LPC Dealscan database and converted to millions of US dollars. As already discussed, the ESG-related variables are retrieved from the Asset4 database. The entire database, covering over 9000 firms for 21 consecutive years, has initially been extracted. Although this raw database contains 21 distinct ESG related variables, I opted to analyse only five of these variables. The five selected variables are included as they are the most aggregated. Three individual pillars of the ESG score; the environmental (*E*), social (*S*), and governmental (*G*) score are included in this study. While two scores, reflecting overall scores, are characterised by the general combined ESG score (*ESG*) and a combined ESG score with a controversies overlay (*ESGC*). The former is just a combination of the three equally weighted individual pillars, while the latter takes also considers the exposure each individual company has to ESG controversies and adverse events reflected in global media. Therefore, *ESGC* can be scaled downwards compared to *ESG* in the case of low exposure. All ESG-related variables can take any numeric value between 0 and 100, where a higher value indicates that a company is performing better on that score. Aside from the currently opted data source, ESG scores could also have been extracted from another source. The MSCI KLD database provides company ratings from 1991 onwards. Nonetheless, this dataset has several limitation, making it non-preferable to use. First, due to a variety of updates, the database only has reliable data between the years 2003 and 2014. The influence and attention of ESG have also experienced considerable growth after 2014. E.g., from 2016 onwards, European banks are required to disclose the ESG risk they face by implementing the revised rules on capital and liquidity (CRR2) (Bruon and Lagasio, 2021). Therefore, this would have undermined part of this research. Further, all missing values are treated as concerns and thereby automatically treated as a negative indicator. As this influences the final ESG score, while it is not a priori optimal, it provides another reason not to use this dataset. After the participation of a bank in a deal is calculated, each individual participation in a deal volume is categorized as excellent (>74), good (<49 & >75), or bad (<24 & >50) based on each individual E, S, G, ESG borrower score. In the determination of this terminology and thresholds, I follow the guidelines of Refinitiv (2021). These lending volumes towards

[21] *NPL* is used both as a dependent and explanatory variable. More specifically, *NPL* is excluded from the model as an explanatory variable if it is used as a dependent variable.
[22] An explanation behind the transformation will follow in the next subsection.

excellent, good, or bad borrowers are afterwards aggregated to an annual bank-specific measure for E, S, G, or ESG lending. To account for the relative size of each bank, the annual bank specific deal volumes towards different ESG profiles are divided by the gross loans and advances of each bank.[23] To obtain the annual bank-specific percentage of E, S, G, or ESG lending (*Y_lending_X)*, the relative E, S, G, or ESG deal volumes are multiplied by 100.[24] Finally, this variable is squared ($Y\_lending\_X^2$) to test for a potential non-linear relationship between the dependent and independent variables. *Y_lending_X* is winsorized at 5% to control for measurement errors.[25]

Additionally, a set of control variables is appended to the estimation model. Three bank-level variables and two country-level variables are incorporated into the model. The capitalization (*Capitalization*) is calculated by dividing a bank's total equity by its total assets multiplied by 100. Both variables are measured in millions of dollars and obtained from EIKON. A bank's liquidity is measured by its relative amount of deposits (*Liquidity*). The variable is constructed by dividing the total amount of deposits by the total assets of a bank and multiplying by 100. The total amount of deposits is reflected by a combination of the demand, savings, money market, and certificates of deposits held by the bank. The variable is retrieved from EIKON and measured in millions of US Dollars. All unreported years of deposits were manually included with values from ORBIS Bank Focus.[26] The efficiency (*Efficiency*) of a bank is measured in percentages and obtained from Orbis Bank Focus. The percentage is calculated by dividing a bank's total operating expenses by its operating revenues. Therefore, the lower the percentage, the more efficiently a bank is run. To account for the asymmetry of the distribution, *Efficiency* is transformed into a natural logarithm.[27]

The two country-level control variables are reflected by the Gross Domestic Product (GDP) growth (*GDP_growth*) and the financial development of a Country (*DC*). The former measures the annual percentage change in GDP, while the latter proxies the domestic credit to the private sector by banks as a percentage of GDP. *DC* is transformed into a natural logarithm to control for asymmetry in the distribution.[28] Both variables are extracted from the World Databank.

4.2 Descriptive analysis

The summary statistics of the employed variables are displayed in Table 1. As Table 1 is rather extensive, not every variable will be discussed in depth. Nonetheless, there are still some statistics interesting to point out. *TQ* is slightly above one, which indicates that, on average, the market values the

[23] For Goldman Sachs, ING, Raymond James Financial, and Stifel Financial Corporation, between 2010-2012, total loans were manually included using Orbis Bank Focus data.
[24] The 'Y' in the variable refers to either E, S, G, or ESG, while 'X' in the variable refers to a number indicating that the E, S, G, or ESG profiles above 74 (X=75), between 50 and 75 (X=5075), between 25 and 50 (X=2550).
[25] A detailed explanation and intuition behind this procedure will be explained in the descriptive analysis section.
[26] Goldman Sachs, ING, Morgan Stanley, Raymond James Financial missed data on deposits.
[27] The next subsection provides a detailed explanation for this transformation.
[28] An explanation behind this transformation follows in the next subsection.

book value of equity considerably good. The mean ESG score (50.95) reflects a just-above-average ESG performance and degree of transparency in reporting ESG data publicly, following the criteria of Refinitiv (2022). However, considering the minor issues with the discussed selection bias, the mean ESG score is tilted towards a higher level than it actually should be according to the originated deals. When borrower controversies are included, the average ESG score drops towards 45.01. Looking at each individual ESG pillar, the statistics show that within the sample, the borrowers generally perform the worst with respect to the environmental pillar. The mean environmental pillar is ten points lower than the social and governance pillar. This difference is rather surprising as Glocalities' report (2019) pinpoints that especially environmental concerns have steadily risen to 77% by 2019. The mean of *NPL* suggests that, on average, each bank has 3.14% nonperforming loans. Regarding the control variables, the following conclusions can be drawn. As the efficiency ratio is above 50% (64.78%), the banks are on average operating relatively efficiently. It costs 1 US dollar to generate 1.54 US dollars. Further, the mean capitalization percentage (8.37%) indicates that, on average, all banks meet the BASEL 3 criteria for maintaining at least 8% tier 2 capital.[29]

From Table 1 also follows that some variables suffer from heavily skewed and fat-tailed distributions.[30] This seems to be particularly applicable to the yearly share of (high) ESG loans. Nonetheless, as I am a priori no proponent of just removing, winsorizing, or trimming extreme values, minima, maxima, and graphical visualizations have been analysed. Table 1 shows that the annual share in (high) ESG loans for some banks has been more than 100% (e.g. ESG_share_75: 334.81% and ESG_share_5075: 515.98%). Figure A3 depicts the dispersed observation points of *ESG_share_75* in more detail. The extreme values of the annual share in ESG loans variables depict unrealistic values and are, therefore, assumed to be measurement errors in the retrieved data from LPC DealScan. To overcome an undesirable influence of these outliers, all variables covering the bank-specific annual share in ESG loans are winsorized. In line with Kennedy and Lakonishok (1992), all variables are winsorized at a 5% level (top percentile only), which has been pinpointed as the most effective percentage. After the adjustments, all ESG loan share variables have skewness and kurtosis in acceptable ranges. Aside from the formerly mentioned variables, other explanatory variables are still suffering from kurtosis and skewness (*Efficiency*, *NPL*, and *DC*). Nonetheless, as for these variables the skewness and kurtosis is less problematic, and as the observations are valid, they are only transformed into natural logarithms. Additionally, this enhances the ease of interpretation. As *ROA* and *NCF* variables contain non-positive values, logarithmic transformations cannot be imposed on them. Therefore, these variables are not adapted. However, robustness tests that winsorized *ROA* and *NCF* illustrate that their unadjusted values

[29] Tier 1 capital consists of shareholder's equity and retained earnings, while tier 2 capital includes, aside from the formerly mentioned components, also related surplus, additional qualifying minority interests, qualifying loans provisions, and regulatory adjustments (Financial Stability Institute, 2019)

[30] George and Mallery (2010) and Bryne (2010) argue that data is suggested to be normal if skewness is between -2 and +2 and kurtosis between -7 and +7.

do not affect the obtained results.[31] On average, 7.08% of the total amount of loans have been issued for high ESG borrowers.

Table 1. Descriptive Statistics.

	Mean	SD.	Median	Min	Max	Skew.	Kurt.	N
ROA*	.91	.72	.92	-5.78	2.56	-2.93	27.63	329
TQ**	1.09	.48	1.03	.08	2.45	.38	2.43	329
NCF*	4.38	16.73	4.68	-235.72	56.2	-8.91	130.75	329
NPL*	3.21	3.76	2.04	.02	32.65	3.19	18.88	329
NPL (LN)*	.65	1.06	.71	-3.91	3.49	-.27	3.59	329
ESG**	50.91	12.76	51.82	12.53	83.16	-.34	3.48	329
ESGC**	45.01	11.1	45.19	12.53	78.98	.12	4.04	329
E**	43.6	18.56	45.4	0	85.99	-.44	3.2	329
S**	52.82	14.11	53.04	14.87	97.86	.09	3.43	329
G**	53.66	11.78	55.12	9.12	85.31	-.86	5.08	329
ESG_lending_75*	7.08	24.93	1.16	0	334.81	9.24	106.67	329
W_ESG_lending_75*	4.52	7.39	1.16	0	27.36	2.1	6.42	329
ESG_lending_5075*	16.89	44.73	4.34	0	515.99	6.38	56.95	329
W_ESG_lending_5075*	11.44	17.02	4.34	0	64.31	2.03	6.27	329
ESGC_lending_75*	1.44	3.77	.21	0	40.36	5.81	46.49	329
W_ESGC_lending_75*	.99	1.56	.21	0	5.74	1.88	5.65	329
ESGC_lending_5075*	11.63	26	3.73	0	218.18	4.73	29.45	329
W_ESGC_lending_5075*	8.97	13.52	3.73	0	52.27	2.13	6.74	329
E_lending_75*	10.88	33.23	2.42	0	365.34	7.09	62.73	329
W_E_lending_75*	6.75	9.94	2.42	0	36.75	1.88	5.69	329
E_lending_5075*	10.92	35.23	2.75	0	499.13	9.45	118.58	329
W_E_lending_5075*	7.35	11.76	2.75	0	45.47	2.29	7.4	329
S_lending_75*	10.48	38.42	1.85	0	476.02	8.92	94.56	329
W_S_lending_75*	6.23	9.76	1.85	0	35.66	1.96	5.79	329
S_lending_5075*	13.93	42.17	3.16	0	517.11	7.28	71.81	329
W_S_lending_5075*	8.98	14.48	3.16	0	58.93	2.46	8.44	329
G_lending_75*	6.89	17.23	1.65	0	162.98	5.15	34.53	329
W_G_lending_75*	4.73	7.01	1.65	0	26.46	1.98	6.08	329
G_lending_5075*	16.76	49.16	4.18	0	513.76	7.12	62.65	329
W_G_lending_5075*	10.72	14.85	4.18	0	53.53	1.78	5.1	329
Liquidity*	54.59	19.33	57.87	4.25	84.96	-.55	2.48	329
Capitalization*	8.37	3.8	7.82	2.46	27.27	1.25	5.83	329
GDP_growth*	2.09	1.84	2.05	-5.88	9.56	.57	8.54	329
Efficiency*	64.78	17.91	63.22	39.57	292.94	6.41	81.21	329
Efficiency (LN)*	4.15	.22	4.15	3.68	5.68	1.03	9.73	329
DC*	86.64	52.82	64.23	10.47	522.5	3.5	27.59	329
DC (LN)*	4.32	.54	4.16	2.35	6.26	-.29	4.74	329

Table notes. This Table illustrates the descriptive statistics of all variables and their adaptations. SD. refers to standard deviation, min to minimum, max to maximum, Skew. to skweness, Kurt. to kurtosis, and N to the number of observations per variable.* are in percentages and ** are numeric values. The 'W' in *W_X_lending_Y* refers to a winsorized variable at a 5% top percentile. (LN) represent the natural logarithm of the corresponding variable. For logarithmically transformed variables, the statistics of interest are primarily the skewness and kurtosis values, as the rest of the statistics become rather uninformative due to the transformation.

[31] This will be addressed in more detail in the next section.

Figure 1 shows the development of the mean share in loans towards excellent performing ESG borrowers over the sample period. Generally, ESG-related lending activities fluctuate between approximately 3% and 11% of total loans. The fall in ESG lending around 2012 can potentially be explained by the European Sovereign Debt crisis. Similarly, the credit boom around 2014 can be a result of catch-up lending behaviour after the European sovereign debt crisis. Interestingly, even though borrowers, on average, perform the best in terms of their social pillar, as can be seen in Figure A4, the average lending shares towards high social performers do not outweigh other ESG lending related measures. Contrary, the environmental pillar seems to receive relatively the largest lending shares. Even though the difference in lending shares is not statistically significant, this suggests that on average the corporate governance of borrowers performs the best. At the same time, if they excel, they excel with respect to their environmental pillar most frequently. This is in accordance with the view that corporate governance has been incorporated into businesses for an established period, while environmental awareness has been a relatively new topic requiring drastic measures. Finally, Figure A4 also indicates that, except for 2017, the average ESG level and its individual component scores have remained around the same mean.

Fig. 1. Evolution of the mean shares in loans towards excellent performing borrowers over the years.

Figure notes. This Figure illustrates the trend of the mean share in E, S, G, or ESG loans over the years. % in ESG loans reflects the % of total loans towards 74+ ESG scores. Source: own calculations

Figure 2 illustrates the trajectory of three bank-related performance indicators over the analysed sample period.[32] During the European sovereign debt crisis, the number of nonperforming loans increased. Similarly, *ROA* and *TQ* experienced a downfall during this period. From 2012 onwards, all depicted indicators for bank performance increased on average.

Fig 2. Evolution of mean bank performance indicators over the years.

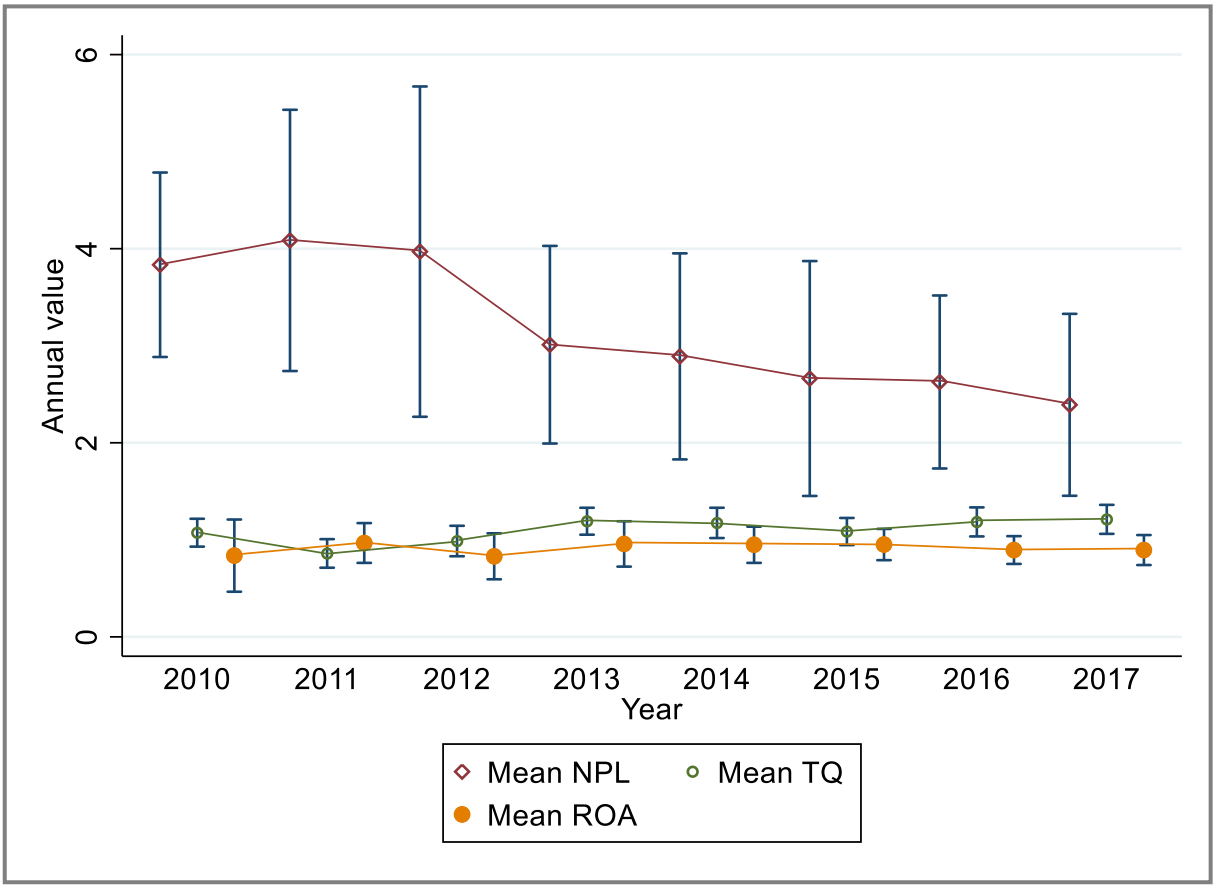

Table notes. This Figure shows the trend in mean *NPL*, *ROA*, and *TQ* over the years. *NPL* and *ROA* are in percentages, while *TQ* expresses a numeric value. Source: own calculations.

[32] The indicator for bank performance measured via *NCF* is excluded from Figure 2, as it would not fit into the scale of the figure.

Table 2 illustrates the correlation coefficients among the utilised variables. The value represents the relationships between the dependent and independent variables. Row (5) and columns (1), (2), (3), and (4) show the correlation between lending towards excellent performing borrowers and bank performance and credit risk. As all correlation coefficients are not above/below 0.1/-0.1, there exists a relatively weak correlation between the variables. Moreover, contrary to what Yin et al. (2020) depicted are the correlation coefficients for lending towards excellent performing borrowers and *ROA* and *TQ* negative. Nevertheless, according to Falk and Miller (1992) this does not necessarily have negative consequences for the outcome of the preliminary analysis. As the relationship is relatively close to zero, this could also simply reflect random variation around zero. The correlation coefficient signs for TQ and NPL align with Yin et al. (2020). Although the variables employed by Yin et al. were much stronger correlated. Potentially this can be explained by the fact that the GCP is relatively old (originated in 2007), making the Chinese green lending market more developed than green lending markets in other countries. As can be seen in Table 2, there exists a relatively high correlation between the ESG-related lending shares and its separate pillars lending shares, which is accommodated by high coefficients. Nonetheless, this should not be considered problematic. First, the loan shares related to the individual pillars are not included in the same estimation model as the aggregated ESG loan shares. Secondly, the p-values of the 'problematic' variables are unaffected by multicollinearity (Allison, 1999). Table 3 shows both regression models' variance inflation factors (VIF). Aside from the formerly discussed variables, all variables comply with the general rule of thumb as initiated by Verbeek (2008).[33]

[33] Verbeek (2008) argues that VIF's should be below ten to ensure no multicollinearity exists in the model.

Table 2. Correlation matrix.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
(1) ROA	1.000																
(2) NCF	0.215	1.000															
(3) TQ	0.409	0.192	1.000														
(4) NPL (LN)	-0.283	-0.275	-0.468	1.000													
(5) ESG_lending_75	-0.077	0.078	-0.085	-0.049	1.000												
(6) (ESG_lending_75)^2	-0.037	0.020	-0.047	-0.066	0.957	1.000											
(7) E_lending_75	-0.063	0.030	-0.112	-0.045	0.862	0.818	1.000										
(8) (E_lending_75)^2	-0.011	0.028	-0.062	-0.070	0.814	0.841	0.950	1.000									
(9) S_lending_75	-0.029	0.029	-0.052	-0.088	0.794	0.757	0.884	0.850	1.000								
(10) (S_lending_75)^2	0.003	0.030	-0.033	-0.099	0.744	0.764	0.838	0.875	0.957	1.000							
(11) G_lending_75	-0.023	0.028	-0.022	-0.123	0.802	0.754	0.754	0.714	0.747	0.697	1.000						
(12) (G_lending_75)^2	-0.006	0.012	-0.013	-0.122	0.775	0.789	0.713	0.731	0.720	0.723	0.951	1.000					
(13) Liquidity	0.138	0.099	0.353	-0.194	-0.333	-0.326	-0.325	-0.313	-0.358	-0.364	-0.289	-0.333	1.000				
(14) Capitalization	0.375	0.156	0.204	-0.220	-0.098	-0.025	-0.132	-0.052	-0.040	0.020	-0.011	0.044	0.391	1.000			
(15) Efficiency (LN)	-0.236	-0.083	-0.251	0.156	0.234	0.225	0.230	0.226	0.276	0.278	0.232	0.270	-0.203	0.173	1.000		
(16) GDP_growth	0.035	0.082	-0.082	0.028	-0.060	-0.081	0.018	-0.026	-0.003	-0.040	-0.068	-0.095	-0.056	-0.178	-0.160	1.000	
(17) DC (LN)	-0.160	-0.053	-0.094	0.109	-0.127	-0.158	-0.117	-0.149	-0.147	-0.172	-0.170	-0.203	-0.289	-0.427	-0.139	0.100	1.000

Table notes. This table shows the correlation coefficients among all employed variables. LN refers to the natural logarithm. E/S/G/ESG_lending_75 are winsorized at 5% top percentile.

Table 3. Variance inflation factors.

Variables	Bank performance (ESG)	Bank performance (E)	Bank performance (S)	Bank performance (G)
(1) ESG_lending_75	13.89	-	-	-
(2) (ESG_lending_75)^2	13.72	-	-	-
(3) E/S/G_lending_75	-	16.52	17.93	14.85
(4) (E/S/G_lending_75)^2	-	15.49	18.09	16.70
(5) NPL (LN)*	1.20	2.80	2.79	2.80
(6) Liquidity	1.55	2.75	3.20	3.54
(7) Capitalization	1.62	2.88	2.77	2.86
(8) GDP_growth	1.17	1.45	1.45	1.44
(9) Efficiency (LN)	1.29	2.46	2.49	2.52
(10) DC (LN)	1.40	2.23	2.22	2.21
Mean VIF	3.35	3.06	3.20	3.08

Table notes. This table shows the VIF's of all explanatory variables. LN refers to the natural logarithm. '*' indicates that the variable is both used as a dependent and independent variable. The terms in this first row in brackets refer to the type of sustainable lending employed as independent variable. '–' suggest that the variable is not included in the estimation model.

5. Results

This section of the paper presents the results that are obtained using the estimation procedures as described in the section regarding the methodology. A detailed interpretation of the obtained estimations follows. First, the association between lending towards excellent performing borrowers and bank performance is estimated for four performance indicators. Subsequently, the same procedure is repeated for borrowers with good ESG scores to see how the previous findings may alter. This sub-analysis will be followed by an estimation of the decomposed ESG pillars. This regression aims to find the most important driving pillar behind bank performance. Finally, a set of robustness checks is conducted to further justify, clarify and potentially strengthen the acquired results.

5.1 Regression results

5.1.1 Lending towards excellent performing borrowers

Table 4 presents the regression results of bank lending towards borrowers with ESG profiles above 74 for various indicators of bank performance. As discussed in the methodology section, all regressions are conducted with robust standard errors clustered at country level. Furthermore, year and country fixed effects are included to control for respectively time-varying and country-specific variation between the set of banks in the sample. Bank-specific fixed effects are excluded from the model as a simultaneous inclusion of both country and bank fixed effects would have caused multicollinearity. As explained in section 3, a Ramsay RESET test is conducted to validate the squared specification of lending towards excellent performing borrowers. The results of this test are displayed at the bottom of Table 4. A quadratic specification adds extra explanatory power for all variables except ROA. This justifies the use of this specification in the upcoming regressions.[34] Columns (1) and (2) contain the results when ROA is used as a response variable. Column (1) shows an insignificant estimate for $ESG\_lending\_75^{\,2}$, therefore, the variable gets excluded from the regression in column (2) to address this systematically. Nonetheless, *ESG_lending_75* remains insignificant, suggesting no association between high ESG lending and ROA. Among the remaining explanatory variables are only *NPL* and *capitalization* statistically significantly different from zero. Even though *NPL* is statistically significant at 5%, it has no real effect in terms of economic significance. *Capitalization* is both statistically significant and economically significant. A percentage point increase in a bank's relative capitalization is associated with an increase of 0.07% in ROA.

[34] To remain consistent, a quadratic specification of *ESG_lending_75* will still be incorporated for ROA.

Column (3) shows the results from the estimation model with *TQ* as a dependent variable. The signs of both ESG_lending_75 and ESG_lending_75 ^{2} are respectively positive and negative. Moreover, both variables are significant at minimally the 5% level. This provides evidence for the existence of an inverted U-shaped relationship between high ESG lending and bank performance. However, the expected turning point, which can be calculated using equation (5), will almost certainly not be reached.[35] The inflection point is reached when *TQ* is approximately 15.78, while the mean of *TQ* is 1.09 and the maximum 2.45. Accordingly, the turning point seems to be an artefact of a polynomial functional form rather than actually being representative in the data. Additionally, this suggests the variance of the inflection point to be noticeably large, indicating a monotonically increasing relationship to be perhaps more plausible. Nonetheless, a percentage point increase in high ESG lending is associated with a positive increase in *TQ* of approximately 0.02 on average, while at high levels of excellent ESG lending, this effect starts to delink. This result is also economically significant: a one standard deviation increase in lending towards excellent borrowers implies a change equal to 11.2% of mean *TQ*. *NPL* is both statistically and economically significant, albeit at the 10% level. The estimated effect of a percentage point increase in *TQ* is -0.12 on average. In terms of economic significance is the estimated effect of one standard deviation increase in *ESG_lending_75* -0.40% of *TQ's* mean. Similarly, the coefficient of *DC* is also both economically and statistically significant. A percentage point increase in the domestic credit by banks to the private sector as a share of GDP is, on average, associated with a 0.12 increase in *TQ*. Economically this indicates that a one standard deviation increasing *DC* is associated with impacting mean *TQ* by 0.34%. Even though liquidity is statistically significant at 1%, economically, it is insignificant.

Column (4) represents the results with *NCF* as a response variable. Again, the estimates of both *ESG_lending_75* and *ESG_lending_75* ^{2} are statistically significant and respectively positive and negative in accordance with the predicted hypothesis. The estimated turnaround point is reached at 17.63.[36] The estimates for lending towards excellent performing borrowers are also economically significant: a one standard deviation increase in *ESG_lending_75* implies a change equal to 11.2% of mean *NCF*. This effect starts to delink for high levels of *ESG_lending_75*. Regarding the rest of the explanatory variables: *NPL*, *liquidity*, and *capitalization* are statistically significant at the 1% level, while the remainder is insignificant. The estimated effect of a percentage point increase in NPL, liquidity, and capitalization is respectively -6.23, 0.15, and 0.70 percentage points. In economic terms, the effect of a one standard deviation increase in *NPL*, *Liquidity*, and *capitalization* is respectively associated with a change equal to -45.25%, 0.16%, and 1.88% of mean *NCF*.

[35] The exact values for the estimates of *ESG_lending_75* and *ESG_lending_75* ^{2} are respectively 0.0237944 and -0.0007538.

[36] The exact values for the coefficients of *ESG_lending_75* and *ESG_lending_75* ^{2} are respectively 1.100243 and -0.0312045. Therefore, the turnaround point is calculated as follows: $\frac{1.100243}{2*0.0312045}$.

Contrary to my a priori expectations, lending towards high ESG borrower profiles is not associated with any reduction in the *NPL*. Similarly, all remaining predictor variables are insignificant likewise.

If one compares the output for the four different indicators of bank performance, a few statistics are worth notifying. Among the two accounting-based earning measures (*ROA* and *NCF*), does only *NCF* produce significant estimates. A potential explanation can be found in the composition of *NCF*. While *ROA* is closely related to *NCF* from operating income, *NCF* additionally compromises of *NCF* from financing and investing activities. Therefore, the obtained results for *NCF* could be driven by *NCF* from financing and/or investing activities. Suggestive evidence indeed supports this theory.[37] The coefficient for *TQ* illustrates that the market generally believes that lending towards excellent performing borrowers is generally financially beneficial. The fact that the estimates of *NPL* in columns (5) and (6) are insignificant, while the market-based measure (*TQ*) is significant, provides suggestive evidence that the positive relationship between bank performance and excellent ESG lending is to a larger extent driven by the reputational benefit argument than the credit risk argument. All obtained estimates for *NPL* as an explanatory variable are statistically significant and contain a negative sign. This is in line with past literature (e.g., Yin et al. (2021) and Azmi et al. (2021)), as a higher fraction of impaired loans over total loans negatively influences the performance of banks. For two of the four bank performance indicators, the obtained coefficients of *capitalization* are positive and significant at 1%. The sign of the coefficients supports the theory by Berger and Udell (1994) arguing that increased capitalization enhances financial stability and performance by functioning as a cushion for shocks and shifting away from risky borrowers.[38] *DC* is only statistically significant for *TQ* (0.13). This is potentially due to the fact that *TQ* is the only market-based measure, indicating that individuals under the impression that an increase in *DC* will positively impact bank performance.

In terms of accuracy, especially columns (1), (2), and (4) perform substandard in explaining the variation of the around the bank performance indicator's mean. Contrarily, the regression with *TQ* and *NPL* perform better in explaining this variation. The adjusted R-squared statistics indicate that the models are respectively able to explain 59% and 60% of the variation around their mean.

[37] The coefficients of *ESG_lending_75* for a regression with NCF from financing, investing, and operating activities as a response variable are respectively 0.003, 0,0025, and 0.0013.

[38] Opposing arguments suggest that increased capitalization jeopardizes bank performance due to the substitution of debt with more expensive capital (see e.g. King, 2010).

Table 4. Regression results of lending towards excellent performing borrowers on bank performance.

VARIABLES	(1) ROA	(2) ROA	(3) TQ	(4) NCF	(5) NPL (LN)	(6) NPL (LN)
ESG_lending_75	0.023	0.004	0.024***	1.100**	0.022	0.006
	(0.017)	(0.007)	(0.008)	(0.446)	(0.025)	(0.004)
ESG_lending_75 ^{2}	-0.001	-	-0.001**	-0.031*	-0.001	-
	(0.001)	-	(0.000)	(0.017)	(0.001)	-
NPL (LN)	-0.062**	-0.060**	-0.124*	-6.232***	-	-
	(0.028)	(0.024)	(0.061)	(0.318)	-	-
Liquidity	-0.001	-0.001	0.007***	0.148***	0.003	0.004
	(0.006)	(0.006)	(0.002)	(0.046)	(0.004)	(0.004)
Capitalization	0.073***	0.073***	-0.013	0.699***	-0.012	-0.012
	(0.013)	(0.013)	(0.014)	(0.118)	(0.009)	(0.009)
GDP_growth	0.016	0.016	-0.004	0.600	-0.017	-0.017
	(0.021)	(0.021)	(0.010)	(0.418)	(0.018)	(0.018)
Efficiency (LN)	-0.701	-0.713	0.083	1.042	-0.524	-0.535
	(0.491)	(0.495)	(0.174)	(4.474)	(0.584)	(0.593)
DC (LN)	-0.010	-0.010	0.119**	0.888	0.014	0.014
	(0.118)	(0.117)	(0.054)	(1.094)	(0.084)	(0.086)
Constant	3.668*	3.688*	0.458	-18.345	1.723	1.743
	(1.952)	(1.970)	(0.805)	(13.190)	(2.775)	(2.805)
Year fixed effects	yes	yes	yes	yes	yes	yes
Country fixed effects	yes	yes	yes	yes	yes	yes
Economic significance	-	-	0.017	11.20	-	-
Ramsay RESET (3, 293) F	2.2	-	6.9	2.8	4.61	-
Ramsay RESET (3, 293) p	0.088	-	0.000	0.040	0.004	-
Observations	329	329	329	329	329	329
Adjusted R-squared	0.398	0.398	0.590	0.117	0.604	0.605

Table notes**.** This table investigates the impact of lending towards excellent performing ESG borrowers on indicators of bank performance. *ESG_lending_75* refers to the relative lending shares towards borrowers with ESG scores above 74. Dependent variables: *ROA*, *TQ*, *NCF*, and *NPL*. The statistics for economic significance relate to *ESG_lending_75* and are calculated by multiplying the coefficient of *ESG_lending_75* by its standard error to subsequently divide it by the dependent variable' mean and to multiply it by 100. This procedure is not executed for insignificant variables as no association is suggested. Robust standard errors in parentheses, *** ,**,* refer to 1%, 5%, and 10% significance respectively. '-' indicates that the variable is not included in the regression model. All variables except *TQ* are measured in percentages. Ramsay RESET (3, 293) F refers to the F statistic of this test, while Ramsay RESET p refers to the p-value of this test.

5.1.2. Lending towards good performing borrowers

To investigate whether the findings of the previous analysis hold, alter, or deteriorate when a bank lends towards good ESG-performing borrowers, the same procedure as in Table 4 is repeated for borrowers with an ESG score between 50 and 75. This analysis' primary intention is to detect whether the positive association between TQ and NCF from Table 4 is unique in its sign, size, and significance for lending towards excellent performing borrowers. From the estimates of the indicators for lending towards borrowers with ESG profiles between 50 and 75 in Table 5 follows that all performance measures are statistically significant. Nonetheless, in terms of economic significance, only a real effect is found in column (3) using *NCF* as a dependent variable. The statistic indicating economic significance shows that a one standard deviation change in *ESG_lending_5075* has an estimated impact equal to 1.09% on mean *NCF*, while this effect starts deteriorating for high levels of *ESG_lending_5075*. The inflection point of *TQ*, as found in the previous subsection, shifts from 15.78% to 39.19%.[39] While for the other bank performance indicators, the inverted U-shaped relationship between good performing borrowers in terms of ESG appears to be an artefact of a polynomial functional form. Interesting to note is, and as a priori expected, that the previously found positive impact on both *TQ* and *NCF* (0.02 & 1.1) diminishes to 0.01 and 0.47. This indicates that the positive effects of lending towards high ESG borrowers indeed decline in the ESG score. Similarly, although insignificant in Table 3, the positive effect on *ROA* also shrinks (from 0.02 to 0.006). This is a reassuring observation and further strengthens the finding in Table 4. In contrast to the initial expectations, Table 5 provides suggestive evidence for a positive relationship between lending towards borrowers with a good ESG profile and *NPL*. Nonetheless, this positive impact is relatively small (0.02). A possible explanation could be that the positive impact of a reputational boost and reduced credit risk on diminishing the share in non-performing loans do not outweigh the absolute effect of increased lending volumes on *NPL*. In the end, the probability of incurring impaired loans will always be positive in the level of lending volumes.

[39] $\frac{0.4661121}{2*0.0059457} = 39.19\%$.

Table 5. Regression results of lending towards good performing borrowers on bank performance.

VARIABLES	(1) ROA	(2) TQ	(3) NCF	(4) NPL (LN)
ESG_lending_5075	0.006**	0.008***	0.466***	0.018***
	(0.003)	(0.002)	(0.103)	(0.005)
ESG_lending_5075 ^{2}	-0.000*	-0.000**	-0.006***	-0.000***
	(0.000)	(0.000)	(0.002)	(0.000)
NPL (LN)	-0.063**	-0.124*	-6.289***	-
	(0.026)	(0.062)	(0.333)	-
Liquidity	-0.002	0.007***	0.133***	0.001
	(0.005)	(0.001)	(0.044)	(0.004)
Capitalization	0.070***	-0.013	0.627***	-0.019*
	(0.011)	(0.014)	(0.071)	(0.010)
GDP_growth	0.015	-0.006	0.529	-0.019
	(0.022)	(0.009)	(0.403)	(0.017)
Efficiency (LN)	-0.683	0.092	1.885	-0.416
	(0.470)	(0.157)	(3.288)	(0.493)
DC	-0.004	0.131**	1.548	0.025
	(0.123)	(0.054)	(1.145)	(0.089)
Constant	3.602*	0.364	-23.588**	1.397
	(1.787)	(0.719)	(8.914)	(2.465)
Year fixed effects	yes	yes	yes	yes
Country fixed effects	yes	yes	yes	yes
Economic significance	0.002	0.002	1.094	0.030
Observations	329	329	329	329
Adjusted R-squared	0.396	0.587	0.115	0.609

Table notes**.** This table measures the impact of lending towards good performing ESG borrowers on bank performance. *ESG_lending_5075* refers to the relative lending shares towards borrowers with ESG scores between 50 and 75.Robust standard errors in parentheses, *** ,**,* refer to 1%, 5%, and 10% significance respectively. The statistics for economics significance are calculated by multiplying the coefficients of *ESG_lending_75* by its standard error, to subsequently divide it by the dependent variable' mean and multiply it by 100.'-' indicates that the variable is not included in the regression model. All variables except *TQ* are measured in percentages. Dependent variables: *ROA*, *TQ*, *NCF*, and *NPL*. LN indicates that the variables is specified as a natural logarithm.

5.1.3 Decomposing the ESG score of excellent performing borrowers

A third model is employed. to investigate how each individual ESG pillar differently affects the set of bank performance indicators. Table 6 portrays the results of these distinct regressions in which each individual ESG component (E, S, or G) is regressed on the four bank performance measures. Due to the threat of multicollinearity, the separate pillars are not simultaneously included in a model. The rationale behind this is that assumable an excellent performing ESG borrower excels in all three pillars, increasing the threat of multicollinearity. Table 3 further justifies the potential of multicollinearity, as the correlation between all three pillars is above 0.753. In accordance with the results found in Table 4, each pillar is insignificant when ROA and NPL are used as a dependent variable. Similarly, the estimates for the individual pillars following from using *TQ* and *NCF* as dependent variables are all statistically significant at minimally 5%. Contrary to the initial expectation, the environmental pillar's estimate for both *TQ* and *NCF* as dependent variables is not the largest positive estimate. The regressions from columns 4, 5, and 6 illustrate that the social, followed by the governance and, subsequently, the environmental pillar, has the largest positive impact on *TQ*. A potential explanation for this confounding result could be explained by the fact that *TQ* is a market-based measure. The social pillar measures how a company operates within a broader and more diverse society and how it aligns with those standards. Therefore, the social pillar is the most externally oriented pillar, thus, influencing the market-based measure the most. Columns 7, 8, and 9, with *NCF* as a response variable, show that the governance pillar is quoted first, closely followed by the environmental pillar, and the social pillar last in terms of positive impact on NCF. A potential explanation can be derived from Figure A4, which illustrates the borrowers' governance profile is, on average, the highest over the years. This suggests that the borrowers' corporate governance structure is relatively the most developed, thereby contributing the most to their sustainable business structure. Hence, these borrowers' credit risk and reputational benefits could therefore be relatively low. This explanation is also supported by Hauptmann (2017), who suggests that due to its longer establishment, the corporate governance pillar simplifies screening. Additionally, Hauptman (2017) proposed that misaligned corporate governance incentives contribute the most to credit risk.

Table 6. Regression results of individual ESG pillar lending towards excellent performing borrowers on bank performance.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	(E)	(S)	(G)	(E)	(S)	(G)	(E)	(S)	(G)	(E)	(S)	(G)
VARIABLES	ROA	ROA	ROA	TQ	TQ	TQ	NCF	NCF	NCF	NPL	NPL	NPL
E/S/G_lending_75	0.005	0.006	0.004	0.014***	0.025***	0.017***	0.681**	0.241***	0.900***	0.001	-0.001	0.026
	(0.004)	(0.004)	(0.005)	(0.004)	(0.006)	(0.003)	(0.243)	(0.043)	(0.209)	(0.003)	(0.003)	(0.024)
E/S/G_lending_75	-	-	-	-0.000**	-0.001***	-0.000***	-0.013*	-	-0.025**	-	-	-
	-	-	-	(0.000)	(0.000)	(0.000)	(0.006)	-	(0.009)	-	-	-
NPL (LN)	-0.058**	-0.057**	-0.059**	-0.123*	-0.120*	-0.124*	-6.130***	-5.958***	-6.221***	-	-	-
	(0.024)	(0.025)	(0.025)	(0.062)	(0.063)	(0.061)	(0.352)	(0.409)	(0.315)	-	-	-
Liquidity	-0.001	-0.000	-0.001	0.007***	0.007***	0.007***	0.151***	0.165***	0.136**	0.002	0.002	0.002
	(0.005)	(0.006)	(0.005)	(0.001)	(0.002)	(0.002)	(0.039)	(0.038)	(0.056)	(0.004)	(0.004)	(0.004)
Capitalization	0.075***	0.074***	0.072***	-0.012	-0.013	-0.013	0.762***	0.657***	0.662***	-0.016	-0.018*	-0.014
	(0.012)	(0.012)	(0.012)	(0.014)	(0.014)	(0.014)	(0.127)	(0.108)	(0.077)	(0.010)	(0.009)	(0.009)
GDP_growth	0.016	0.016	0.016	-0.005	-0.005	-0.004	0.560	0.615	0.602	-0.017	-0.016	-0.017
	(0.021)	(0.021)	(0.021)	(0.010)	(0.010)	(0.010)	(0.418)	(0.409)	(0.413)	(0.018)	(0.018)	(0.018)
Efficiency (LN)	-0.714	-0.732	-0.714	0.084	0.084	0.086	1.072	0.036	1.411	-0.524	-0.518	-0.495
	(0.497)	(0.499)	(0.501)	(0.171)	(0.160)	(0.168)	(4.012)	(4.750)	(4.053)	(0.583)	(0.579)	(0.557)
DC (LN)	-0.003	-0.005	-0.013	0.124**	0.121**	0.113*	1.306	1.010	0.552	0.010	0.007	0.004
	(0.115)	(0.116)	(0.122)	(0.054)	(0.053)	(0.059)	(1.132)	(1.056)	(1.169)	(0.092)	(0.091)	(0.085)
Constant	3.633*	3.676*	3.719*	0.441	0.467	0.461	-20.369*	-15.435	-17.544	1.835	1.871	1.709
	(1.935)	(1.950)	(1.919)	(0.793)	(0.770)	(0.767)	(11.110)	(14.064)	(12.004)	(2.838)	(2.803)	(2.664)
Year fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Country fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Economic significance	-	-	-	0.005	0.013	0.005	3.774	1.259	4.295	-	-	-
Observations	329	329	329	329	329	329	329	329	329	329	329	329
Adjusted R-squared	0.399	0.400	0.398	0.586	0.596	0.587	0.115	0.110	0.113	0.604	0.604	0.605

Table notes. This table shows the impact of lending towards excellent performing E/S/G borrowers on bank performance. E/S/G_lending_75 refers to the relative lending shares towards borrowers with E/S/G scores above 74. Dependent variables: *ROA, TQ, NCF,* and *NPL*. The statistics for economic significance are calculated by multiplying the coefficients of *ESG_lending_75* by its standard error, to subsequently divide it by the dependent variable' mean and multiply it by 100. This procedure is not executed for insignificant variables as no association is suggested. *NPL, Efficiency, and DC* are in logarithmic form. *** ,**,* refer to 1%, 5%, and 10% significance respectively. Robust standard errors in parentheses. E, S, and G refer to respectively environmental, social, and governance.'-' indicates that the variable is not included in the regression model. In columns (1), (4), (7), and (10) the environmental pillar is used an independent variable. In columns (2), (5), (8), and (11) the social pillar is used as an independent variable. In columns (3), (6), (9), and (12) the governance pillar is used as an independent variable.

5.2 Robustness checks

5.2.1. A balanced panel dataset

Even though most statistical estimation programs are perfectly capable of dealing an unbalanced panel dataset, Baltagi (2005) suggests that large and numerous gaps in the panel dataset can distort the regression outcome. Therefore, all banks with less than eight years of unique observations are excluded from the sample. Initially, this is not preferred for three reasons. First, as already illustrated, most statistical estimation programs are perfectly capable of handling gaps in the panel structure. Secondly, considering the already small sample size, further reductions can harm the significance of the results. Finally, the threat of a selection bias increases by excluding banks without the entire length of observations. As the unbalanced panel dataset also includes bankrupted banks, dropping these firms will tilt the sample towards higher performance values and larger ESG lending volumes. Subsequently, the estimates could be biased downwards. Nonetheless, it is interesting to see how the results found in Table 4 will be strengthened or altered using a balanced panel dataset. Table B1 shows the results of the balanced panel dataset regression derived from 30 banks adding up to 240 observations. The results for both *ROA* and *NPL* remain insignificant. The squared specification of *TQ* also turns insignificant, suggesting a monotonically increasing relationship between *TQ* and *ESG_lending_75* indeed to be more plausible. Interestingly, and as expected, the estimates for *ESG_lending_75* get scaled downwards. The estimates with respectively *TQ* and *NCF* become 0.01 and 0.67. Close to the turning point as calculated in Table 4 (18.78%), the turning point with a balanced dataset is estimated at 18.03%.[40] In terms of model accuracy, the balanced models appear to be stronger in predicting the observed variation in the bank performance indicators around their mean. Especially *ROA*, *TQ*, and *NCF* benefit from this sample shift. Altogether, the potential issues regarding the sample size appear to have a minimal effect on the significance estimates, while the selection bias indeed influences the results. Therefore, the findings of Table B1 further strengthen the analysis conducted in the first subsection of this chapter.

5.2.2. *Winsorized dependent variables*

As discussed in the data section, all dependent variables are checked for the validity of their values. As all observations reflected valid data points, initially no data points of the dependent variables were replaced. Only logarithmic transformations have been considered to control for heavily asymmetric properties. Nevertheless, to verify to what extent the obtained results of Table 4 are driven by extreme values, additional tests are employed. Table B2 shows the results of regressions for which all response variables are winsorized at either 1% or 5%. The estimates are almost identical to the obtained in Table 4, although the coefficients are scaled downwards in some cases. Again, for *ROA* and *NPL*, no

[40] $\frac{0.6668603}{2*0.0184952} = 18.03.$

association is found between lending towards excellent performing borrowers and bank performance. While in line with the previous findings, an inverted U-shaped relationship exists between *NCF* and *ESG_lending_75*, and the relationship between *TQ* and *ESG_lending_75* has signs of a monotonically increasing relationship. Generally, the larger the winsorize percentile cut-off level, the more the estimates get scaled downward. Further, winsorizing enables to explain more of the model's variation in the dependent variable and thereby increases the goodness of fit. Even though the results of Table B2 indicate the initial findings are slightly lifted upward, the positive relationship between *TQ* and *NCF* is robust to extreme values.

5.2.3 Lending towards good and excellent borrowers

To further investigate the impact of ESG lending on bank performance, a third model is employed where lending behaviour towards borrowers with an ESG score higher than 49 is analysed. Table B3 shows the results of this regression. *ROA* turns insignificant, similar as to in Table 4. The effect of *TQ* remains almost identical as in Table 5. The estimate for *NCF* lies between the estimates as obtained in Table 4 and Table 5. The findings for *TQ* and *NCF* further strengthen the rationale that the benefits of high ESG lending seem to be particularly apparent for lending towards excellent performing borrowers. Contrarily, the effect on *NPL* increases compared to the results from Table 5. Again, this could be explained by the absolute effect of lending on *NPL*. When the interval of ESG scores (ESG>49) increases, the absolute effect of lending on *NPL* will also increase.

5.2.4 Controlling for greenwashing

Even though rating agencies such as Asset4 Refinitiv or the MSCI KLD index are auditing company ESG disclosure thoroughly, there always exists a possibility of ESG greenwashing. Greenwashing refers to the scenario in which ESG data disclosed by the firm is not reliable. Considering the previously discussed benefits regarding the loan arrangements provided by financial institutions (e.g. lower interest rates or higher loan volumes) and the potential threat of ESG-related regulation in the future, borrowers may be incentivised to greenwash their ESG information. The presence of greenwashing will negatively influence the benefits of lending towards excellent performing ESG borrowers. The intended reputational benefits and reduced credit risk of firms that greenwash actually do not exist. Extensive research has been conducted towards the characteristics of firms that are more engaged in greenwashing ESG information. Unfortunately, the constructed sample in this study also contains numerous non-listed borrowers, therefore, making it relatively impossible to quantify greenwashing based on borrower characteristics. Nonetheless, an empirical study by Yu et al. (2020) constructed a peer-relative greenwashing score. This score represents the normalised difference between performance and disclosure scores and their mean. The mean peer-relative greenwashing score, based

on 1925 firms, is 4%, suggesting that 4% of the firms engage in greenwashing practices. To incorporate this peer-relative greenwashing score in this study, all borrower ESG scores are downgraded by 4%. Subsequently, the construction of the lending shares towards excellent performing borrowers, including winsorizing for measurement errors, is performed as in the initial procedure. The regression results of this analysis are displayed in Table B5. Interestingly, and as projected, does the effect of lending towards excellent performing borrowers increase for *TQ* and *NCF*. By filtering away borrowers that obtained an excellent ESG score through greenwashing, the benefits of high ESG lending indirectly get amplified. The estimates of TQ and NCF increase from respectively 0.024 and 1.1 to 0.047 and 1.515. Similar to Table 4, the estimates for ROA and NPL are insignificant. The results of Table B5 illustrate that by taking into account the effect of greenwashing, the effect of lending towards excellent performing borrowers gets boosted. This provides suggestive evidence that the estimates, as obtained in Table 4, are biased downwards. Therefore, the positive relationship between lending towards excellent performing borrowers and bank performance is potentially stronger than initially thought.

5.2.5 Mean-centered independent variables

Generally, researchers distinguish between two types of multicollinearity: 'essential' and 'nonessential'. 'Essential' multicollinearity describes correlations between variables for constructs with a high probability of being correlated. On the contrary, 'nonessential' multicollinearity describes the correlation between variables that arise due to issues of measurement or in a multiple regression context (i.e., they are derived from each other). All researchers agree on the fact that 'essential' multicollinearity is problematic, while there exists controversy on whether 'nonessential' is troublesome and whether the proposed treatments are effective (Iacobucci, Schneider, Popovich, and Bakamitsos, 2015). As indicated, in essence, this paper follows the theory by Allison (1999), suggesting that 'nonessential' multicollinearity is not problematic. However, e.g. Aiken and West (1991) and Cronbach (1997) argue that this type of multicollinearity should not be ignored and the mean-centering alleviates the problem. Therefore, as a robustness analysis, another model is employed in which all independent variables are mean-centered.[41] The results of this model are displayed in Table B4. The coefficients of both ESG_lending_75 and ESG_lending_75^2 are for all columns statistically and economically insignificant. Additionally, the mean-centered model performs a relatively poorer job in explaining the variation around the bank performance indicators' mean. The adjusted R-squared is for all distinct performance indicators lower in comparison with the statistics as listed in Table 4. This justifies the decision to follow Allision (1999) by keeping the independent variables uncentered.

[41] For interpretational purposes, all independent variables are mean-centered instead of only the variables prone to multicollinearity.

6. Conclusion

Currently, no one denies the essence of shifting to a sustainable economy that conforms to the commonly accepted Environmental, Social, and Governance standards (Yin et al., 2021). However, past developments have proven that businesses do not automatically incorporate this into their daily operations. The speed of environmental deterioration, as presented in the sixth assessment report of the IPPC, perfectly illustrates this. Banks occupy themselves in the unique position to both pass on ESG standards via their own ESG score, as via their lending decisions. Their central role in allocating resources to non-financial companies and their ability to impose costs on non-compliant companies provides them tools to have a crucial role in the transition towards a sustainable economy. However, given the systemic threat to the financial system that banks impose, it is essential to understand the interaction between ESG lending behaviour and bank performance.

The current study fills a gap in past literature by investigating the relationship between ESG lending behaviour and firm performance. In line with theoretical evidence, this study also tests the existence of a nonlinear relationship between the two variables. To obtain scarce high-ESG borrowers, banks are tempted to decrease their interest rates compared to low-ESG borrowers. This absorbs some of the reputational benefits and reduced credit risk of high-ESG lending. Aside from analysing lending based on ESG profiles, all lending based on individual ESG pillars is tested to further disentangle the relationship between sustainable lending and bank performance.

Using a POLS approach including year and country fixed effects, this study analyses the interaction between ESG lending and bank performance for 49 international banks for a period of eight years (2010-2017). More specifically, this study tests the impact of increased shares in lending towards excellent (ESG>49) and good performing (49<ESG<75) borrowers on ROA, TQ, NCF, and NPL. Bank and country specific control variables are included to minimise the omitted variable bias. A set of sensitivity tests (i.a., tests for greenwashing, extreme values, and ‘nonessential’ multicollinearity) are conducted to provide a deeper explanation behind the obtained results.

The findings this paper encountered for excellent performing borrowers are mixed. Generally, evidence for a nonlinear relationship between high ESG lending and bank performance has only been found for NCF. While no association has been found for ROA and NPL. Even though statistically significant, the positive impact of lending towards excellent performing borrowers on TQ is economically small. The findings for lending towards good performing borrowers reveal in most cases a reduction in the estimated coefficients of ESG lending. Contrarily, the estimates for ROA and NPL are statistically significant and positive. Disentangling the ESG score of excellent performing borrowers into individual pillars showed surprising results. For TQ and NCF, respectively, the social and governance pillar appeared to explain most of the positive impact of excellent ESG lending and the performance indicators in lieu of the environmental pillar. A potential explanation for the opposing result of TQ can be found in the nature of the variable. As the variable is a market-based measure, it is

directly influenced by the society's view. The social pillar captures this view the most. The governance pillar's surprisingly large impact on *NCF* (accounting-based) can potentially be explained the fact that the governance pillar is generally the longest-established pillar. Therefore, it is the most developed, thereby contributing the most to the obtained benefits of lending towards excellent performing borrowers. The sensitivity analysis shows that if greenwashing is present in the employed dataset, it biases the estimates downwards. Moreover, the positive relationship between high ESG lending and bank performance is robust to extreme values. While mean-centering the explanatory variables does not increase the explanatory power of the variation around the mean of the dependent variables.

From the obtained results, a few interesting conclusions can be drawn. First, NPL's performance indicator estimates suggest that the reduced credit risk argument dominates the reputational benefit argument in explaining the positive relationship between high ESG-based lending and bank performance. Secondly, the difference between the accounting-based measures (ROA and NCF) is suggested to be driven by cash flow from financing and investing activities. Finally, disentangling the ESG score shows that there exists no dominant pillar for boosting bank performance, while aligning to your sustainable goals, as this depends on the type of performance indicator.

Nonetheless, this research comes with some limitations. First, the examined period is relatively short. As this could have deteriorated the precision of the obtained results, one should be cautious while interpreting the specific change in bank performance indicators. Secondly, even though there has been controlled for the main bank and country-specific characteristics, there could still exist omitted variables that influence the bank performance indicators. Examples of unobserved bank heterogeneity are intangibles such as managerial talent, franchise value or bank culture. Finally, the direction of causality could be influencing the obtained results and has not been tested in this paper. It could be plausible that good performing banks purposely increase lending towards good and excellent performing borrowers as they initially have more reputation to lose.

It would be interesting for future research to touch upon some of these limitations. Re-assessing this study for a future period of data is interesting, considering the annual increase in attention towards ESG. Further, it would be interesting to analyse how the current finding may alter for a longer spun of data using a system GMM approach. As this would both enhance precision and tackle endogeneity issues, it would contribute to the existing literature.

Aside from the discussed limitations, this research has useful implications for policymakers. A broader incorporation of ESG could be a viable solution for a more sustainable economy. This process could be fastened by regulating the credit supply towards companies with, e.g., minimum ESG lending shares. The empirical results of this study suggest that such regulation does not induce any harmful impact on bank performance themselves. However, if this stimulates increased lending in total volumes, one should not neglect the fact that there exists the possibility of increased credit risk. Further, as no dominant ESG pillar exists, focussing on individual pillars is possible, although this does not induce any incremental benefits compared to focussing on the complete ESG metric.

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Appendices

Appendix A

Fig. A1. Schematic overview of Asset4 Refinitiv's E,S,G,ESG, and ESGC derivations.

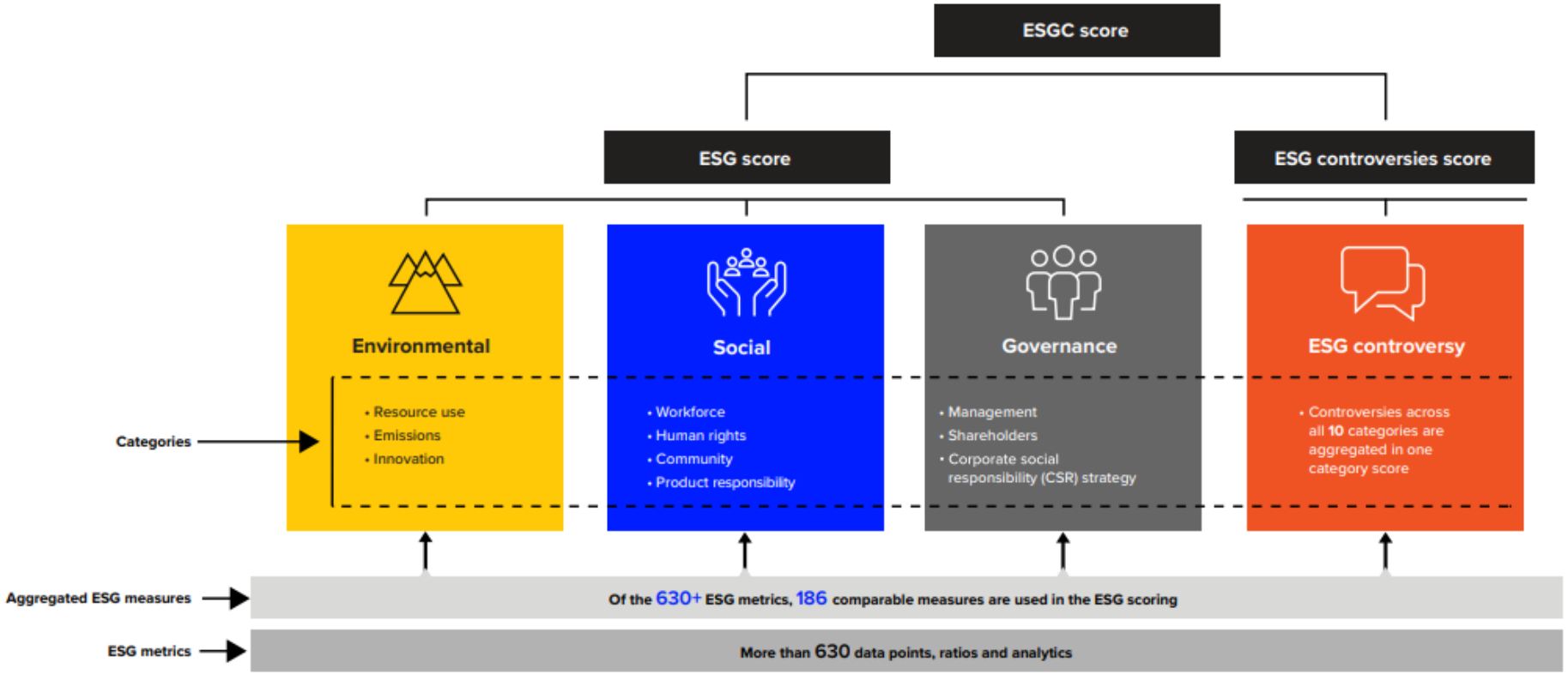

Table notes. This Figure illustrates a schematic overview of a decomposition of an ESG score as constructed by Asset4 Refinitiv.
Source: Refinitiv (2022)

Fig. A2. Roadmap to enhance your ESG score.

Figure notes. This Figure provides a detailed overview of how entities can enhance their ESG score.
Source: Duponcheele and Perraudin (2021)

Table A1. Decomposition of each individual ESG pillar.

Pillar	Categories	Themes
Environmental	Emissions	Emissions, waste, biodiversity*, and environmental management systems*
	Innovation	Product innovation, green revenues, research and development, and capital expenditures
	Resource use	Water, energy, sustainable packaging*, and environmental supply chain*
Social	Community	Equally important to all industry groups, hence a median weight of five is assigned to all
	Human rights	Human rights
	Product responsibility	Responsible marketing, product quality, data privacy
	Workforce	Diversity and inclusion, career development and training, working conditions, and health and safety
Governance	CSR strategy	CSR strategy, ESG reporting and transparency
	Management	Structure (committees, diversity, and independence) and compensation
	Shareholders	Shareholder rights and takeover defences

Table notes. This Table shows an overview of the decomposition of each individual ESG pillar.
* Occasionally, no data points are available that may be used as a proxy for ESG impact.
Source: Refinitiv (2022).

Table A2. List of variable sources and definitions as employed in the model.

Variable	Definitions	Frequency (Unit)	Source
Dependent			
TQ	Market value of equity / book value of equity	Annual (%)	EIKON
ROA	Net income / total assets*	Annual (%)	EIKON
NCF	Operating cash flow + financing cash flow + investing cash flow	Annual ($MM)	EIKON
NPL**	Impaired loans / gross customer loans and advances	Annual (%)	Orbis Bank Focus
Independent			
ESG lending	Lending as a share of total loans towards borrower ESG profiles based on an equally weighted score constructed by several ESG pillars	Annual (%)	Asset4 Refinitiv & LPC Dealscan***
E lending	Lending as a share of total loans towards borrowers based on the score of their environmental pillar	Annual (%)	Asset4 Refinitiv & LPC*** Dealscan***
S lending	Lending as a share of total loans towards borrowers based on the score of their social pillar	Annual (%)	Asset4 Refinitiv & LPC*** Dealscan
G lending	Lending as a share of total loans towards borrowers based on the score of their governance pillar	Annual (%)	Asset4 Refinitiv & LPC Dealscan***
Bank level control variables			
Efficiency	Total operating expenses / operating revenues.	Annual (%)	Orbis Bank Focus
NPL**	Impaired loans / gross customer loans and advances	Annual (%)	Orbis Bank Focus
Capitalization	Total equity / total assets	Annual (%)	EIKON
Liquidity	Total deposits / total assets	Annual (%)	EIKON & Orbis Bank Focus
Country level control variables			
GDP growth	GDP growth over one year	Annual (%)	The World DataBank
Domestic Credit	Domestic credit to the private sector by bank (% GDP)	Annual (%)	The World DataBank

Table notes. This Table provides a list of descriptions and sources of the variables included in the employed model. ***** ROA is either directly obtained from EIKON or manually calculated using the formula in the definitions column, ** NPL is used both as a dependent and independent variable, although not in the same regression, *** E, S, G, and ESG are obtained from Asset4 Refinitiv, while volume-specific deal agreements are obtained from LPC Dealscan. $MM indicates millions of US dollars.

Figure A3. Scatterplot of *ESG_lending_75*

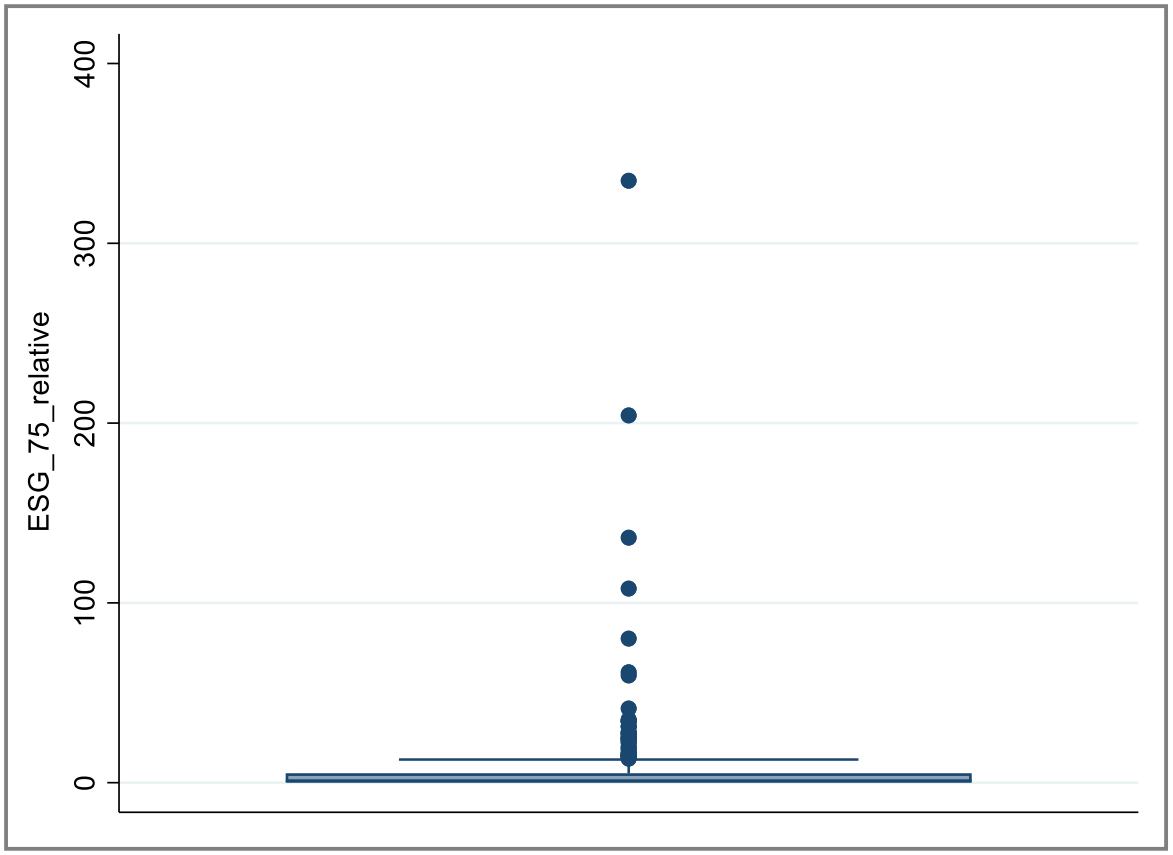

Table notes. This Figure shows a scatterplot of *ESG_lending_75* un-winsorized.

Fig. A4. Development of mean score of E,S,G, and ESG over the years.

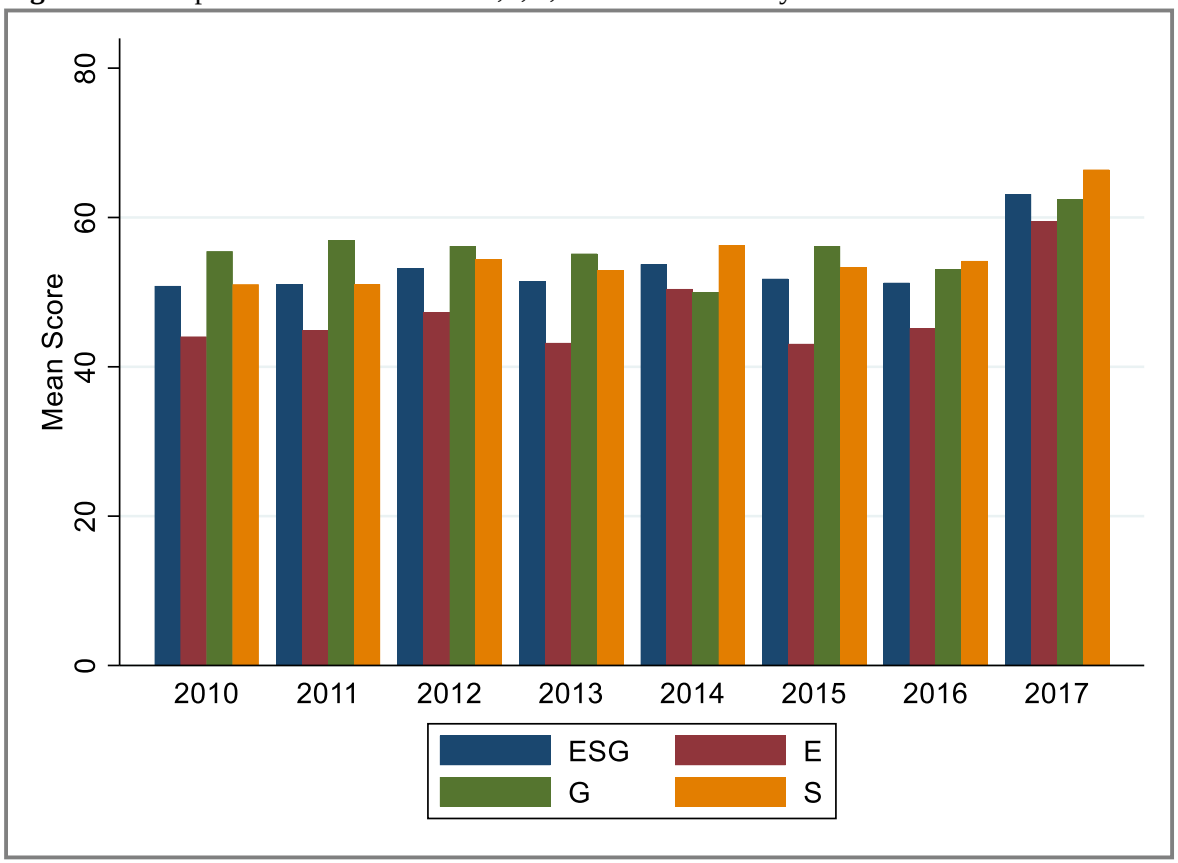

Table notes. This Figure shows the trend of mean E,S,G, or ESG scores over the analysed years.

Appendix B

Table B1. Regression results of lending towards excellent performing ESG borrowers on bank performance for a balanced dataset.

VARIABLES	(1) ROA	(2) ROA	(3) TQ	(4) TQ	(5) NCF	(6) NPL (LN)	(7) NPL (LN)
ESG_lending_75	0.007	0.001	0.015**	0.010***	0.667**	0.022	-0.001
	(0.013)	(0.003)	(0.005)	(0.001)	(0.230)	(0.034)	(0.006)
ESG_lending_75 ^{2}	-0.000	-	-0.000	-	-0.018*	-0.001	-
	(0.000)	-	(0.000)	-	(0.009)	(0.001)	-
NPL (LN)	0.015	0.016	-0.036*	-0.035*	-1.801	-	-
	(0.024)	(0.022)	(0.020)	(0.019)	(1.565)	-	-
Liquidity	0.000	0.000	0.012***	0.012***	0.136***	-0.003*	-0.003
	(0.002)	(0.002)	(0.001)	(0.001)	(0.037)	(0.002)	(0.002)
Capitalization	0.062***	0.062***	-0.087***	-0.087***	0.303	0.142***	0.142***
	(0.011)	(0.012)	(0.006)	(0.007)	(0.222)	(0.019)	(0.017)
GDP_growth	0.013	0.014	0.006	0.006	0.615	-0.002	-0.002
	(0.020)	(0.020)	(0.009)	(0.009)	(0.510)	(0.012)	(0.012)
Efficiency (LN)	-1.018	-1.025	-0.454**	-0.459**	-0.195	0.099	0.073
	(0.658)	(0.657)	(0.184)	(0.183)	(2.860)	(0.228)	(0.228)
DC (LN)	0.019	0.019	0.044	0.044	-0.555	0.099	0.102
	(0.056)	(0.057)	(0.048)	(0.048)	(0.803)	(0.062)	(0.067)
Constant	4.872*	4.888*	3.022***	3.033***	-0.901	-1.680	-1.634
	(2.631)	(2.622)	(0.736)	(0.735)	(11.374)	(1.020)	(1.018)
Year fixed effects	yes	yes	yes	yes	yes	yes	yes
Country fixed effects	yes	yes	yes	yes	yes	yes	yes
Observations	240	240	240	240	240	240	240
Adjusted R-squared	0.695	0.696	0.866	0.866	0.434	0.685	0.685

Table notes**.** This Table shows the regression results of lending towards excellent performing borrowers in terms of ESG on bank performance for a balanced dataset. *ESG_lending_75* refers to the relative lending shares towards borrowers with ESG scores above 74. Robust standard errors in parentheses, *** ,**,* refer to 1%, 5%, and 10% significance respectively. '-' indicates that the variable is not included in the regression model. All variables except *TQ* are measured in percentages. Dependent variables: *ROA*, *TQ*, *NCF*, and *NPL*. NPL is in logarithmic form.

Table B2. Regressions results of lending towards excellent performing borrowers on bank performance winsorized at 1% and 5%.

VARIABLES	(2) ROA_1	(3) ROA_1	(4) ROA_5	(5) ROA_5	(6) TQ_1	(7) TQ_5	(8) NCF_1	(9) NCF_5	(10) NPL_1	(11) NPL_1	(12) NPL_5	(13) NPL_5
ESG_lending_75	0.021	0.000	0.020	-0.000	0.024***	0.022**	0.716***	0.641***	-0.005	0.017	-0.008	0.013
	(0.016)	(0.003)	(0.014)	(0.002)	(0.008)	(0.009)	(0.166)	(0.141)	(0.088)	(0.023)	(0.086)	(0.021)
ESG_lending_75 ^{2}	-0.001	-	-0.001	-	-0.001**	-0.001*	-0.022**	-0.021***	0.001	-	0.001	-
	(0.001)	-	(0.001)	-	(0.000)	(0.000)	(0.008)	(0.007)	(0.003)	-	(0.003)	-
ln_NPL	-0.056*	-0.053**	-0.028	-0.026	-0.125**	-0.119**	-4.286***	-3.044***	-	-	-	-
	(0.027)	(0.023)	(0.029)	(0.025)	(0.059)	(0.052)	(0.466)	(0.431)	-	-	-	-
Liquidity	-0.003	-0.003	-0.003	-0.003	0.007***	0.006***	0.100**	0.073*	-0.005	-0.006	-0.007	-0.008
	(0.004)	(0.003)	(0.003)	(0.003)	(0.002)	(0.001)	(0.047)	(0.036)	(0.010)	(0.010)	(0.008)	(0.008)
Capitalization	0.066***	0.066***	0.058***	0.057***	-0.013	-0.012	0.397***	0.258***	0.044	0.044	0.025	0.025
	(0.003)	(0.003)	(0.003)	(0.003)	(0.012)	(0.010)	(0.059)	(0.071)	(0.054)	(0.054)	(0.036)	(0.036)
GDP_growth	0.014	0.014	0.003	0.003	-0.004	-0.001	0.518	0.307	-0.075	-0.076	-0.042	-0.043
	(0.019)	(0.019)	(0.011)	(0.011)	(0.009)	(0.009)	(0.333)	(0.254)	(0.072)	(0.072)	(0.055)	(0.055)
ln_Efficiency	-0.700	-0.713	-0.685	-0.698	0.083	0.046	1.847	0.006	-0.822	-0.806	-1.148	-1.134
	(0.471)	(0.472)	(0.468)	(0.468)	(0.173)	(0.147)	(2.134)	(1.785)	(1.049)	(1.081)	(0.852)	(0.882)
ln_DC	0.032	0.032	0.039	0.039	0.118**	0.111*	0.482	0.690	-0.016	-0.017	-0.139*	-0.139*
	(0.074)	(0.074)	(0.048)	(0.049)	(0.054)	(0.054)	(0.761)	(0.659)	(0.127)	(0.126)	(0.078)	(0.078)
Constant	3.708**	3.731**	3.648*	3.671*	0.474	0.664	-15.286**	-5.446	4.624	4.595	6.771*	6.744*
	(1.708)	(1.721)	(1.761)	(1.771)	(0.786)	(0.674)	(7.126)	(5.952)	(5.290)	(5.319)	(3.716)	(3.747)
Year fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Country fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	329	329	329	329	329	329	329	329	329	329	329	329
Adjusted R-squared	0.538	0.535	0.575	0.570	0.603	0.624	0.411	0.397	0.718	0.719	0.720	0.721

Table notes. This Table shows the regression results of lending towards excellent performing ESG borrowers for dependent variables winsorized at 1% and 5%. Respectively 1 and 5 in the second row reflect winsorizing the dependent variable at a 1% and 5% level. Robust standard errors in parentheses, *** ,**,* refer to 1%, 5%, and 10% significance respectively. *ESG_lending_75* refers to the relative lending shares towards borrowers with ESG scores above 74.'-' indicates that the variable is not included in the regression model. All variables except *TQ* are measured in percentages. Dependent variables: *ROA*, *TQ*, *NCF*, and *NPL*.

Table. B3. Regression results of lending towards borrowers with good and excellent performing ESG profiles on bank performance.

VARIABLES	(1) ROA	(2) ROA	(3) TQ	(5) NCF	(6) NPL (LN)
ESG_lending_50	0.004	0.001	0.008**	0.552***	0.023**
	(0.003)	(0.002)	(0.004)	(0.126)	(0.009)
ESG_lending_50 ^{2}	-0.000	-	-0.000**	-0.007***	-0.000**
	(0.000)	-	(0.000)	(0.002)	(0.000)
NPL (LN)	-0.062**	-0.059**	-0.128*	-6.496***	-
	(0.025)	(0.024)	(0.062)	(0.353)	-
Liquidity	-0.002	-0.002	0.008***	0.151***	0.003
	(0.005)	(0.005)	(0.001)	(0.050)	(0.004)
Capitalization	0.071***	0.071***	-0.011	0.713***	-0.009
	(0.011)	(0.011)	(0.012)	(0.093)	(0.008)
GDP_growth	0.016	0.016	-0.006	0.525	-0.020
	(0.021)	(0.021)	(0.010)	(0.384)	(0.018)
Efficiency (LN)	-0.702	-0.710	0.062	0.570	-0.516
	(0.488)	(0.495)	(0.179)	(4.264)	(0.565)
DC (LN)	-0.012	-0.011	0.125**	1.100	0.021
	(0.120)	(0.120)	(0.056)	(1.127)	(0.076)
Constant	3.720*	3.743*	0.460	-18.095	1.596
	(1.876)	(1.907)	(0.780)	(12.304)	(2.646)
Year fixed effects	yes	yes	yes	yes	yes
Country fixed effects	yes	yes	yes	yes	yes
Observations	329	329	329	329	329
Adjusted R-squared	0.395	0.397	0.589	0.119	0.610

Table notes**.** This table investigates the impact of lending towards good and excellent performing ESG borrowers on bank performance. *ESG_lending_50* refers to the relative lending shares towards borrowers with ESG scores above 49. Dependent variables: *ROA*, *TQ*, *NCF*, and *NPL*. Robust standard errors in parentheses, *** ,**,* refer to 1%, 5%, and 10% significance respectively. '-' indicates that the variable is not included in the regression model. All variables except *TQ* are measured in percentages.

Table B4. Regression results of lending towards excellent performing ESG borrowers controlled for greenwashing.

VARIABLES	(1) ROA	(2) ROA	(3) TQ	(4) NCF	(6) NPL (LN)	(7) NPL (LN)
ESG_lending_75	0.040	0.001	0.047***	1.515**	-0.036	0.005
	(0.025)	(0.006)	(0.010)	(0.736)	(0.031)	(0.012)
ESG_lending_75 ^{2}	-0.004	-	-0.003***	-0.049*	0.003*	-
	(0.002)	-	(0.001)	(0.042)	(0.002)	-
NPL (LN)	-0.075***	-0.078***	-0.118*	-6.007***	-	-
	(0.025)	(0.024)	(0.061)	(0.336)	-	-
Liquidity	-0.567*	-0.492*	0.643***	19.424***	0.300	0.227
	(0.274)	(0.236)	(0.139)	(3.322)	(0.344)	(0.344)
Capitalization	6.244***	6.101***	-1.026	77.192***	-1.729*	-1.594*
	(0.590)	(0.503)	(1.271)	(22.254)	(0.837)	(0.855)
GDP_growth	0.000	0.000	-0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Efficiency (LN)	-1.091***	-1.103***	0.005	-0.718	-0.576	-0.566
	(0.286)	(0.288)	(0.145)	(5.571)	(0.594)	(0.595)
DC (LN)	-0.035	-0.034	0.001	-0.331	0.034	0.033
	(0.020)	(0.020)	(0.020)	(0.358)	(0.024)	(0.024)
Constant	6.718***	6.694***	1.308*	2.144	0.891	0.917
	(1.255)	(1.192)	(0.648)	(28.837)	(2.300)	(2.349)
Year fixed effects	yes	yes	yes	yes	yes	yes
Country fixed effects	yes	yes	yes	yes	yes	yes
Observations	327	327	324	327	327	327
Adjusted R-squared	0.490	0.488	0.591	0.107	0.600	0.600

Table notes**.** This table investigates the impact of lending towards excellent performing ESG borrowers on indicators of bank performance, where the lending shares towards excellent performing ESG borrowers are controlled for borrower ESG greenwashing. *ESG_lending_75* refers to the relative lending shares towards borrowers with ESG scores above 74. Dependent variables: *ROA*, *TQ*, *NCF*, and *NPL*. This procedure is not executed for insignificant variables as no association is suggested. Robust standard errors in parentheses, *** ,**,* refer to 1%, 5%, and 10% significance respectively. '-' indicates that the variable is not included in the regression model. All variables except *TQ* are measured in percentages.

Table B5. Mean-centered regression results of lending towards excellent performing borrowers on bank performance

VARIABLES	(2) ROA	(3) ROA	(4) TQ	(5) TQ	(6) NCF	(7) NCF	(8) NPL	(9) NPL
ESG_lending_75	-0.004	-0.001	-0.002	0.001	0.022	0.049	-0.008	0.003
	(0.006)	(0.006)	(0.001)	(0.002)	(0.103)	(0.110)	(0.005)	(0.005)
ESG_lending_75 ^{2}	0.001*	-	0.001**	-	0.005	-	0.002***	-
	(0.000)	-	(0.000)	-	(0.007)	-	(0.000)	-
NPL (LN)	-0.008	-0.006	-0.037	-0.035	-3.122***	-3.105***	-	-
	(0.072)	(0.072)	(0.025)	(0.025)	(1.049)	(1.055)	-	-
Liquidity	0.010	0.010	0.010	0.010	0.605***	0.601***	0.020	0.019
	(0.009)	(0.009)	(0.006)	(0.006)	(0.162)	(0.163)	(0.015)	(0.014)
Capitalization	0.169	0.169	0.045	0.044	-1.226***	-1.232***	0.018	0.015
	(0.110)	(0.111)	(0.028)	(0.028)	(0.370)	(0.376)	(0.019)	(0.021)
GDP_growth	0.008	0.008	0.006	0.006	0.638	0.635	-0.004	-0.005
	(0.014)	(0.013)	(0.008)	(0.008)	(0.421)	(0.419)	(0.017)	(0.017)
Efficiency (LN)	-0.343	-0.353	0.149	0.140	5.132*	5.057*	0.258	0.230
	(0.297)	(0.306)	(0.186)	(0.192)	(2.557)	(2.441)	(0.214)	(0.234)
DC (LN)	0.002	0.003	0.046	0.046	0.330	0.335	0.043	0.045
	(0.069)	(0.069)	(0.036)	(0.035)	(0.652)	(0.652)	(0.071)	(0.070)
Constant	1.459***	1.464***	1.732***	1.736***	7.019**	7.061**	-0.059	-0.040
	(0.090)	(0.090)	(0.029)	(0.029)	(2.826)	(2.821)	(0.122)	(0.127)
Year fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Country fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Observations	329	329	329	329	329	329	329	329
Adjusted R-squared	0.384	0.385	0.530	0.529	0.052	0.055	0.603	0.598

Table notes. This Table shows the impact of lending towards excellent performing ESG borrowers on indicators for bank performance, where all explanatory variables are mean-centered. Robust standard errors in parentheses, *** ,**,* refer to 1%, 5%, and 10% significance respectively. *ESG_lending_75* refers to the relative lending shares towards borrowers with ESG scores above 74. All independent variables (column (1)) are centered around their mean. '-' indicates that the variable is not included in the regression model. All variables except *TQ* are measured in percentages. Dependent variables: *ROA*, *TQ*, *NCF*, and *NPL*. NPL is in logarithmic form.