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Finance Working Paper N° 917/2023
May 2023

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## Abstract

In recent years, there has been a significant increase in the issuance of sustainability-linked loans (SLLs), where loan contract terms depend on the borrower's ESG performance. This study investigates the economic motivations behind SLL agreements. Our analysis reveals no reduction in loan spreads for SLLs, nor any improvement in borrower ESG performance following the initiation of an SLL. However, we observe that SLL lenders successfully attract higher deposits after issuance, enabling them to increase their lending. However, we find no evidence to suggest that lenders offer SLL contracts predominantly to low-risk borrowers. Our results imply that the primary incentives for engaging in SLL contracts may reside with the lenders, who appear to reap the majority of benefits from such arrangements. Consequently, these findings call into question the purported objectives of SLLs in promoting sustainable practices.


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Keywords: ESG, sustainability-linked loans, loan spreads, bank deposits, relationship lending

JEL Classifications: G20, G21, M14



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# Who Benefits from Sustainability-linked Loans?[*]

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Abstract

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## 1. Introduction

Sustainability-linked loans (SLLs) represent one of the most rapidly expanding segments within sustainable finance, aiming to encourage borrowers to meet pre-established sustainability performance targets.[1] In recent years, SLLs have experienced a surge in global popularity, with their issuance surpassing that of green bonds and loans, as reported by S&P Global.[2] These loan agreements include covenants that offer borrowers reduced interest rates upon achieving certain sustainability objectives or impose higher rates if they fail to meet the specified goals. By providing banks with a mechanism to incentivize borrowers to pursue ESG targets, SLLs eliminate the necessity for loan proceeds to be allocated to explicit ESG projects.[3]

Contrasting with pre-existing forms of sustainable finance (e.g., ESG funds or corporate green bonds), where ESG-linked financial instruments are traded among numerous market participants, SLLs (and the wider sustainability lending market) embody a significantly different institutional structure. Within this framework, ESG factors are integrated into legally enforceable contracts, generally involving a consortium of lenders and a single borrower. The bilateral nature of these agreements suggests that the driving forces behind SLLs likely stem from the economic motivations of both lending parties and borrowers.

Despite the attractive premise and growing popularity of SLLs, limited empirical research exists on the economic motivations of borrowers and lenders involved in these loan contracts. It remains uncertain whether borrowers can obtain reduced loan spreads through such arrangements

[1] In the context of this research, we employ the terms "sustainability" and "ESG" interchangeably throughout the study.

[2] See "Sustainability-linked loan supply outpaces green bonds and loans amid US surge," S&P Global, available at https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/sustainability-linked-loan-supply-outpaces-green-bonds-and-loans-amid-us-surge-65569374. See also, "U.S. Sustainability-Linked Loans Are 292% More Than All of 2020," Bloomberg, available at https://www.bloomberg.com/news/articles/2021-05-24/u-s-sustainability-linked-loans-are-292-more-than-all-of-2020.

[3] In this respect, SLLs differ from green loans, as the latter necessitates the allocation of loan proceeds specifically towards environmentally and socially responsible projects.

or whether they utilize these loans to convey a genuine dedication to enhancing their ESG performance. The economic motivations driving banks to issue these loans are also unclear. In this research, we undertake an empirical examination to address these questions.

In order to empirically investigate SLLs, we assemble a dataset comprising 1,606 SLL facilities and 921 deals, sourced from Thomson/Refinitiv LoanConnector Dealscan during the period from January 2017 to December 2021. The Dealscan database offers comprehensive information on corporate loans, including key performance indicators incorporated into SLL contracts, which are linked to sub-components of RepRisk, our primary ESG score. For the sake of robustness, we also obtain sustainability performance data from S&P Global and Thomson/Refinitiv ASSET4. By matching borrowers and lenders to companies covered in Compustat and Compustat Bank, we are able to obtain relevant borrower and lender characteristics for our analysis.

Our analysis begins by documenting fundamental patterns observed in SLLs. Firstly, SLLs have gained increasing prominence over time, with the total issuance escalating from $2,258 million (representing 0.04% of total corporate loan issuance) in 2017 to $634,863 million (8.17%) in 2021. Secondly, SLLs are widespread in "hard-to-abate" industries, such as utilities, oil and gas, and chemicals. Thirdly, in terms of total issuance, SLLs are predominantly concentrated in the United States (24.65%) and Western Europe (57.39%). Lastly, the average proportion of SLLs within a lender's loan portfolio has grown from 0.06% in 2017 to 9.45% in 2021.

We proceed to investigate whether SLLs offer economic incentives to borrowers and contribute to improvements in their ESG performance. In our loan pricing analysis, we compare loan spreads for the same borrower and lender within the same year. This identification strategy effectively accounts for the influence of potential unobservable borrower and lender characteristics

on yield spreads. We do not identify a significant difference in at-issue loan spreads between SLLs and matched non-SLLs. However, SLL contractual terms are subject to adjustment based on borrowers' ESG performance throughout the loan's duration. Consequently, a straightforward comparison of loan spreads at issuance may not capture the essential features of SLL contracts. To gain a deeper understanding of the pricing implications of SLLs, we manually gather data on sustainability rate adjustments from the DealScan database. Our findings suggest that potential discounts for ESG performance do not appear to provide sufficient economic incentives for SLL borrowers to pursue substantial changes in their ESG profiles.

To investigate whether SLLs help borrowers commit to a predetermined set of sustainability goals, we compare an SLL borrower's ESG performance before and after the loan's origination. We manually gather specific key performance indicators (KPIs) integrated into SLL contracts and subsequently match each KPI to a corresponding RepRisk subcomponent. By contrasting the ESG performance of an SLL borrower around the issuance of an SLL with that of its peers, we aim to assess the effectiveness of these loans in achieving their intended objectives. Contrary to the original purpose of SLLs, our findings reveal that SLL borrowers are, in fact, more likely to encounter negative ESG events following the loan's issuance.

The low correlation across different ESG ratings is a well-established fact (Berg, Koelbel, and Rigobon, 2022). As a robustness check, we compare the overall sustainability performance of SLL borrowers using various ESG ratings. To achieve this, we match each SLL borrower with non-SLL borrowers within the same country, industry, and year in the 12 months preceding the loan issuance. This approach ensures that any subsequent differences in borrower characteristics between the SLL and non-SLL samples reflect the impact of the SLL. Consistent with our previous findings, we do not observe evidence of improved ESG performance for SLL borrowers relative

to their non-SLL counterparts. Consequently, it appears that SLLs do not effectively incentivize borrowers to enhance their ESG profiles. This result aligns with the conclusion that potential loan spread discounts, if present, may not offer sufficient economic incentives for SLL borrowers to pursue ESG improvements.[4]

As we do not find evidence that SLLs benefit borrowers in terms of loan pricing or ESG performance improvement, we shift our focus to the analysis of lenders. Specifically, we examine two potential benefits for lenders: increased ability to attract deposits from ESG-conscious customers and the issuance of SLLs to less risky borrowers. Our results show that SLL lenders are able to attract more deposits than matched non-SLL lenders, allowing them to engage in more liquidity creation and transform short-term demand deposits into long-term loans - a key function of financial intermediation (Berger and Bouwman, 2009). This finding supports the hypothesis that entering into SLL contracts makes lenders more attractive to ESG-conscious depositors, leading to positive NPV growth.

Next, we hypothesize that SLL borrowers are less risky in terms of default and credit risk, which could be either because SLLs are issued to safer borrowers or because better sustainability practices reduce risk. To test this hypothesis, we first compare a borrower's probability of default over horizons of 1-month to 60-months between SLLs and matched non-SLLs. We do not find any statistically significant differences in default risk between the two groups, rejecting the hypothesis that SLL borrowers represent reduced risks compared to non-SLL borrowers. We then examine borrowers' credit risk using credit downgrades and default events between SLLs and matched non-

[4] In the absence of evidence suggesting borrowers benefit from a loan spread discount or improved ESG performance, we explore alternative financial incentives that could be driving the emergence of such loans. We investigate whether borrowers experience a significant improvement in financial performance around the origination of SLLs. Employing market-to-book ratio and profitability (ROA) as proxies for financial performance, our analysis does not reveal any evidence of improvement on the part of borrowers.

SLLs. Again, we find no evidence to support the hypothesis that SLL borrowers are safer than non-SLL borrowers. Our analysis of the lender side potentially explains why SLLs are adopted: lenders are able to extract most of the benefits from SLLs by attracting more deposits and thus improving their performance, while not necessarily taking on more risk.

We conclude our analysis by investigating the factors driving the initiation of SLL contracts. Given that lenders appear to capture the majority of benefits from SLLs, we hypothesize that SLLs are more likely to be initiated by banks with greater market power. Our findings support this conjecture. Additionally, our findings suggest that SLLs are more likely to be issued through relationship lending, highlighting the importance of strong relationships between borrowers and lenders in the initiation of SLL contracts.

Our study is related to the growing literature on the role of ESG information in banking relationships and loan contracts. One way in which ESG information may affect these relationships is through implicit consideration of ESG factors in loan terms, while another way is through explicit inclusion of ESG criteria in loan contracts, as is the case with SLLs.

Prior research on the implicit use of ESG information has investigated the relationship between borrower corporate ESG ratings and loan terms. For instance, Goss and Roberts (2011) find that firms with social responsibility concerns pay higher interest rates than socially responsible firms. Chava (2014) reports that lenders charge higher interest rates on loans issued to firms with environmental concerns. Hasan et al. (2017) find that firms with higher levels of social capital, measured by their location in US counties with greater social capital, receive loans with lower spreads and less stringent nonprice terms.

Another strand of research highlights the relevance of ESG information in lending relationships, particularly in the loan origination process. Houston and Shan (2022) argue that

lenders have both financial and reputational incentives to focus on a borrower's ESG performance. They find that banks tend to match with borrowers with similar ESG ratings. Shin (2023) suggests that banks with lower ESG reputations may seek to improve their standing by aligning themselves with ESG-focused borrowers and offering favorable rates. These studies shed light on the implicit use of ESG information in lending relationships and underscore the growing significance of sustainability considerations in the financial sector.

The explicit use of ESG information in banking has been studied in recent research by Amiram, Gavious, Jin, and Li (2021) and Kim, Kumar, Lee, and Oh (2022). Amiram et al. (2021) investigates the impact of the Equator Principles, an environmental and social risk management framework adopted by several large US banks, on loan contracts for their borrowers. The study finds an increase in environmental protection provisions in loan contracts, and a reduction in loan spreads, particularly among borrowers who borrow from early adopters and borrowers who switch to banks that adopted the framework.[5]

The only existing empirical research on the SLL market is a study conducted by Kim et al. (2022), which characterizes the growth of ESG lending, including SLLs and green loans, globally. The authors report that SLLs are more likely to be initiated between borrowers and lenders with superior ESG profiles ex-ante and find no evidence of ESG performance deterioration following loan origination. Furthermore, they find no pricing difference between ESG-linked loans and non-ESG loans. In contrast, our paper focuses on the economic incentives of lenders in the SLL market, utilizing specific KPIs embedded in SLL contracts to compare borrower ESG performance. Therefore, our study complements the literature on the explicit use of ESG information in debt

[5] It is important to note that the type of ESG-related covenants examined by Amiram et al. (2021) differ from those in SLL contracts. The covenants studied by Amiram et al. do not include contingencies related to loan spreads, unlike those found in SLLs.

contracts, which supplements the existing literature on the use of financial information in debt covenants.

More broadly, our study is related to the growing literature on sustainable finance. While the majority of prior studies have examined sustainable equity investing, with a focus on how investors use sustainable investments to achieve their performance goals and influence the ESG performance of investee firms (for a review, see Gillan, Koch, and Starks, 2021), our study specifically examines the explicit use of ESG information in debt contracts. Our findings contribute to the understanding of the effectiveness of SLLs in incentivizing borrowers to improve their ESG performance and the role of lenders in adopting these contracts. Our study adds to the literature on sustainable finance and highlights the importance of incorporating ESG considerations in debt contracts, in addition to equity investments.

Other recent studies have focused on sustainable debt instruments. Larcker and Watts (2020) found no pricing difference between green and non-green bonds in the market for municipal bonds. Flammer (2021) found that investors respond positively to the issuance of green bonds and that issuers of green bonds improve their environmental performance post-issuance while experiencing increased ownership by long-term and green investors. Baker et al. (2021) showed that green municipal bonds are issued at a premium to otherwise similar ordinary bonds and that green bonds, particularly small or essentially riskless ones, are more closely held than ordinary bonds. However, ESG lending involves formal, written contracts between a group of lenders and a borrower, unlike green bonds that are traded among a large number of investors. Therefore, different economic forces may be at play, and monitoring strength could differ substantially between the lending and bond setting.

The structure of the paper is as follows. Section 2 provides the institutional background and develops the hypotheses. Section 3 presents the data, sample, and descriptive statistics. Section 4 examines whether borrowers benefit from SLLs. Section 5 investigates whether lenders benefit from SLLs. Section 6 analyzes potential mechanisms. Finally, Section 7 provides concluding remarks.

## 2. Institutional Background and Hypothesis Development

### 2.1. Institutional background: sustainability-linked loans

Sustainability-linked loans are designed to incentivize borrowers to improve their sustainability practices by aligning loan terms with their sustainability performance, which is measured using one or more sustainability key performance indicators (KPIs) that can be either external or internal. The industry standards for SLLs are governed by the Sustainability-Linked Loan Principles, which were developed by a working group consisting of representatives from leading financial institutions involved in the global syndicated loan markets, including the Loan Market Association (LMA), Asia Pacific Loan Market Association (APLMA), and Loan Syndications and Trading Association (LSTA).

SLLs aim to incentivize positive changes in sustainability through the use of sustainability performance targets (SPTs) set against key performance indicators (KPIs). The calibration process for SPTs per KPI is essential to the structure of SLL contracts, as it expresses the level of targets that the borrower is willing to commit to. The SPTs should be set in good faith and remain relevant throughout the life of the loan. Examples of SPTs include reducing greenhouse gas emissions related to the borrower's products or manufacturing cycle and increasing the number of affordable housing units developed by the borrower. A borrower may choose to work with one or more

"Sustainability Coordinators" or "Sustainability Structuring Agents" to assist with arranging their SLL product. If appointed, these coordinators or agents will help negotiate the KPIs and calibrate the SPTs with the borrower.

To provide an example of how SLLs are structured, consider the SLL issued to BlackRock. The company entered into a financing agreement with a group of banks that ties its borrowing costs for a $4.4 billion credit facility to its ability to meet certain "sustainability targets." These targets include achieving goals for women in senior leadership positions and increasing the representation of Black and Hispanic employees in its workforce. The clauses for the sustainability fee adjustment and sustainability rate adjustment from the original loan agreement of BlackRock are provided in Appendix A. In the revolving credit agreement, Annex B outlines the sustainability fee adjustment and sustainability rate adjustment. The agreement specifies that if, in a fiscal year, as reported in the SASB Aligned Report, (i) "two or more of the KPI Metrics are equal to or more than the applicable Sustainability Target set forth in the Sustainability Table," and (ii) "no KPI Metric is less than the applicable Sustainability Threshold set forth in the Sustainability Table," BlackRock will receive a Sustainability Fee Adjustment of -0.01% for the fiscal year.

## 2.2. Hypothesis development

One of the defining characteristics of SLLs is the potential for borrowers to access discounted loan rates while retaining flexibility in the use of funds. Our first hypothesis relates to whether SLLs offer a lower loan spread compared to other types of loans. On one hand, three factors may contribute to a lower spread at contract initiation. First, borrowers who opt for SLLs may inherently be less risky. Second, lenders may initiate SLL lending relationships and offer favorable loan spreads as incentives for borrowers to enter into these loans. Third, borrowers may

demand a lower spread at loan initiation as compensation for the risk of potential penalties for failing to meet sustainability targets.

On the other hand, there are reasons why spreads at issuance may not be lower. For example, SLL borrowers may not necessarily be financially safer or have stronger bargaining power than non-SLL borrowers. Additionally, while SLL borrowers are entitled to a subsequent discount if they meet specific sustainability targets, the initial spread may not be advantageous. Taking both sides of the argument into account, our first hypothesis can be stated as follows.

H1a: SLLs offer borrowers lower loan spreads than do comparable non-SLLs.

In addition to a potentially lower cost of debt, SLLs may also provide a mechanism for borrowers to improve their overall sustainability performance, demonstrate their sustainability commitments to stakeholders, and deepen relationships with lenders (Sustainalytics, 2021). Our second hypothesis is that SLL borrowers will improve their ESG performance. While there are arguments both for and against this hypothesis, SLLs provide a way for borrowers to signal their genuine commitment to improving their sustainability profile through real economic decisions. However, it is also possible that some borrowers may use SLLs for window-dressing or impression management, especially when the economic benefits are negligible. Prior research has documented instances of firms engaging in green-washing practices.

H1b: SLLs lead to an improvement in the ESG performance of borrowers.

Unlike other sustainability finance instruments, where the company raising funds interacts with a large number of capital providers, SLLs arise from a bilateral relationship, and the loan terms are potentially determined through negotiations between borrowers and lenders. As such, we hypothesize that the benefits of SLLs accrue not only to borrowers, but also to lenders.

For banks, SLLs provide an opportunity to expand their lending portfolios and meet firm-wide sustainability financing commitments, incentivize corporate clients to improve their sustainability performance, and develop deeper relationships and engagements with customers (Sustainalytics, 2021). According to research by S&P Global (2021), one of the key drivers for the rapid growth of SLL markets is banks' need to fulfill corporate objectives related to impact financing within their lending books.

By issuing sustainable loans, banks can signal their commitment to ESG considerations. This signal is likely to be viewed as credible for two reasons. First, SLLs represent substantial long-term investments for banks, and come at an opportunity cost. Second, as the architect and initiator of SLLs, banks have an interest in maintaining the credibility of the sustainability-linked loan segment.[6]

We next investigate two potential benefits for lenders in SLL arrangements: increased deposit attraction and loan volume, and improved credit risk management. Anecdotal evidence suggests that demand depositors may be attracted to banks with strong ESG commitments, and SLLs may serve as an ESG label, increasing the attractiveness of banks that offer sustainable loans. However, prior research has found a negative relationship between financial institutions' environmental policies and customers' deposits, as institutions that excel in managing carbon emissions and pursuing sustainable development tend to pay lower interest rates on customer

[6] See ING's Position Paper "The credibility of the sustainability-linked loan and bond markets," https://www.ingwb.com/en/sustainable-finance/sustainability-linked-loans.

deposits, discouraging deposit growth (Galletta, Mazzù, Naciti, and Vermiglio, 2021). Thus, it is uncertain whether SLL lenders are better positioned to attract deposits.

Banks rely on demand deposits to fund their lending activities, creating liquidity on their balance sheets by financing less liquid assets with more liquid liabilities (Diamond and Dybvig, 1983; Berger and Bouwman, 2009). On the one hand, offering sustainable loans through SLLs may enhance lenders' reputation and relationships with clients, leading to increased demand for loans. However, this may not be the case if SLLs are perceived as green-washing or discourage deposit growth. Our hypothesis, stated below, also includes a parallel prediction for the loans made by banks that issue SLLs.

H2a: SLL lenders attract more deposits and make more loans relative to comparable non-SLL lenders.

Finally, we examine whether SLL borrowers exhibit lower credit risk than other borrowers. It is possible that SLL-issuing lenders have better risk management practices due to their adherence to ESG principles, which could translate into lower credit risk for borrowers. For instance, Amiram et al. (2021) found that early adopters of the Equator Principles, a set of standards that improve ESG policies by certain borrowers and formalize their commitments to ESG goals in loan contracts, offer reductions in loan spreads. Other studies provide evidence that is consistent with this view. Ilhan, Sautner, and Vilkov (2021), for example, discovered that firms' downside risk increases with carbon intensity, while Seltzer et al. (2022) found that companies with poor environmental performance tend to have lower credit ratings. Furthermore, Jagannathan, Ravikumar, and Sammon (2018) found that ESG-related risks are non-diversifiable and associated with firms'

downside risks. This finding is supported by Hoepner et al. (2021), who found that engagements on ESG issues can benefit shareholders by reducing firms' downside risks.

However, there are opposing arguments that SLL borrowers may not necessarily exhibit lower credit risk. Becchetti, Ciciretti, and Hasan (2015), among others, suggest that ESG/CSR increases firms' idiosyncratic risk. Additionally, if an SLL is used solely as a window-dressing tool, we should not expect to find any significant difference in the risk profile between SLL and non-SLL borrowers.

H2b: SLL borrowers exhibit lower risk profiles than non-SLL borrowers.

## 3. Data, Sample, and Descriptive Statistics

### 3.1. Data and sample

Our data on SLLs and other types of loans are sourced from Thomson/Refinitiv LoanConnector Dealscan (formerly LPC Dealscan), which provides comprehensive coverage of the global commercial loan market. We consider a loan facility to be an SLL if it is classified under the market segment of "Environmental, Social & Governance/Sustainable Linked." Our primary sample consists of 1606 SLL facilities (921 deals) from 53 borrowing countries, spanning the period from January 2017 to December 2021.

Data on financial statements for borrowers are obtained from Compustat (North America and Global), while financial data for lenders are obtained from Compustat Bank Fundamental. To match DealScan borrowers with Compustat companies, we use Michael Roberts’s link table and supplement it with a manual comparison of borrower names not covered by the Roberts link table and company names in Compustat. For matching DealScan lenders with companies covered by

Compustat Bank, we use Michael Schwert's (2018) link table and supplement it with a manual comparison of bank names. Finally, stock price data are obtained from CRSP.

To address potential concerns that our research findings may be influenced by the choice of ESG data sources (Christensen, Serafeim, and Sikochi, 2022), we use ESG performance data from multiple providers, including RepRisk, S&P Global, and Thomson/Refinitiv ASSET4. RepRisk is our primary sustainability rating provider, as it is based on negative ESG events that are actually reported by external sources, which reduces reliance on companies' self-reported disclosures.

### 3.2. Descriptive statistics

Table 1 presents descriptive statistics for the sample of SLLs used in our analysis from January 2017 to December 2021.

[Table 1]

Panel A of Table 1 reports that the mean (median) issuance size of an SLL is $624.78 (269.56) million, with a standard deviation of $1.03 billion. The mean (median) maturity of SLLs is 55.3 (60) months, with a standard deviation of 24.89 months. The mean (median) all-in-drawn spread is 154.19 (125) basis points.[7]

Panel B of Table 1 presents summary statistics for three measures of lending relationship in the context of SLL issuance: Relationship Number, Relationship Length, and Cumulative Loan Amount. Relationship Number is the cumulative number of loan contracts between a borrower and a lender since they first initiated a loan contract. The mean (median) Relationship Number is 5.84

[7] The number of observations for loan spreads is limited to 276, as this summary statistic only considers SLL contracts that use the London Interbank Offered Rate (LIBOR) as the base reference rate. Various other reference rates are utilized by different parties, such as Prime, SIBOR, HIBOR, and others. In certain loan agreements, data regarding the reference rate is not accessible.

(3.50). Relationship Length is defined as the number of years that have elapsed since the first loan between a borrower and a lender. The mean (median) length is 5.06 (3) years. Cumulative Loan Amount is the sum of all loan facility amounts initiated between the borrower-lender pair. The mean (median) cumulative loan amount for a pair is $6.96 (3.08) billion when an SLL is issued.

Panel C of Table 1 displays the total amount of SLL issuance by year. The SLL market started with a size of $2.26 billion in 2017 and has steadily grown since then. In 2021, the total annual issuance has reached $634.86 billion. Additionally, Panel A provides information on the size of the SLL market relative to the entire corporate loan market. The total SLL issuance volume as a percentage of the total corporate loan issuance volume was only 0.04% in 2017, but by 2021, SLLs represent 8.17% of all loan issuance. The SLL market has experienced remarkable growth in both absolute and relative terms over the past five years.

Panel D of Table 1 reports the SLL issuance amount by industry, focusing on the top 10 industries as classified by LPC DealScan. Notably, several "hard-to-abate" industries, such as utilities (14.26% of all SLL loan volume), general manufacturing (6.98%), oil and gas (5.91%), chemicals, plastics & rubber (4.53%), and automotive (4.25%) are among the top borrowers of SLLs. This suggests that the flexibility of SLL contracts, which do not require funds to be spent solely on green projects, makes them particularly appealing to borrowers in traditionally high-emissions industries. This finding aligns with the results of Nordea Research. Additionally, the financial services sector ranks second in SLL loan volume, with $116.78 billion (11.68%).

Panel E of Table 1 presents the top 10 countries in which SLL facilities are domiciled. Except for Singapore, all the top 10 countries are located in North America or Western Europe. The United States is the largest market for SLLs, with a total issuance amount of $246.43 billion, accounting for 24.65% of the entire SLL market. France follows with $101.62 billion (10.17%).

Panel F of Table 1 shows the regional breakdown of the SLL market according to the DealScan classification. Western Europe dominates the SLL market, with $573.73 billion, accounting for 57.39% of the total SLL market. North America comes in second place, with $280.07 billion or 28.02%, followed by the Asia Pacific with $92.89 billion or 9.29%.

Panel G of Table 1 presents the average proportion of SLLs in a lender's loan portfolio (SLL Ratio). SLL Ratio is defined as a lender's total SLL issuance amount in a year divided by the lender's total corporate loan issuance amount in the year. The ratio grew from 0.06% in 2017 to 9.45% in 2021, indicating that SLLs are becoming an increasingly important segment of a lender's loan portfolio.

## 4. Do Borrowers Benefit from SLLs?

We begin by investigating whether borrowers derive any benefits from SLL. Specifically, we focus on two types of benefits: advantageous loan pricing (H1a) and improved ESG performance (H1b).

### 4.1. Loan pricing

For the loan pricing analysis, we compare the yield spreads charged by banks between SLLs and non-SLLs. To isolate the effects of SLL from factors that are related to borrower characteristics, we restrict our analysis to a sample of borrowers utilizing both SLL and non-SLL loans. Our identification strategy consists of two alternative specifications that differ in how we select comparable non-SLL loans as the control sample.

In the first specification (Model 1), we compare the loan spreads charged to SLLs of a borrower with those charged to non-SLLs of the same borrower, for a given loan issuance year. In

the second specification (Model 2), we further control for the impact of lender characteristics and lending relationship on loan pricing by limiting the sample used in Model 1 to loan facilities in which the spreads are charged by the same lender. That is, we compare yield spreads charged to the same borrower by the same lender in the same year. Model 2 effectively controls for unobservable borrower and lender characteristics that affect the pricing of loans. We exclude financial firms from the borrowing population. The analysis is based on the following regression:

$$\text{Ln(Spread)}_{i,j,t} = \alpha + \beta \cdot \text{SLL}_{i,t} + \theta_t + \nu_i + \chi_j + Z_{i,j,t} + \varepsilon_{i,j,t} \quad (1)$$

The dependent variable, Ln(Spread), is the natural logarithm of the loan spread over the London Interbank Offered Rate (LIBOR). The independent variable of interest is SLL, which takes the value one for SLLs of a borrower and zero for non-SLLs of the same borrower. To control for time trends and unobservable time-invariant heterogeneities of a borrower and a lender, we include fixed effects for year ($\theta_t$), borrower ($\nu_i$), and lender ($\chi_j$). Loan characteristics such as loan type, loan purpose, issuance amount, and loan maturity are included in the vector $Z_{i,j,t}$. Standard errors are clustered by borrower to account for possible correlation within a borrower's multiple loan facilities.

[Table 2]

Table 2 presents the results of our analysis. Model 1 (Column 1) compares yield spreads within the borrower-year, while Model 2 (Column 2) compares spreads within the borrower-lender-year. Both models yield negative coefficients, but we do not find significant differences in loan spreads at issuance between SLL and non-SLL samples. This finding rejects the hypothesis that SLLs offer borrowers lower loan spreads compared to comparable non-SLLs.

However, it should be noted that our comparison of loan spreads at initiation does not consider the subsequent adjustments to loan rates, which are a central feature of SLLs. To assess

whether the potential reduction in loan spreads stipulated in SLL contracts could overturn the comparison between SLLs and non-SLLs, we formally consider the impact of the sustainability-linked adjustments.[8]

We further investigate the potential benefit of SLLs for borrowers by examining whether the sustainability-linked adjustments stipulated in SLL contracts may result in lower loan spreads compared to non-SLLs. The DealScan database provides information on some subsequent adjustments, we retrieve the details of 121 out of the 1,606 SLL facilities issued during the sample period (missing data fields limit our ability to collect adjustment details). We find that the potential maximum total discount ranges from 0.01% to 1%, with a mean (median) discount of 4.87 (4) basis points. Given the mean (median) SLL amount in our sample of $624.78 (269.56) million, the maximum discount that a borrower can earn over the life of the loan by achieving target KPIs is $0.3 (0.11) million. However, our analysis suggests that this discount is not economically large enough to significantly lower the loan spreads of SLLs compared to non-SLLs. Therefore, the potential benefit to borrowers in terms of lower loan spreads is economically small, and consequently, the maximum penalty for poor sustainability performance is also economically small.

### 4.2. Borrower sustainability performance

A pertinent question that follows is whether the ESG performance of borrowers improves after SLL origination. To investigate this, we manually collect all available information on Key Performance Indicators (KPIs) in SLL contracts from the DealScan database. Specifically, we use three variables (deal remark, tranche remark, or performance pricing remark) to gather detailed

[8] Unfortunately, we do not have data on realized discounts.

information on KPIs. Out of the 1,606 (921) SLL facilities (deals) during the sample period, we are able to extract the KPI details for 566 (340) facilities (deals), and we identify 1,171 KPIs embedded in SLL contracts. On average, there are 2.07 KPIs per loan facility. We then manually match each KPI to a particular subcategory of RepRisk, which is our primary source for ESG data.[9]

[Table 3]

Panel A of Table 3 presents a summary of the KPIs included in SLL contracts. The most commonly used metric among SLL contract counterparties is related to climate change and Greenhouse Gas (GHG) emissions, accounting for 32.88% of all KPIs. This is followed by a KPI related to energy management, which accounts for 10.93% of all KPIs. As shown in the table, most of the indicators are based on a borrower's environmental or social performance. In some cases, counterparties agree to use third-party ESG scores (4.01%) instead of predetermined specific performance indicators.

To compare an SLL borrower's ESG performance around issuance, we first determine the length of the period after SLL initiation for each loan facility. We define this period as the difference (in days) between the tranche active date for each loan and December 31, 2021. To ensure comparability, we make the lengths of the pre-SLL periods the same as those of the post-SLL periods. For instance, if a tranche active date is June 27, 2018, the number of days between that date and December 31, 2021 is 1,283. Therefore, the pre-SLL period for the loan runs from December 22, 2014, to the active date (a period of 1,283 days). We estimate the following equation to examine the relationship between an SLL borrower's ESG performance and the issuance of an SLL facility:

$$\text{Neg\_ESG}_{i,t} = \alpha + \beta \cdot \text{Post}_t + \zeta_b + \text{I}_{\text{Ind}} + \theta_t + \nu_i + \varepsilon_{i,t} \quad (2)$$

[9] For the period spanning January 1, 2007 to December 31, 2021, RepRisk offers binary variables for subcategories of ESG risks, which are set to one (T) if a negative event occurs and zero (F) otherwise.

Equation (2) represents a regression analyzing borrower ESG performance around SLL origination. The dependent variable is the borrower's sustainability, measured by RepRisk sub-scores based on negative ESG events that are reported. The variable "Post" takes a value of one during the time period following loan SLL origination, and a value of zero otherwise. If the contractual details of SLLs provide borrowers with incentives to improve their ESG profiles, the coefficient of "Post" should be negative. The variables $\zeta_b$, $I_{Ind}$, $\theta_t$, and $\nu_i$ represent borrowing country, industry (SIC 2-digit), year, and borrower fixed effects, respectively. Standard errors are clustered by borrower.

Panel B of Table 3 presents the results. We find that the coefficients on Post are significantly positive across all model specifications. In contrast to what might reasonably be expected, borrowers' sustainability performance deteriorates rather than improves post-SLL. This finding, along with the loan pricing analysis, casts doubt on the purpose of ESG loans that claim to promote the ESG goals of borrowers by incentivizing and rewarding companies for making positive contributions to the environment and society.

As a robustness test, we examine whether the results are sensitive to the choice of ESG ratings data by comparing a borrower's overall ESG performance around the issuance of SLLs using three different ESG ratings: RepRisk, S&P Global ESG, and Thomson/Refinitiv Asset4. For this analysis, we match each SLL borrower to non-SLL borrowers in the same country, industry (2-digit SIC code), and year. This matching procedure results in 293 SLL borrowers and 1,861 matched peers.[10] The unit of observation is a unique borrower-year. The empirical analysis is based on the following model:

[10] As a robustness check, we replicated the analyses in Table 4 with additional matching variables, including loan primary purpose and loan type. The untabulated results indicate that our conclusions hold for all ESG scores used, further supporting our main findings.

$$ESG_{i,t} = \alpha + \beta \cdot Post_t \times SLL_{i,t} + \gamma \cdot SLL_{i,t} + \delta \cdot Post_t + \zeta_b + I_{Ind} + \theta_t + \nu_i + \varepsilon_{i,t} \quad (3)$$

The dependent variable in each panel is a borrower's sustainability score, which is measured by different ESG ratings, including RepRisk, S&P Global, and Thomson/Refinitiv ASSET4. It is important to note that RepRisk and S&P Global have opposite interpretations, where a higher RepRisk score indicates worse sustainability performance while higher S&P Global and ASSET4 ratings indicate better sustainability performance. The variable Post takes the value of one for ESG scores one (Panel A), two (Panel B), or three (Panel C) years after loan origination, and zero for those one year before origination. SLL is a dummy variable that takes the value of one for SLL borrowers and zero for matched non-SLL borrowers. The SLL group includes borrowers who use SLLs in a year, while the non-SLL group consists of borrowers who use only non-SLLs in the year. We include borrowing country ($\zeta_b$), industry ($I_{Ind}$, SIC 2-digit), year ($\theta_t$), and borrower ($\nu_i$) fixed effects as control variables. Standard errors are clustered by borrower.

[Table 4]

Table 4 reports the results of the analysis based on overall ESG ratings. The findings suggest that SLL borrowers do not improve their ESG performance regardless of the ESG rating used or the model specification employed. It is notable that the SLL dummy itself is often positive and significant, suggesting that firms that already have good scores seek out SLL loans, perhaps because they will meet the SLL KPI goal without having to make any additional investments. Together with the results from Tables 2 and 3, these findings raise doubts about the effectiveness of SLLs in achieving their intended objective of incentivizing borrowers to improve their sustainability performance. This begs the question of why and under what circumstances SLL contracts are initiated. In the following section, we explore the incentives for lenders to use SLLs.

## 5. Do Lenders Benefit from SLLs?

### 5.1. Lenders' performance: deposits and loans

Before examining the consequences of SLLs for lenders, we investigate the determinants of a lender's decision to extend an SLL. Specifically, we examine the relationship between the likelihood of SLL issuance and lender characteristics, such as deposits and loans, measured prior to issuance. We match each SLL lender to non-SLL lenders in the same country and year, with each observation representing a unique bank-year. The empirical analysis is based on the following OLS regressions:

$$SLL_{j,t} = \alpha + \beta \cdot Y_{j,t-1} + \eta_l + \theta_t + \chi_j + \varepsilon_{j,t} \qquad (4)$$

The dependent variable is a binary indicator that takes the value of one for lenders offering SLLs and zero for those offering non-SLLs. The independent variable of interest ($Y_{j,t-1}$) is a lender's deposit and loan growth in the year prior to loan origination. To construct the variable, we calculate the percentage change in deposits and loans from the previous year for each lender. For example, if an SLL was issued in 2020, the growth variable is measured by (2020 value - 2019 value) / 2019 value. The model controls for lender country ($\eta_l$), year ($\theta_t$), and lender fixed effects ($\chi_j$). Standard errors are clustered by lender.

[Table 5]

Table 5 presents the regression results of the determinants of a lender's decision to offer an SLL, based on two panels: Panel A, which utilizes the full sample, and Panel B, which is restricted to loans with LIBOR as the reference rate. Columns 1 through 4 present the results of the regression model with the independent variable ($Y_{j,t-1}$) representing changes in deposit variables, including total domestic deposits (Compustat item: TDOMD), customer demand deposits (DPDC), customer savings deposits (DPSC), and customer total deposits (DPTC). In Columns 5 through 7, the main

independent variable is one of the following loan variables: changes in commercial and industrial (domestic) loans (LCACLD), consumer loans (LCACRD), and loans net of unearned income (LG).

We find evidence suggesting that the coefficient estimates of most of the deposit and loan growth measures are significantly negative, indicating that, among a set of banks in a country in a given year, those with slower (or possibly negative) growth are more likely to initiate an SLL in the following year. These findings suggest that an SLL lender's decision to issue an SLL may be influenced by poor performance.

We further investigate whether the issuance of an SLL actually improves a lender's performance (H2a). SLL lenders may be more attractive to depositors who prioritize ESG commitments, leading to increased deposit growth. Additionally, the ability to offer sustainable loans could enhance lenders' reputation and relationships with clients, potentially increasing loan demand. However, it is possible that the issuance of an SLL is viewed as "green-washing," or it may discourage deposit growth (Galletta et al., 2021). Same as before, we use deposit and loan variables as proxies for bank performance. The empirical analysis is based on the following regression equation:

$$\Delta\text{Deposit (or Loan)}_{j,t} = \alpha + \beta \cdot \text{Post}_t \times \text{SLL}_{j,t} + \gamma \text{SLL}_{j,t} + \eta_l + \theta_t + \chi_j + \varepsilon_{j,t} \qquad (5)$$

The dependent variable is the growth in either deposits (Columns 1 through 4) or loans (Columns 5 through 7). $\text{Post}_t$ is an indicator that takes the value of one for observations one (Panel A) or two (Panel B) years after SLL issuance, and zero for those one year before issuance. SLL takes the value of one for banks issuing SLLs and zero for their counterparts. To clarify, if an SLL is initiated in 2020, a post-issuance metric is defined as (2021 value – 2020 value) / 2020 value in Panel A and (2022 value – 2020 value) / 2020 value in Panel B. Similarly, a pre-issuance measure

is defined as (2020 value – 2019 value) / 2019 value. We control for lender country, year, and lender fixed effects using $\eta_l$, $\theta_t$, and $\chi_j$, respectively. Standard errors are clustered by lender.

[Table 6]

Results are documented in Table 6. Our results suggest that the issuance of SLLs helps banks attract more deposits. This relation suggests that depositors react to information about a bank beyond its traditional fundamentals. The effect is economically meaningful, with SLL banks experiencing increases in deposit growth of up to 19.6% relative to their peers in Panel A, Column 2. In contrast, SLL banks have relatively lower loan growth in the period immediately following SLL origination, but this difference disappears two years after issuance. Overall, our findings suggest that SLLs are initiated by banks with weak performance, and these loans help improve a bank's performance post-issuance by attracting more deposits and allowing for increased lending. These results support our hypothesis that SLLs can provide a reputational benefit for banks and attract deposits from investors concerned about ESG commitments.[11]

5.2. SLL borrower risk

Next, we test the hypothesis (H2b) that banks issue SLLs to safe borrowers in order to reduce their exposure to credit risk. To examine this, we compare the probability of default (PD) between SLL borrowers and their non-SLL peers. The PD measure estimates the likelihood of a borrower failing to meet its financial obligations over different time horizons, ranging from 1 to 60 months. The empirical analysis is based on the following regression:

$$SLL_{i,t} = \alpha + \beta \cdot PD_{i,t} + \zeta_b + I_{Ind} + \theta_t + \nu_i + Z_{i,j,t} + \varepsilon_{i,t} \qquad (6)$$

[11] The results remain robust when we restrict our sample to instances where the reference base rate is LIBOR.

In the model, the dependent variable is SLL, which takes the value of one for SLLs and zero for non-SLLs. The independent variable of interest is a borrower's default probability measured over different periods after the SLL contract is initiated. We use the probability of default (PD) from the National University of Singapore's Credit Research Institute.[12] With this specification, we assume that our PD is a proxy for the bank's assessment of the borrower's likelihood of default, and our hypothesis is that lower-risk borrowers are more likely to be offered SLLs. Borrower country ($\zeta_b$), industry ($I_{Ind}$, SIC 2-digit), year ($\theta_t$), and borrower ($\nu_i$) fixed effects are controlled for in the regression. Loan characteristics, including loan type, purpose, amount, and maturity, are included in the model as a vector $Z_{i,j,t}$. Standard errors are clustered by borrower.

[Table 7]

Table 7 presents the results, with Panel A showing the results without controlling for borrower fixed effects and Panel B with the controls. The coefficients on the main covariates are statistically insignificant with mixed signs, indicating that we cannot detect any significant difference in default probabilities between SLL and non-SLL borrowers. As such, the results reject the hypothesis that banks use SLLs to reduce their exposure to borrowers' default risk.

To further investigate whether SLLs are issued to safe borrowers, we compare the frequency of SLL downgrades and defaults with that of non-SLL downgrades and defaults.

$$\text{Downgrade (or Default)}_{i,j,t} = \alpha + \beta \cdot SLL_{i,j,t} + \zeta_b + I_{Ind} + \theta_t + \nu_i + Z_{i,j,t} + \varepsilon_{i,j,t} \quad (7)$$

Downgrade is a binary variable indicating whether a borrower's S&P credit rating has been downgraded during the loan period, while Default is a binary variable indicating whether a borrower has failed to meet its financial obligations during the loan period. Specifically, Default

[12] For details of the PD measure, see https://d.nuscri.org/static/pdf/Probability%20of%20Default%20White%20Paper.pdf.

is defined as a borrower's S&P long-term credit rating being downgraded to 'D' or 'SD'. SLL is the main independent variable, with a value of one for SLLs and zero for comparable non-SLLs. We control for borrower country ($\zeta_b$), industry ($I_{Ind}$, SIC 2-digit), year ($\theta_t$), and borrower ($\nu_i$) fixed effects in the regression. Loan characteristics are included in the vector $Z_{i,j,t}$, which contains loan type, purpose, amount, and maturity. Standard errors are clustered by borrower.

[Table 8]

The results of our analysis are presented in Table 8. The coefficients on the SLL variable are statistically insignificant (except in Column 2) for both downgrade and default measures, suggesting that SLLs are not more likely to be issued to safe borrowers. Specifically, we find no significant difference in the likelihood of downgrades and defaults between SLL borrowers and non-SLL borrowers. These findings support the conclusion that banks do not use SLLs to reduce their exposure to borrowers' credit risk. Overall, the results suggest that sustainable lending practices are not driven by credit risk considerations.

## 6. What Drives the Issuance of SLLs?

### 6.1. Market power

In this section, we aim to identify the drivers of SLL issuance, with a specific focus on the impact of lender market power. Our previous findings suggest that lenders are the primary beneficiaries of SLLs. Therefore, we posit that sustainable loans are more likely to be issued when lenders possess greater market power vis-à-vis borrowers. To measure a lender's market power, we use market capitalization (as of December 2021) and corporate lending market share (as of 2021). We estimate the following regression:

$$SLL_{j,t} = \alpha + \beta \cdot Y_{j,t} + \eta_l + \theta_t + \varepsilon_{j,t} \qquad (8)$$

The dependent variable in this analysis is a binary indicator that takes the value of one for SLL banks and zero for matched peers. We use a set of proxies for a bank's market power ($Y_{j,t}$) as the main independent variables. Each measure of market power is a binary indicator that takes the value of one if the bank is in a position to exert its influence, and zero otherwise. We control for lender country ($\eta_l$) and year ($\theta_t$) fixed effects in the model, and standard errors are clustered by lender.

[Table 9]

Table 9 presents the results of our analysis. Columns 1-3 report the results based on market capitalization measures, while Columns 4-5 present the results based on market share measures. We find that all coefficients on proxies for banks' market power are positive and statistically significant at the 1% level, regardless of the model specifications. This finding suggests that sustainable loans are more likely to be issued by banks with greater market power, as measured by market capitalization and corporate loan market share. Combined with the results in Table 5, the overall picture of an SLL initiator is a mature, larger bank with high market share, but slowing growth.

### 6.2. Lending relationship

Finally, we investigate the potential role of lending relationships in driving the origination of SLL contracts. We construct three proxies for lending relationships: Relationship Number, Relationship Length, and Cumulative Loan Amount. Relationship Number is the total number of loan contracts initiated between a borrower and a lender since the first loan between the pair. Relationship Length is the number of years since the first loan transaction between the borrower-lender pair. Cumulative Loan Amount is the total amount a firm has borrowed from a bank since

the first loan contract between the counterparties. We interpret a higher value of each metric as indicating a stronger and longer-lasting relationship between the borrower-lender pair. The empirical tests are based on the following regression equation:

$$SLL_{i,j,t} = \alpha + \beta \cdot Y_{i,j,t} + \zeta_b + \eta_l + I_{Ind} + \theta_t + \varepsilon_{i,j,t} \quad (9)$$

The dependent variable is an indicator that takes the value of one for SLLs and zero otherwise. The independent variables ($Y_{i,j,t}$) of interest are the proxies for lending relationships as defined above. We control for borrower country ($\zeta_b$), lender country ($\eta_l$), industry ($I_{Ind}$, SIC 2-digit, I_Ind), and year ($\theta_t$) fixed effects in the regression model. Standard errors are clustered by borrower and lender. A positive coefficient on $Y_{i,j,t}$ would suggest that sustainable loans are more likely to be initiated through relationship lending.

[Table 10]

Table 10 presents the results of our analysis. Columns 1 and 2 report the results based on Relationship Number, Columns 3 and 4 are based on Relationship Length, and Columns 5 and 6 are based on Cumulative Loan Amount. We find that the coefficients on proxies for lending relationships are significantly positive across different model specifications. These results suggest that a stronger or longer banking relationship is a potential mechanism through which SLL arrangements are initiated.

## 7. Concluding Remarks

In this study, we examine the economic incentives for SLL borrowers and lenders. Our findings indicate that loan spreads are not lower for SLL contracts and that borrower sustainability performance does not improve after SLL initiation. However, SLL lenders can attract more deposits post-origination and consequently increase their loan volume. We did not find evidence

that SLL lenders issue sustainable loans to safer borrowers. Overall, our results suggest that the economic incentives for entering SLL contracts are likely driven by the lenders, who capture most of the benefits from such loans.

These findings call into question the effectiveness of SLLs in incentivizing borrowers to improve their ESG performance and highlight the potential distortions in allocative efficiency caused by SLL arrangements. Future research could explore ways to restructure such arrangements to align their economic consequences with the intended ESG goals. Our finding that the potential magnitude of benefits from achieving sustainability goals is quite small suggests that larger pricing adjustments is a starting point.

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## Appendix A: Sustainability Fee Adjustment and Sustainability Rate Adjustment in the BlackRock Example

Sustainability Fee Adjustment; Sustainability Rate Adjustment

This table determines if the applicable adjustments for the Sustainability Fee Adjustment and the Sustainability Rate Adjustment apply for any given Fiscal Year based on metrics set in the Sustainability Table in Schedule 4.17.

1. Sustainability Fee Adjustment = +0.01%, 0% or -0.01%, in each case for such Fiscal Year.

   a. As reported in the SASB Aligned Report, (I) are two or more of the KPI Metrics less than the applicable Sustainability Threshold set forth in the Sustainability Table and (II) no KPI Metric is equal to or more than the applicable Sustainability Target set forth in the Sustainability Table? Check one: ☐ YES ☐ NO

      i. If yes, a Sustainability Fee Adjustment of +0.01% applies for such Fiscal Year.

      ii. If no, a Sustainability Fee Adjustment of +0.01% does not apply for such Fiscal Year.

   b. As reported in the SASB Aligned Report, (I) are two or more of the KPI Metrics equal to or more than the applicable Sustainability Target set forth in the Sustainability Table and (II) no KPI Metric is less than the applicable Sustainability Threshold set forth in the Sustainability Table? Check one: ☐ YES ☐ NO

      i. If yes, a Sustainability Fee Adjustment of -0.01% applies for such Fiscal Year.

      ii. If no, a Sustainability Fee Adjustment of -0.01% does not apply for such Fiscal Year.

   c. If neither (a)(i) nor (b)(i) above applies, a Sustainability Fee Adjustment of 0% applies for such Fiscal Year.

   d. The Sustainability Fee Adjustment for Fiscal Year 20____ is _____%.

   e. As of the date hereof, after giving effect to the Sustainability Fee Adjustment, the Commitment Fee is _____%[12].

2. Sustainability Rate Adjustment = +0.05%, 0% or -0.05%, in each case for such Fiscal Year.

   a. As reported in the SASB Aligned Report, (I) are two or more of the KPI Metrics less than the applicable Sustainability Threshold set forth in the Sustainability Table and (II) no KPI Metric is equal to or more than the applicable Sustainability Target set forth in the Sustainability Table? Check one: ☐ YES ☐ NO

      i. If yes, the Sustainability Rate Adjustment of +0.05% applies for such Fiscal Year.

      ii. If no, the Sustainability Rate Adjustment of +0.05% does not apply for such Fiscal Year.

   b. As reported in the SASB Aligned Report, (I) are two or more of the KPI Metrics equal to or more than the applicable Sustainability Target set forth in the Sustainability Table and (II) no KPI Metric is less than the applicable Sustainability Threshold set forth in the Sustainability Table? Check one: ☐ YES ☐ NO

      i. If yes, the Sustainability Rate Adjustment of -0.05% applies for such Fiscal Year.

      ii. If no, the Sustainability Rate Adjustment of -0.05% does not apply for such Fiscal Year.

   c. If neither (a)(i) nor (b)(i) above applies, a Sustainability Rate Adjustment of 0% applies for such Fiscal Year.

   d. The Sustainability Rate Adjustment for Fiscal Year 20____ is _____%.

   e. As of the date hereof, after giving effect to the Sustainability Rate Adjustment, the Applicable Rate Percentage for each of the Base Rate, the Japanese Base Rate, the LIBOR Market Index Rate and the LIBOR Rate for purposes of Section 4.1(a) is as set forth below[13].

Source: BlackRock Form 8-K: Entry into a Material Definitive Agreement (filed as of 04/06/2021), Amendment No. 10 to Five-Year Revolving Credit Agreement (dated as of 03/31/2021), available at https://www.sec.gov/Archives/edgar/data/0001364742/000119312521107747/d113222dex101.htm.

Appendix B: Definitions of Variables

| Variable | Definition | Data Source |
|---|---|---|
| ESG | ESG total score | RepRisk / S&P Global / Asset4 |
| CESG | The weighted average of the ESG scores and ESG controversies score per fiscal period | Asset4 |
| Neg_ESG | Negative ESG events | RepRisk |
| Spread | Loan spread (all-in-drawn) over LIBOR | DealScan LPC Connector |
| Loan Purpose | Dummies for loan purpose (corporate purposes, takeover, and others) | DealScan LPC Connector |
| Loan Type | Dummies for loan type (term loan, revolver line of credit, and others) | DealScan LPC Connector |
| Loan Amount | Loan (facility) amount | DealScan LPC Connector |
| Loan Maturity | Number of months between facility start and end dates | DealScan LPC Connector |
| Relationship Number | Number of loan contracts since the first loan initiated between a borrower and a lender | DealScan LPC Connector |
| Relationship Length | Number of years passed since the first loan initiated between a borrower and a lender | DealScan LPC Connector |
| Cumulative Loan Amount | Total loan amount since the first loan initiated between a borrower and a lender | DealScan LPC Connector |
| TDOMD | Total domestic deposits | Compustat Bank |
| DPDC | Deposits - demand - customer | Compustat Bank |
| DPSC | Deposits - savings - customer | Compustat Bank |
| DPTC | Deposits - total - customer | Compustat Bank |
| LCACLD | Loans - commercial and industrial (domestic) | Compustat Bank |
| LCACRD | Loans - consumer | Compustat Bank |
| LG | Loans - net of unearned income loans | Compustat Bank |
| PD | Probability of Default based one Duan, et al. (2012) | NUS Credit Research Initiative |

Appendix C: Largest Banks Worldwide as of December 2021 (Source: Statista)

| Banks | Market Capitalization ($ billion) |
|---|---|
| JPMorgan Chase | 468.0 |
| Bank of America | 364.1 |
| Industrial & Commercial Bank of China | 245.5 |
| China Merchants Bank | 193.8 |
| Wells Fargo | 191.3 |
| Morgan Stanley | 176.1 |
| China Construction Bank | 175.4 |
| Charles Schwab | 159.0 |
| Agricultural Bank of China | 158.3 |
| Royal Bank of Canada | 151.3 |
| Toronto-Dominion Bank | 139.7 |
| Goldman Sachs | 127.6 |
| Commonwealth Bank of Australia | 125.1 |
| HSBC | 122.0 |
| Citigroup | 119.8 |

Table 1. Descriptive Statistics

Table 1 presents a comprehensive analysis of sustainability-linked loans (SLLs) between January 2017 and December 2021. It is organized into seven panels, with Panel A displaying the cross-sectional distribution of SLLs; Panel B showcasing proxies for SLL lending relationships; Panel C illustrating the total SLL issuance size by year; Panel D providing the total SLL issuance size by industry; Panel E revealing the total SLL issuance size by country; Panel F depicting the total SLL issuance size by region; and Panel G presenting the average fraction of SLLs in a lender's loan portfolio (unit: $ million).

Panel A: SLL

| Variable | Mean | SD | Q1 | Q2 | Q3 | Observations |
|---|---|---|---|---|---|---|
| Amount (million) | 624.78 | 1029.60 | 89.58 | 269.56 | 715.90 | 1600 |
| Maturity (months) | 55.30 | 24.89 | 36.00 | 60.00 | 60.00 | 1554 |
| Spread (bps) | 154.19 | 84.87 | 100.00 | 125.00 | 187.50 | 276 |

Panel B: SLL lending relationship

| Variable | Mean | SD | Q1 | Q2 | Q3 | Observations |
|---|---|---|---|---|---|---|
| Relationship Number | 5.84 | 6.71 | 2.00 | 3.50 | 7.00 | 1,748 |
| Relationship Length (years) | 5.06 | 5.57 | 0.00 | 3.00 | 8.00 | 1,748 |
| Cumulative Loan Amount (million) | 6960.34 | 12625.74 | 1307.32 | 3079.80 | 7479.97 | 1,747 |

Panel C: SLL by year

| Year | SLL | All | Ratio of All Loans (%) |
|---|---|---|---|
| 2017 | 2258.36 | 6185254.19 | 0.04 |
| 2018 | 49253.58 | 6865374.89 | 0.72 |
| 2019 | 139630.22 | 6149078.18 | 2.27 |
| 2020 | 173644.18 | 5730642.12 | 3.03 |
| 2021 | 634863.37 | 7769918.67 | 8.17 |

Panel D: SLL by industry (top 10)

| Industry | SLL | Ratio (%) |
|---|---|---|
| Utilities | 142510.24 | 14.26 |
| Financial Services | 116780.25 | 11.68 |
| REITS | 75678.00 | 7.57 |
| General Manufacturing | 69737.46 | 6.98 |
| Oil and Gas | 59070.72 | 5.91 |
| Beverage, Food, and Tobacco Processing | 53130.65 | 5.31 |
| Healthcare | 46989.77 | 4.70 |

| | | |
|---|---|---|
| Chemicals, Plastics & Rubber | 45240.37 | 4.53 |
| Automotive | 42480.49 | 4.25 |
| Telecommunications | 40390.61 | 4.04 |

Panel E: SLL by borrower country (top 10)

| Country | SLL | Ratio (%) |
|---|---|---|
| United States | 246427.36 | 24.65 |
| France | 101619.04 | 10.17 |
| Germany | 85022.41 | 8.51 |
| United Kingdom | 69981.41 | 7.00 |
| Italy | 67020.27 | 6.70 |
| Netherlands | 63987.03 | 6.40 |
| Spain | 59744.62 | 5.98 |
| Singapore | 26451.12 | 2.65 |
| Canada | 25798.75 | 2.58 |
| Switzerland | 21537.91 | 2.15 |

Panel F: SLL by borrower region

| Region | SLL | Ratio (%) |
|---|---|---|
| Western Europe | 573733.32 | 57.39 |
| USA/Canada | 280066.01 | 28.02 |
| Asia Pacific | 92886.68 | 9.29 |
| Latin America/Caribbean | 22498.35 | 2.25 |
| Eastern Europe/Russia | 18608.71 | 1.86 |
| Middle East | 7589.62 | 0.76 |
| Africa | 4267.02 | 0.43 |

Panel G: The average proportion of SLLs in a lender’s loan portfolio

| Year | Ratio (%) |
|---|---|
| 2017 | 0.06 |
| 2018 | 0.78 |
| 2019 | 2.48 |
| 2020 | 3.65 |
| 2021 | 9.45 |

Table 2. Loan Pricing

Table 2 presents regression analyses comparing loan spreads for sustainability-linked loans (SLLs) and their counterparts. Column 1 compares yield spreads within the same borrower-year, while Column 2 further refines the comparison by examining spreads within borrower-lender-year to fully account for lender characteristics and relationship lending. The dependent variable in the analysis is the natural logarithm of the all-in-drawn loan spreads, with the independent variable of interest being SLL, assigned a value of one for SLLs of a borrower and zero for non-SLLs of the same borrower. The model also takes into account loan characteristics such as facility amount, maturity, purpose, and type, along with year, borrower, and lender fixed effects. Standard errors are clustered by borrower, with t-statistics reported in parentheses. Significance levels are denoted by *, **, and *** for 10%, 5%, and 1% levels, respectively.

| | (1) | (2) |
|---|---|---|
| Dependent Variable: | Ln(Spread) | Ln(Spread) |
| SLL | -0.108 | -0.098 |
| | (-1.624) | (-1.094) |
| Ln(Amount) | -0.041 | -0.003 |
| | (-1.066) | (-0.071) |
| Ln(Maturity) | 0.365*** | 0.129 |
| | (7.843) | (0.947) |
| Year FE | Y | Y |
| Borrower FE | Y | Y |
| Lender FE | Y | Y |
| Loan Purpose & Type | Y | Y |
| Clustering | Y | Y |
| Observations | 723 | 177 |
| R-squared | 0.977 | 0.961 |

Table 3. KPIs and Borrower ESG Performance

Table 3 comprises two panels examining key performance indicators (KPIs) in sustainability-linked loan (SLL) contracts and borrower ESG performance. Panel A reports the frequency of KPIs in SLL contracts, while Panel B presents regression analyses of borrower ESG performance surrounding SLL issuance. The dependent variable is an indicator assigned a value of one if a firm experiences negative ESG events corresponding to KPIs in SLL contracts and zero otherwise. The covariate of interest, Post, takes the value of one for ESG ratings after issuance and zero for those before issuance. The model accounts for borrower country, industry (SIC 2-digit), year, and borrower fixed effects. Standard errors are clustered by borrower, with t-statistics reported in parentheses. Significance levels are denoted by *, **, and *** for 10%, 5%, and 1% levels, respectively.

Panel A: KPIs

| KPIs | Frequency | Ratio (%) |
|---|---|---|
| Climate change, GHG emissions, and global pollution | 385 | 32.88 |
| Energy management | 128 | 10.93 |
| Other ESG issues | 80 | 6.83 |
| Water management | 69 | 5.89 |
| Gender inequality | 65 | 5.55 |
| Waste issues | 64 | 5.47 |
| ESG ratings | 47 | 4.01 |
| Supply chain issues | 46 | 3.93 |
| Economic impact | 36 | 3.07 |
| Salaries and benefits | 29 | 2.48 |
| Occupational health and safety issues | 28 | 2.39 |
| Discrimination in employment | 27 | 2.31 |
| Social discrimination | 22 | 1.88 |
| Impacts on communities | 21 | 1.79 |
| Epidemics/Pandemics | 18 | 1.54 |
| Products (health and environmental issues) | 15 | 1.28 |
| Plastics | 14 | 1.20 |
| Poor employment conditions | 8 | 0.68 |
| Health impact | 6 | 0.51 |
| Human rights abuses and corporate complicity | 6 | 0.51 |
| Airborne pollutants | 5 | 0.43 |
| Coal-fired power plants | 5 | 0.43 |
| Water scarcity | 5 | 0.43 |
| Agricultural commodity speculation | 4 | 0.34 |
| Animal mistreatment | 4 | 0.34 |
| Impacts on landscapes, ecosystems and biodiversity | 4 | 0.34 |
| Security services | 4 | 0.34 |

| | | |
|---|---|---|
| Access to products and services | 3 | 0.26 |
| Corruption, bribery, extortion and money laundering | 3 | 0.26 |
| High conservation value forests | 3 | 0.26 |
| Land ecosystems | 3 | 0.26 |
| Local pollution | 3 | 0.26 |
| Overuse and wasting of resources | 3 | 0.26 |
| Soy | 3 | 0.26 |
| Land mines | 2 | 0.17 |
| Racism/Racial inequality | 2 | 0.17 |
| Marine/Coastal ecosystems | 1 | 0.09 |

Panel B: Borrower ESG performance around the issuance of SLLs

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Dependent Variable: | Neg_ESG | Neg_ESG | Neg_ESG | Neg_ESG |
| Post | 0.032* | 0.033* | 0.032* | 0.033*** |
| | (1.870) | (1.930) | (1.866) | (2.638) |
| Borrower Country FE | Y | Y | Y | Y |
| Industry FE | Y | Y | Y | Y |
| Year FE | Y | Y | Y | Y |
| Borrower FE | N | Y | N | Y |
| Clustering | Y | Y | Robust | Robust |
| Observations | 1,078 | 1,078 | 1,078 | 1,078 |
| R-squared | 0.414 | 0.731 | 0.414 | 0.731 |

Table 4. Borrower ESG Performance Using Different ESG Ratings

Table 4 presents regression analyses of borrower ESG performance surrounding the issuance of sustainability-linked loans (SLLs), with Columns 1 and 2 based on RepRisk, Columns 3 and 4 on S&P Global ESG, and Columns 5 through 8 on Thomson/Refinitiv Asset4. Panel A's Post variable represents ratings one year after issuance (value of one) compared to one year before issuance (value of zero); Panel B's Post variable considers ratings two years after issuance compared to one year before issuance; and Panel C's Post variable examines ratings three years after issuance compared to one year before issuance. SLL is a dummy variable assigned a value of one for SLL borrowers and zero for matched non-SLL borrowers. The model accounts for borrower country, industry (SIC 2-digit), year, and borrower fixed effects. Standard errors are clustered by borrower, with t-statistics reported in parentheses. Significance levels are denoted by *, **, and *** for 10%, 5%, and 1% levels, respectively.

Panel A: ESG performance one year after SLL initiation

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| ESG | RepRisk | RepRisk | S&P | S&P | Asset4 | Asset4 | Asset4 | Asset4 |
| Dependent Variable: | ESG | ESG | ESG | ESG | ESG | ESG | CESG | CESG |
| SLL x Post | 1.653 | 2.028* | -0.244 | -2.324* | -0.003 | -0.016 | 0.003 | -0.019 |
| | (1.409) | (1.850) | (-0.109) | (-1.665) | (-0.167) | (-1.229) | (0.176) | (-1.121) |
| SLL | 1.002 | -0.369 | 11.464*** | 1.139 | 0.091*** | 0.000 | 0.088*** | 0.005 |
| | (1.071) | (-0.505) | (6.308) | (1.144) | (6.047) | (0.062) | (6.216) | (0.641) |
| Post | -1.727*** | -1.783*** | -2.911*** | 2.363*** | 0.033*** | 0.046*** | 0.018** | 0.031*** |
| | (-3.485) | (-3.653) | (-3.743) | (3.881) | (5.334) | (10.073) | (2.364) | (4.573) |
| Borrower Country FE | Y | Y | Y | Y | Y | Y | Y | Y |
| Industry FE | Y | Y | Y | Y | Y | Y | Y | Y |
| Year FE | Y | Y | Y | Y | Y | Y | Y | Y |
| Borrower FE | N | Y | N | Y | N | Y | N | Y |
| Clustering | Y | Y | Y | Y | Y | Y | Y | Y |
| Observations | 2,041 | 1,554 | 2,042 | 1,390 | 2,663 | 2,201 | 2,663 | 2,201 |
| R-squared | 0.29 | 0.819 | 0.243 | 0.948 | 0.204 | 0.952 | 0.183 | 0.894 |

Panel B: ESG performance two years after SLL initiation

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| ESG | RepRisk | RepRisk | S&P | S&P | Asset4 | Asset4 | Asset4 | Asset4 |
| Dependent Variable: | ESG | ESG | ESG | ESG | ESG | ESG | CESG | CESG |
| SLL x Post | 1.176 | 2.632* | -2.206 | -3.240 | 0.028 | -0.011 | 0.034 | -0.014 |
| | (0.743) | (1.686) | (-0.742) | (-1.445) | (1.366) | (-0.880) | (1.551) | (-0.763) |
| SLL | 0.901 | -0.945 | 11.693*** | 1.697* | 0.091*** | -0.003 | 0.088*** | 0.000 |
| | (0.937) | (-0.910) | (6.412) | (1.729) | (5.982) | (-0.414) | (6.197) | (0.048) |
| Post | -2.282*** | -2.484*** | -5.155*** | 1.744* | 0.050*** | 0.066*** | 0.027** | 0.042*** |
| | (-3.296) | (-3.574) | (-4.020) | (1.780) | (5.349) | (10.205) | (2.404) | (4.198) |
| Borrower Country FE | Y | Y | Y | Y | Y | Y | Y | Y |
| Industry FE | Y | Y | Y | Y | Y | Y | Y | Y |
| Year FE | Y | Y | Y | Y | Y | Y | Y | Y |
| Borrower FE | N | Y | N | Y | N | Y | N | Y |
| Clustering | Y | Y | Y | Y | Y | Y | Y | Y |
| Observations | 1,809 | 1,240 | 1,760 | 1,028 | 2,316 | 1,824 | 2,316 | 1,824 |
| R-squared | 0.274 | 0.778 | 0.241 | 0.943 | 0.208 | 0.958 | 0.193 | 0.9 |

Panel C: ESG performance three years after SLL initiation

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| ESG | RepRisk | RepRisk | S&P | S&P | Asset4 | Asset4 | Asset4 | Asset4 |
| Dependent Variable: | ESG | ESG | ESG | ESG | ESG | ESG | CESG | CESG |
| SLL x Post | 4.248 | 6.712** | -3.648 | -6.413 | 0.011 | -0.008 | 0.013 | -0.019 |
| | (1.323) | (2.232) | (-0.765) | (-1.606) | (0.345) | (-0.354) | (0.441) | (-0.896) |
| SLL | 1.069 | -0.041 | 11.723*** | 2.447** | 0.089*** | -0.003 | 0.085*** | 0.002 |
| | (1.095) | (-0.040) | (6.430) | (2.144) | (5.872) | (-0.347) | (5.963) | (0.226) |
| Post | -3.578*** | -3.888*** | -7.254*** | -2.596* | 0.072*** | 0.080*** | 0.047*** | 0.055*** |
| | (-3.426) | (-3.753) | (-4.171) | (-1.720) | (4.620) | (6.933) | (2.648) | (3.453) |
| Borrower Country FE | Y | Y | Y | Y | Y | Y | Y | Y |
| Industry FE | Y | Y | Y | Y | Y | Y | Y | Y |
| Year FE | Y | Y | Y | Y | Y | Y | Y | Y |
| Borrower FE | N | Y | N | Y | N | Y | N | Y |
| Clustering | Y | Y | Y | Y | Y | Y | Y | Y |
| Observations | 1,557 | 897 | 1,500 | 735 | 1,982 | 1,444 | 1,982 | 1,444 |
| R-squared | 0.291 | 0.806 | 0.259 | 0.947 | 0.208 | 0.963 | 0.194 | 0.919 |

Table 5. Bank Performance Before the Issuance of SLLs

Table 5 examines lenders' deposit and loan growth before the issuance of sustainability-linked loans (SLLs), with the dependent variable SLL taking the value of one for SLL-issuing banks and zero for matched peers issuing non-SLLs. Panel A includes the full sample, while Panel B restricts the sample to cases where the base reference rate is LIBOR. The model controls for lender country, year, and lender fixed effects. Standard errors are clustered by lender, with t-statistics reported in parentheses. Significance levels are denoted by *, **, and *** for 10%, 5%, and 1% levels, respectively. Variable definitions can be found in Appendix B.

Panel A: Full sample

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| Dependent Variable: | SLL | SLL | SLL | SLL | SLL | SLL | SLL |
| ΔTotal Domestic Deposits | 0.033 | | | | | | |
| | (0.082) | | | | | | |
| ΔCustomer Demand | | -0.071 | | | | | |
| Deposits | | (-0.396) | | | | | |
| ΔCustomer Savings | | | -0.153*** | | | | |
| Deposits | | | (-4.916) | | | | |
| ΔCustomer Total Deposits | | | | -0.206* | | | |
| | | | | (-1.938) | | | |
| ΔCommercial and Industrial | | | | | 0.015 | | |
| Loans | | | | | (0.107) | | |
| ΔConsumer Loans | | | | | | -0.129* | |
| | | | | | | (-1.752) | |
| ΔLoans Net of Unearned | | | | | | | -0.172 |
| Income Loans | | | | | | | (-1.199) |
| Lender Country FE | Y | Y | Y | Y | Y | Y | Y |
| Year FE | Y | Y | Y | Y | Y | Y | Y |
| Lender FE | Y | Y | Y | Y | Y | Y | Y |
| Clustering | Y | Y | Y | Y | Y | Y | Y |
| Observations | 342 | 355 | 216 | 668 | 355 | 357 | 658 |
| R-squared | 0.179 | 0.188 | 0.242 | 0.215 | 0.188 | 0.196 | 0.212 |

Panel B: LIBOR sample

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| Dependent Variable: | SLL | SLL | SLL | SLL | SLL | SLL | SLL |
| ΔTotal Domestic Deposits | -0.191 | | | | | | |
| | (-0.872) | | | | | | |
| ΔCustomer Demand | | -0.268** | | | | | |
| Deposits | | (-2.689) | | | | | |
| ΔCustomer Savings | | | -0.258*** | | | | |
| Deposits | | | (-3.737) | | | | |
| ΔCustomer Total Deposits | | | | -0.280*** | | | |
| | | | | (-3.907) | | | |
| ΔCommercial and Industrial | | | | | -0.108 | | |
| Loans | | | | | (-0.874) | | |
| ΔConsumer Loans | | | | | | -0.158*** | |
| | | | | | | (-6.131) | |
| ΔLoans Net of Unearned | | | | | | | -0.272*** |
| Income Loans | | | | | | | (-2.910) |
| Lender Country FE | Y | Y | Y | Y | Y | Y | Y |
| Year FE | Y | Y | Y | Y | Y | Y | Y |
| Lender FE | Y | Y | Y | Y | Y | Y | Y |
| Clustering | Y | Y | Y | Y | Y | Y | Y |
| Observations | 177 | 186 | 119 | 342 | 186 | 192 | 339 |
| R-squared | 0.140 | 0.169 | 0.265 | 0.193 | 0.162 | 0.188 | 0.191 |

Table 6. Bank Performance Around the Issuance of SLLs

Table 6 presents regression analyses of lenders' deposit and loan growth surrounding the issuance of sustainability-linked loans (SLLs). In Panel A, the Post variable represents measures of deposits and loans one year after issuance (value of one) compared to one year before issuance (value of zero). In Panel B, the Post variable considers measures of deposits and loans two years after issuance compared to one year before issuance. SLL is a dummy variable assigned a value of one for SLL-issuing banks and zero for matched peers issuing only non-SLLs in a year. The model accounts for lender country, year, and lender fixed effects. Standard errors are clustered by lender, with t-statistics reported in parentheses. Significance levels are denoted by *, **, and *** for 10%, 5%, and 1% levels, respectively. Variable definitions can be found in Appendix B.

Panel A: Bank performance one year after SLL initiation

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| Dependent Variable: | ΔTotal Domestic Deposits | ΔCustomer Demand Deposits | ΔCustomer Savings Deposits | ΔCustomer Total Deposits | ΔCommercial and Industrial Loans | ΔConsumer Loans | ΔLoans Net of Unearned Income Loans |
| SLL x Post | 0.073** | 0.196*** | 0.026** | 0.057*** | -0.019 | -0.051*** | 0.000 |
| | (2.560) | (4.522) | (2.362) | (3.585) | (-0.915) | (-3.754) | (0.006) |
| SLL | -0.045** | -0.104*** | -0.083*** | -0.039*** | -0.007 | 0.011 | -0.008 |
| | (-2.625) | (-4.413) | (-2.845) | (-3.150) | (-0.450) | (0.481) | (-0.911) |
| Lender Country FE | Y | Y | Y | Y | Y | Y | Y |
| Year FE | Y | Y | Y | Y | Y | Y | Y |
| Lender FE | Y | Y | Y | Y | Y | Y | Y |
| Clustering | Y | Y | Y | Y | Y | Y | Y |
| Observations | 680 | 702 | 427 | 1,322 | 702 | 706 | 1,306 |
| R-squared | 0.350 | 0.440 | 0.173 | 0.359 | 0.328 | 0.309 | 0.334 |

Panel B: Bank performance two years after SLL initiation

| Dependent Variable: | (1) ΔTotal Domestic Deposits | (2) ΔCustomer Demand Deposits | (3) ΔCustomer Savings Deposits | (4) ΔCustomer Total Deposits | (5) ΔCommercial and Industrial Loans | (6) ΔConsumer Loans | (7) ΔLoans Net of Unearned Income Loans |
|---|---|---|---|---|---|---|---|
| SLL x Post | 0.076* | 0.199*** | 0.070* | 0.071*** | 0.011 | -0.033 | 0.023 |
| | (1.980) | (6.034) | (1.850) | (3.616) | (0.269) | (-1.321) | (0.971) |
| SLL | -0.041** | -0.107*** | -0.073* | -0.043*** | 0.026 | 0.017* | -0.012 |
| | (-2.487) | (-7.053) | (-2.003) | (-4.872) | (1.440) | (1.900) | (-0.907) |
| Lender Country FE | Y | Y | Y | Y | Y | Y | Y |
| Year FE | Y | Y | Y | Y | Y | Y | Y |
| Lender FE | Y | Y | Y | Y | Y | Y | Y |
| Clustering | Y | Y | Y | Y | Y | Y | Y |
| Observations | 641 | 662 | 408 | 1,180 | 643 | 647 | 1,164 |
| R-squared | 0.294 | 0.260 | 0.181 | 0.278 | 0.260 | 0.329 | 0.268 |

Table 7. SLL Borrower Risk: Probability of Default

Table 7 investigates the probability of default (PD) measured over different time horizons, comparing sustainability-linked loan (SLL) and matched non-SLL groups. The dependent variable is SLL, assigned a value of one for SLLs and zero for their counterparts. The independent variable of interest represents a borrower's default probability measured over various time horizons ranging from 1 to 60 months after the SLL contract is initiated. Loan characteristics include loan type, purpose, amount, and maturity. The model controls for borrower country, industry (SIC 2-digit), year, and borrower fixed effects. Standard errors are clustered by borrower, with t-statistics reported in parentheses. Significance levels are denoted by *, **, and *** for 10%, 5%, and 1% levels, respectively.

Panel A: Analyses without borrower FEs

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| Dependent Variable: | SLL | SLL | SLL | SLL | SLL | SLL | SLL |
| PD_1M | 2.622 | | | | | | |
| | (0.411) | | | | | | |
| PD_3M | | 0.600 | | | | | |
| | | (0.272) | | | | | |
| PD_6M | | | 0.109 | | | | |
| | | | (0.084) | | | | |
| PD_12M | | | | -0.255 | | | |
| | | | | (-0.287) | | | |
| PD_24M | | | | | -0.550 | | |
| | | | | | (-0.896) | | |
| PD_36M | | | | | | -0.642 | |
| | | | | | | (-1.343) | |
| PD_60M | | | | | | | -0.647* |
| | | | | | | | (-1.898) |
| Borrower Country FE | Y | Y | Y | Y | Y | Y | Y |
| Industry FE | Y | Y | Y | Y | Y | Y | Y |
| Year FE | Y | Y | Y | Y | Y | Y | Y |
| Borrower FE | N | N | N | N | N | N | N |
| Loan Characteristics | Y | Y | Y | Y | Y | Y | Y |
| Clustering | Y | Y | Y | Y | Y | Y | Y |
| Observations | 2,273 | 2,273 | 2,273 | 2,273 | 2,273 | 2,273 | 2,273 |
| R-squared | 0.235 | 0.235 | 0.235 | 0.235 | 0.236 | 0.236 | 0.237 |

Panel B: Analyses with borrower FEs

| Dependent Variable: | (1) SLL | (2) SLL | (3) SLL | (4) SLL | (5) SLL | (6) SLL | (7) SLL |
|---|---|---|---|---|---|---|---|
| PD_1M | 33.466 | | | | | | |
| | (1.573) | | | | | | |
| PD_3M | | 9.236 | | | | | |
| | | (1.475) | | | | | |
| PD_6M | | | 4.031 | | | | |
| | | | (1.347) | | | | |
| PD_12M | | | | 1.625 | | | |
| | | | | (1.036) | | | |
| PD_24M | | | | | 0.393 | | |
| | | | | | (0.435) | | |
| PD_36M | | | | | | 0.036 | |
| | | | | | | (0.052) | |
| PD_60M | | | | | | | -0.064 |
| | | | | | | | (-0.117) |
| Borrower Country FE | Y | Y | Y | Y | Y | Y | Y |
| Industry FE | Y | Y | Y | Y | Y | Y | Y |
| Year FE | Y | Y | Y | Y | Y | Y | Y |
| Borrower FE | Y | Y | Y | Y | Y | Y | Y |
| Loan Characteristics | Y | Y | Y | Y | Y | Y | Y |
| Clustering | Y | Y | Y | Y | Y | Y | Y |
| Observations | 1,861 | 1,861 | 1,861 | 1,861 | 1,861 | 1,861 | 1,861 |
| R-squared | 0.864 | 0.864 | 0.864 | 0.864 | 0.864 | 0.864 | 0.864 |

Table 8. SLL Borrower Risk: Downgrade and Default

Table 8 presents regression analyses of borrower downgrades (Columns 1 and 2) and defaults (Columns 3 and 4) over the life of loans. The Downgrade indicator takes the value of one if a borrower's S&P credit rating is downgraded during the loan's life and zero otherwise, while the Default indicator takes the value of one if a borrower fails to meet its financial obligation during the loan period (S&P long-term credit rating downgraded to D or SD) and zero otherwise. The main independent variable, SLL, is assigned a value of one for SLLs and zero for non-SLLs. Loan characteristics include loan type, purpose, amount, and maturity. The model controls for borrower country, industry (SIC 2-digit), year, and borrower fixed effects. Standard errors are clustered by borrower, with t-statistics reported in parentheses. Significance levels are denoted by *, **, and *** for 10%, 5%, and 1% levels, respectively.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Dependent Variable: | Downgrade | Downgrade | Default | Default |
| SLL | -0.002 | 0.027* | -0.000 | 0.001 |
| | (-0.250) | (1.843) | (-0.058) | (0.836) |
| Borrower Country FE | Y | Y | Y | Y |
| Industry FE | Y | Y | Y | Y |
| Year FE | Y | Y | Y | Y |
| Borrower FE | N | Y | N | Y |
| Loan Characteristics | Y | Y | Y | Y |
| Clustering | Y | Y | Y | Y |
| Observations | 4,120 | 3,517 | 4,120 | 3,517 |
| R-squared | 0.084 | 0.759 | 0.006 | 0.127 |

Table 9. Market Power

Table 9 examines the relationship between the issuance of sustainability-linked loans (SLLs) and a lender's market power, as measured by market capitalization and corporate lending market share. SLL is a dummy variable assigned a value of one for SLL-issuing banks and zero for matched peers issuing only non-SLLs in a year. A series of covariates of interest are dummy variables representing banks with market power. The model controls for lender country and year fixed effects. Standard errors are clustered by lender, with t-statistics reported in parentheses. Significance levels are denoted by *, **, and *** for 10%, 5%, and 1% levels, respectively.

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Dependent Variable: | SLL | SLL | SLL | SLL | SLL |
| High Mkt Cap (Top 5) | 0.185*** | | | | |
| | (3.381) | | | | |
| High Mkt Cap (Top 10) | | 0.179*** | | | |
| | | (4.305) | | | |
| High Mkt Cap (Top 15) | | | 0.163*** | | |
| | | | (5.997) | | |
| High Mkt Share (above Q50) | | | | 0.207*** | |
| | | | | (5.704) | |
| High Mkt Share (above Q75) | | | | | 0.265*** |
| | | | | | (8.270) |
| Lender Country FE | Y | Y | Y | Y | Y |
| Year FE | Y | Y | Y | Y | Y |
| Clustering | Y | Y | Y | Y | Y |
| Observations | 1,153 | 1,153 | 1,153 | 951 | 951 |
| R-squared | 0.153 | 0.157 | 0.165 | 0.184 | 0.23 |

## Table 10. Lending Relationship

Table 10 explores the relationship between the issuance of sustainability-linked loans (SLLs) and lending relationships, measured by Relationship Number, Relationship Length, and Ln(Cumulative Loan Amount). Relationship Number is defined as the total number of loan contracts initiated between a borrower and a lender since their first loan, while Relationship Length represents the number of years passed since their first loan contract. Cumulative Loan Amount refers to the total amount a firm has borrowed from a bank since their first transaction. The model controls for borrower country, lender country, industry (SIC 2-digit), and year fixed effects. Standard errors are clustered by borrower and lender, with t-statistics reported in parentheses. Significance levels are denoted by *, **, and *** for 10%, 5%, and 1% levels, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Dependent Variable: | SLL | SLL | SLL | SLL | SLL | SLL |
| Relationship Number | 0.001*** | 0.001*** | | | | |
| | (6.490) | (5.840) | | | | |
| Relationship Length | | | 0.006*** | 0.005*** | | |
| | | | (15.362) | (15.382) | | |
| Ln(Cumulative Loan Amount) | | | | | 0.012*** | 0.011*** |
| | | | | | (16.861) | (16.855) |
| Borrower Country FE | Y | Y | Y | Y | Y | Y |
| Lender Country FE | Y | Y | Y | Y | Y | Y |
| Industry FE | Y | N | Y | N | Y | N |
| Year FE | Y | N | Y | N | Y | N |
| Industry x Year FE | N | Y | N | Y | N | Y |
| Clustering | Y | Y | Y | Y | Y | Y |
| Observations | 47,797 | 47,782 | 47,797 | 47,782 | 47,793 | 47,778 |
| R-squared | 0.389 | 0.458 | 0.4 | 0.466 | 0.397 | 0.465 |

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