Financial Innovation via Sustainable Lending*

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Abstract

We examine the incentives that drive banks to introduce Sustainability-Linked Loans (SLLs). By analyzing a comprehensive dataset of banks leading these deals, we find that multinational banks, especially top players in the global syndicated markets, are more likely to offer SLLs than domestically focused banks. While multinational banks are more inclined to offer SLLs in their home markets, their international expansion strategies prioritize economically important credit markets, where they hold leading market positions but face stagnating growth. Leading an SLL transaction, particularly by taking on a prominent role as a sustainability agent, strengthens foreign banks' market positions in local syndicated loan markets. This is achieved by retaining relationship borrowers and attracting new clients, even though such activities contribute little to banks' profitability. Our findings underscore the strategic motivations behind banks' introduction of SLL products, highlighting their efforts to maintain a competitive edge in global syndicated markets.

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1. Introduction

Banks play a crucial role in providing funding to facilitate the transition of businesses to a more sustainable world. During the past decade, sustainability-linked and green debt have emerged as new instruments that encourage companies to adopt sustainable practices. Sustainability-Linked loans (SLLs) were first introduced in 2017 and have grown exponentially in global loan markets. SLLs are a new type of general-purpose loans that link pricing terms (e.g., interest rate) to one or more Key Performance Indicators (KPIs) measuring borrowers' environmental, social, and governance (ESG) performance. Compared to green loans, SLLs provide borrowers with more flexibility in the use of the proceeds, as well as sustainability targets. Not surprisingly, the growth of the SLL market has far outpaced that of the green loan market in recent years. By 2022, more than 200 banks from 47 countries have led or participated in at least one SLL for borrowers in more than 60 countries. Although the growth of the SLL market is undoubtedly a result of supply and demand, in this paper, we focus on the supply side and explore the economic incentives underlying banks' decisions to offer SLL as a new financial product in the global syndicated loan market.

We argue that the cost-benefit tradeoffs shape a bank's decision to introduce SLLs as a new financial product. On the benefit side, banks can expand their client base by attracting borrowers who demand sustainable financing options. Once a lending relationship is established through SLLs, banks may retain these clients for future conventional syndicated loan deals, strengthening their competitive home market positions. This benefit could be extended as the experience gained from SLLs can be transferred to foreign markets. Furthermore, leading SLL deals may help banks establish a sustainable reputation and strengthen their brand image, which, in turn, could help attract clients in global syndicated markets. On the cost side, banks face high information uncertainty. Due to unfamiliarity with the sustainability KPIs used in loan contracts, lenders encounter significant uncertainty when assessing the volatility in loan interest rates linked to these KPIs. This uncertainty may also make these loans more costly to securitize, as it is more challenging for investors to assess

the underlying risk of default. Additionally, monitoring borrowers' performance based on sustainability KPIs is more expensive, as these metrics are often unstandardized, opaque, and hard to verify.

Using a comprehensive sample of more than 200 global banks that offered 3,400 SLLs across 70 markets between 2017 and 2022, we investigate the economic factors driving these offerings. At the bank level, we find that top global banks, those with ESG rating coverage, and those with prior involvement in SLLs are more likely to offer these loans. At the credit market level, banks are more likely to offer SLLs in markets with higher concentration, and where SLLs have already been introduced. These findings suggest that economies of scale and familiarity help reduce informational uncertainty associated with offering a new financial product. Our analysis, conducted at the bank-borrower country level, allows us to explore banks' decisions to offer SLL in different markets while holding the bank-level and borrower-country-level characteristics constant. Interestingly, while multinational banks are far more likely to offer SLLs in their home markets, their strategies abroad differ. When expanding internationally, they prioritize markets that carry more weight in their global syndicated loan portfolios, where they hold leading market positions and stronger lending relationships, but simultaneously face stagnating growth. In contrast, these strategic considerations are reversed in their home markets. At home, banks with a stronger focus on domestic operations, lower growth, and stronger lending relationships are less likely to offer SLLs. Instead, compliance with the European Union's sustainability reporting requirements seems to play a significant role. Collectively, these findings suggest that the SLL market is segmented: while SLL offerings abroad are strategically motivated to maintain or enhance market competitiveness, domestic offerings are driven by reporting considerations.

Conditional on leading an SLL deal, we further examine a bank's decision to act as a sustainability agent, a unique and more predominant role in an SLL deal. The sustainability agent collaborates with the borrower to establish and integrate sustainability KPIs while monitoring the borrower's sustainability performance. Although this role bolsters a bank's

expertise and reputation, it likely incurs higher information-gathering and monitoring costs. Consistent with this tradeoff, we observe a strong home bias in the decision to act as a sustainability agent: banks are much more likely to assume this role in their home markets. Similarly, when acting as a sustainability agent for foreign borrowers, banks tend to do so in a market with significant economic exposure and a leading position. These findings further highlight the cost-benefit tradeoffs of acting as sustainability agents. Interestingly, prior participation in SLLs offers little advantage in assuming this role, likely because simple participation does not provide the critical insights required for acting as an agent.

Lastly, we explore the potential benefits associated with leading an SLL deal. We find that leading such deals, particularly as a sustainability agent, enhances a bank's market power by increasing its market share in the subsequent year. This is achieved through the retention of existing borrowers and the attraction of new ones.However, these benefits are primarily realized in foreign markets, with little impact observed in banks' home markets. These findings align with our earlier results, indicating that banks strategically offer SLLs in foreign markets to strengthen their market power.

We also investigate whether offering SLLs improves banks' loan portfolio profitability or ESG ratings. Our evidence suggests that SLL offerings do not significantly impact the profitability of banks' overall loan portfolios, even though SLLs themselves are typically cheaper than conventional loans. Similarly, offering SLLs does not improve banks' overall ESG ratings.

In summary, our findings suggest that despite the costs associated with structuring and enforcing loan contracts with complex sustainability metrics, investing in sustainability expertise provides banks with a competitive advantage. This expertise enables them to expand their client base and market share, particularly in foreign markets, while reinforcing their strategic positioning in the global syndicated loan market.

We note that the patterns we identify in our data might represent an off-equilibrium state. Over time, it is conceivable that every bank currently extending traditional syndicated loans

will also begin to offer SLLs, and SLLs will eventually become a conventional loan product. This notion aligns with the findings in Gale (1992), which suggest that a new equilibrium can emerge when all firms issue non-standard securities, thereby redefining these securities as standard ones. However, reaching this equilibrium is likely to be a gradual process. Our observations confirm a rapid increase in the number of banks offering SLLs during our sample period, indicating a swift progression towards an equilibrium where SLLs become a standard loan product. Our analysis aims to shed light on the economic incentives driving the early adopters in the global SLL market.

Our study contributes to the recent literature on lender monitoring of borrowers' ESG performance. Amiram et al. (2021) find that banks that adopted the Equator Principles, a framework to manage environmental and social (E&S) risks in project finance, include more environmental covenants in their loan contracts. Choy et al. (2023) find that a stringent public environment increases lenders' monitoring incentives via environmental covenants. Wang (2023) finds that banks subject to ESG disclosure regulations improve borrowers' ESG performance via active engagements and monitoring. Houston & Shan (2021) find that banks influence borrowers' subsequent ESG performance via the threat of exit. Our paper differs from these by studying a new monitoring mechanism, i.e., linking loan pricing to sustainability metrics.[1] Concurrent studies examining the contract design of SLLs and borrower characteristics document that SLLs are, on average, ineffective in improving borrowers' ESG performance. Loumioti & Serafeim (2023) find that SLL contracting is more prevalent among low ESG-risk borrowers, and the KPIs are often unrelated to a borrower's ESG risk. Kim et al. (2022) find that the disclosure of KPIs used in SLLs varies substantially. Borrowers' ESG scores deteriorate after the issuance of less transparent SLLs. Our paper differs from the above studies by focusing on the economic incentives for lenders to offer SLLs. We explore inter-market differences within banks to offer SLLs. Given that 46.9% of SLLs are issued by foreign banks, it is important to understand the within-bank

[1]Private debt contracts have started including environmental covenants decades ago.

inter-market incentives. This helps us understand the economic tradeoffs banks face when introducing financial innovation to a particular market. A paper most related to ours is Du et al. (2022), which studies lenders' benefits from extending SLLs. Our paper differs from theirs in two main ways. First, our analysis is more granular, i.e., at the lender-borrower-country level rather than the lender level. Given that most of the market participants in the SLL market are large multinational banks with syndicated loans extended to borrowers worldwide, treating each borrower country as a separate observation allows us to understand better how local market dynamics affect banks' lending decisions in that particular country. Second, unlike Du et al. (2022), who focus on aggregate lender-level benefits (e.g., deposit and consumer loans at the parent bank level) associated with issuing SLLs, our analysis on the lender-borrower-country level within the syndicated loan market allows us to focus on the cost-benefit tradeoffs a bank faces at a particular product market.

Second, our study contributes to the broader literature on financial innovation in the banking industry. Our findings provide evidence supporting the theoretical arguments that banks' incentives to innovate reflect the cost-benefit tradeoffs (Gale, 1992; Thakor, 2012). A concurrent financial innovation that banks widely adopt is green loans, which are used to fund environmental or social projects. The major difference between SLLs and green loans is the intended use of proceeds. Without restrictions on how funds are deployed, SLLs provide borrowers with more flexibility (Guthrie, 2023). A noteworthy observation is that Kim et al. (2022) find very different borrower characteristics and loan features comparing SLLs with green loans. In contrast, our findings are similar across these two types of financial innovations (untabulated). This suggests that our results for banks' incentives for financial innovation are generalizable across different E&S loan products.

2. Sustainability-linked Loans (SLLs): Background and Examples

Since their introduction in 2017 by the Dutch bank ING, SLLs have experienced remarkable growth. In 2022, over 1,000 SLLs were issued worldwide, totaling over $300 billion. SLLs

are a subset of ESG loans designed for general purposes, but specific ESG-related metrics directly influence their pricing terms. The loan spreads are determined by the key performance indicators (KPIs) that reflect sustainability goals. Adjustments to these spreads might be based on various ESG targets, including ESG scores provided by external rating agencies like S&P, greenhouse gas (GHG) emissions, and employment-related measures such as employee health and diversity. When structuring a conventional syndicated loan, some banks act as lead arrangers, and others act as participants. Lead banks often play a more active role in facilitating the deal, overseeing the documentation and repayment, and monitoring the borrowers. A syndicated SLL has a similar structure but often designates one or more banks as the sustainability agent or coordinator, a role in addition to the traditional role of the lead arrangers in the syndicated loan market. The sustainability agent collaborates with the borrower to establish and integrate specific KPIs related to the borrower's ESG goals.

Sustainability agents play a pivotal role in formulating the sustainability part of the contract, which dictates potential pricing adjustments based on the borrower's performance against the sustainability KPIs, often labeled as "sustainability adjustments." The effectiveness of such adjustment is subject to review and potential objections by other participating lenders. Adjustments are bound by specified caps and necessitate validation and reporting with the sustainability agent. For example, the 2021 SLL agreement with Trimble Inc., BofA Securities (USA) Inc., and TD Securities (USA) LLC served as co-sustainability structuring agents. The agreement stipulates that the KPI metrics are based on GHG emissions (Scope 1 and Scope 2) and the percentage of gender-diverse employees. For 2022, the sustainability targets were set at a 13.6% reduction in GHG emissions and a gender diversity employee percentage greater than 30%, using 2019 as the benchmark. These targets are set for up to 2026. Upon reaching these targets and after the borrower submits the pricing certificate to the sustainability agent, the applicable margin can be adjusted by up to 0.05%, and the applicable facility fee percentage can be altered by up to 0.01%. Such design is analogous to performance pricing provisions used in traditional syndicated loan contracts, which often

link pricing to financial ratios or credit ratings (Asquith et al., 2005).

While some companies disclose their ESG-related KPIs and the corresponding performance pricing grid, this information is not always publicly available. Representatives from top financial institutions have crafted a standard framework under the Sustainability Linked Loan Principles (SLLPs) for choosing and publicly disclosing KPIs in SLLs. However, these principles only serve as suggested guidelines. Market participants can voluntarily adopt them on a transactional basis, contingent on the specific nature of the deal.

Appendix B shows an example of an SLL issued to CMS Energy Corporation, a publicly listed energy company in the United States.[2] The new SLL contract serves as an amendment to an existing five-year revolver. Compared to the previous contract (illustrated in the example), the update introduces sustainability adjustments to the price margins, adds a sustainability agent, and utilizes slightly different thresholds for the financial covenant while maintaining all other contractual features unchanged. The old and new contracts feature an identical performance pricing provision linking price margins to credit ratings. Regarding the sustainability adjustments, the contract defines two KPIs, "sustainability percentage" and "sustainability amount," aiming to capture the sustainable portion of the total energy produced by the company. The borrower is rewarded (penalized) by a lower (higher) interest rate adjustment if the sustainable portion increases (decreases). However, the magnitude of the sustainability adjustment is small. Each pricing step, i.e., the increase or decrease in interest rates associated with a one-level change in the performance metric, is only 2.5 basis points for the sustainability adjustment, compared to a 12.5 basis points change for the credit rating adjustment.[3] It is important to highlight that sustainability-related terms used in the contract differ from what the borrower designates as "renewable energy" in its 10-K reports. The loan contract thus provides detailed calculation steps defining these terms. Such a

[2]We only have access to the original loan contracts of publicly listed U.S. firms in our sample.

[3]This observation is consistent with the large sample evidence. Loumioti & Serafeim (2023) document that the mean sustainability adjustment for each pricing step is 4.8 basis points for SLLs in their sample. Asquith et al. (2005) find that the mean adjustment is 14 to 16 basis points for performance pricing provisions in traditional syndicated loan contracts.

detailed definition is analogous to the adjustment for GAAP net income numbers used in financial covenants (Li, 2010). This example illustrates a transparent and sophisticated SLL contract.

Appendix C illustrates another example of an SLL extended to Covanta, another publicly listed energy company in the United States. The borrower had no prior lending relationship with the lead lenders. This SLL agreement, facilitated by Barclays Bank Plc, Credit Suisse AG, and TD Securities LLC as co-sustainability agents, is a new contract rather than an amendment to an existing conventional loan agreement. In this scenario, should Covanta not achieve the sustainability target by the specified future date, its interest rate will rise by 12.5 basis points annually. The sustainability target is determined by the amount of sustainably processed waste, according to the criteria set by the U.S. EPA and the European Union. Unlike the previous example, this SLL agreement does not define its sustainability-related terms, nor does it allow for a reduction in margin. The sustainability KPIs rely mostly on regulatory definitions and act more as a punitive measure than an incentive. Consequently, this example showcases an SLL agreement that is transparent yet less sophisticated.

As discussed above, green loans are another new loan product banks have offered in recent years. SLLs have several benefits relative to green loans. First, while green loans are often explicitly tied to financing environmentally friendly projects, SLLs do not restrict the use of proceeds. The sustainability metrics used in SLLs also encompass a wide range of environmental, social, and governance measures. Such flexibility allows borrowers to use the funds for various purposes, making SLLs more versatile and appealing to a broader spectrum of businesses. Linking ESG performance metrics to financial incentives or penalties provides a strong incentive for borrowers to improve their sustainability practices actively, fostering a proactive approach to environmental and social responsibility. Second, measuring and reporting on the impact of green projects can be challenging and time-consuming. SLLs, with their focus on overall sustainability performance, often involve simpler and more standardized reporting processes (e.g., using metrics disclosed in government filings). This

ease of measurement and reporting can make SLLs more attractive to lenders and borrowers. Therefore, it is unsurprising that the growth of SLLs has outpaced that of green loans in recent years (Kim et al., 2022; Loumioti & Serafeim, 2023).

3. Literature Review and Predictions

Frame & White (2004) define financial innovation as "*something new that reduces costs, reduces risks, or provides an improved product/service/instrument that better satisfies participants' demands.*" We view SLLs as an innovative loan product that satisfies borrowers' need for sustainable finance. We thus rely on the theoretical work on financial innovation to understand banks' incentives to introduce SLLs. We view a bank's decision to offer an SLL product as a result of cost-benefit tradeoffs. We propose the following benefits associated with introducing SLLs.

First, we expect banks offering SLLs to gain reputation and expand their client base within and beyond syndicated loan markets. There is a growing demand from companies and investors for sustainable financing options. By introducing loans linked to sustainability, banks can attract borrowers with sustainability commitment and capture this new market segment. Once a lending relationship is established, banks may also retain these borrowers for future conventional syndicated loans. Furthermore, banks that actively support sustainable initiatives can enhance their reputation and brand image. Offering SLLs allows banks to position themselves as responsible and forward-thinking institutions, which can attract clients beyond syndicated loan markets. Consistent with this conjecture, Homanen (2022) finds that banks that finance the Dakota Access Pipeline, a highly controversial environmental project, experienced a significant decline in deposit growth. Du et al. (2022) find that banks issuing SLLs can attract more deposits and extend more commercial and industrial loans. SLLs may also help improve banks' profitability. Banks may charge higher initial interests for SLLs, promising to reduce future interests once the sustainability-related KPIs are met later. With sustainability commitment, banks could also attract socially conscious

investors, thus raising capital at a lower cost. These conjectures are consistent with prior studies on other types of financial innovation: innovators often enjoy a first-mover advantage by capturing a larger market share (Tufano, 1989) and abnormal profits and economies of scale (Carow, 1999).

However, offering SLL as a new loan product is not without costs. We contend that the most substantial cost is associated with lenders' information acquisition. Gale (1992) introduces the concept of "non-standard" securities, a novel financial product whose investors are unfamiliar with the underlying risks and payoff functions. If investors make a substantial investment in a new security, they are exposed to a significant amount of idiosyncratic risk. However, mitigating uncertainty involves costly information acquisition, and these costs can potentially be recovered by investing in a large number of new securities. In the context of SLLs, the uncertainty comes from lenders' unfamiliarity with the sustainability metrics used in the contracts and, thus, the lack of the ability to assess or manage the associated risks. Similarly, Thakor (2012) models banks' choice between innovative loans and standard loans. In his model, banks operate in a competitive banking system, and standard loans produce zero profits for each bank due to competition. Innovative loans come with the potential cost that investors may disagree over the likelihood of default (and thus withdraw the funding for these loans). As a result, not all banks innovate. Ultimately, the degree of innovation results from the tradeoffs between abnormal profits (from innovation) and the risk of refinancing (due to investor disagreement through the lack of familiarity with the new loans). We expect the information friction to be particularly pronounced among SLLs. Unlike financial ratios, which are often based on standardized and audited financial statements, ESG metrics used in SLLs are unstandardized, opaque, and often unverifiable (Kim et al., 2022; Du et al., 2022). These features make information acquisition and subsequent monitoring particularly costly. Banks lacking the resources or expertise to do so may find it unworthy to invest in these financial products. Banks with different risk appetites or areas of expertise may also be hesitant to adopt. In addition, the benefits which are often associated with scale are also

unclear. For example, regional banks relying on relationship-building with local borrowers may have little incentive to incur the initial costs. Consistent with this conjecture, prior studies document that large financial institutions are more likely to adopt financial innovation (Hannan & McDowell, 1984; Frame & White, 2004).

Therefore, we expect a positive association between a bank's inclination to innovate through SLLs and the net benefits of innovation. We expect that these net benefits will be greater among larger banks and banks with a more extensive reputation exposure to a local market.

We also expect the local loan market structure to play a role in affecting a bank's decision to offer SLLs to its local clients, although the association between these two constructs is unclear ex ante. On the one hand, higher competition discourages innovation because it reduces post-entry rents (Romer, 1990; Aghion & Howitt, 1992; Grossman & Helpman, 1991). In the context of financial products, patents typically do not protect innovation or product development. In the case of SLLs, most loan contract details are available in the public domain (e.g., SEC filings). These features make it easy for competitors to imitate, diminishing the advantages of innovation. On the other hand, in sectors with similar technological levels, competition might encourage innovation because innovating firms could differentiate their products and thus alleviate the competitive pressure (Aghion et al., 2005).

4. Data and Sample Construction

This section provides an overview of our dataset and the methodology employed for sample construction. We obtain our loan-level data from the Refinitiv DealScan database, which offers extensive details on the international commercial loan market, including contract-specific terms and stipulations. Each loan deal in DealScan is categorized within a market segment. Accordingly, a loan is classified as an SLL if it is designated under the "Environmental, Social & Governance/Sustainable Linked" market segment by DealScan. Our initial data set consists of 63,986 distinct loan deals (which corresponds to 861,815 lender-deal level

observations) extending from January 2011 to December 2022, from which we have identified 2,379 unique SLLs. We initially include data starting six years before the issuance of the first SLL in 2017 to capture relationship banking in the preceding five years. Then, we keep loans issued post-2016, the year immediately preceding the first SLL. Given our emphasis on commercial loans, we exclude loans extended to non-corporate borrowers, such as government entities and not-for-profit organizations. For each loan, we selectively keep only the lead banks for our analysis due to their significant roles in gathering information, drafting contracts, and monitoring (Sufi, 2007; Ivashina, 2009). A bank is deemed a lead arranger if it is listed as such in the "Lead Arranger" field within DealScan. Throughout our analysis, we only considered lead banks. Therefore, we use the terms "bank," "lender," and "lead bank" interchangeably from this point onward. Since our analysis aims to explore the economic incentives driving banks' decisions to offer SLLs, we exclude central and development banks, as they are likely to face non-financial incentives. To create a panel of bank-borrower country-year observations, we next aggregate the SLLs by each lead bank, borrower country, and the year of the loan initiation. Additionally, for a bank to be included in our sample, we require a minimum of two observations. Similarly, for a borrower country to be included, we require a minimum of two observations. The final data set for the baseline model includes 13,078 bank-borrower country-year observations. Table 1, Panel A lists the detailed steps involved in constructing our sample.

Table 1Panel B presents the sample distribution by country, categorized based on the location of borrowers. The table reports the number of lead banks operating in each country, the total number of banks leading SLLs in that country, the total number of foreign lead banks, and the total number of foreign banks leading SLLs. Additionally, it includes the total number of SLLs and the total number of conventional syndicated loans that are neither SLLs nor classified as green loans. The United States exhibits the largest number of lead banks (297), followed by the United Kingdom (220) and the Netherlands (161). Of the 297 lead banks operating in the United States, 86 have led at least one SLL during the sample

period. Furthermore, 161 of the 297 lead banks in the United States are foreign banks, defined as those headquartered outside the United States. Among these foreign banks, 49 have led at least one SLL in the United States.

Table 1, Panel C lists the top 20 banks by the total number of SLLs they led during our sample period. BNP Paribas and Credit Agricole, two French banks, stand out as the top two in the list (1,017 and 766 SLLs, respectively), followed by BofA Securities, HSBC, and JP Morgan. Four of the top 20 banks are headquartered in France, three in the U.S., three in Spain, and three in Japan. Most of these banks have offered SLLs to borrowers located in more than 20 countries. Interestingly, the United States is the largest foreign market for seven of these non-U.S. banks.

Table 1, Panel D presents the sample distribution by loan initiation year. It highlights the significant growth of the SLL market from its introduction in 2017 to 2022. We provide additional details for our sample distribution across countries in Table OA1 of Appendix D.

In Table OA2, we report the summary statistics for SLLs and their matched conventional syndicated loans, using propensity score matching (PSM). The summary statistics are presented for three categories of SLLs: the first SLL led by a bank globally ("First SLL"), the first SLL led by a bank in a specific country (excluding its first-ever SLL, "First SLL in a Country"), and all subsequent SLLs led by the bank ("All Other SLLs"). Each category is matched with conventional syndicated loans based on loans either issued in the same country or by the same bank in the same country. Loan attributes used for matching include the year of issuance, the tranche amount, the maturity, whether the tranche includes performance pricing, whether the tranche is an origination or an amendment, and whether a foreign bank is present in the deal. For each category of SLLs, we find that they are consistently cheaper than conventional syndicated loans with comparable attributes. For instance, the mean spread on the first SLL led by a bank globally is 156.031 basis points, while the matched conventional loans in the same country have a mean spread of 233.281 basis points—a difference of -77.250 basis points (with a p-value of 0.00). Similar price differences

are observed for the first SLL led by a bank in a specific country (excluding its first-ever SLL, "First SLL in a Country") and for all subsequent SLLs led by the bank ("All Other SLLs"). Notably, the All Other SLLs category shows the smallest differences compared to conventional syndicated loans, with spreads approximately 36.619 basis points lower than conventional loans in the same country and 34.870 basis points lower than conventional loans in the same country issued by the same bank.

5. Results

5.1. Determinants of Offering SLLs

We begin our analyses by first estimating the likelihood of a bank acting as a lead arranger in an SLL in a borrower country in a given year. In particular, we estimate the following specification,

$$Y_{i,j,t+1} = \alpha + \beta M_{j,t} + \gamma X_{i,j,t} + \eta_j + \delta_t + \epsilon_{i,j,t+1}, \tag{1}$$

where i identifies a bank, j refers to a country, and t refers to the year of loan initiation. The unit of analysis is at the bank-borrower country-year level. The dependent variable $Y_{i,j,t+1}$ is an indicator defined as one if bank i leads at least one SLL in a borrower country j in year *t+1*, and zero if bank i does not lead any SLLs but leads at least one non-sustainability loan (non-SLL) in country j in year *t+1* (variable *sll_lead_t*1). As discussed in the sample construction, we exclude banks that do not lead any syndicated loans (SLLs or non-SLLs) to borrower country j in year *t+1*. This allows us to focus on banks' decisions to offer SLLs compared to non-SLLs in a borrower country, rather than their choice to not offer any loans. As discussed in Section 2, an SLL agreement can be either a new contract or an amendment to an existing conventional loan contract. For every loan in our sample, DealScan labels it as either "origination" or "amendment." However, such information is often inaccurate. To ensure that an SLL agreement is extended as a new contract, we also require that the borrower has no prior lending relationship with the bank during the past five years. We thus

create a separate variable *sll_new_origination_t1* defined as one if a bank leads at least one new SLL to a new borrower in country j in year *t+1*.

$M_{j,t}$ represents a vector of loan market-level variables for borrower country j in year t. It includes a measure for loan market concentration (*total_hhi*) and an indicator for whether the borrower country has already introduced SLLs (*country_year_esg_indicator*). *total_hhi* refers to the Herfindahl–Hirschman Index, calculated as the sum of the squares of the market shares (*market_share*) of all banks leading syndicated loans in country j in year t. A higher *total_hhi* indicates greater market concentration.[4] We anticipate that banks are more inclined to offer SLLs in countries where borrowers are already familiar with the product, as this familiarity reduces information asymmetry and the associated risks. As discussed above, the association between market concentration and offering of SLLs is ex ante unclear.

$X_{i,j,t}$ represents a vector of bank-level variables for bank i in year t. Some of these variables vary across borrower country j, while others remain constant. The former group includes an indicator for market leader (*loan-leader*), defined as one if the bank's market share ranks in the top 25% in country j in year t and the bank's relationship lending intensity, defined as the percentage of loans extended to borrowers in country j in year t that had lending relationship with this bank over the past five years (*rel_perc*). The latter includes an indicator for whether a bank is subject to ESG-reporting regulation, defined as one if the bank's headquarter country implemented ESG-reporting regulation for banking industry in year t (*bank_home_regulation*); an indicator for whether a bank is subject to European Union's Sustainable Finance Disclosure Regulation (SFDR), defined as one if a

[4]Each lead bank's *market_share* is defined as its total amount extended in dollars in a given year and country, divided by the total lead market size in that year and country. To calculate a bank's market share, we rely on DealScan's *lender_share* variable, which includes a bank's share in each loan deal. If the share percentage information is missing, we use the annual average of the sum of lead arrangers' shares in a tranche divided by the number of participating lead arrangers to infer missing percentage allocations. We then calculate our *share_amount* variable by multiplying *lender_share* and the total tranche amount in dollars. This variable represents the total dollar amount extended by each lead bank in a deal. We then aggregate the *share_amount* for all lead banks in each year and each country to determine the total lead market size. Appendix D.2 of the Online Appendix provides more details on how we calculate the share amount.

bank's home country or any of its borrower's home country is subject to SFDR at year t (*sfdr*); an indicator for whether a bank has an ESG rating coverage in Refinitiv in year t (*has_refinitiv*); and an indicator for whether a bank is publicly listed in year t (*public*). As discussed above, we expect multinational banks and domestic-focused banks to face different incentives to offer SLLs due to differing costs and benefits. Consequently, we introduce an indicator *multinational* if a bank operates a foreign syndicated loan markets in year t. To distinguish domestic markets from foreign markets, we further split *multinational* into $multinational\_foreign$ and $multinational\_home$. [5]These two variables thus capture the proclivity to extend SLLs for multinational banks in their home and foreign markets relative to domestic-only banks (the omitted category) in a given year. To capture the effect of reputation and economies of scale, we include bank size, calculated using a bank's aggregate worldwide syndicated loan volume in a year. We also include an indicator if a bank's aggregate worldwide loan volume is ranked in the top 20 in a given year. We denote this variable as *top_20*. We also split the *top_20* indicator into $top\_20\_foreign$ and top_20_home. Since all top 20 banks are multinational in our sample, these two variables thus capture the incremental proclivity to extend SLLs by a top 20 bank relative to other multinational banks. We additionally include borrower country, bank, and year fixed effects to control for unobservable factors that might drive the demand for SLL across borrower country, bank or time. We cluster standard errors at the bank and the borrower country level. We expect a bank's own ESG rating to play a role. On the one hand, highly rated banks often view ESG positively and thus are more inclined to offer SLLs as a new way to achieve their sustainability goals (Houston & Shan, 2021). On the other hand, poorly rated banks may offer SLLs as a cost-effective way to remedy their reputation (Cai et al., 2023). the bank's exposure to country j, defined as the banks' share of the total loan volume issued to borrowers in country j relative to the bank's total worldwide loan volume in year t (*exposure*), we only

[5]There are 758 unique banks in our sample, of which 532 have at least one foreign operation. Among these 532 multinational banks ($multinational = 1$), 136 operate exclusively outside their headquarters country.

include this variable in the multinational foreign sample due to multicollinearity with the *multinational_foreign* and *multinational_home* variable in the main sample);

We expect that ESG-reporting regulations will motivate banks to innovate through SLLs. These regulations mandate banks to report on the ESG performance of their portfolios. Wang (2023) finds that banks in jurisdictions with ESG disclosure requirements adopt measures to elevate the ESG performance of their borrowers. This includes incorporating additional environmental action clauses in loan agreements and terminating relationships with borrowers with poor ESG performance. Banks might leverage SLLs as a strategy to improve their borrowers' ESG outcomes or to highlight the sustainability of their loan portfolios. To estimate the likelihood of a bank acting as a sustainability agent, we replace the dependent variable in Equation (1) with an indicator *sustainability_agent_t*1, defined as one if bank i played a sustainability agent role in any SLLs it extended to borrowers in country j in year *t+1*. It is defined as zero if the bank was not a sustainability agent for any of the SLLs it extended to borrowers in country j in year *t+1*. A bank is deemed a sustainability agent in a deal if DealScan records "sustainability agent" or "sustainability coordinator" in the data entry "primary role" or "additional roles." For this analysis, we only keep observations where the bank leads at least one SLL in a country-year. All the other variables remain the same. Appendix A provides detailed definitions of our variables. δ_t and η_c are year and country indicators to account for unobserved heterogeneity. To mitigate the effects of extreme observations, we winsorize all continuous variables at the 1% and 99% levels of their respective distributions.

Table 2 presents descriptive statistics for the main variables in our sample. In particular, Panel A shows that, on average, 21.4% of banks lead an SLL in a country-year and 12.2% lead a new SLL extended to a new borrower. Out of the banks that lead an SLL, 17.1% of them act as a sustainability agent. 82.4% of our sample are multinational banks operating in a foreign country, and 8.8% are multinational banks operating in home markets. In other words, the remaining 8.8% are domestic-focused banks. 69.3% of our sample banks are

subject to ESG-reporting regulations in their home countries. Panel B provides pairwise Pearson correlations of our main variables.

Table 3, Panel A presents the OLS regression results for *sll_lead_t*1. Column (1) reports the results for the full sample. In this specification, we include country fixed effects, year fixed effects, and bank fixed effects. Regarding bank characteristics, we find that banks, particularly multinational banks, are more likely to lead SLLs, but primarily within their home markets. Banks are also more likely to lead SLLs if they have previously participated in an SLL deal(*prior_sll_par_exp*), indicating potential learning effects from such participation. Additionally, banks are more likely to lead SLLs in countries where they dominate the market (*loan_leader*). These findings supports the notion that large banks offer SLLs to enhance their reputation, with the associated benefits being higher due to economies of scale. Additionally, the coverage of a bank's ESG rating (*has_refinitiv*) positively influences a bank's decision to lead SLLs. Specifically, if Refinitiv begins to cover the bank, it is more likely to issue SLLs. Regarding market structure, we find that banks are more likely to offer SLLs in markets with less competition (*total_hhi*) and where SLLs have already been introduced in previous years (*country_year_esg_indicator*). Interestingly, although market leaders are, on average, more likely to offer SLLs, this tendency is significantly reduced in concentrated markets. This is likely because, in concentrated markets, leaders face intense monopolistic competition from similarly sized peers (Bikker & Haaf, 2002). This finding suggests that competition discourages innovation through SLL offerings. We also find that banks relying more on relationship banking are more likely to offer SLLs. This is consistent with the findings of Kim et al. (2022), which suggest that SLLs are more likely to be syndicated by relationship banks. ESG-reporting regulations in a bank's home country also play a positive role in encouraging banks to offer SLLs. Finally, we find that signing up for the UN PRI and being subject to SFDR do not appear to significantly affect a bank's decision to offer SLLs. In column (2) and column (3), we repeat the analysis with additional, tighter fixed effects. In column (2), we include country $\times$ year fixed effects. In column (3), we further incorporate

bank × year fixed effects. The fixed-effects structures cause some of our market-level and bank-year-level variables to be subsumed. However, the results remain generally consistent with our main specification in column (1).

In column (4) - (6) we repeat the same set of analyses as column (1) - (3) using *sll_new_originaion_t*1 as the dependent variable. The results are largely consistent with those reported in column (1) - (3) , with a few exceptions: we observe that the presence of SLL products in the market and the concentration of loan market share play a smaller role in motivating banks to extend SLLs to new borrowers. This is likely because banks, when targeting new clients, are less influenced by the current market conditions.

Next, we examine whether the incentives differ for banks operating in foreign and home markets by dividing our sample into two subgroups. Table 3Panel B, columns (1)–(3) present the results for banks operating in foreign markets, while columns (4) and (5) present the results for banks operating in home markets. For the foreign market sample, the coefficients are largely comparable to those reported in columns (1)–(3) of Table 3Panel A. However, for banks operating in their home markets, some notable differences emerge. The coefficients on *rel_perc* become negative and significant, indicating that when a bank has strong relationship lending in its home market, it is less likely to innovate and offer SLLs. Interestingly, the *loan_growth* variable shifts from negative in the foreign market sample to positive in the home market sample, suggesting that banks adopt different strategies for leveraging innovation as a means of expansion in the home market and foreign market.

Table 4 reports the OLS regression results for a bank's decision to act as a sustainability agent (*sustainability_agent_t*1). In this analysis, we only keep bank-country-years with *sll_lead_t*1=1. Results suggest that conditional on offering SLLs in a given country-year, banks are more likely to act as a sustainability agent when they are multinational banks operating in the home market. Similar to before, although loan market leaders are more likely to act as sustainability agents, they are less likely to do so when the market share is highly concentrated.

We next turn to Refinitiv scores to understand whether a bank's existing environmental (e_score), social (s_score), and governance (g_score) scores are associated with its decisions to lead an SLL deal or act as a sustainability agent. We use the environmental, social, and governance pillar scores from Refinitiv. Refinitiv scores range from 0 to 100, with higher scores indicating better performance in the respective pillar. We match 238 banks from Refinitiv with our baseline sample, resulting in 7,180 bank-borrower country-year observations. We re-estimate Equation 1 after including Refinitiv scores. As the three scores are highly correlated, we introduce them one at a time.[6] Panel A of Table 5 shows descriptive statistics for the distributions of Refinitiv's E, S, and G component scores in our sample. All three scores are divided by 100 to maintain a consistent range with other variables such as $exposure$ and $total\_hhi$. The scores are positively correlated with each other.

Panel B of Table 5 presents the results. We find that none of the coefficients for the three components of the ESG score are statistically significant for the full sample of SLL lead bans.Overall, we view these results as a bank's ESG scores play a rather limited role in affecting banks' decisions to offer SLLs. It is worth noting that despite the smaller sample size, the coefficients on other variables remain qualitatively similar to those reported in Table 3 and Table 4.

5.2. Consequences of Extending SLLs

Next, we investigate the consequences of banks' decisions to enter the SLL market and/or act as sustainability agents. In particular, we examine whether leading SLLs in a country could subsequently help a bank gain market power. We also intend to see whether such an effect is mostly local or could transfer across markets. We thus introduce an additional indicator capturing whether a bank leads in a foreign country in year t ($sll\_foreign\_lead$).

[6] In robustness analyses, we include all three scores jointly and find similar results.

We estimate the following specification:

$$Consequence_{i,j,t+1} = \alpha Y_{i,j,t} + \beta M_{j,t} + \gamma X_{i,j,t} + \theta_i + \eta_j + \delta_t + \epsilon_{i,j,t+1}, \tag{2}$$

where i identifies a bank, j refers to a country, and t refers to the year of loan initiation. The dependent variable $Consequence_{i,j,t+1}$ is defined as bank i's loan market share in country j in year *t+1*. We classify market share into three distinct categories. first_time_market_share measures the proportion of loans given to borrowers who have never previously borrowed from any bank in the country j up to time i. repeat_borrower_market_share quantifies the market share of loans extended to borrowers who have an existing borrowing relationship with bank i. The denominator for this market share variable is the total volume of loans extended to borrowers who have previously borrowed in country j at least once before year t. Finally, switch_borrower_market_share captures the market share of loans made to borrowers who have previously borrowed in country j but do not have a prior borrowing relationship with bank i up to year t. The main set of independent variables of interest is $Y_{i,j,t}$, including an indicator for bank i leading an SLL deal in country j in year $t(sll\_lead)$, an indicator for bank i leading an SLL deal in a different country other than j in year $t(sll\_foreign\_lead)$, an indicator for bank i acting as a sustainability agent in an SLL deal in country j in year t ($sustainability\_agent$), and an indicator for bank i acting as a sustainability agent in an SLL deal in a foreign country j in year t ($sustainability\_agent\_foreign$). The coefficients on sll_lead and $sll\_foreign\_lead$ thus capture the effect of a bank's SLL experience in local and foreign markets on its market share. The coefficient on $sustainability\_agent$ captures the *incremental* effect of sustainability agent experience on a bank's market power. We use the same set of control variables as in Equation 1 and include country, bank, and year fixed effects in all specifications.

Panel B, Table 6 presents summary statistics for this sample. The average first-time market share for a bank in a market is 1.76%; 1.03% of the market share comes from SLLs

extended to relationship borrowers, and 1.95% is extended to switch borrowers. Panel B presents OLS regression results. Columns (1) to (3) present the results using the full sample. Columns (4) to (6) use the multinational banks' foreign subsample. We observe that leading a local SLL deal helps a multinational bank gain future market share and attract new borrowers. In particular, a multinational bank with SLL-leading experience can extend more loans to first-time borrowers and to relationship borrowers. Acting as a sustainability agent in a local SLL deal has an incremental positive effect on strengthening a bank's existing relationships. These findings are consistent with offering SLLs, especially acting as sustainability agents, which enhances a bank's reputation. However, such reputational gain does not seem to be transferable across markets: $sll\_foreign\_lead$ is only weakly associated with some of the market power variables, and $sustainability\_agent\_foreign$ is positively associated with none. Columns (7) to (9) report the results for the multinational home subsample. We find that SLL-leading experience plays a limited role in affecting the future market power of multinational banks' home markets. In columns (10) to (12), we also find no effect of SLL-leading experience on the market power of domestic-focused banks.

It is possible that the de-globalization of banks can serve as an alternative explanation to our findings. In particular, domestic and remaining foreign banks' market shares should increase if multinational banks leave a foreign market. If a decision to remain in the foreign market is positively associated with the decision to issue SLLs, we expect to observe a positive association between SLL experience and subsequent market share gains. However, we argue that our findings are unlikely to be driven by this alternative mechanism for two reasons. First, the de-globalization of foreign banks would benefit domestic banks the most. However, we do not find significant changes in the market shares of domestic banks. Second, we observe increased lending to new borrowers, especially by SLL banks. This suggests that issuing SLLs helps banks attract new customers over and above those that might have been affected by the exit of foreign multinational banks.

6. Conclusion

In this paper, we investigate the role of banks' participation in SLL loans as lead arrangers or sustainability agents. In particular, we hypothesize that a bank's decision to introduce SLLs is shaped by their cost-benefit tradeoffs. Issuing SLLs signals a bank's commitment to sustainability and helps attract socially conscious clients within and beyond syndicated loan markets. However, due to the complexity of ESG metrics used in SLLs, issuing such contracts may carry significant information acquisition and monitoring costs. Investing in the expertise gives banks a first-mover advantage and helps them expand their client base beyond their home country. Using a comprehensive sample of banks that participate in these deals, we find that the size and origin of the leading banks and the structure of the local syndicated market affect a bank's decision to enter the SLL market. On average, large multinational banks with economies of scale and strong lending relationships with local borrowers are more likely to offer SLLs. Although multinational banks are more likely to lead SLLs in their home countries, when they decide to enter a foreign market, they are more likely to choose a market where they have a larger exposure and a leading market position. We also find evidence suggesting that local loan market competition discourages while ESG regulation in banks' home countries encourages SLL offerings.

When investigating the consequences of banks' decisions to enter these markets, we find that banks enter foreign SLL markets to enhance their reputation and gain market share. In particular, we find that leading an SLL in a country improves a foreign bank's market share, and the improvement is mainly driven by attracting new borrowers to the market.

Our study adds to the emerging literature on SLLs. Our paper focuses on the economic incentives for lenders to issue SSLs and explores inter-market differences within banks to issue SLLs. We also provide important insights into the decisions and the resulting consequences of foreign banks entering this growing market.

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Appendix A. Variable definitions

Variable	Definition	Source
Bank - ESG experience		
sll_lead_{ijt}	Indicator variable: 1 if bank i extended SLL loans in country j at time t and 0 otherwise	DealScan
$sll\_foreign\_lead_{ijt}$	Indicator variable: 1 if bank i extended SLL loans outside of its home country country j at time t and 0 otherwise	DealScan
$sll\_new\_origination_{ijt}$	Indicator variable: 1 if bank i originated an SLL to at least one new borrower with whom the bank has no prior relationship in the past 5 years in country j in year t and 0 otherwise	DealScan
$sustainability\_agent_{ijt}$	Indicator variable: 1 if bank i acts as sustainability agent in an SLL in country j in year t and 0 otherwise	DealScan
$sustainability\_agent\_foreign_{ijt}$	Indicator variable: 1 if bank i acts as sustainability agent outside of country j and its home country in year t and 0 otherwise	DealScan
$prior\_sll\_par\_exp_{ijt}$	Indicator variable: 1 if bank i has participated in but did not lead an SLL deal in any country at any time up to and including year t, and 0 otherwise.	DealScan
$prior\_green\_loan\_exp_{ijt}$	Indicator variable: 1 if bank i has participated or led any green loan deal in any country at any time up to and including year t, and 0 otherwise.	DealScan
Bank - local market		
$loan\_leader_{ijt}$	Indicator variable: 1 if the bank's loan amount is ranked in the top 25% of all banks extending loans in country j in year t and 0 otherwise	DealScan
$loan\_growth_{ijt}$	Loan growth rate of bank i in country j in year t; calculated as the difference between the total loan volume extended by bank i in country j in year t and the total loan volume extended by bank i in country j in year $t-1$, divided by the sum of the total loan volume extended by bank i in country j in year t and the total loan volume extended by bank i in country j in year $t-1$.	DealScan
$exposure_{ijt}$	Exposure of bank i to country j in year t. Total loan amount by bank i in country j in year t ÷ Total syndicated loan amount by bank i in all countries in year t	DealScan
rel_perc_{ijt}	bank i's relationship loan percentage in country j in year t. Total loans by bank i in country j in year t to relationship borrowers ÷ Total loans by bank i in country j in year t; Relationship loans are those where the borrower has borrowed from bank i in the past 5 years	DealScan
sll_perc_{ijt}	bank i's SLL percentage in country j in year t. Total SLL by bank i in country j in year t ÷ Total loans by bank i in country j in year t	DealScan
$ln\_average\_loan\_size_{ijt}$	Natural logarithm of the average loan size by bank i in country j in year t. Log (1+ Total loan amount by bank i in country j in year t ÷ number of loans by bank i in country j in year t)	DealScan
$ln\_average\_maturity_{ijt}$	Natural logarithm of the average loan maturity by bank i in country j in year t; missing values replaced by country-year mean of average maturity for non-missing loans in country j in year t	DealScan

Variable	Definition	Source
Bank - regulation		
$bank\_home\_regulation_{it}$	Indicator variable: 1 if bank i's parent country experienced a regulation change related to ESG reporting, 0 otherwise.	Wang (2023)
$sfdr_{ijt}$	Indicator variable: 1 if bank i's parent operating country resides in the European Union or bank i extends syndicated loans in the European Union after the European Union Sustainable Finance Disclosures Regulation became effective in 2021	
Bank - bank type		
$multinational\_foreign_{ij}$	Indicator variable: 1 if bank i leads loans outside of its headquarter country, 0 otherwise.	DealScan
$multinational\_home_{ij}$	Indicator variable: 1 if bank i operates in multiple countries and the parent operating country is the same as the borrower's operating country, 0 otherwise.	DealScan
top_20_{it}	Indicator variable: 1 if bank i's syndicated loan volume in the past five years ranks in the top 20, 0 otherwise.	DealScan
$top\_20\_foreign_{it}$	Indicator variable: 1 if bank i's syndicated loan volume in the past five years ranks in the top 20 and the parent operating country differs from the borrower's operating country, 0 otherwise.	DealScan
$top\_20\_home_{it}$	Indicator variable: 1 if bank i's syndicated loan volume in the past five years ranks in the top 20 and the parent operating country is the same as the borrower's operating country, 0 otherwise.	DealScan
$public_{it}$	Indicator variable: 1 if bank i is a public bank in year t, 0 otherwise.	DealScan
Bank - Refinitiv		
$has\_refinitiv_{it}$	Indicator variable: 1 if bank i is listed in the Refinitiv ESG ratings in year t, 0 otherwise.	Refinitiv
e_score_{it}	Environmental score of bank i in year t.	Refinitiv
s_score_{it}	Social score of bank i in year t.	Refinitiv
g_score_{it}	Governance score of bank i in year t.	Refinitiv
Market variables		
$total\_hhi_{jt}$	Country j's Herfindahl–Hirschman Index (HHI) in year t. Calculated as the sum of squared market shares (ijt)	DealScan
$country\_year\_sll\_indicator_{jt}$	Indicator variable: 1 if an SLL loan exists in country j in year t and 0 otherwise. Indicates the presence of an SLL loan in country j in year t	DealScan

Variable	Definition	Source
Bank - market share		
$first\_time\_market\_share_{ijt}$	Market share of bank i for first-time borrowers in country j in year t. Calculated as the total loans extended by bank i in country j in year t to first-time borrowers, divided by the total loans extended to first-time borrowers in country j in year t.	DealScan
$repeat\_borr\_market\_share_{ijt}$	Market share of bank i for repeat borrowers in country j in year t. Calculated as the total loans extended by bank i in country j in year t to repeat borrowers, divided by the total loans extended to non-first-time borrowers in country j in year t.	DealScan
$switch\_borr\_market\_share_{ijt}$	Market share of bank i for borrowers who are new to bank i but not first-time borrowers in country j in year t. Calculated as the total loans extended by bank i in country j in year t to such borrowers, divided by the total loans extended to non-first-time borrowers in country j in year t.	DealScan
Bank - profitability		
$portfolio\_return_{ijt}$	Syndicated loan portfolio return of bank i in country j in year t. Calculated as total interest income earned by bank i in country j in year t, divided by the total loan amount extended by bank i in country j in year t. Interest income is derived from "all in spread drawn" times the amount of loan for each deal q by bank i in country j in year t. Missing values of "all in spread drawn" are imputed using the country-year mean of non-missing values.	DealScan
$new\_portfolio\_return_{ijt}$	The portfolio return of syndicated loans issued to new borrowers of bank i in country j in year t. Calculated as total interest income earned from new borrower origination by bank i in country j in year t, divided by the total loan amount extended to new borrowers by bank i in country j in year t. Interest income is derived from "all in spread drawn" times the amount of loan for each deal q by bank i in country j in year t. Missing values of "all in spread drawn" are imputed using the country-year mean of non-missing values.	DealScan
$sll\_portfolio\_return_{ijt}$	SLL portfolio return of bank i in country j in year t. Calculated as total interest income earned from SLLs by bank i in country j in year t, divided by the total SLL amount extended by bank i in country j in year t. Interest income is derived from "all in spread drawn" times the amount of loan for each deal q by bank i in country j in year t. Missing values of "all in spread drawn" are imputed using the country-year mean of non-missing values.	DealScan

Appendix B. SLL contract example 1

CMS Energy Corporation (Utilities, United States)

The following example illustrates a Sustainability-Linked Loan (SLL) contract created through the modification of an existing conventional syndicated loan contract. The table below compares the contract terms of the traditional syndicated loan and the SLL.

	Conventional Syndicated Loan	**Sustainability-linked Loan**
Issue date	May 27, 2015	June 5, 2018
Loan amount	$550 million	$550 million
Lead arrangers	Barclays Bank PLC, JPMorgan Chase Bank, MUFG Union Bank, Mizuho Bank, Merrill Lynch, Pierce, Fenner & Smith Incorporated, Bank of America,	Barclays Bank PLC, JPMorgan Chase Bank, MUFG Union Bank, Mizuho Bank, Merrill Lynch, Pierce, Fenner & Smith Incorporated, Bank of America
Sustainability Agent	None	Barclays Bank PLC
Financial covenants	The Company shall at all times maintain a ratio of Total Consolidated Debt to Total Consolidated EBITDA of not greater than 6.0 to 1.0.	The Company shall at all times maintain a ratio of Total Consolidated Debt to Total Consolidated EBITDA of not greater than (x) 6.25 to 1.0 for any twelve-month period ending on or before December 31, 2020 and(y) 6.0 to 1.0 for any twelve-month period ending thereafter.
Loan Type	Revolver	Revolver
Performance Pricing	Yes	Yes
Maturity	Five years	Five years
Interest Rate	LIBOR + 125 bps	LIBOR + 125 bps
Loan Purpose	General/working capital	General/working capital
Sustainability Adjustment	None	Yes

Details of performance pricing:

- Level I: S&P >AA, Moody's >A.
  Applicable Margin for Eurodollar Rate Loans: 1.000%
- Level II: S&P >A-, Moody's >AAA.
  Applicable Margin for Eurodollar Rate Loans: 1.125%
- Level III: S&P >BBB+, Moody's >Baa1.
  Applicable Margin for Eurodollar Rate Loans: 1.250%
- Level IV: S&P >BBB, Moody's >Baa2.
  Applicable Margin for Eurodollar Rate Loans: 1.500%

- Level V: any time when none of Pricing Levels I, II, III, or IV is applicable.

  Applicable Margin for Eurodollar Rate Loans: 1.750%

- Note: The traditional syndicated loan and the SLL share identical performance pricing. Pricing levels are anchored to the senior debt rating by SP or Moody's.

Details of sustainability adjustments to margins:

- Sustainability Percentage >= Baseline AND:

  Sustainability Amount > 105% of Baseline Sustainability Amount, margin reduced by 0.025%

  Sustainability Amount > 110% of Baseline Sustainability Amount, margin reduced by 0.05%

- Sustainability Percentage < Baseline AND:

  Sustainability Amount <= 95% of Baseline Sustainability Amount, margin increased by 0.025%

  Sustainability Amount <= 90% of Baseline Sustainability Amount, margin increased by 0.05%

"Sustainability Amount" means, for any period, the Company's (including its subsidiaries) total Renewable Energy generation and supply (both generated and purchased) without duplication, measured in gigawatt hours, during such period, as reported in the Company's annual report on Form 10-K (or any successor form) for such period filed with the SEC. For the avoidance of doubt, the Company is under no obligation to update the Sustainability Amount between the filing of the annual reports on Form 10-K (or any successor form), has no obligation to report the Sustainability Amount in the Company's quarterly report on Form 10-Q (or any successor form), and is further under no obligation to advise of changes to the Sustainability Amount as a result of a business change throughout the year by or for the Company (other than any material inaccuracy of which it becomes aware as described in the definition of "Applicable Sustainability Adjustment" or Section 6.7(c)).

"Baseline Sustainability Amount" means the average of the Company's annual Sustainability Amount, for the end of each of the Company's 2015, 2016 and 2017 fiscal years, in each case as reported on the Company's annual report on Form 10-K for such fiscal year, resulting in 3,478 gigawatt hours as of the Closing Date.

"Sustainability Percentage" means, for any period, (x) the Sustainability Amount for such period, over (y) the Company's (including its subsidiaries) total energy generation and supply (both generated and purchased) without duplication, measured in gigawatt hours, during such period, as reported in the Company's annual report on Form 10-K (or any successor form) for such period filed with the SEC. For the avoidance of doubt, the Company is under no obligation to update the Sustainability Percentage between the filing of the annual reports on Form 10-K (or any successor form), has no obligation to report the Sustainability Percentage in the Company's quarterly report on Form 10-Q (or any successor form), and is further under no obligation to advise of changes to the Sustainability Percentage as a result of a business change throughout the year by or for the Company (other than any material inaccuracy of which it becomes aware as described in the definition of "Applicable Sustainability Adjustment" or Section 6.7(c)).

"Baseline Sustainability Percentage" means the average of the Company's annual Sustainability Percentage for the end of each of the Company's 2015, 2016 and 2017 fiscal years, in each case as reported on the Company's annual report on Form 10-K for such fiscal year, resulting in 8.66% as of the Closing Date.

Applicable Sustainability Adjustment (1):

1. Baseline Sustainability Amount	3,478 *Gwh*
2. Sustainability Amount (comprised of Renewable Energy):	
(a) wind generation	*Gwh*
(b) solar generation	*Gwh*

	(c) hydroelectric generation (excluding pumped storage)	*Gwh*
	(d) biomass generation	*Gwh*
	(e) other Renewable Energy generation (to the extent approved by the Majority Banks)	*Gwh*
	(f) purchased wind generation	*Gwh*
	(g) purchased other Renewable Energy generation (as reported on Form 10-K)	*Gwh*
Minus	(h) Flint, MI (50%) for duplication	*Gwh*
Minus	(i) Grayling, MI (50%) for duplication	*Gwh*
	(j) **Sustainability Amount:** sum of 2(a) through 2(i)	= *Gwh*
	(k) Sustainability Amount divided by Baseline Sustainability Amount	%
3. Other Non-Renewable Energy Generation		
	(a) coal steam generation	*Gwh*
	(b) oil/gas steam generation	*Gwh*
	(c) hydroelectric generation (to the extent not constituting Renewable Energy)	*Gwh*
	(d) gas combined cycle	*Gwh*
	(e) gas/oil combustion turbine	*Gwh*
	(f) coal generation	*Gwh*
	(g) gas generation	*Gwh*
	(h) other gas generation	*Gwh*
	(i) nuclear generation	*Gwh*
Minus	(j) Filer City, MI (50%) for duplication	*Gwh*
	(k) sum of 3(a) through 3(j) = **Non-Renewable Owned/Purchased Generation**	*Gwh*
	(l) Sustainability Amount (2(j)) plus Non-Renewable Energy (3(k)) = **Total Owned/PurchasedGeneration**	
4. Baseline Sustainability Percentage		8.66%
5. Sustainability Percentage		%
(total of Sustainability Amount (2(j)) divided by Total Owned/Purchased Generation (3(l))		

The following is from CMS's 2017 Annual Report. Note that one cannot obtain the baseline sustainability amount of 3,478 Gwh as stated in the contract directly by adding the numbers labeled as "renewable energy" in the table below (using these numbers directly will produce an average of 3,299 Gwh). One also cannot obtain the baseline sustainability percentage of 8.66% as stated in the contract by directly using these numbers below. This suggests that lenders make their own modifications instead of just relying on the annual reports when defining sustainable energy.

Presented in the following table are the sources of Consumers' electric supply for the last three years:

			GWh
Years Ended December 31	2017	2016	2015
Owned generation			
Coal	10,098	9,739	15,833
Gas	5,190	6,194	3,601
Renewable energy	1,078	1,083	1,056
Oil	12	8	-
Net pumped storage[1]	(290)	(316)	(186)
Total owned generation	16,088	16,708	20,304
Purchased power[2]			
Gas generation	5,521	6,139	4,301
Nuclear generation	6,780	6,927	6,909
Renewable energy generation	2,288	2,229	2,163
Coal generation	491	512	510
Net interchange power[3]	4,384	3,688	1,327
Total purchased and interchange power	19,464	19,495	15,210
Total supply	35,552	36,203	35,514

[1] Represents Consumers' share of net pumped-storage generation. During 2017, the pumped-storage facility consumed 997 GWh of electricity to pump water during off-peak hours for storage in order to generate 707 GWh of electricity later during peak-demand hours.

[2] Represents purchases under long-term PPAs.

[3] Represents purchases from the MISO energy market.

Appendix C. SLL contract example 2

Covanta (Energy, United States)

The following example illustrates the contract details of a new SLL extended to a new borrower.

	Sustainability - linked Loan
Issue Date	November 30, 2021
Loan Amount	$3.5 billion
Lead Arrangers	Barclays Bank Plc, BNP Paribas SA, Citigroup, Citizens Bank NA, Credit Agricole Corporate & Investment Bank SA [Credit Agricole CIB], Credit Suisse AG, Fifth Third Bank, Goldman Sachs & Co, MUFG Union Bank NA, Royal Bank of Canada, Stifel Bank & Trust, Toronto-Dominion Bank, TD Securities LLC
Sustainability Agent	Barclays Bank Plc, Credit Suisse AG, TD Securities LLC
Loan Type	Revolver + Term Loan
Performance Pricing	YES
Sustainability Adjustment	YES
Maturity	Revolver 60 months, Term loan B, C 84 months,
Initial Interest Rate	LIBOR + 250 bps
Deal Purpose	Leveraged buyout

Details of sustainability adjustments:

"Sustainability Performance Targets" means, collectively, the Sustainably Processed Waste Target and the Waste Recycled/Reused Target; provided, however, that for purposes of determining if any Sustainability Performance Target has been achieved, the Borrower and its consolidated Subsidiaries may exclude the impact of (i) any amendment to, or change in, any applicable laws, regulations, rules, guidelines, standards and policies (or any amendment, change or inability to renew with consistent terms or obtain, any permits or licenses issued thereunder) applicable or relating to the business, operations or properties of the Borrower and its consolidated Subsidiaries following the Closing Date, including with respect to the measurement or calculation of any of the Sustainability Performance Targets or (ii) any force majeure or extraordinary or exceptional events or circumstances, including the occurrence of such events or circumstances with respect to the availability and/or continuous supply of any relevant residue or waste that is necessary, appropriate or, as of the date of this offering, anticipated, for the achievement of the Sustainability Performance Targets (including but not limited to market developments related to the availability and/or continuous supply of relevant residues or wastes, supply chain disruptions or physical impacts from extreme weather or climate change).

If a Sustainability Performance Target is not achieved as a result of the occurrence of any of the foregoing described in the proviso to the immediately preceding sentence, as determined by the Borrower in its reasonable judgment, such Sustainability Performance Target will be deemed to have been achieved for purposes of this Agreement and no interest rate adjustment shall result from the failure to achieve such Sustainability Performance Target.

"Sustainably Processed Waste" means all waste managed by the Borrower on behalf of customers and clients through energy recovery (or, the waste to energy process), recycling, and reuse in line with the EPA

and the five step waste hierarchy established in the Waste Management Hierarchy of the U.S. EPA and the European Union.

"Sustainably Processed Waste Target" means the Borrower's target to increase the amount of Sustainably Processed Waste (measured in thousand tons) by a total of 2.5% in the year ending December 31, 2025 compared to the year ended December 31, 2020.

(g) From and including the Sustainability Rate Adjustment Date, the Applicable Rate with respect to the Initial Term Loans shall increase by:

(i) 0.125% per annum unless the Borrower has achieved the Sustainably Processed Waste Target as of the Testing Date (the "Sustainably Processed Waste Applicable Rate Adjustment Amount"); and

(ii) 0.125% per annum unless the Borrower has achieved the Waste Recycled/Reused Target as of the Testing Date (the "Waste Recycled/Reused Applicable Rate Adjustment Amount" and, together with the Sustainably Processed Waste Applicable Rate Adjustment Amount, the "Sustainability Adjustment Amount"); in each case, as certified by the Borrower to the Administrative Agent in a Pricing Certificate delivered to the Administrative Agent on or prior to the Step-Up Date (subject to any clerical or administrative errors (including any delays resulting therefrom)). For purposes of the foregoing, any change in the Applicable Rate resulting from the Pricing Certificate (or the non-delivery of the Pricing Certificate) shall be determined as of the fifth Business Day following receipt by the Administrative Agent of the Pricing Certificate delivered pursuant to this clause (g) (or, in the case of non-delivery of the Pricing Certificate, commencing on March 31, 2026) (in either case, the "Sustainability Rate Adjustment Date"); provided, that, the Borrower may elect not to deliver the Pricing Certificate, and such election shall not constitute a Default or Event of Default (but such **failure to so deliver the Pricing Certificate by March 31, 2026 shall result in the Applicable Rate with respect to the Initial Term Loans increasing by 0.250%** commencing on March 31, 2026); provided, further, that, for the avoidance of doubt:

Details of performance pricing:

First Lien Leverage Ratio	Initial Revolving Loan ABR Spread	Initial Revolving Loan Eurocurrency/RFR Rate Spread
Category 1: First Lien Leverage Ratio greater than 2.30:1.00	1.50%	2.50%
Category 2: First Lien Leverage Ratio equal to or less than 2.30:1.00 and greater than 1.80:1.00	1.25%	2.25%
Category 3: First Lien Leverage Ratio equal to or less than 1.80:1.00	1.00%	2.00%

Table 1: Sample Composition and Construction

This table reports the composition and construction of our regression sample. Panel A presents the steps of our sample construction. Panel B shows the distribution of the regression sample by the operating country of borrowers. It includes the number of banks operating in the borrower's country, the number of banks leading SLLs, and the number of banks leading non-ESG loans (conventional syndicated loans that are neither SLLs nor green loans). Additionally, it reports the number of SLLs and conventional syndicated loans led by foreign banks, as well as the number of unique SLL deals and unique conventional loan deals. Panel C shows the top 20 lenders in our sample. Panel D shows the sample distribution by year.

Panel A: Sample Construction

Sample selection process	Remaining observations	
Raw loan-bank level data from 1.1.2006 - 12.31.2023	1128123	bank-tranche level
Filter out government borrowers	1121104	
Drop data before 2014	674927	
Keep only lead arrangers	422516	
Observations before aggregation	418703	
Aggregate to the bank-country-year-level	22948	bank-country-year level
Drop development banks, central banks, and non-bank institutions	21012	
Drop 2022 due to lack of t+1 data	18634	
Keep only observations from 2016-01-01 to 2022-12-31	13727	
Drop singletons, require each group (bank, country, year) to have at least 2 observations	13078	
Final observations	13078	

Table 1: Sample Composition, continued

Panel B: Sample Distribution by Borrower Country

Country	Total Number of Lead Banks	Total Number of SLL Lead Banks	Total Number of Foreign Lead Banks	Total Number of Foreign SLL Lead Banks	Total Number of SLLs	Total Number of Conventional Syndicated Loans (excluding SLLs and green loans)
United States	297	86	161	49	410	33622
United Kingdom	220	82	203	77	151	2613
Netherlands	161	68	150	64	105	1037
Germany	158	66	120	52	274	3605
France	130	64	106	55	313	3308
Spain	145	64	115	47	333	2444
Singapore	99	61	97	59	95	200
Australia	121	59	107	53	147	1222
Switzerland	118	56	109	53	45	554
Hong Kong	81	55	77	51	130	141
Luxembourg	122	46	121	45	30	477
Italy	91	40	65	28	116	1835
Sweden	91	39	87	35	42	520
Taiwan	58	35	31	11	169	120
Turkey	85	35	76	32	74	157
Norway	62	35	59	32	37	348
China	60	34	42	24	34	145
Denmark	56	34	52	31	26	228
United Arab Emirates	96	33	80	24	14	166
Finland	56	32	51	31	50	321
Belgium	77	31	74	29	37	376
Brazil	62	29	53	28	11	190
Austria	61	28	55	24	61	342
Ireland	92	27	90	25	14	338
Portugal	54	26	49	23	13	103
India	66	25	53	23	10	296
Thailand	54	24	44	23	14	46
Bahrain	51	23	45	19	8	37
South Africa	55	23	48	20	20	153
Cayman Islands	77	23	77	23	10	78
Russian Federation	44	22	35	18	12	42
Cyprus	42	20	42	20	5	33
Canada	97	19	86	13	72	1443
Japan	51	19	27	2	173	934
Mauritius	28	19	28	19	4	20
Indonesia	53	18	48	16	11	104
Poland	41	16	32	11	7	104
Mexico	43	16	38	14	20	218
Ghana	27	15	27	15	5	11
Iceland	15	11	15	11	4	22
Israel	34	10	26	10	4	38
Chile	44	10	39	10	9	120
Czech Republic	28	8	28	8	3	58
Estonia	7	7	7	7	4	
New Zealand	39	6	39	6	33	130
Qatar	26	6	23	6	1	11
Bermuda	61	5	61	5	3	177
Hungary	22	5	19	5	3	23
Vietnam	31	4	31	4	2	18
Egypt	57	4	52	4	3	42
Virgin Islands (British)	31	4	31	4	2	20
South Korea	28	4	16	4	9	52
Slovakia	21	4	21	4	1	15
Philippines	27	4	21	2	3	25
Saudi Arabia	68	3	53	3	3	114
Greece	43	3	40	1	3	55
Kenya	17	3	17	3	1	16
Malaysia	36	3	30	2	4	62
Malta	26	2	26	2	1	24
Colombia	38	2	36	1	4	89
Peru	24	1	23	1	1	35
Panama	20	1	19	1	3	26

Table 1: Sample Composition, continued

Panel C: Top 20 banks by SLL

Bank	Bank home country	Total number of SLL led	Total volume of SLL led ($ billions)	Total number of times acted as sustainability agent	Total number of non-ESG loans led	Total volume of non-ESG loans led ($ billions)	Number of foreign countries led SLL	Number of foreign SLL led
BNP Paribas SA	France	1019	81.514	134	9889	840.253	42	801
Credit Agricole Corporate & Investment Bank SA...	France	768	53.553	182	6305	406.787	37	492
BofA Securities	United States	632	87.818	117	18523	2722.654	32	338
HSBC Banking Group	United Kingdom	627	56.921	112	7012	643.713	42	552
ING Group	Netherlands	624	44.792	126	5907	352.626	37	544
Societe Generale SA	France	587	42.526	38	5194	365.546	36	412
Mizuho Financial Group Inc	Japan	550	51.374	34	4969	638.954	40	463
JP Morgan	United States	539	70.773	79	16756	2611.320	31	287
Sumitomo Mitsui Financial Group Inc	Japan	532	44.512	85	4384	420.564	41	484
Banco Santander SA	Spain	500	38.539	102	4482	245.880	27	254
Mitsubishi UFJ Financial Group Inc	Japan	499	44.148	47	6906	775.247	41	458
Citi	United States	460	58.185	33	9280	1670.805	38	318
UniCredit	Italy	459	36.664	75	4264	248.750	25	382
Banco Bilbao Vizcaya Argentaria SA [BBVA]	Spain	399	28.737	157	2943	155.133	23	153
Barclays	United Kingdom	351	37.616	38	9596	1210.731	24	280
Deutsche Bank AG	Germany	347	32.290	30	8560	991.677	26	271
Natixis SA	France	321	24.375	64	3388	230.151	22	171
Caixabank SA	Spain	311	17.042	56	1652	52.455	11	92
Rabobank	Netherlands	300	24.057	97	2382	146.632	30	235
Commerzbank AG	Germany	287	22.432	15	3008	195.604	23	176

Table 1: Sample Composition, continued

Panel D: Sample distribution by year

Year	Total number of non-ESG loans	Total volume of non ESG-loans ($ billions)	Total number of SLLs	Total volume of SLLs ($ billions)	Total Number of Green Loans	Total volume of green loans ($ billions)	Number of lead banks	Number of banks participating SLLs	Number of SLL lead banks	Number of sustainability agents	Number of new lead banks	Number of new sustainability agent banks	SLL relationship%	SLL origination%	SLL public borrower%	SLL new origination%
2016	10622	4065.965			88	5.431	1424									
2017	12385	5033.839	3	2.258	81	7.668	1483	1	23	1	23	1	1	0.333	1	
2018	13102	5451.361	56	49.763	108	20.166	1578	89	77	16	55	16	0.643	0.607	0.679	0.286
2019	12157	4674.492	207	137.06	225	43.506	1592	141	113	23	56	15	0.662	0.729	0.618	0.285
2020	10740	4389.535	299	178.496	367	63.023	1486	196	131	33	37	10	0.592	0.779	0.508	0.401
2021	11334	5123.096	1014	653.839	428	88.835	1531	423	230	61	105	26	0.554	0.743	0.447	0.396
2022	8318	3714.253	1823	797.552	546	135.488	1458	533	320	88	132	34	0.455	0.808	0.393	0.527

Table 2: Descriptive statistics

This table reports the summary statistics for the variables used in our determinants model. Panel A reports the descriptive statistics. Panel B reports the Pearson correlation coefficient. All continuous variables are winsorized at the 1% and 99% levels. All variables are defined in Appendix A.

Panel A: Summary Statistics

VARIABLES	**count**	**mean**	**std**	**25%**	**50%**	**75%**
prior_sll_par_exp	13078	0.468	0.499	0	0	1
prior_green_loan_exp	13078	0.633	0.482	0	1	1
total_hhi	13078	0.084	0.077	0.045	0.057	0.09
country_year_sll_indicator	13078	0.49	0.5	0	0	1
loan_leader	13078	0.322	0.467	0	0	1
rel_perc	13078	0.391	0.418	0	0.216	0.835
bank_home_regulation	13078	0.693	0.461	0	1	1
pri_sig	13078	0.196	0.397	0	0	0
has_refinitiv	13078	0.487	0.5	0	0	1
public	13078	0.336	0.472	0	0	1
sfdr	13078	0.135	0.342	0	0	0
loan_growth	13078	0.794	1.161	-0.129	0.838	2
multinational_home	13078	0.088	0.283	0	0	0
multinational_foreign	13078	0.824	0.381	1	1	1
top_20	13078	0.27	0.444	0	0	1
top_20_foreign	13078	0.261	0.439	0	0	1
top_20_home	13078	0.009	0.095	0	0	0
sll_lead_t1	13078	0.214	0.41	0	0	0
sll_new_origination_t1	13078	0.122	0.327	0	0	0
sustainability_agent_t1	2274	0.171	0.377	0	0	0
exposure	10733	0.110	0.233	0.016		0.072

Table 2: Summary Statistics, continued

Panel B: Correlations

VARIABLES	*prior_sll par_exp*	*prior green loan_exp*	*total hhi*	*country_year sll_indicator*	*loan leader*	*rel_perc*	*bank_home regulation*	*has refinitiv*	*public*	*sfdr*	*exposure*	*loan growth*	*multinational home*	*multinational foreign*	*top 20*	*top 20 foreign*	*top 20 home*	*sll_lead t1*	*sll_new origination t1*	*sustainability agent t1*
prior_green_loan_exp	0.550																			
total_hhi	-0.003	0.004																		
country_year_sll_indicator	0.414	0.205	-0.278																	
loan_leader	0.125	0.153	0.134	-0.063																
rel_perc	0.131	0.117	-0.193	0.128	0.111															
bank_home_regulation	0.157	0.310	-0.016	0.017	0.006	0.011														
has_refinitiv	0.124	0.123	0.019	-0.030	0.112	0.076	0.021													
public	0.090	0.112	-0.003	-0.019	0.075	0.019	-0.206	0.052												
sfdr	0.363	0.229	0.007	0.292	0.028	0.019	0.084	0.018	0.018											
exposure	-0.346	-0.481	-0.029	0.048	-0.032	-0.115	-0.264	-0.127	-0.078	-0.117										
loan_growth	-0.095	-0.110	0.159	-0.095	-0.043	-0.320	-0.043	-0.046	-0.029	-0.004	0.059									
multinational_home	-0.067	-0.092	-0.018	0.029	0.185	0.000	-0.053	-0.036	0.000	-0.028	0.276	-0.121								
multinational_foreign	0.222	0.320	0.029	-0.045	-0.052	0.046	0.190	0.081	0.033	0.084	-0.711	0.091	-0.671							
top_20	0.277	0.318	0.029	-0.040	0.269	0.162	-0.054	0.202	0.285	0.091	-0.331	-0.123	-0.116	0.227						
top_20_foreign	0.272	0.315	0.031	-0.048	0.242	0.148	-0.048	0.198	0.279	0.090	-0.347	-0.112	-0.185	0.275	0.977					
top_20_home	0.040	0.033	-0.008	0.036	0.140	0.071	-0.032	0.027	0.042	0.009	0.057	-0.060	0.310	-0.208	0.158	-0.057				
sll_lead_t1	0.391	0.298	-0.139	0.357	0.237	0.192	0.119	0.082	0.028	0.211	-0.092	-0.230	0.128	-0.017	0.178	0.153	0.124			
sll_new_origination_t1	0.316	0.229	-0.091	0.292	0.189	0.093	0.106	0.056	0.020	0.219	-0.033	-0.151	0.141	-0.056	0.120	0.095	0.119	0.712		
sustainability_agent_t1	0.188	0.145	-0.064	0.166	0.200	0.089	0.090	0.099	0.009	0.137	-0.027	-0.096	0.134	-0.054	0.087	0.057	0.142	0.397	0.398	
pri_sig	0.122	0.137	-0.014	0.054	0.048	0.063	0.040	0.021	-0.034	0.086	-0.140	-0.028	-0.039	0.102	0.102	0.100	0.017	0.073	0.035	0.061

Table 3: Determinants of banks' SLL decisions

This table examines the determinants of banks' decisions to lead an SLL in a specific country for a particular year. Panel A reports the results of banks' decision to lead an SLL in the subsequent year. Column (1) presents the results from the estimation of ordinary least squares (OLS) for the full sample. In column (2), we repeat the same regression and add country × year fixed effects. In column (3), we further add bank × year fixed effects. In column (4) - (6), we repeat the same set of analyses as column (1) - (3) but replace the dependent variable with *sll_new_originaion_t1*.Panel B reports the results of our sub-sample analysis. Columns (1) - (3) report the results from the estimation of ordinary least squares (OLS) for the banks operating in the foreign market sample. Column (4) and (5) report the results for our home market sample. Market-level measurements include a competition measure, *total_hhi*, and an indicator to identify if the country had any SLLs in that year: *country_year_sll_indicator*. Bank-specific measures include *loan-leader*, *exposure*, *rel_perc*, *is_foreign_bank*, *bank_home_regulation*, *has_refinitiv*, and *public*. We control for bank size with *top_20*. All continuous variables are winsorized at the 1% and 99% levels. Both country and year fixed effects are incorporated into the OLS estimations. Standard errors are adjusted for clustering at the bank and country levels. The sample comprises 13,078 bank-country-year level observations. All variables are defined in Appendix A. Robust standard errors are reported in parentheses. *, **, and *** represent 10%, 5%, and 1% significance levels, respectively.

Panel A: Full sample

VARIABLES	Predicted Sign	Full Sample					
		sll_lead_t1			*sll_new_origination_t1*		
		(1)	(2)	(3)	(4)	(5)	(6)
prior_sll_par_exp	(+)	0.139***	0.129***		0.079***	0.073***	
		(0.022)	(0.024)		(0.020)	(0.022)	
prior_green_loan_exp	(+)	-0.012	-0.029		-0.011	-0.025	
		(0.018)	(0.018)		(0.018)	(0.019)	
total_hhi	(+/-)	0.392***			0.208*		
		(0.136)			(0.108)		
country_year_sll_indicator	(+)	0.050**			0.022		
		(0.024)			(0.020)		
loan_leader		0.205***	0.218***	0.226***	0.126***	0.131***	0.139***
		(0.023)	(0.024)	(0.024)	(0.017)	(0.018)	(0.019)
rel_perc		0.006	0.023*	0.032**	-0.002	0.002	0.005
		(0.012)	(0.012)	(0.013)	(0.008)	(0.006)	(0.006)
bank_home_regulation	(+)	0.007	-0.018		-0.064	-0.081**	
		(0.045)	(0.048)		(0.038)	(0.040)	
has_refinitiv	(+)	0.098**	0.159***		0.069**	0.138***	
		(0.046)	(0.048)		(0.033)	(0.044)	
loan_leaderxhhi		-0.722***	-0.877***	-0.941***	-0.384***	-0.438***	-0.492***
		(0.132)	(0.172)	(0.154)	(0.105)	(0.143)	(0.129)
sfdr		0.015	0.075*		0.042	0.110**	
		(0.042)	(0.041)		(0.047)	(0.045)	
pri_sig		0.009	-0.009		-0.006	-0.021	
		(0.032)	(0.033)		(0.024)	(0.022)	
loan_growth		-0.024***	-0.026***	-0.035***	-0.012***	-0.011***	-0.016***
		(0.004)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)
top_20_foreign		-0.015	0.003	-0.117**	0.008	0.021	-0.134***
		(0.038)	(0.040)	(0.050)	(0.023)	(0.027)	(0.049)
top_20_home		0.095	0.117**		0.136**	0.155***	
		(0.059)	(0.058)		(0.056)	(0.055)	
multinational_foreign		-0.105***	-0.108***	-0.163***	-0.078***	-0.089***	-0.134***
		(0.021)	(0.020)	(0.029)	(0.025)	(0.024)	(0.026)
multinational_home		0.068***	0.061**		0.059**	0.047*	
Observations		13,078	13,022	11,420	13,078	13,022	11,420
Adjusted R-squared		0.373	0.447	0.469	0.252	0.333	0.363
Country FE		YES	NO	NO	YES	NO	NO
Bank FE		YES	YES	NO	YES	YES	NO
Year FE		YES	NO	NO	YES	NO	NO
Country x Year		NO	YES	YES	NO	YES	YES
Bank x Year		NO	NO	YES	NO	NO	YES
Cluster		Country Bank	Country Bank	Country Bank	Country Bank	Country Bank	Country Bank
Mean dependent variable		0.214	0.214	0.214	0.122	0.122	0.122

Table 3: Determinants of banks' SLL decisions, continued

Panel B: SLL Lead Sub-sample

VARIABLES	Multinational Foreign Markets			Home Market	
	sll_lead_t1			*sll_lead_t1*	
	(1)	(2)	(3)	(4)	(5)
prior_sll_par_exp	0.104***	0.102***		0.297***	0.219***
	(0.020)	(0.021)		(0.045)	(0.037)
prior_green_loan_exp	-0.038**	-0.054***		0.104***	0.083**
	(0.018)	(0.018)		(0.036)	(0.037)
total_hhi	0.402***			0.089	
	(0.145)			(0.229)	
country_year_sll_indicator	0.053**			0.013	
	(0.026)			(0.039)	
loan_leader	0.197***	0.217***	0.212***	0.059	0.002
	(0.023)	(0.024)	(0.021)	(0.036)	(0.041)
rel_perc	0.006	0.025**	0.027*	-0.071***	-0.050***
	(0.013)	(0.013)	(0.014)	(0.021)	(0.015)
bank_home_regulation	-0.010	-0.038		0.167	
	(0.046)	(0.051)		(0.144)	
has_refinitiv	0.101***	0.208***		-0.037	-0.019
	(0.026)	(0.025)		(0.103)	(0.063)
public					
loan_leader×hhi	-0.739***	-0.933***	-0.953***	-0.162	0.032
	(0.130)	(0.160)	(0.129)	(0.335)	(0.466)
sfdr	0.001	0.055		0.054	0.171***
	(0.051)	(0.043)		(0.070)	(0.052)
pri_sig	0.014	-0.003		0.015	0.031
	(0.030)	(0.035)		(0.088)	(0.071)
loan_growth	-0.028***	-0.031***	-0.036***	0.014**	0.022***
	(0.004)	(0.004)	(0.004)	(0.006)	(0.008)
exposure	0.170***	0.151***	0.278***	-0.109***	-0.117***
	(0.046)	(0.049)	(0.055)	(0.038)	(0.041)
top_20	-0.010	0.006		-0.026	-0.001
	(0.038)	(0.042)		(0.146)	(0.123)
Observations	10,687	10,623	9,926	2,243	2,200
Adjusted R-squared	0.363	0.443	0.465	0.503	0.607
Country FE	YES	NO	NO	YES	NO
Bank FE	YES	YES	NO	YES	YES
Year FE	YES	NO	NO	YES	NO
Country x Year	NO	YES	YES	NO	YES
Bank x Year	NO	NO	YES	NO	NO
Cluster	Country Bank	Country Bank	Country Bank	Country Bank	Country Bank
Mean sll_lead_t1	0.211	0.211	0.211	0.230	0.230

Table 4: Determinants of banks' sustainability agent decisions

This table examines the determinants of banks' decisions to act as sustainability agents in an SLL deal in a given country-year. The samples in this table are restricted to the banks that lead an SLL in the same year and in the same country. Column (1) presents the results from estimating ordinary least squares (OLS) for the full sample. Columns (2), (3), and (4) repeat the same regression as in (1) but with the multinational banks' foreign markets sample, multinational banks' home market sample, and domestic-only sample, respectively. Market-level measurement includes competition measurement, *total_hhi*, and an indicator determining if the country initiated any SLLs during that year, *country_year_sll_indicator*. Bank-specific measurements include *loan-leader*, *exposure*, *rel_perc*, *bank_home_regulation*, *has_refinitiv*, and *public*. We account for bank size using *top_20*. All continuous variables are winsorized at the 1% and 99% levels. OLS estimations incorporate both country and year fixed effects. Standard errors are clustered at the country and bank levels and reported in parentheses. All variables are defined in Appendix A. Robust standard errors are reported in the parentheses. *, **, and *** represent 10%, 5%, and 1% significance, respectively.

VARIABLES	Full Sample			Multinational Foreign Markets			Home Market	
	sustainability_agent_t1			*sustainability_agent_t1*			*sustainability_agent_t1*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
prior_sll_par_exp	-0.009	-0.030		-0.035	-0.055		0.019	-0.030
	(0.037)	(0.035)		(0.039)	(0.040)		(0.064)	(0.062)
prior_green_loan_exp	0.077*	0.063*		0.045	0.049		0.038	-0.050
	(0.039)	(0.037)		(0.044)	(0.049)		(0.074)	(0.052)
total_hhi	-0.734			-0.756			-0.884	
	(0.639)			(0.640)			(1.180)	
country_year_sll_indicator	-0.012			-0.007			0.094	
	(0.029)			(0.031)			(0.080)	
loan_leader	0.156***	0.151***	0.164***	0.145***	0.125***	0.134***	-0.175	-0.257*
	(0.038)	(0.040)	(0.044)	(0.037)	(0.038)	(0.043)	(0.141)	(0.134)
rel_perc	0.014	0.027	0.032	0.011	0.029	0.034	-0.183*	-0.079
	(0.019)	(0.020)	(0.025)	(0.019)	(0.022)	(0.025)	(0.098)	(0.065)
bank_home_regulation	-0.031	0.002		0.001	-0.015		-0.256*	
	(0.070)	(0.081)		(0.059)	(0.070)		(0.147)	
has_refinitiv								
public								
loan_leader×hhi	-0.559	-0.375	-0.512	-0.532	-0.149	-0.251	1.264	1.625
	(0.349)	(0.423)	(0.475)	(0.436)	(0.487)	(0.524)	(1.109)	(1.297)
sfdr	-0.197***	-0.226***		-0.213***	-0.165		0.034	0.131*
	(0.060)	(0.078)		(0.075)	(0.101)		(0.080)	(0.066)
pri_sig	0.008	-0.008		0.032	-0.001		-0.143	-0.283
	(0.053)	(0.041)		(0.083)	(0.067)		(0.187)	(0.222)
loan_growth	-0.006	-0.005	0.001	-0.019**	-0.016	-0.014	0.067**	0.011
	(0.009)	(0.009)	(0.009)	(0.009)	(0.011)	(0.010)	(0.028)	(0.035)
top_20_foreign	-0.075	-0.079	-0.034					
	(0.064)	(0.065)	(0.090)					
top_20_home	-0.034	-0.037						
	(0.094)	(0.092)						
multinational_foreign	-0.228***	-0.230**	-0.293***					
	(0.069)	(0.089)	(0.053)					
multinational_home	0.040	0.036						
	(0.030)	(0.053)						
exposure				0.413***	0.439***	0.525***	-0.123	0.206**
				(0.094)	(0.096)	(0.118)	(0.127)	(0.099)
top_20				-0.009	-0.011		-0.296**	-0.446***
				(0.052)	(0.054)		(0.110)	(0.119)
Observations	2,724	2,720	2,483	2,238	2,229	2,122	452	428
Adjusted R-squared	0.228	0.242	0.236	0.192	0.203	0.197	0.423	0.568
Country FE	YES	NO	NO	YES	NO	NO	YES	NO
Bank FE	YES	YES	NO	YES	YES	NO	YES	YES
Year FE	YES	NO	NO	YES	NO	NO	YES	NO
Country x Year	NO	YES	YES	NO	YES	YES	NO	YES
Bank x Year	NO	NO	YES	NO	NO	YES	NO	NO
Cluster	Country Bank	Country Bank	Country Bank	Country Bank	Country Bank	Country Bank	Country Bank	Country Bank
Mean sustainability_agent_t1	0.192	0.192	0.192	0.172	0.172	0.172	0.28	0.28

Table 5: Role of Refinitiv ESG scores

This table investigates the influence of Refinitiv ESG scores on banks' decisions to either lead an SLL or act as a sustainability agent in a market within a given year. The results for *e_score*, *s_score*, and *g_score* are reported separately. Panel A presents the summary statistics for these ESG scores sourced from Refinitiv. Panel B reports the regression results mirroring the specification of the earlier determinant model but replacing the indicator of whether the bank possesses a Refinitiv rating with specific pillar scores. Columns (1) to (5) detail the decisions associated with leading a SLL. Specifically, columns (1), (2), and (3) relay the outcomes for the environmental pillar across the full sample, multinational foreign sample, and multinational domestic sample, respectively. Column (4) focuses on the social pillar, while column (5) covers the governance pillar. Columns (6) through (10) follow a similar structure but restrict the sample to banks that have led an SLL, exploring their decisions to serve as sustainability agents. At the market level, measurements include a competition measure, *total_hhi*, and an indicator highlighting if the country has initiated any SLLs during that year, labeled as *country_year_sll_indicator*. Bank-specific measurements feature *loan-leader*, *ln_lead_amount*, *rel_perc*, *bank_home_regulation*, *has_refinitiv*, and *public*. We control for bank size using *top_20*. All continuous variables are winsorized at the 1% and 99% levels. OLS estimation includes both country and year fixed effects. Standard errors are clustered at the country and bank levels and reported in parentheses. All variables are defined in Appendix A. *, **, and *** represent 10%, 5%, and 1% significance, respectively.

Panel A: Summary statistics for the Refinitiv sample

	count	mean	std	25%	50%	75%
e_score	6368	0.771	0.236	0.686	0.859	0.929
s_score	6368	0.755	0.169	0.7	0.798	0.869
g_score	6408	0.661	0.216	0.51	0.718	0.841

	e_score	*s_score*
s_score	0.735	
g_score	0.339	0.403

Table 5: Role of Refinitiv ESG scores, continued

Panel B: Refinitiv regression results

VARIABLES	Full Sample							
	sll_lead_t1							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
esgscore	-0.125				-0.159			
	(0.080)				(0.096)			
escore		0.133**				0.076		
		(0.055)				(0.061)		
sscore			-0.085				-0.095	
			(0.087)				(0.083)	
gscore				-0.023				-0.023
				(0.040)				(0.040)
Control Variables	YES	YES	YES	YES	YES	YES	YES	YES
Observations	7,180	7,164	7,178	7,180	7,127	7,111	7,125	7,180
Adjusted R-squared	0.396	0.396	0.396	0.395	0.495	0.495	0.495	0.395
Country FE	YES	YES	YES	YES	NO	NO	NO	NO
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	NO	NO	NO	NO
Country x Year FE	NO	NO	NO	NO	YES	YES	YES	YES
Cluster	Bank Country	Bank Country	Bank Country	Bank Country	Bank Country	Bank Country	Bank Country	Bank Country
Mean Dependent Variable	0.237	0.237	0.237	0.237	0.237	0.237	0.237	0.237

Table 6: Consequences of SLL lending for bank performance

This table presents the consequences when a bank leads an SLL or acts as a sustainability agent. The effects are observed in the year following a bank's decision to lead an SLL in that country. Panel A outlines the descriptive statistics of relevant variables. Panel B reports the results from estimating the competitive posture of banks after they lead an SLL in a country within a year. Columns (1) through (4) capture results from the multinational foreign sample: column (1) reports the results of estimating the bank's market share in the subsequent period, column (2) reports the results of estimating the bank's share of loans with new borrowers, and column (3) reports the results in SLL market share. Column (4) reports results from estimating banks' market shares in non-SLL loans. Columns (4)-(8) repeat the above regressions for multinational banks' home markets. Panel B regressions incorporate market-level measurements, such as *total_hhi* and an indicator to identify if the country had any SLLs in that year,*country_year_sll_indicator*. Bank-specific measurements include *loan-leader*, *ln_lead_amount*, *rel_perc*, *bank_home_regulation*, *has_refinitiv*, and *public*. Adjustments for bank size are made using *top_20*. Detailed descriptions for these variables are available in the appendix. All continuous variables are winsorized at the 1% and 99% levels. OLS estimation includes bank, country, and year fixed effects. Standard errors are clustered at the country and bank levels and reported in parentheses. All variables are defined in Appendix A. *, **, and *** represent 10%, 5%, and 1% significance, respectively.

Panel A: Summary statistics

VARIABLES	count	mean	std	25%	50%	75%
sustainability_agent	13078	0.027	0.161	0	0	0
sustainability_agent_foreign	13078	0.186	0.389	0	0	0
sll_lead	13078	0.177	0.382	0	0	0
sll_foreign_lead	13078	0.497	0.5	0	0	1
prior_sll_par_exp	13078	0.468	0.499	0	0	1
prior_green_loan_exp	13078	0.633	0.482	0	1	1
first_time_market_share_t1	13078	1.764	8.476	0	0	0
rel_market_share_t1	13078	1.03	2.986	0	0	0.758
switch_borr_market_share_t1	13078	1.953	44.25	0	0.001	0.7
portfolio_return_t1	8236	2.74	1.054	2.034	2.741	3.289
sll_portfolio_return_t1	2803	2.503	1.013	1.756	2.532	3.206
new_portfolio_return_t1	6564	2.792	1.044	2.131	2.799	3.349
ln_average_size_t1	8236	4.088	0.869	3.543	4.125	4.657
ln_average_maturity_t1	8236	4.085	0.544	3.863	4.107	4.29
sll_perc_t1	8236	0.134	0.272	0	0	0.116
rel_perc_t1	8236	0.502	0.39	0	0.553	0.882
sscore_t1	980	0.666	0.206	0.529	0.708	0.833
gscore_t1	980	0.614	0.214	0.457	0.648	0.788
esgscore_t1	980	0.635	0.180	0.516	0.667	0.776
sll_lead	980	0.288	0.453	0.000	0.000	1.000
green_lead	980	0.282	0.450	0.000	0.000	1.000
sustainability_agent	980	0.109	0.312	0.000	0.000	0.000
ln_total_bank	980	7.266	2.444	5.352	6.844	9.305
sll_perc	980	0.047	0.122	0.000	0.000	0.012
foreign_perc	980	0.415	0.377	0.000	0.378	0.794
rel_perc	980	0.406	0.332	0.000	0.415	0.703
portfolio_return	980	0.998	0.969	0.103	0.762	1.591
sfdr	980	0.087	0.282	0.000	0.000	0.000
bank_pri_sig	980	0.009	0.095	0.000	0.000	0.000
pri_sig	980	0.074	0.263	0.000	0.000	0.000

Table 6: Consequences, continued

Panel B: Consequences–market shares

VARIABLES	Full Sample				Multinational Foreign Sample				Home Market Sample
	market_share_t1 (1)	*first_time_market_share_t1* (2)	*rel_market_share_t1* (3)	*switch_borr_market_share_t1* (4)	*market_share_t1* (5)	*first_time_market_share_t1* (6)	*rel_market_share_t1* (7)	*switch_borr_market_share_t1* (8)	*market_share_t1* (9)
sll_lead	0.554***	0.393	0.366***	2.345	0.410***	0.218	0.297***	2.616	0.075
	(0.162)	(0.278)	(0.108)	(1.684)	(0.143)	(0.321)	(0.097)	(1.918)	(0.335)
sll_foreign_lead	1.255***	1.289**	0.660***	1.870**	0.760*	-0.441	0.431**	0.616	-0.209
	(0.313)	(0.531)	(0.179)	(0.940)	(0.403)	(0.570)	(0.196)	(1.045)	(0.425)
sustainability_agent	1.515***	2.284**	1.054***	1.943	1.401***	2.021**	0.721***	2.359	-0.196
	(0.373)	(0.875)	(0.219)	(1.580)	(0.424)	(0.781)	(0.202)	(1.772)	(0.466)
sustainability_agent_foreign									-0.116
									(0.720)
loan_leader	1.414***	1.559**	1.200***	-7.593	1.704***	1.750***	1.269***	-8.266	-1.034
	(0.390)	(0.606)	(0.238)	(8.032)	(0.373)	(0.627)	(0.239)	(9.098)	(0.844)
rel_perc	-0.270**	-0.765***	0.134	-0.810*	-0.188	-0.641**	0.121	-0.601	-0.570*
	(0.131)	(0.291)	(0.089)	(0.472)	(0.128)	(0.262)	(0.098)	(0.512)	(0.311)
loan_leaderxhhi	12.344**	7.458	2.692	125.475	6.661	2.923	1.495	135.849	7.351
	(5.113)	(6.609)	(2.458)	(119.185)	(4.679)	(6.870)	(2.566)	(136.658)	(9.421)
multinational_foreign	-2.617***	-3.835***	-0.998***	-1.398*					
	(0.388)	(0.649)	(0.197)	(0.807)					
top_20_foreign	-4.223**	-6.505*	-3.331***	-0.673					
	(1.925)	(3.577)	(0.664)	(1.215)					
exposure					1.120	1.194	0.695	-3.501	-1.850**
					(0.751)	(0.856)	(0.440)	(3.667)	(0.762)
loan_growth	-0.482***	-0.520***	-0.173***	-1.288*	-0.405***	-0.379***	-0.188***	-1.257	0.006
	(0.061)	(0.120)	(0.037)	(0.775)	(0.063)	(0.118)	(0.039)	(0.854)	(0.238)
prior_sll_par_exp									0.300
									(0.653)
prior_green_loan_exp									0.046
									(0.489)
Observations	11,420	11,420	11,420	11,420	9,926	9,926	9,926	9,926	2,200
Adjusted R-squared	0.329	0.168	0.327	0.157	0.291	0.108	0.316	0.168	0.592
Country FE	NO	NO	NO	NO	NO	NO	NO	NO	NO
Bank FE	NO	NO	NO	NO	NO	NO	NO	NO	YES
Year FE	NO	NO	NO	NO	NO	NO	NO	NO	NO
Bank x Year	YES	YES	YES	YES	YES	YES	YES	YES	NO
Country x Year	YES	YES	YES	YES	YES	YES	YES	YES	YES
Cluster	Country Bank	Country Bank	Country Bank	Country Bank	Country Bank	Country Bank	Country Bank	Country Bank	Country Bank
Mean Dependent Variable	2.086	1.764	1.030	1.953	1.832	1.276	0.977	1.787	3.271

Table 6: Consequences, continued

Panel C: Consequences–portfolio return

VARIABLES	Full Sample		
	$portfolio\_return\_t1$	$new\_portfolio\_return\_t1$	$sll\_portfolio\_return\_t1$
	(1)	(2)	(3)
sll_lead	-0.004	-0.043	0.039
	(0.033)	(0.036)	(0.067)
sll_foreign_lead	0.027	0.041	0.077
	(0.056)	(0.057)	(0.086)
sustainability_agent	0.024	0.062	0.033
	(0.028)	(0.046)	(0.043)
loan_leader	0.035	0.030	-0.011
	(0.037)	(0.029)	(0.045)
rel_perc	-0.064**	0.000	-0.035
	(0.029)	(0.026)	(0.041)
loan_leader×hhi	-0.268	-0.296	0.218
	(0.339)	(0.340)	(0.478)
multinational_foreign	-0.029	0.032	0.000
	(0.035)	(0.037)	(0.043)
top_20_foreign	0.078	0.100*	-0.020
	(0.053)	(0.053)	(0.078)
loan_growth	0.006	0.003	-0.004
	(0.010)	(0.010)	(0.011)
sll_perc_t1	-0.154*	-0.244***	
	(0.078)	(0.088)	
ln_average_maturity_t1	0.056*	0.060**	0.054
	(0.029)	(0.030)	(0.044)
ln_average_size_t1	-0.055***	-0.024	0.023
	(0.018)	(0.024)	(0.031)
rel_perc_t1	-0.103***		0.103
	(0.038)		(0.068)
green_perc_t1	-0.267**		-0.172
	(0.106)		(0.170)
sll_perc_t1×sll_lead	-0.006	0.171**	
	(0.083)	(0.081)	
rel_perc_t1×sll_lead			-0.113
			(0.099)
Observations	6,955	5,389	2,483
Adjusted R-squared	0.771	0.729	0.824
Country FE	NO	NO	NO
Bank FE	NO	NO	NO
Year FE	NO	NO	NO
Country x Year FE	YES	YES	YES
Bank x Year FE	YES	YES	YES
Cluster	Country Bank	Country Bank	Country Bank
Mean Dependent Variable	2.740	2.792	2.503

Table 6: Consequences, continued

Panel D: Consequences–ESG rating

	Full Sample			
VARIABLES	*escore_t1* (1)	*sscore_t1* (2)	*gscore_t1* (3)	*esgscore_t1* (4)
sll_lead	0.002	-0.024**	-0.001	-0.018**
	(0.016)	(0.010)	(0.014)	(0.009)
green_lead	-0.008	-0.000	-0.016	-0.008
	(0.012)	(0.008)	(0.012)	(0.007)
sustainability_agent	-0.018	-0.046***	-0.017	-0.035***
	(0.017)	(0.013)	(0.016)	(0.011)
ln_total_bank	0.013**	-0.000	-0.010	-0.001
	(0.006)	(0.005)	(0.006)	(0.004)
sll_perc	-0.051	0.038	0.028	0.025
	(0.052)	(0.037)	(0.049)	(0.031)
foreign_perc	0.022	0.007	-0.007	0.007
	(0.020)	(0.012)	(0.017)	(0.010)
rel_perc	0.004	-0.003	0.011	0.003
	(0.021)	(0.013)	(0.021)	(0.011)
portfolio_return	-0.013**	-0.011**	-0.003	-0.009**
	(0.007)	(0.004)	(0.007)	(0.004)
sfdr	-0.022	-0.024	-0.020	-0.024*
	(0.022)	(0.016)	(0.021)	(0.014)
pri_sig	-0.019	0.037	-0.069	-0.007
	(0.032)	(0.024)	(0.062)	(0.024)
Observations	975	980	980	980
Adjusted R-squared	0.866	0.883	0.758	0.890
Bank FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Cluster	Bank	Bank	Bank	Bank

Appendix D. Online Appendix to "Financial Innovation via Sustainable Lending"

Appendix D.1. Additional Tables

Table OA1: Sample distribution by bank headquarter country

This table reports the regression sample distribution by the lender's headquarters country. *Regulation Year* refers to the year ESG-related disclosure regulations were introduced in the country where the lender parent operates. *Total Number of Lead Banks* represents the count of lenders that have served as lead arrangers in syndicated loan deals. *Total Number of SLL Lead Banks* indicates the number of lenders that have acted as lead arrangers in Sustainability-Linked Loans (SLLs). *Total Number of Sustainability Agent Banks* quantifies the lenders that have served as sustainability agents. We further report whether the bank's headquarters country has ESG reporting regulations applicable to banks(Has Regulation Data). If such regulations exist, we also provide the year they were implemented(Regulation Year).

Country	Total number of lead banks	Total number of SLL lead banks	Total number of sustainability agent banks	Regulation Year	Has Regulation Data
United States	170	42	12		
Taiwan	28	24	2	2008	Yes
Japan	28	20	5	2005	Yes
Spain	31	17	6	2012	Yes
Germany	44	17	7	2005	Yes
China	23	14	6	2008	Yes
Italy	31	13	4	2007	Yes
United Arab Emirates	16	10	3		
France	26	9	6	2003	Yes
United Kingdom	26	6	5	2006	Yes
Netherlands	16	6	3	1999	Yes
Austria	10	6	1		Yes
Australia	14	6	4	2005	Yes
Canada	15	6	5	2012	Yes
South Africa	8	5	4	2010	Yes
Russian Federation	10	5			
India	13	5		2012	Yes
Poland	9	5			Yes
Hong Kong	6	4	2	2016	Yes
Norway	6	4	2	2013	Yes
Bahrain	7	4	2		
Brazil	9	4		2012	Yes
Switzerland	16	4	2		Yes
Sweden	5	4	3	2009	Yes
South Korea	15	4			Yes
Portugal	6	4		2010	Yes
Kuwait	9	4			
Denmark	8	4	1	2009	Yes
Saudi Arabia	16	3			
Turkey	9	3			
Greece	3	3			
Malaysia	7	3	1		
Qatar	6	3			
Luxembourg	6	2			Yes
Singapore	4	2	2	2017	Yes
Mexico	5	2			Yes
Ireland	2	2		2008	Yes
Philippines	6	2			
Belgium	4	2	1		Yes
Indonesia	6	2			
Lebanon	1	1			
Jordan	1	1			
Finland	7	1		2011	Yes
Mauritius	2	1			
Thailand	10	1			
Togo	1	1			
Colombia	2	1			
Argentina	2				
Bangladesh	1				
Bermuda	1				
Chile	5				
Cyprus	2				
Egypt	6				
Fiji	1				
Gibraltar	1				
Hungary	3				
Israel	8			2011	Yes
Malta	1				
Nigeria	5				
North Korea	1				
Oman	4				
Pakistan	8				
Panama	2				
Peru	1				
Romania	2				
Serbia	1				
Slovenia	1				
Venezuela	1				

Appendix D.2. Calculation of the variable share_amount

Several of our measurements, such as *market_share*, *exposure*, and *total_hhi*, depend on accurately determining the volume of a bank's lending in a specific country within a given year. To construct those variables, we first calculate the *share_amount* variable, which represents the financial contribution of a bank within a specific tranche of a loan. This variable is calculated by multiplying two DealScan variables: *tranche_amount_converted* and *lender_share*. *tranche_amount_converted* represents the total dollar value of a tranche, while the *lender_share* indicates the proportional monetary involvement of each participating bank in that tranche.

When the *lender_share* variable is missing from DealScan, we employ an alternative method to estimate it. Because our primary focus is on lead banks, we calculate the *lender_share* by first taking the annual mean of the aggregate share percentages held by lead banks across all loan tranches for a specific year; this average is then divided by the total number of lead arrangers participating in each respective tranche, yielding the *lender_share*.

For illustration, consider a syndicated loan dated June 20, 2019, involving Barclays (lead arranger) and AccentCare Inc., where *lender_share* is not provided in DealScan. To estimate the *lender_share*, we first determine the average involvement of all lead banks in 2019, which stands at 67%. Next, this figure is divided by the number of lead banks in this specific tranche, in this case, 5. Consequently, the estimated *lender_share* for Barclays in this transaction is 13.4%. Finally, we multiply the estimated *lender_share* 13.4% by the *tranche_amount_converted* which is 355 ($ millions) to obtain the *share_amount*, of Barclays in this tranche-- 47.57 ($ millions).

We choose to use annual averages instead of country-specific annual averages to address the missing *lender_share* values for several reasons. First, relying on country-specific annual averages might result in inaccuracies due to a limited number of available *lender_share* data points at the country-year level. Our dataset comprises 274 unique country-years, with each unit representing a unique combination of a country and a year. In half of these country-years, there are fewer than 12 tranches for which valid *lender_share* data is available. Among the lowest 25% of these units, the number of tranches with valid *lender_share* data is as low as 4. This relatively small count at the lower quartile may lead to the presence of outliers, potentially introducing noise in our data analysis and predictions. Second, there is a noticeable consistency in the lead bank percentages over different years. This trend suggests that the shares held by lead banks in each tranche exhibit a stable characteristic, reinforcing the use of annual averages for more reliable estimations.

Appendix D.3. Summary Statistics of First Time SLLs

Table OA2: Summary statistics of first SLLs led by banks

This table presents the summary statistics for first-time SLLs and their matched conventional syndicated loans, using propensity score matching (PSM). The matching process uses loan-level attributes, including *tranche_active_year*, *tranche_amount_converted*, *tenor_maturity*, *relationship_loan*, *origination*, *public_borrower*, *has_performance_pricing*, and *is_foreign_bank*. The table summarizes three categories of SLLs: the first SLL led by a bank globally ("First SLL"), the first SLL led by a bank in a specific country excluding its first-ever SLL ("First SLL in a Country"), and all subsequent SLLs led by the bank ("All Other SLLs"). For each category, two matching approaches are performed. First, SLLs are matched to comparable conventional syndicated loans issued in the same country. Second, a stricter criterion is applied, matching SLLs to conventional loans issued by the same bank in the same country. The stricter matching reduces the sample size, as only a subset of the first SLLs meets these additional criteria. Mean differences are calculated as the difference in averages between first SLLs and their matched conventional loans. The reported statistics include means, standard deviations, mean differences, and p-values from t-tests to assess balance across covariates.

First SLL				PSM: conventional loans in the same country					PSM: conventional loans by the same bank in the same country				
	count	mean	std	count	mean	std	Mean Difference	p-value	count	mean	std	Mean Difference	p-value
tranche_amount_converted	112	633.919	564.300	112	626.873	729.943	7.046	0.936	87	623.718	749.056	22.259	0.827
all_in_spread_drawn_bps	112	156.031	129.383	112	233.281	151.199	-77.250	0.000	87	231.818	158.967	-74.399	0.001
tenor_maturity	112	50.920	22.866	112	60.688	47.170	-9.768	0.050	87	59.057	42.395	-5.448	0.288
relationship_loan	112	0.286	0.454	112	0.259	0.440	0.027	0.654	87	0.241	0.430	0.103	0.135
origination	112	0.804	0.399	112	0.768	0.424	0.036	0.517	87	0.759	0.430	0.011	0.859
public_borrower	112	0.607	0.491	112	0.429	0.497	0.179	0.007	87	0.471	0.502	0.115	0.130
has_performance_pricing	112	0.080	0.273	112	0.045	0.207	0.036	0.272	87	0.034	0.184	0.057	0.121
is_foreign_bank	112	0.527	0.502	112	0.607	0.491	-0.080	0.227	87	0.425	0.497	0.000	1.000

First SLL in a country (excluding first ever SLL by the bank)				PSM: conventional loans in the same country					PSM: conventional loans by the same bank in the same country				
	count	mean	std	count	mean	std	Mean Difference	p-value	count	mean	std	Mean Difference	p-value
tranche_amount_converted	429	826.670	962.642	429	682.234	1133.763	144.436	0.045	348	1046.871	1774.782	-155.836	0.157
all_in_spread_drawn_bps	429	148.932	125.701	429	242.957	190.954	-94.025	0.000	348	228.878	164.458	-76.390	0.000
tenor_maturity	428	54.661	39.923	429	52.238	42.638	2.296	0.416	348	63.626	45.816	-7.963	0.014
relationship_loan	429	0.382	0.487	429	0.347	0.477	0.035	0.288	348	0.405	0.492	0.029	0.443
origination	429	0.786	0.411	429	0.783	0.413	0.002	0.934	348	0.724	0.448	0.020	0.549
public_borrower	429	0.587	0.493	429	0.566	0.496	0.021	0.535	348	0.468	0.500	0.115	0.002
has_performance_pricing	429	0.107	0.310	429	0.114	0.318	-0.007	0.744	348	0.106	0.309	0.014	0.551
is_foreign_bank	429	0.921	0.270	429	0.818	0.386	0.103	0.000	348	0.905	0.293	0.000	1.000

All other SLLs				PSM: conventional loans in the same country					PSM: conventional loans by the same bank in the same country				
	count	mean	std	count	mean	std	Mean Difference	p-value	count	mean	std	Mean Difference	p-value
tranche_amount_converted	7628	890.2	1464.94	7628	780.659	1527.591	109.515	0.000	7307	939.889	1767.809	-26.417	0.329
all_in_spread_drawn_bps	7628	156.8	113.56	7628	193.387	155.365	-36.619	0.000	7307	191.637	151.078	-34.870	0.000
tenor_maturity	7616	61.4	51.37	7628	58.092	42.639	3.224	0.000	7307	57.149	34.970	4.866	0.000
relationship_loan	7628	57.8%	0.49	7628	0.585	0.493	-0.007	0.384	7307	0.548	0.498	0.039	0.000
origination	7628	68.4%	0.46	7628	0.696	0.460	-0.011	0.128	7307	0.664	0.472	0.008	0.308
public_borrower	7628	55.1%	0.50	7628	0.556	0.497	-0.005	0.536	7307	0.572	0.495	-0.030	0.000
has_performance_pricing	7628	14.0%	0.35	7628	0.143	0.350	-0.002	0.659	7307	0.145	0.352	0.000	0.981
is_foreign_bank	7628	54.5%	0.50	7628	0.509	0.500	0.036	0.000	7307	0.536	0.499	0.000	1.000