

# Collateralization, Monitoring, and Credit Reallocation<sup>\*</sup>

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## Abstract

This paper studies how lenders' ability to monitor collateral and mitigate frictions in collateralization affect credit outcomes. Exploiting law reforms that subject collateral monitoring to information frictions, I show that such reforms trigger credit reallocation from foreign to domestic lenders. Following the legal change, the moral hazard in monitoring collateral by foreign lenders increases. In response, foreign lenders decrease loan issuance and acceptance of movable collateral from treated firms, while increasing the use of covenants. The reallocation effects translate into a reduction in firms' employment and net income in the post-period. These results highlight the importance of friction associated with collateralization in shaping credit markets.

*JEL classification:* D8, G21, G33, K12, K22

*Keywords:* Collateral, Monitoring, Information Frictions, Credit Reallocation, Foreign Lenders

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“...Movable asset-based lending requires a series of enabling elements...where lenders are incentivized to extend credit while managing the risks associated with lending activities...”

– World Bank Group, 2020

## I Introduction

Since [Stiglitz and Weiss \(1981\)](#), the literature has uncovered the positive effects of collateral on debt contracting by alleviating ex-ante and ex-post information frictions ([Bester, 1985](#); [Boot and Thakor, 1994](#)). An important feature of collateralization is that it allows lenders to legally seize the liquidation value in the event of default. However, the liquidation value depends on how effectively lenders can monitor, repossess, and resell the collateral. Put differently, collateralization comes with costs stemming from the frictions experienced by the collateralization process itself.

This paper studies how the ability to monitor collateral and mitigate frictions in collateralization impacts credit outcomes. I exploit law reforms that *exogenously* subject collateral monitoring to information frictions and demonstrate that the reform can induce credit reallocation from foreign to domestic lenders. The results suggest that moral hazard in monitoring movable collateral increases for foreign lenders following the legal change. Foreign lenders further respond to reforms by decreasing loan origination, shifting loan collateralization away from movable assets and increasing the use of covenants, relative to domestic lenders. This has real effects on firms. Firms more exposed to the law ex-ante, i.e., borrowing more from foreign lenders, reduce employment and net income after the reform.

Starting from 1995, several European countries have reformed secured transaction laws and introduced non-possessory security interests over movable assets. The goal of the reform is to facilitate credit access by increasing the use of movable assets as collateral. However, movable assets differ from immovable assets in nature. Loans backed by movable collateral can be riskier than ones backed by immovable collateral for two reasons. First, movable assets are subject to agency concerns and have lower expected recovery rates relative to immovable assets ([Degryse et al., 2020](#)). Second, lenders cannot physically control the movable collateral, while borrowers can keep assets for daily operations. These two points together mean that lenders need to deal with it by monitoring the collateral intensively after the loan origination.

While monitoring helps manage the risk associated with moral hazard in movable collateral, not all types of lenders have the same ability to do so. Monitoring of collateral can include ongoing assessments and oversights of the collateral to make sure that it remains sufficient to cover the outstanding debt, which differs from monitoring debtor actions aimed at ensuring future repayment ([Mester et al., 2007](#); [OCC, 2014](#)). Importantly, collateral monitoring can suffer from information friction. This implies that foreign lenders will face a higher degree of information friction and have a lower degree of ability in monitoring relative to domestic lenders. The legal change leads to higher friction in monitoring movable collateral for both domestic and foreign lenders. Nevertheless, foreign lenders are more disadvantaged due to the greater physical distance. In contrast, domestic lenders enjoy the benefit of proximity and may find it

easier to monitor and inspect collateral.

I illustrate how information frictions play a role in collateral monitoring in the syndicated loans setting by presenting a simple theoretical framework following [Cao et al. \(2023\)](#). In this framework, the expected liquidation value of the collateral depends on asset pledgeability, ex-post monitoring intensity, and information friction between borrowers and lenders. In a syndicated loan, a lead arranger incurs the full cost of monitoring but only receives partially the recovered value of collateral if she does monitor. Hence, ex-ante there is a moral hazard among the lead arrangers and other participants. Because lenders lose physical control of movable assets that are subject to agency concerns, close monitoring becomes more important but is hindered when lenders face higher information frictions. As a result, given the same asset pledgeability, it is optimal for foreign lenders to monitor less if loans are backed by movable collateral because the expected recovery rates from such loans are lower relative to domestic lenders. The reduced ex-post monitoring efforts lead to an increase in demand for lead arranger shares ex-ante by participants to curb the possibility of shirking in monitoring. The result from the model is in line with [Park \(2000\)](#), which shows that a lender's incentive to monitor is maximized when he appropriates the full return from monitoring. It is also partly reflected in [Gryglewicz et al., \(forthcoming\)](#) showing that initial retention is non-monotonic in ex-post monitoring efforts.

Empirically, I combine law reforms with rich syndicated loan data that offers several advantages. First, granular loan-level data allows me to identify monitoring associated with individual loans and collateral. Second, shocks to collateral monitoring as the identification strategy enable me to capture collateral monitoring and filter out other unobserved factors that simultaneously influence information asymmetry and debt contracting. Third, the unique feature of syndicated loans provides a laboratory for gauging monitoring issues (see, e.g., [Ivashina, 2009](#); [Sufi, 2007](#)). Fourth, the richness of the data allows me to control for loan demand with firm-year fixed effects or loan fixed effects. The main assumption of adding loan fixed effects is that loan demand is likely to be homogeneous among lenders, a condition expected to hold in the syndicated loan setting. Additionally, I control for all observed and unobserved bank-specific determinants of lending by incorporating lender-year fixed effects. In contrast to studies focusing on the demand side and relying on firm-level information, I am able to examine the effects of secured transaction law reforms on credit supply. By relying on the syndicated loans setting, I focus on firms that can already access loan financing, enabling me to compare the degree of collateral monitoring before and after the reform.<sup>1</sup>

I start by analyzing the impacts of legal changes on collateral monitoring using a triple difference approach, which allows me to exploit variations along three dimensions: before versus after, treated versus control borrowers, and foreign versus domestic lenders. This is because firms in sectors with substantial movable assets are more affected by the law relative to firms in sectors with less movable assets. By the same token, domestic lenders require less effort to monitor movable collateral compared to foreign lenders. I follow the literature and measure collateral monitoring using (i) the likelihood of being a lead

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<sup>1</sup>As suggested by [Ongena et al. \(2022\)](#), the loan-level outcomes can only be compared for borrowers who borrow both before and after the reform. This holds for the setting in this paper. I can only compare the degree of collateral monitoring within syndicates issued to borrowers who borrow both before and after the reform.

arranger and (ii) the reported lead arranger share. These two proxies are able to capture *ex-ante monitoring commitment*, but not *ex-post monitoring intensity*. Still, the ex-post monitoring efforts are reflected in ex-ante monitoring incentives (Gryglewicz et al., forthcoming; Gustafson et al., 2021). I find that, after the law reform, when issuing loans to firms in treated sectors foreign lenders are approximately 7 percentage points (henceforth, pp) less likely to become a lead arranger and their loan shares increase by approximately 2pp if they are lead arrangers, which is 14% of the unconditional mean. The significance level and economic magnitude are robust to controlling for a set of fixed effects, using alternative samples, and employing different estimation methods. These results are in line with expectations. Due to high information frictions in monitoring collateral, foreign lenders are less willing to be the lead arrangers to avoid the monitoring responsibilities. Foreign lenders need to put more 'skin in the game' to signal that they won't shirk on monitoring.

I also rule out other explanations that may drive the effects on collateral monitoring. First, one could argue that it is not the country where a borrower is located that plays a role, but rather the country where a loan is syndicated. Indeed, the definition of the DealScan variable "Country of Syndication" is the country where the loan is syndicated, meaning that a loan is issued *under the law* of this country (Berg et al., 2021). To deal with this concern, I redefine the variable of measuring reform based on "Country of Syndication" rather than the borrower's country. The results remain largely unchanged and suggest that the only factor playing a role is whether the debtor can retain possession of the asset under the law of a given country, irrespective of the borrower's country or the country of syndication. Second, one concern can be that firms' incentive for strategic default may increase which increases lenders' incentive to monitor debtor actions. I argue that this is unlikely to happen because of two reasons. First, the default rates in the syndicated loan market are quite low.<sup>2</sup> Second, borrowers value assets more than lenders do, given the importance of those movable assets for production. Third, it might be possible that the risk of borrowers in treated sectors increased after the reform, subsequently leading to an increase in collateral monitoring within syndicates. I show that during the sample period, the risk levels of borrowers and monitoring of debtors in treated and control groups do not exhibit significant differences. In fact, the difference in borrower action or riskiness arising from the reforms cannot invalidate my results. This is because monitoring incentives should not differ between foreign and domestic lenders. Hence, the results from the triple difference strategy are attributed to the difference in collateral monitoring incentives.

After establishing that the law reforms increase moral hazard in collateral monitoring for foreign lenders, I analyze the effects of the legal change on credit outcomes. How do foreign lenders respond? Do they adjust their loan portfolios to avoid negative shocks in monitoring? To investigate potential credit reallocation effects, I conduct tests at both loan level, lender-firm level, and lender-sector level. The results suggest the reallocation effects are economically large. At the loan level, I find that borrowing from a syndicate with a foreign lead arranger ratio above the median after the reform reduces the loan amount by approximately 50%, relative to borrowing from a syndicate with a foreign lead arranger ratio below the

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<sup>2</sup>See Sufi (2007) for the overall default rates for the US syndicated loan market. There is no exact number for the overall default rate in the European syndicated loan market. The default rate for leveraged loans remains under 1.4% between 2015-2021. See, <https://www.fitchratings.com/research/corporate-finance/european-leveraged-loan-issuance-halved-in-2019-15-01-2020>.

median. Given the syndicated nature of the loan, I capture the notion of foreign in a loan using the ratio of the number of foreign lead arrangers over the total number of lead arrangers. At the lender-firm level, the loan issuance amount from a foreign lender to a treated firm decreases by roughly 7%-9% following the legal change relative to a domestic lender. At the lender-sector level, the fraction of loans granted to treated sectors within foreign lenders' overall loan portfolios decreased by 3pp relative to domestic lenders after the reform. Those results consistently indicate that the legal changes reshuffle between foreign and domestic lenders and induce reallocation effects of credit. Foreign lenders respond by adjusting their loan portfolios away from firms operating in treated sectors.

To substantiate the credit reallocation effects, I further provide evidence on collateralization and the use of covenants. The primary goal of the reform is to enhance the use of movable assets, which further raises a question: Do foreign lenders prefer movable assets as collateral after the reforms? The answer to this question can generate implications for legislators and benefits policy evaluation. Taking advantage of the data that provides information on collateral types, I am able to examine the effects of law reforms on loan collateralization. In particular, I conduct facility-level analysis and measure foreign lenders using a fraction of the number of foreign lead arrangers over the total number of lead arrangers. Surprisingly, I find suggestive evidence that for treated firms in packages (deals) with a higher proportion of foreign lead arrangers, the likelihood of pledging movable assets decreases by 25pp, relative to packages with a lower fraction of foreign lead arrangers. The results remain robust when controlling for demand shocks arising from the country-sector-year level. The reason behind such results is straightforward, following the previously established mechanism. Additionally, I explore the impacts on the use of covenants. If agency issues in movable assets concern foreign lenders, who are disadvantaged in gathering soft information, it is reasonable to hypothesize that foreign lenders will increase the use of covenants to prevent asset misappropriation. I find results consistent with this conjecture. At the extensive margin, a package with a ratio of foreign lead arrangers above the median, on average, has a 2pp-4pp higher likelihood of including covenants when issuing loans to treated firms after the reform relative to those packages that do not.

Does the reduction of lending by foreign lenders translate into impacts on firm outcomes and aggregate productivity? To this end, I examine the real effects of the secured transaction law reforms. The previous findings indicate that foreign lenders are more affected by the reform relative to domestic lenders, given that foreign lenders are more vulnerable to information frictions and are more prone to collateral monitoring. Consequently, firms that borrowed more from foreign lenders before the reform might be more affected compared to firms that borrowed less from foreign lenders. To test this hypothesis, I calculate firms' exposure to the reform based on the ratio of the amount of loans from foreign lenders to the amount of loans from all lenders before the reform. The findings show that firms operating in treated sectors, which borrow more from foreign lenders before the reform, experience approximately a 2% decrease in net income, and a 35% decrease in employment following the legal reform. I further examine the effects at the aggregate level following [Sraer and Thesmar \(2023\)](#). I do not find that the reforms led to changes in aggregate productivity while the average credit allocation did not change.

The identification strategy relies on the assumption that the timing of the legal change in a country is exogenous. I conduct several exercises to support the assumption. First, I estimate a hazard model to examine the timing of the reform by including a rich set of variables. I find that most macroeconomic variables, such as population, export, and import, play no role in determining the timing of the reform. Further, I include the country-level average of the propensity of being lead arrangers, lead shares, and firm characteristics as explanatory variables. I do not find evidence that these variables influence the timing of the reform. One could argue that the fraction of foreign banks in the banking industry could be a determinant since foreign banks have an incentive to lobby for postponing the reform to avoid a disadvantageous position after the reform. To test this, I employ data from [Claessens and Van Horen \(2015\)](#) to identify foreign versus domestic banks and compute a ratio of foreign banks. The results suggest that it has no impact on the timing of the reform. Second, I estimate the dynamic effects on treated firms. I do not find a significant difference in being lead arrangers and lead shares when granting loans to treated firms before and after the reform. Third, I estimate a stacked difference-in-differences following [Cengiz et al. \(2019\)](#). The estimates remain largely unchanged.

**Related Literature.** This paper contributes to several strands of literature. First, it relates to the broad studies on the role of collateral in financial contracting and credit supply. Since [Stiglitz and Weiss \(1981\)](#), the theoretical literature has shown collateral helps solve adverse selection [Bester \(1985\)](#) and moral hazard ([Boot and Thakor, 1994](#)). The empirical literature finds evidence supporting ex-ante theory ([Petersen and Rajan, 1994](#); [Degryse and Van Cayseele, 2000](#)) and ex-post theory ([Berger et al., 2011](#); [Jimenez et al., 2006](#)). In addition, the increase (decrease) in collateral value positively (negatively) influences credit supply ([Benmelech et al., 2005](#); [Cerqueiro et al., 2016, 2020](#)), and thus firm impacts outcomes ([Chaney et al., 2012](#); [Schmalz et al., 2017](#)). Within this strand of literature, a small set of papers focuses on the friction associated with collateralization process. For instance, [Assunção et al. \(2014\)](#) investigates how a simplified repossession process of the collateral can improve credit provision. [Calomiris et al. \(2017\)](#) finds that the creditors' ability to use movable assets as collateral affects bank credit supply. [Benmelech and Bergman \(2009\)](#) studies the role of redeployability of collateral in determining the cost of debt and suggests that the ability to pledge redeployable collateral increases firm debt capacity. This paper differs from these papers in two ways. First, I shed light on the role of information frictions in monitoring collateral, i.e., a lender's ability to effectively monitor encumbered assets. It pertains to frictions *before* entering liquidation, which is distinct from repossessing and redeploying the collateral that occurs *during* liquidation, as explored in [Assunção et al. \(2014\)](#) and [Benmelech and Bergman \(2009\)](#). This *micro-mechanism* is unveiled by highlighting how legal changes operate, thereby understanding the significance of reforms for the credit market and the real economy. Second, I focus on the role of *cross-lender* variations in monitoring for affecting lending activity rather than directly examining variations in aggregate lending *within* lenders. This is important in the sense that the coexistence of foreign and domestic lenders has implications for social welfare.

Second, this paper contributes to the ongoing debates about the policy that attempts to increase collateral supply. In a model, [Donaldson et al. \(2020\)](#) document that policy aiming at expanding collateral

availability can backfire, because increasing the supply of collateral can increase the need for collateral, by triggering a rat race. On the other hand, [Bernhardt et al. \(2020\)](#) suggests that the expansion of pledgeable assets can never hurt firms. This can be supported by empirical evidence from [Aretz et al. \(2020\)](#); [Campello and Larrain \(2016\)](#) among others. The main result of these two papers is that a larger collateral menu is associated with a firm's higher leverage ratio. One related paper is from [Ongena et al. \(2022\)](#) who study the effects of such policy on loan spread and argue that more collateral supply can improve intermediation but also raise costs. This paper is distinct from existing papers in two ways. I emphasize the role of financial frictions associated with the collateralization process and different types of lenders in policy design. The results suggest that information asymmetry in debt contracting can hinder policies from achieving their goals. Such frictions lead to no effects at the aggregate level because they trigger the reallocation of credit from foreign to domestic lenders. I did not find "unintended consequences" of the law on firm borrowing, as in the first strand of research. Instead, my results indicate that the law reforms unintentionally favor domestic lenders relative to foreign lenders, creating winners and losers. Additionally, I identify the effects of collateral monitoring using individual loans while controlling for demand and credit shocks. That is, I trace the effects from credit supply rather than demand. This approach contrasts with the investigations in existing papers that are often based on measures from borrower balance sheets.

Third, this paper extends research on how geographic distance affects lending techniques (e.g., [Agarwal and Hauswald, 2010](#); [Degryse and Ongena, 2005](#); [Keil and Müller, 2020](#)). Existing studies focusing on foreign banks' entry underscore geographical distance and information frictions they face (e.g., [Bruno and Hauswald, 2014](#); [Detragiache et al., 2008](#); [Sengupta, 2007](#)). [Beck et al. \(2018\)](#) show that foreign banks are more likely to ask for collateral than domestic banks because collateral helps to reduce credit risks. The findings from this paper provide a new angle to explain why foreign lenders are more sensitive to secured transaction laws because of collateral monitoring.

Last, this paper extends research on bank monitoring (e.g., [Besanko and Kanatas, 1993](#); [Datta et al., 1999](#); [Diamond, 1991](#); [Gustafson et al., 2021](#)). [Cerqueiro et al. \(2016\)](#) uncover the relationship between collateral value and monitoring and find that following the reform, banks reduce the assessed value of collateral and the frequency of monitoring. Two points are understudied in the existing literature. First, monitoring consists of monitoring debtors and collateral. In this regard, [Cerqueiro et al. \(2016\)](#) is the only paper that uncovers the relationship between collateral value and collateral monitoring. Second, monitoring itself can suffer from information frictions, which have implications for debt contracting and credit supply. This paper addresses these two points. It unbundles monitoring of debtors and collateral and studies the effects of frictions related to collateral monitoring.

The remainder of this paper is structured as follows. Section II describes the institutional background. Section III presents a simple theoretical framework. Section IV describes the data and statistics. Section V investigates the effects of law reforms on aggregate loan volumes. Section VI studies the effects of law reforms on collateral monitoring. Section VII and VIII present the empirical analysis on credit allocation and real effects. Section IX concludes.

## II Institutional Background

### A Before the Reform

In civil law countries, security interests over movable property were historically associated with dispossession as a means of perfection, i.e., the creditors need to physically possess encumbered assets to perfect security interests. This was because the value of movable assets can be easily misappropriated and could result in (i) the assets being undervalued by creditors or (ii) a misapprehension of a borrower's creditworthiness (Aretz et al., 2020). Furthermore, monitoring movable assets once they were transferred to third parties was difficult (Castellano, 2015). This so-called possessory security interest has the advantage that dispossession limits the scope for misleading ostensible ownership by protecting transparency (Morell and Helsen, 2014). The drawback is also apparent since it limits credit access by asking firms to relinquish assets they could not. Movable assets are rarely employed as collateral in these countries despite being recognized as an important type of collateral. Under the dispossession regime, it is legally feasible to use movable assets as collateral if they are willing to transfer the physical possession to lenders, while it is practically infeasible since those movable assets need to be deployed for their daily operations.

In response to the growing importance of movable assets in production and to mitigate the need for a dispossession form of perfection, policymakers implemented gradual legal adjustments without reforming the law.<sup>3</sup> The adjustments involve (i) a greater recognition of the enforceability of contractual arrangements, such as the retention of title, and (ii) enacting ad hoc legislative measures, permitting exceptions to the standard publicity in specific situations (Castellano, 2015). The example countries adopting the first way include Germany, which operates through the transfer of title (*Sicherungsübereignung*) rather than any observable act of publicity (Morell and Helsen, 2014).<sup>4</sup> By contrast, France and Hungary are example countries for adopting the second way. As mentioned in Aretz et al. (2020), there were 10 different nonpossessory security interests extended into certain trades or industries that can be legally identifiable. However, the complications and inconsistencies of ad hoc regulation significantly limit the use of movable assets for security interests and thus movable assets are barely employed in practice in the modern economy (Castellano, 2015). In Hungary, the exception applied to bank loans, rather than certain industries. Specifically, the dispossession over movable assets was not required for "charge securing a bank loan" but it was untenable after 1987 since it was criticized for lacking publicity and favoring banks (Csizmazia, 2008).<sup>5</sup>

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<sup>3</sup>In developing countries, 78% of firms' capital stock comprises movable assets, and this percentage is even higher for smaller firms (Ramalho et al., 2018). In the US, movable assets are the most important class of collateral, especially for small and medium-sized enterprises (SMEs). Calomiris et al. (2017) document that 63% of secured loans made to SMEs are collateralized by movable assets. Barbiero et al., (forthcoming) show that 77% of loans made to nonfinancial corporations in AnaCredit with single collateral between 2018-2022 are backed by "Other physical collateral." This collateral type includes any physical object other than real estate and gold. For more details about the collateral category in AnaCredit, see [https://www.ecb.europa.eu/pub/pdf/other/AnaCredit\\_Manual\\_Part\\_II\\_Datasets\\_and\\_data\\_attributes.en.pdf](https://www.ecb.europa.eu/pub/pdf/other/AnaCredit_Manual_Part_II_Datasets_and_data_attributes.en.pdf).

<sup>4</sup>The primary advantage of the transfer of title is that it only requires a symbolic delivery or precise description of the assets to make the public aware of and evidence the security (Thomson Reuters Practical Law). Germany is included in the control group. For more details about German secured transaction law, see Morell and Helsen (2014).

<sup>5</sup>The "charge securing a bank loan" was introduced by the Civil Code of 1959 and became untenable in 1987. For more details, see Csizmazia (2008).



## ***B Reforms in European Countries: Movable Assets as Collateral***

To make the movable property more effectively used as collateral and overcome the limitations of ad hoc legislative measures, policymakers amended the legal framework to allow registration as a means of perfection for loans secured by *stand-alone* movable assets.<sup>6,7</sup> That is, creditors do NOT need to physically possess encumbered assets to perfect security interests. This is a so-called nonpossessory security interest. Several European countries reformed the secured transaction law. Table A1 shows the overview of security interests in sample countries. For instance, France reformed the secured transaction law in 2006 by enacting Ordinance no 2006-346, which permits a pledge on any kind of tangible movable assets (*gage de biens meubles corporels*). Italy amended law decree n 59 of 3 May 2016, in which the law introduces the nonpossessory pledge (*pegno mobiliare non possessorio*). Eastern European countries, including Hungary, Romania, and Slovakia among others, reformed the secured transaction law, guided by the Model Law on Secured Transactions developed by the European Bank for Reconstruction and Development (EBRD).<sup>8</sup>

After the reform, the security right can now be created on individual movable assets and it is enforceable against third parties by registering the agreements in a public register. This means that movable assets can be employed as collateral while firms still physically possess them. In principle, the secured transaction law reform will be able to drastically increase firms' willingness to pledge movable assets, allowing firms to borrow more and expand firms' debt capacity. What is missing in this view is information asymmetry. For loans collateralized by movable assets, creditors would need to monitor the assets and ensure they are not transferred to third parties before the claim is settled. As argued by [Castellano \(2015\)](#),

*"...it is difficult to imagine that lenders would enter into nonpossessory secured transactions with the intention of mitigating credit risk without a legal mechanism that allows for both monitoring collateral and ensuring that priority can be enforced..."*

which underscores the significance of information asymmetry in evaluating the effects of reforming secured transaction laws that allow movable assets as collateral. Similarly, [Ramalho et al. \(2018\)](#) document that lending based on movable collateral often tends to be associated with higher credit risk due to information asymmetry compared to immovable-based lending for two reasons. First, movable assets are prone to misappropriation. This may pose challenges for lenders in maintaining effective control over collateral, particularly if the borrower is in financial distress. Second, assessing and accurately valuing

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<sup>6</sup>One needs to distinguish loans collateralized by one piece of movable asset from loans collateralized by a basket of assets or business value, i.e., floating lien/charge. The object of the floating lien covers a collection of assets that can fluctuate freely until bankruptcy, at which time the secured creditor's rights are "fixated", and whatever assets are part of the "business", as defined in the security agreement at that time, will primarily serve to satisfy the secured claim ([Morell and Helsen, 2014](#)).

<sup>7</sup>Perfection (perfect in verb) is a step in establishing security interests over collateral. It specifies how the security interests are publicly notified of creditors' claims over the collateral to make them legally recognized and enforceable against third parties. Before the reform, movable asset-based lending was not operational because legal systems require the physical delivery of the collateral to perfect security interests, i.e., dispossession of assets. Registration is a way to provide notice to the public and other creditors about the security interest. The purpose is to establish priority among creditors and to give notice to other parties that there is a claim against the specified assets. Four common methods of perfection include possession, filing or registration, control, and automatic perfection. For more details, see [https://uk.practicallaw.thomsonreuters.com/6-381-0551?originationContext=knowHow&transitionType=KnowHowItem&contextData=\(sc.Default\)&comp=pluk&firstPage=true](https://uk.practicallaw.thomsonreuters.com/6-381-0551?originationContext=knowHow&transitionType=KnowHowItem&contextData=(sc.Default)&comp=pluk&firstPage=true). Security interests that use registration as a method of perfection are called nonpossessory security interests since they do not require dispossession for perfection.

<sup>8</sup>The Model Law on Secured Transactions was published in 1994 to help Eastern European countries promote this type of pledge with the aim of harmonizing European private law. For more details, see <https://www.ebrd.com/downloads/legal/secured/enf.pdf>.

movable assets is more challenging. There might be potential information asymmetry between the borrower and the lender regarding the true value and condition of movable collateral.

Does a collateral registry help reduce the information asymmetry problems mentioned above? The answer is no. A public collateral registry can increase transparency on property rights and guard against the threat arising from *bona fide* asset purchases by a third party. This corresponds to the main concern of nonpossessory security interests that is the legal rights *in rem* might not be enforceable against everyone because the third parties can be misled (Gürsel, 2020). A collateral registry would be beneficial in addressing the problem of collateralizability, as in Donaldson et al. (2020). Still, creditors need to monitor the collateral to prevent its deterioration and to determine whether the value of collateral is fixed relative to the loan amount.

### *C Other Collateral and Perfection*

Loans secured with an individual piece of movable property differ from those secured with a collection of movable assets and/or over the entirety of the business's value (Hamwijk et al., 2014). A security interest of the latter is called a floating charge, which is a form of security interest over movable assets and is widely used in common law countries and Nordic countries. The group of assets included in the collateral is likely to change in value and composition over time. Furthermore, a mortgage is a form of nonpossessory security interest over movable assets in a country such as the Netherlands (Thomson Reuters Practical Law). The difference between a mortgage and a nonpossessory pledge is that the former requires the transfer of asset ownership to creditors, while the latter only concerns possession. I focus on the adoption of nonpossessory security interests over movable property in reformed countries, regardless of the types of interests. The reform provides more flexibility relative to a floating charge and transparency relative to the title transfer in using movable assets as collateral.

## **III Theoretical Framework**

To illustrate the economic intuition behind the collateral monitoring, I present a simple theoretical framework incorporating asset pledgeability, information asymmetry, ex-ante monitoring commitment, and ex-post monitoring effort. The framework follows Cao et al. (2023).

### *A Model Setup*

Consider a firm with a project but with no initial endowment and needs to obtain a syndicated loan with a unit of collateral for the project. With the probability  $p$ , the project succeeds and yields repayment 1, and with probability  $1 - p$ , it yields no repayments but one unit of the collateral that can be liquidated and reused for other firms.

For simplicity, I assume that there is *only one* lead arranger who needs to monitor this one unit of syndicated loan. The loan requires the lender to monitor the collateral with intensity  $m \in [0, 1]$ . Monitoring is costly, and the cost function is  $c(m) = \frac{cm^2}{2}$ . Let  $\lambda$  denote the fraction a lead arranger puts into a syndicated

loan, while  $1 - \lambda$  is the fraction participants put into the loan. The repayment of the loan is normalized to 1. The repayment to the lead arranger and participants will be  $\lambda$  and  $(1 - \lambda)$ , respectively. In the case of default, I assume that the lead arranger and participants will share the total liquidation value of the collateral, rather than share the amount of the collateral. Let  $V$  denote the revenue lenders obtain from liquidating collateral in the event of default. If default occurs, lead arrangers and participants will be able to repossess  $\lambda V$  and  $(1 - \lambda)V$ , respectively.

Specifically, I stipulate the liquidation value of the collateral by the following equation:

$$V(m, \theta, \beta) = m[\theta + (1 - \beta)(1 - \theta)].$$

Here,  $\theta \in [0, 1]$  denotes asset pledgeability. Higher values of  $\theta$  indicate immovable assets, including real estate and land, while lower values of  $\theta$  indicate movable assets, such as machines and equipment. Assets with high pledgeability will have a higher liquidation value. This is consistent with [Degryse et al. \(2020\)](#), which finds that movable collateral has a significantly lower expected liquidation value relative to immovable collateral.  $\beta \in [0, 1]$  captures the information asymmetry related to monitoring and collateral. The higher the value of  $\beta$ , the higher the degree of information asymmetry. Therefore,  $(1 - \beta)(1 - \theta)$  captures to what extent the lenders can extract the value difference depending on the information frictions. For instance, domestic lenders will have more information about the local market and may have higher liquidation value for the same asset relative to foreign lenders. Furthermore, the liquidation value depends on  $m$ . This is because more monitoring allows lead arrangers to accumulate information on collateral and benefit resell. This equation features that the expected liquidation value of the collateral depends on (i) monitoring, and (ii) the value that can be recovered from the part that can be diverted away from the collateral, which is a function of the information asymmetry between the borrower and the lead arranger. The variables used for calculating liquidation value for different regimes are summarized below:

	Liquidation Value	
	Before	After
Immovable assets	$\theta = 1$	$\theta = 1$
Movable assets	$\theta = 0$	$0 < \theta < 1, 0 < \beta < 1$

I assume that the loan and/or the borrower's project are uncorrelated with  $V$ .<sup>9</sup> I also rule out the possibility of strategic default because the collateral is normally valued more for borrowers than the creditors.

## ***B Before the Reform***

Before the secured transaction law reforms, firms either pledge immovable assets for a secured loan or do not borrow if they do not have qualified assets. For liquidating immovable assets and reselling them

<sup>9</sup>This assumption is for simplicity. [Barbiero et al. \(forthcoming\)](#) show that there is a correlation between collateral value and borrower type/industry.

to other firms, the information friction between a borrower and a lead arranger  $\beta$  does not enter the function. The reason is that the value of immovable assets is not subject to agency concern and thus no fraction of the asset can be misappropriated. Hence the liquidation value is not sensitive soft information about the collateral and does not depend on  $(1 - \beta)(1 - \theta)$ .

In this scenario, the lead arranger will solve:

$$\max_{m \in [0,1]} \left\{ \lambda p + \lambda(1 - p)V(m, \theta) - \frac{cm^2}{2} \right\}.$$

Solving this yields optimal ex-post monitoring:

$$m^* = \frac{1}{c} \lambda \theta (1 - p).$$

Here, it is clear that  $m^*$  is strictly increasing with  $\lambda$ . This implies that a lead arranger prefers to monitor more ex-post if she puts a higher share in the syndicate. On the other hand,  $m^*$  is a decreasing function  $c$ . This means that monitoring intensity will be lower for lenders with higher monitoring costs.

### *C After the Reform*

**Monitoring.** In a syndicated loan, a lead arranger incurs the full cost of monitoring but only receives partially the recovered value of the collateral if he does monitor. Hence, ex-ante there is a moral hazard among the lead arrangers and other participants. The reform introduces  $\beta$  into the total revenue lenders can obtain in the event of default by liquidating collateral after the reform. Because the loss of physical control of the collateral and movable assets are subject to agency concerns, the fraction of movable assets that can be diverted away increases. A higher degree of information frictions reduces the recovery of that fraction and thereby reduces the liquidation revenue of the collateral. This further disincentivizes lenders to monitor ex-post. This essentially amplifies the moral hazard in monitoring.

After the reform, a lead arranger will solve:

$$\max_{m \in [0,1]} \left\{ \lambda p + \lambda(1 - p)V(m, \theta, \beta) - \frac{cm^2}{2} \right\}.$$

Solving this yields optimal ex-post monitoring:

$$m^* = \frac{\lambda}{c} (1 - p) [\theta + (1 - \beta)(1 - \theta)].$$

Hence, after the reform, the ex-post monitoring intensity can be the same or lower for movable assets compared with immovable assets, depending on  $\theta$  and  $\beta$ . Furthermore,  $m^*$  is strictly decreasing with  $\beta$ , implying that a lead arranger prefers to monitor less if information asymmetry is higher.  $m^*$  is increasing with  $\lambda$ , which means that higher monitoring intensity can be achieved if the lead arranger share is higher.

**Demand of Lead Arranger Shares.** Given the ex-ante moral hazard in monitoring, the participants will demand lead arranger shares in the syndicate. Assuming the market is in perfect competition, the

participants will solve:

$$(1 - \lambda)p + (1 - \lambda)(1 - p)V(m, \theta, \beta) = (1 - \lambda).$$

It is easy to show that the demand for  $\lambda$  will increase as  $\beta$  and  $c$  increase. For lead arrangers who face higher information frictions, participants will ask for higher shares ex-ante to make lead arrangers more committed to ex-post monitoring. This is because a higher  $\beta$  reduces the difference in liquidation value of movable collateral and thus disincentivizes the lead arranger to monitor. The same reason holds for lead arrangers who have higher monitoring costs. Intuitively, it predicts that, even given the same degree of ex-post monitoring effort, foreign lead arrangers still need to have higher shares in syndicates relative to domestic lead arrangers.

**Supply of Lead Arranger Shares.** Moving to the supply of lead arranger shares, the lead arranger will solve:

$$\lambda p + \lambda(1 - p)V(m, \theta, \beta) - \frac{cm^2}{2} = 0.$$

In the Appendix F, I show that  $\lambda$  will increase as  $\beta$  increases. This is because even a higher  $\beta$  will reduce the liquidation value by reducing the recovery of the part that can be misappropriated. Nonetheless, as long as the benefit for the liquidation value is higher than the monitoring costs, the lead arranger is willing to supply shares. In addition,  $\lambda$  is decreasing with  $c$ .

Overall, this framework is consistent with the classical view of "skin in the game". It shows that foreign lenders, whose ex-post monitoring effort in movable assets is more subject to information asymmetry due to the legal change, need to put more shares ex-ante to convince other participants that they will not shirk monitoring after the loan origination.

## ***D Hypothesis for Testing***

Now I can summarize the implications of the framework to guide empirical analysis.

**Intensive Margin.** The law reforms introduce  $\beta$  into the function of the liquidation value of movable collateral. It is a clear disadvantage for foreign lenders issuing loans against movable assets following the legal change. A higher degree of information frictions faced by foreign lenders reduces the recovery of the fraction that can be misappropriated and thereby reduces the liquidation revenue of the collateral. This further disincentivizes lenders to monitor ex-post. As a result, the participants demand more shares ex-ante to curb the moral hazard in monitoring activities.

*Hypothesis 1:* The secured transaction law reforms lead to an increase in lead arranger shares for foreign lenders compared to domestic lenders when granting loans to firms in treated sectors.

**Extensive Margin.** The law reforms introduce  $\beta$  into the function of the liquidation value of movable collateral. This change poses a clear disadvantage for foreign lenders issuing loans against movable assets following the legal change. A higher degree of information frictions reduces the liquidation value

in default and, consequently, the total profit of issuing a loan. Moreover, a lead arranger only obtains a proportion of the liquidation value but incurs full monitoring costs. Consequently, the likelihood of being a lead arranger of a loan secured by movable assets will decrease for lenders with high  $\beta$  after the reform.

*Hypothesis 2:* The secured transaction law reforms lead to a decrease in the likelihood of being a lead arranger for foreign lenders compared to domestic lenders when granting loans to firms in treated sectors.

## IV Data

### A Sources and Variables

**Sample Country Selection.** I use borrower countries to identify the secured transaction law reform.<sup>10</sup> I collect countries' secured transaction law information from different sources, including the Secured Transactions Law Reform Project, Thomson Reuters Practical Law, and other academic publications. I am able to identify 8 European countries that reformed their secured transaction law and their corresponding time.<sup>11</sup> I also include 16 non-reformed countries as a control group. Importantly, all countries in the control group already have the nonpossessory security interest in place.<sup>12</sup> Figure 1 shows the map of sample countries. Table A1 and A2 provide detailed information on the reforms in sample countries.

**Corporate Loans.** I obtain syndicated loan data from the Refinitiv LoanConnector DealScan database (formerly LPC DealScan). This new database is provided as one table with all variables pre-merged, including information on lender parent, lender, borrower, deal, facility and pricing.<sup>13</sup> The unit of observation is at the individual loan level.<sup>14</sup> Typically, a syndicated loan consists of deals and facilities, and a deal can include several facilities. The DealScan database offers detailed loan information, including pricing terms such as all-in-spread-drawn, and non-pricing terms, including amount, maturity, and covenant. A loan is usually syndicated by lead arrangers and participants. Lead arrangers and participants in a syndicated loan have different functions, with the lead lenders being responsible for negotiating with the borrower ex-ante and monitoring ex-post, while the participants mainly provide credit. I follow the convention to clean the data. I only include deals that are closed and with lead arrangers. I drop loans with amendments following Roberts (2015). I only keep term loans and revolver loans following Berg

<sup>10</sup>This is intuitive since the law is initiated to facilitate firm credit access. It is in line with the law. For instance, according to UCC Article 9, the location of the debtor determines the perfection of nonpossessory security interests in the collateral. This is also in line with the literature Campello and Larrain (2016) and Aretz et al. (2020).

<sup>11</sup>Note that the year of reform is mostly identified by the year entering enforcement. For countries with missing information, I use the year of passage of the law.

<sup>12</sup>I manually check the secured transaction for each country in Thomson Reuters Practical Law and academic publications to see if the nonpossessory security interest is in practice or not. This means that I am focusing on whether movable assets can be used as stand-alone collateral in practice, regardless of how security interests over movable assets are created or perfected. For instance, nonpossessory security interests can be established by the acquirer acquiring possession through contractual means in Germany while they need to be registered in Belgium (Morell and Helsen, 2014). For countries with floating charges, the crystallization only concerns the control of assets rather than the possession. If the nonpossessory security interest is in place, I further look at the government's official website to identify when it is in place. Given that I do not find any change in the law over the sample period, I assume that the law was implemented before the sample period.

<sup>13</sup>For more information about the differences between LoanConnector DealScan and DealScan Legacy file, please see <https://wrds-www.wharton.upenn.edu/pages/support/manuals-and-overviews/thomson-reuters/wrds-reuters-DealScan/wrds-overview-on-DealScan-loanconnector/>.

<sup>14</sup>An individual loan refers to the contribution of a lender in the facility granted to a borrower.

et al. (2021). An important point here is that I assume that lenders will hold each loan on their books until the maturity date reported in DealScan (Gropp et al., 2019).<sup>15</sup>

One goal of this paper is to trace the effects of law reforms that expand collateral bases on monitoring. To this end, I follow the literature and measure monitoring at both the extensive and intensive margins, although these measures are not perfect. At the extensive margin, I create a dummy variable  $1(Lead)$  that equals one if a lender is the lead arranger of a facility and zero otherwise. At the intensive margin, I use the reported lead arranger share, *Lead share*. Two points discussed in the existing literature are relevant to my setting. The first one pertains to how to define a lead arranger. It was challenging to do so using the LPC DealScan database because there is no clear classification indicating the role of each lender. This problem can be resolved by using LoanConnector DealScan, which includes a variable called "Lead\_Arranger" specifying the names of lenders acting as lead arrangers. This allows me to determine the exact function of each lender and avoid any ambiguity. The second one concerns the reported loan shares among syndicated members. The most common method is to divide the loan amount equally among all members. However, this method is less likely to work well in my case, given that the lead lender's share is one of the key measures of the monitoring degree. Accordingly, I do not impute values for missing observations.<sup>16</sup> I conduct a series of exercises to validate my results and help with the interpretation. I define the year of the loan issuance as the year when a tranche/facility is active. I then use this information to identify whether a country has a new law in place when this new loan is issued.

**Movable Assets Index.** I postulate that the new collateral regime allowing nonpossessory security interests of movable assets matters more for firms operating in industries with a greater proportion of movable assets. To measure the degree to which an industry is exposed to secured transaction law reforms, I follow Campello and Larrain (2016) and create a movable assets index using US firms' balance sheet data from 1983 to 1994. The calculation steps are as follows. First, I calculate the movable assets index for each firm within a given year. It is computed as the ratio of the sum of machinery, equipment, and inventory, corresponding to Compustat variables: *ppenme* and *invt*, scaled by a firm's total assets. Next, I compute the movable assets index for each 2-digit SIC industry between 1983 and 1994. This index represents the average index for all firms within the industry over the entire sample period. Lastly, I assign an index to each industry included in the sample firms, regardless of firm nationality. I create a dummy variable, *Treated*, that equals one if an industry has a movable assets index above the median and zero otherwise.

The choice of index computation is based on the following reasons. First, as argued by Campello and Larrain (2016), using US firms as a benchmark assumes that firms in the US more closely utilize a desired mix of assets, including movables and immovables, in their production processes. Second, the exact information about movable assets in Compustat is only available for the years 1983-1996. This measure

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<sup>15</sup>Blickle et al. (2020) document that lead arrangers frequently sell their entire loan stake after origination, especially in the case of institutional loans. I restrict the sample to include only term loans and revolvers. Institutional loans represent a small proportion of the overall sample, reducing the likelihood of bias in the results.

<sup>16</sup>The observations with non-missing lender share account for 25% of the total observations. One way to deal with missing values is to compute a share by dividing the loan amount equally among all lenders with missing shares. The general finding is that this computation does not influence the results. The results are robust to this method.

offers several benefits. First, it allows me to capture the ex-ante industry characteristics regarding the use of movable assets after the reform. Second, by using US firms as a benchmark, I can control for differences among sample countries that may influence the use of movable assets in different industries.

**Firm Balance Sheets.** I focus on non-financial firms in sample countries and I exclude financial firms and utility firms with SIC codes 6000-6999 and 4900-4999. I am able to match DealScan borrowers to firms in Compustat using the table thanks to [Chava and Roberts \(2008\)](#). I lose many observations during this procedure, especially for small and/or unlisted firms. Nevertheless, this matching is important and necessary for two reasons. First, it allows me to obtain firm balance sheet information and control for firm observables that may influence outcome variables. Second, it enables me to study the real effects of the new collateral regime by examining changes in firms' balance sheets. Note that the linking table is constantly updated, and the latest version is from April 2018. I can not include the reformed country Belgium from the sample, as it cannot be included in the control group due to all countries in the control group using movable collateral in place.<sup>17</sup>

**Borrower and Lender Location.** I focus on loans issued by the universe of lenders in DealScan. This includes commercial banks, investment banks, financing companies, and other non-bank financial institutions. One concern of this choice is that the business model of different types of lenders may hinder the interpretation of the results.<sup>18</sup> I show that the results are robust to the case that only banks are included. I also run robustness checks to investigate which lenders are driving the results.

I identify borrower location using the country where a firm is legally registered based on Compustat variable: *fic*. I create a dummy variable *Reform* that equals one if a borrower's country reformed the secured transaction law in a year, and zero otherwise.<sup>19</sup> Furthermore, I identify lender location using the DealScan variable: *Lender\_Operating\_Country*. To exploit lender variations, I differentiate between domestic and foreign lenders. I create a dummy variable *Foreign* that equals one if the lender's location is different from the borrower's location, and zero otherwise. The variation of this variable comes from the geographic difference in a lender-borrower pair.<sup>20</sup> In this variable, I identify whether a lender is foreign relative to a borrower, rather than focusing on whether a lender lends to borrowers in different countries (a global lender) or only lends to borrowers where she is located (a domestic lender). It is consistent with the argument that a lender usually provides information to the lender's parent and is responsible for the monitoring ([Giannetti and Laeven, 2012](#)).

**Bank Ownership and Macroeconomic Variables.** I obtained bank ownership data from [Claessens and Van Horen \(2015\)](#), which is helpful in validating the assumption related to the law reforms. I also downloaded country-level macroeconomic variables and credit environment from the World Bank Database and Doing Business Reports.

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<sup>17</sup>I choose not to extend the linking table to the year 2019 to avoid any imprecision.

<sup>18</sup>The observations from non-bank financial institutions account for 5.6% of total observations.

<sup>19</sup>One concern here is about the multi-national firms that have subsidiaries borrowing in different countries. I deal with this issue by conducting a sub-sample analysis.

<sup>20</sup>Similar to [Cao et al. \(2023\)](#), using lender location instead of lender parent location helps me to capture the monitoring mechanism. I also do additional exercises to ensure the results are robust.



## B Summary Statistics

The final sample includes 1441 firms with 6675 facilities in 24 European countries from 1995 to 2017, one year prior to the date of the first reformed country and one year after the date of the latest reformed country. It consists of 59,831 individual loans. Table 1 provides summary statistics and statistics based on treatment status. In Panel A, I can see that the probability of being a lead arranger in a facility is 45% and a lender usually contributes 9% of the facility amount and 14.3% of the facility amount if she is a lead. Panel B shows that there are no noticeable differences in firm characteristics between firms operating in treated sectors and those in control sectors, except for the PPE (Property, Plant, & Equipment) ratio. Table B1 provides all variable definitions.

## V Reform and Aggregate Loan Volume

The first-order question following the law reforms is whether it boosts credit expansion. To answer this question, Aretz et al. (2020) and Campello and Larrain (2016) suggest positive effects of reforms on firm leverage (debt-to-assets) ratio. Instead, I examine the effects on individual loan volume, which is a granular measure of credit outcome. I estimate the following specification:

$$Y_{f,i,t} = \beta \text{Reform}_{c,t} \times \text{Treated}_s + \delta \text{Treated}_s + \gamma \text{Reform}_{c,t} + \mu' \mathbf{X}_{f,t} + \gamma' \mathbf{Z}_{c,t} + \text{FE} + \varepsilon_{f,i,t}, \quad (1)$$

where  $f$ ,  $c$ ,  $s$ ,  $i$ , and  $t$  denote firm, borrower country, sector, facility, and year, respectively.  $\text{Treated}_s$  is a dummy variable that equals one if a firm operates in a sector (defined at the 2-digit SIC level) with a movable assets index above the median value, and zero otherwise.  $\text{Reform}_{c,t}$  denotes a dummy variable that equals one if the borrower country, where a firm is registered, has reformed its secured transaction laws in a year, and zero otherwise. I restrict the years within a  $[-10,10]$  time window around the reform for reformed countries. I also include a set of firm controls  $\mathbf{X}_{f,t}$ , including firm size, debt ratio, PPE ratio, and current ratio. I also add a set of country-level controls  $\mathbf{Z}_{c,t}$ , including Domestic credit to private sectors (%GDP), GDP per capita growth, Export to GDP, Import to GDP, Inflation,  $\text{Ln}(\text{population})$ , and Population growth.

I first study the effects of the reforms on aggregate loan volume at the country level. I regress the outcome variable on  $\text{Reform}_{c,t}$  and  $\mathbf{Z}_{c,t}$ . Table 2 shows how the reforms affect the aggregate loan volume of all firms. The dependent variable is the total deal amount issued to a country  $c$  in year  $t$ . In Columns (1)-(2), I add country and year fixed effects. Following the reform, the total loan volume exhibits no significant changes, as shown by the insignificant coefficient in Column (1). This result remains after adding macroeconomic variables in Column (2). In Columns (3)-(5), I replace year fixed effects with region-year fixed effects to wipe out any difference across geographical regions.<sup>21</sup> Still, the estimates in Columns (3)-(4) show zero significance. I further include a variable to measure the cost of enforcing a

<sup>21</sup>Western European countries include Germany, France, United Kingdom, Belgium, Netherlands, Austria, and Ireland. South European countries include Spain, Portugal, Italy, and Greece. North European countries include Denmark, Finland, Iceland, Norway and Sweden. Central and Eastern European countries include Croatia, Czech Republic, Hungary, Poland, Romania, Slovakia, Slovenia, Ukraine, and Russian Federation. The classification is based on EuroVoc.

contract in Column (6). Not surprisingly, this variable is negatively associated with the aggregate loan volume. However, the coefficient of  $\text{Reform}_{c,t}$  remains insignificant.

To graphically illustrate the relationship between reforms and loan volume, I conduct a dynamic treatment estimation. I use  $[-10,10]$  around the reform year as the window and use one year before the reform as the base. Figure 2 Panel (a) shows that there is no significant difference in loan volume before the reform, neither changes after the reform. Panel (b) shows a similar result by comparing countries within a region and a year.

Next, I conduct a firm-level analysis to examine the effects of reforms on loan volume issued to individual firms. Table 1 Panel B presents the results. Columns (1)-(2) incorporate firm fixed effects and region-year fixed effects. However, the coefficient of the interaction term is not significant. I further use country-year fixed effects in Columns (3)-(4) to compare within a country and a year. Nonetheless, the estimates are not statistically different from zero. For firm characteristics, size and debt ratio are positively associated with the facility amount obtained in a year, while the current ratio is negatively associated with the outcome variable. Furthermore, I validate the parallel trend assumption and estimate the dynamics of the relationship between reforms and facility amount to a firm. Figure 3 confirms the results before and shows that on average reforms have zero effects on the loan amount.

The results above raise a question: Why do policies increasing collateral supply fail to facilitate loan volume for firms with more movable assets? One conjecture is that the law reforms trigger credit reallocation across foreign and domestic lenders. As noted before, lenders lose physical control over movable assets after the reform, and those assets are subject to agency concerns that require intensive monitoring. This is particularly challenging for foreign lenders due to the geographical distance, relative to domestic lenders. This can further disincentivize foreign lenders from lending to firms targeted by the reform. Accordingly, loan amounts issued to treated firms can remain unchanged after the reform because the potential increased lending by domestic lenders is accompanied by decreased lending by foreign lenders. In the following sections, I will study this collateral monitoring channel.

## VI Reform and Collateral Monitoring

In this section, I empirically examine how law reforms affect collateral monitoring heterogeneously across foreign and domestic lenders. The conjecture is that reforms permitting movable collateral make monitoring more sensitive to information frictions, thereby rendering ex-post monitoring less optimal for foreign lenders. Consequently, they may be less willing to act as lead arrangers; if they do, they need to make stronger ex-ante monitoring commitments.

### A *The Specification*

The identification strategy exploits the fact that the law reform induces variations in the degree of moral hazard in monitoring along three dimensions: borrowers (firms in sectors with high or low movable assets index), time (before versus after the law reform), and lenders (foreign lenders relative to domestic

lenders). Therefore, my identification strategy leverages the joint variation along all three dimensions. I estimate the following equation:

$$\begin{aligned}
Y_{l,f,s,t} = & \beta_{123} \text{Reform}_{c,t} \times \text{Treated}_s \times \text{Foreign}_l \\
& + \beta_1 \text{Reform}_{c,t} \times \text{Treated}_s + \beta_2 \text{Reform}_{c,t} \times \text{Foreign}_l \\
& + \beta_3 \text{Treated}_s \times \text{Foreign}_l + \boldsymbol{\mu}' \mathbf{X}_{f,t} + \boldsymbol{\gamma}' \mathbf{Z}_{i,t} + \text{FE} + \varepsilon_{l,f,s,t},
\end{aligned} \tag{2}$$

$Y_{l,f,s,t}$  is the proxy for collateral monitoring. I employ two measures: (i) a dummy variable that equals one if a lender is the lead arranger of a facility and zero otherwise,  $\mathbb{1}(\text{Lead})_{l,f,s,t}$ , (ii) lender shares conditioned on being a lead,  $\text{Lead share}_{l,f,s,t}$ .  $\text{Foreign}_l$  is a dummy variable that equals one if a lender has a different geographical location relative to a borrower, and zero otherwise. I also include a set of firm controls  $\mathbf{X}_{f,t}$ , including firm size, debt ratio, PPE ratio, and current ratio. Depending on the dependent variable, I add loan controls  $\mathbf{Z}_{i,t}$ , including loan amount, and maturity. The unit of observation is at the individual loan level.

One challenge in estimating such a specification is to isolate the demand-side shock from the supply-side shock. The granularity of syndicated loan data helps me address this issue by including a rich set of fixed effects. For all estimated models, lender-year fixed effects are included. Furthermore, I add country-sector-year fixed effects or borrower-year fixed effects to control for demand shock. In the most stringent specification, I add facility fixed effects. The main assumption is that loan demand is homogeneous among lenders, which is likely to hold in the syndicated loan setting. By adding facility fixed effects, I compare lenders lending to the same firm within a facility. Consequently, any changes in the outcome are attributed to lenders. Standard errors are clustered at the country level.<sup>22</sup> The coefficient of interest is  $\beta_{123}$ . I expect it to be negative when collateral monitoring is measured at the extensive margin while positive if it is measured at the intensive margin, indicating that the costs for foreign lenders on monitoring collateral from treated sectors increase after the law reform.

## B Main Results

I first examine the influence of law reform on the probability of becoming a lead arranger. Previous research has documented that foreign lenders face greater information frictions and are more sensitive to changes in secured transaction law and creditor rights (see, e.g., [Beck et al., 2018](#); [Haselmann et al., 2010](#); [Qian and Strahan, 2007](#)). If this holds true, I expect foreign lenders to be less likely to become lead arrangers when granting loans to firms with a high movable assets index in reformed countries.

Table 3 presents the results. The dependent variable is a dummy variable that equals one if a lender is a lead arranger in a facility, and zero otherwise. I first run a simple regression without controlling for supply and demand side factors. The result in Column (1) reports a negative and statistically significant coefficient. Next, I control for loan demand shock. Column (2) includes country-sector-year fixed effects to account for loan demand shock arising from the country-sector level. In Column (3), I augment the

<sup>22</sup>This is because the reform occurs at the country level. One concern is the presence of too few clusters. I show that the results are robust to different cluster methods. See Table D1 in the Appendix.

model by adding borrower-year fixed effects. Hence, I am looking at firms that borrow from two lenders. In both Columns (2) and (3), I include lender-year fixed effects to control for time-varying unobservables. Consistent with the expectations, the coefficient of the triple interaction term is negative and statistically significant. This indicates that after the law reform, foreign lenders are less likely than domestic lenders to become lead arrangers in facilities where firms operate in sectors with high movable asset index relative to firms in sectors with low movable asset index. In Columns (4) and (5), I progressively augment the model by adding facility fixed effects, respectively. The coefficients remain negative and statistically significant across all three specifications. In terms of magnitude, compared to domestic lenders, foreign lenders are approximately 7 pp less likely to become a lead after secured transaction law reform when granting loans to firms operating in treated sectors. This suggests that the law reforms make ex-post monitoring more difficult for foreign lenders and disincentivize them to take monitoring responsibilities ex-ante.

Next, I investigate the relationship between law reforms and lead arranger share within the facility, representing the extensive margin of monitoring. I am interested in whether the law reform requires more "skin in the game" when foreign lenders act as lead arrangers. To do so, I exclude all participants from the sample and only include lead arrangers. Table 4 reports the results. The estimate of the triple interaction term from a naive regression in Column (1) is positive and statistically significant, while I do not control for any demand-side shocks and lender unobservables. In Columns (3) and (5), in which demand shock is stringently controlled, the coefficients of the triple interaction term are positive and statistically significant. This suggests that after the law reform when foreign lenders act as lead arrangers, they need to contribute a higher share to syndicates when granting loans to treated sectors. The economic magnitude is substantial: compared to domestic leads, foreign leads' share increases by approximately 2 pp, which is about 14% of the unconditional mean, after secured transaction law reform when granting loans to firms operating in treated sectors. This is also intuitive because the difficulty in ex-post monitoring reduces foreign lenders' incentive to monitor. This implies a higher degree of moral hazard in monitoring and raises the monitoring commitment ex-ante.

Overall, the results consistently suggest that the law reforms allowing movable assets increase the ex-post collateral monitoring efforts in the syndicates where treated sector firms borrow from foreign lenders.<sup>23</sup> This is because the new regime makes monitoring more prone to information asymmetry, which can potentially be a problem for foreign lenders relative to domestic lenders due to higher distance-related frictions. Consequently, foreign lenders have less incentive to become a lead thus avoiding monitoring. If they are lead arrangers, they need to contribute higher shares to signal that they will take on the monitoring responsibilities.

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<sup>23</sup>The baseline results are estimated by OLS. To address the concern of observation imbalance, I also conduct a weighted least squares estimation. The results are reported in Table D5.

## C Identification Threats

### C.1 Timing of Law Reform: The Hazard Model

The variation of country timing in reforming secured transaction laws raises a concern about the exogenous nature of the reform. One could argue that the reforms might be driven by the economic environment. To mitigate such concerns and explain why countries reformed laws at different time points, I estimate the following hazard model at the country-year level:

$$\mathbf{1}(\text{Reform})_{c,t} = \phi(\delta' \mathbf{M}_{c,t} + \zeta' \mathbf{F}_{c,t} + \pi' \mathbf{C}_{c,t}), \quad (3)$$

where  $c$  denotes country,  $t$  denotes year,  $\mathbf{M}_{c,t}$ ,  $\mathbf{F}_{c,t}$  and  $\mathbf{C}_{c,t}$  represents average collateral monitoring degree, a range of aggregated firm characteristics, and a range of country characteristics, respectively. I estimate a hazard model with a hazard rate following a Weibull distribution. The dependent variable is the natural logarithm of the expected time to enter secured transaction law reform.

Table 5 reports the results. In Columns (1) and (2), I only include the proxy for collateral monitoring separately, and I find that the pre-existing collateral monitoring degree in a country does not predict the timing of reforming the law. In Column (3) I regress the dependent variable on two measures of collateral monitoring and in Column (4) I further add aggregate firm characteristics by averaging the value for all firms within a country in a year. Still, I do not find a significant role for pre-existing collateral monitoring degrees. Interestingly, the estimate of the aggregate level of PPE shows that PPE is a significant predictor of entry time. In Columns (5)-(7), I include macroeconomic variables to investigate whether the economic environment is correlated with the reforming time. The results in Column (7) show that most of the variables, including Domestic credit to private sectors (%GDP), GDP per capita growth, Export to GDP, Import to GDP, Inflation, Ln(population), and Population growth have no predictive power for reforming secured transaction laws. The result is intuitive in the sense that economic development varies substantially across several reformed countries. In Column (7), I also include a variable to capture legal origin, with French law as a dummy variable equal to one if a country's legal system originated from France. However, I do not find any significant evidence.

One could argue that the timing of the reform might be influenced by lenders. For instance, foreign lenders can engage in lobbying to delay the implementation date because they know the reform will not benefit them. Alternatively, domestic lenders want to implement the law sooner due to the information advantage they have. To rule out this possibility, I use lender ownership data from Claessens and Van Horen (2015) and examine whether the prevalence of foreign banks in a country is related to the timing of the reform. I re-estimate Eq.(3) where the explanatory variable is the fraction of the number of foreign banks over the total number of banks in a country. The result is displayed in Table 5 Column (8). The estimate suggests that the timing of the reform is not associated with the lender structure of the banking industry.

## C.2 Parallel Trend

The precondition for the DD analysis is the parallel trend, which requires treated firms and control firms to behave the same without policy implementation. To validate the parallel trend assumption, I investigate the monitoring in the syndicates lending to *treated sectors* before and after the law reform between foreign lenders and domestic lenders using dynamic DD regression:

$$Y_{l,f,t} = \sum_{n=-6, n \neq -1}^{n=2} \beta_n \text{Reform}_{c,n} \times \text{Foreign}_l + \text{FE} + \varepsilon_{l,f,t}, \quad (4)$$

where  $\text{Reform}_{c,n}$  includes a set of dummy variables that equals one when the reform is  $n$  (where  $n = -6, -5, \dots, -2, -1, 0, 1, 2$ ) years lead or lagged relative to new collateral regime implementation. I set the benchmark year  $n = -1$ . That is, I omit the time group one year before the law reform in order to set the estimated coefficients relative to the prior reform year. Note that  $\text{Reform}_{c,n}$  equals zero for all unreformed countries. I plot estimated coefficients for each year and examine whether they are statistically and significantly different from zero.

Figure 4 displays the coefficients for a dynamic treatment effects estimation. The dependent variables are the probability of being a lead, lender share, and lead arranger share, respectively. The estimated coefficients prior to the law reform are not significantly different from zero. This suggests that, before the law reform, there was no noticeable difference in the degree of collateral monitoring within the syndicates between foreign and domestic lenders when loans were granted to treated sector firms. Thus, I conclude that the parallel trend assumption holds.

## C.3 Stacked DD

The staggered nature of implementations of the new collateral regime across different countries raises concerns for the econometric analysis (Baker et al., 2022). To partially address these concerns, I follow the approach of Cengiz et al. (2019) and conduct a stacked difference-in-difference analysis. First, I create eight cohorts for eight reformed countries using a time window of  $[-10, 10]$ . Subsequently, I select control countries that already have nonpossessory security interests in place. Next, I re-estimate Eq.(2) by stacking all eight cohorts. It is important to note that in the regression, the fixed effects are at the cohort level, and robust standard errors are clustered at the cohort-country level. The results are reported in Table C1. The coefficients in all specifications closely align with those in the baseline regressions. This finding is helpful in alleviating concerns regarding the estimation arising from such a staggered setting.

## D Cross-section Heterogeneity of Foreign Lenders

The previous results suggest that the law reform increases the collateral monitoring for syndicates where foreign lenders lend to firms in treated sectors. In this subsection, I further explore cross-sectional variations along different dimensions for lenders and borrowers. To this end, I investigate whether the effect of the law reform is driven by foreign lenders who (i) face higher information frictions and (ii) lend to reformed countries with weaker creditor rights protection. To measure the degree of information asym-

metry between lenders and borrowers, I employ two proxies: (i) the preexisting relationship and (ii) the depth of information sharing in borrower countries. I implement this by replacing the dummy variable  $Foreign_l$  in the baseline equation with a variable  $H_l$  that captures the dimensions of geographic locations and heterogeneity between the lender and borrower simultaneously.

**Preexisting Relationship.** The role of relationship lending in mitigating information frictions between borrowers and lenders has been extensively studied in the literature (see Degryse et al., 2009 for a review). To test whether relationships help lenders alleviate concerns regarding collateral monitoring, I measure relationship intensity using the *preexisting relationship length*. This length is calculated as the number of years between the current loan origination date and the first loan origination date for a firm and a lender.  $H_l$  is a dummy variable that equals one if a lender is foreign and its relationship intensity with a borrower is below the median. My focus is to examine whether the effects of law reform on collateral monitoring are driven by foreign lenders lending to transactional borrowers.

Table 6 Columns (1)-(2) present the results.<sup>24</sup> Consistent with expectations, the estimates show that the effect of law reform on collateral monitoring for foreign lenders is driven by foreign lenders with transactional borrowers. For instance, Column (1) suggests that after the reform, when a foreign lender issues new loans to a firm that has a weak previous relationship in treated sectors, this lender is less likely to be a lead arranger. Economically, foreign lenders with relationship borrowers in treated sectors have a 10.3 pp higher likelihood of becoming a lead arranger. Furthermore, Column (3) reveals a significant role in the preexisting relationship between lenders and borrowers. It indicates that compared to foreign lenders issuing loans to relationship firms in the treated sectors, foreign lenders have a larger lender share when issuing loans to transactional borrowers following the legal change. The results are in line with previous literature that highlights the importance of relationship lending in alleviating information frictions and helping with monitoring.

**Legal Rights.** Existing studies underscore the significance of creditor protection within a country in improving credit market outcomes. It is plausible that the impact of the law reform on collateral monitoring is driven by lenders who provide loans to borrowers in countries with weak legal rights. Weak creditor rights give rise to concerns about enforcement and liquidation in the event of default. Foreign lenders might take this into account considering that it is more difficult to monitor movable collateral. Accordingly, foreign lenders may exhibit even greater aversion to lending in such countries. I explore whether this argument holds true by examining the role of legal rights in the borrower's country. Specifically, I investigate whether foreign lenders lending to firms in the treated sectors of reformed countries are less likely to assume the role of a lead arranger when the borrower's country possesses weak legal rights. To measure a country's legal rights, I employ data from the World Bank Doing Business report, which provides a strength of the legal rights index covering the years 2004 to 2017.<sup>25</sup> This index ranges from 0 to 10/12, with higher scores indicating stronger legal rights within the country. Subsequently, I create a dummy variable  $H_l$ , which equals one if a lender is foreign and its borrower is located in a

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<sup>24</sup>For brevity, I only present the coefficients of the triple interaction term. I include all variables in the regression.

<sup>25</sup>I have to lose observations of countries that reformed the law before 2004.

country with a legal rights index below the median value.

The results are presented in Table 6 Columns (3)-(4). In Column (3), the estimated coefficient of the triple interaction term is negative and statistically significant. This suggests that when a foreign lender issues loans to firms in the treated sectors operated in a country with weak legal rights after the reform, it is less likely to become a lead arranger. The estimate in Column (6) shows that the effect of law reform on higher shares of lead arrangers is driven by foreign lenders with borrowers operating in countries with weak legal rights. This finding suggests that stronger creditor protection helps alleviate concerns regarding the enforcement of movable collateral in case of defaults and may substitute monitoring activities.

**Credit Information Depth.** One scenario in which the impact of law reform on collateral monitoring is more pronounced is when lenders lend to countries with low credit information depth. Theory suggests that information sharing on borrower credit information assists in reducing adverse selection and moral hazard (Jappelli and Pagano, 2002; Padilla and Pagano, 1997).<sup>26</sup> The information from public credit registries can be important for foreign lenders due to their lack of knowledge of the local credit market. Compared to domestic lenders, foreign lenders are less likely to collect "soft" information, leading to a greater reliance on "hard" information Beck et al. (2018). To measure a country's credit information depth, I again employ data from the World Bank Doing Business report. In the report, the depth of credit information index measures the coverage, scope, and accessibility of credit information available through credit reporting service providers such as credit bureaus or credit registries (World Bank). This index ranges from 0 to 6/8, with higher scores indicating deeper credit information within the country. For regression, I create a dummy variable  $H_i$ , which equals one if a lender is foreign and its borrower is located in a country with a credit information depth index below the median value. The results are presented in Table 6 Columns (5)-(6). I find that the increase in collateral monitoring due to the law reform is driven by foreign lenders that lend to treated sector borrowers in countries with low credit information depth. For instance, the coefficient in Column (5) means that after the reform, when a foreign lender issues new loans to a firm in a reformed country, it is less likely to take on the role of a lead arranger if the borrower is in a low information sharing environment. Moreover, at the intensive margin, the estimate from Column (6) suggests that foreign lenders need to put a larger share in the syndicate if they are lead arrangers when they lend to borrowers located in countries with lower scores of information sharing. These findings are in line with the expectations and consistent with literature that emphasizes the crucial role of information sharing and how it boosts foreign lenders' entry and participation Detragiache et al. (2008).

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<sup>26</sup>The effects of information sharing on credit outcomes through moral hazard are inconclusive in the literature. Information sharing has disciplinary effects on loan repayments and reduces access to credit for risky borrowers Padilla and Pagano (2000). On the other hand, sharing positive information might reduce borrowers' incentive to exert effort since borrowers know that lenders can access it. The results might suggest that, for foreign lenders, the negative effects of sharing credit information could be outweighed by the positive effects.



## *E Exclude Alternative Explanations*

### **E.1 Syndication Location**

One concern about my setup is that the law of the borrower's country doesn't play a role, whereas the law in the syndicating country does. The definition of DealScan variable "Country\_of\_Syndication" is the country where the loan was syndicated, meaning that a loan is issued under the law of this country (Berg et al., 2021). Suppose a French firm borrows from a US bank syndicated in the UK in 2004. Although nonpossessory security interest is not valid in France, it does not concern the lender because the law will apply to a firm based on the UK regime, where nonpossessory security interests are allowed. If this is the case, the monitoring efforts and costs do not bother lenders because they already needed to increase monitoring efforts before the reform. The lender may reduce lending to French firms after the 2006 reform because it might be more familiar with the UK regime. This could also invalidate the results.

I do two exercises. First, I remove all observations where the borrower country and country of syndication are different and re-estimate Eq.(2) to examine whether the results still hold. I find that the estimates shown in Table C2 remain largely the same. Second, I redefine  $\text{Reform}_{c,t}$  based on "Country\_of\_Syndication" rather than the borrower's country. The definition of  $\text{Foreign}_i$  remains the same because it measures the geographical distance between borrowers and lenders that matters for monitoring. Table C3 reports the results. It suggests that the only factor that plays a role is whether the debtor can retain possession of the asset under the law of a given country, irrespective of the borrower's country or the country of syndication.

### **E.2 Borrower Quality**

Another possible explanation for the results is that the risk of borrowers in treated sectors increased after the reform, subsequently leading to an increase in collateral monitoring costs within syndicates. This would imply that the rise in costs of monitoring collateral cannot be solely attributed to the law reform but rather to a deterioration in the risk profiles of treated sector firms. Additionally, this could motivate (foreign) lenders to reduce their loan origination from treated sectors.

However, because I lack access to internal ratings assessed by lenders and default rates for borrowers, I present a plot of the average "All\_In\_Spread\_Drawn" across all firms in both treated and control groups during the sample period. The literature typically categorizes borrowers as risky based on their loan spreads. If a firm has a relatively high loan spread, such as being in the 75th percentile of all firms, it is considered risky. Figure B2 illustrates that there is no significant difference in loan spreads between borrowers in treated sectors and control sectors. This suggests that it's unlikely for treated sector firms to have become riskier following the legal change.

### **E.3 Lender Locations and Parents**

The measure  $\text{Foreign}_i$  is at the lender level rather than the lender parent level; hence, it does not account for cases where lenders are foreign relative to borrowers while their parents are in the same countries

as the borrowers. There might be reasons unknown to researchers that cause foreign lenders to be less willing to act as lead arrangers and to have higher shares in syndicates when they do act as lead arrangers. To address such concerns, I undertake two additional exercises. First, I re-estimate Eq.(2) by only including loans where lenders are in the same location as their parents. This allows me to examine cases where lenders are foreign and cannot obtain local information from their parents. Table C4 presents the results. The estimates remain quantitatively the same as those in the baseline results. Second, I redefine  $\text{Foreign}_i$  as a dummy variable that equals one if a lender parent is not in the same country as the borrower in the syndicate, and zero otherwise. That is, the measure is now at the lender parent level rather than the lender level. Next, I investigate whether foreign lender parents overcome the challenges in monitoring by issuing loans through domestic subsidiaries if they have both foreign and domestic subsidiaries (lenders) relative to the borrowers. I exclude loans that are directly issued by a lender parent. Results are shown in Table C5. The dependent variable is a dummy variable that equals one if the loan originated from a subsidiary of a lender parent where this subsidiary is located in the borrower's country. The coefficient of the triple interaction term is positive and statistically significant at the 1% level across three specifications. This indicates that the concern about higher monitoring efforts ex-post for foreign lenders is taken into account by the lender parent. Consequently, a foreign lender parent is more likely to originate loans through local subsidiaries to offset the informational disadvantages after the reform relative to a domestic lender parent.

## *F Robustness Checks*

I conduct a battery of robustness checks to further validate the baseline results. Table C6 reports the results. In Panel A, I recheck baseline results using alternative samples. First, I only include firms from one reformed country, France, which observations account for a large proportion of the sample. Table C6 Columns (1)-(3) show the results. The estimated coefficients remain largely the same after controlling for loan demand and loan supply shocks. Second, I only include firms from eight reformed countries. This allows me to focus on countries that did not have nonpossessory security interests in the first place and help remove any systematic differences between reformed and unreformed countries. The estimates in Columns (4)-(6) remain largely unchanged. Third, I remove all UK and Ireland firms from the sample. One concern is that the legal systems in these two countries are common law, which can differ from civil law countries in some dimensions.<sup>27</sup> I find that the coefficients in Columns (7)-(9) became economically larger but remained statistically significant.

In Panel B, I address concerns about data structure. First, I rerun regressions using data at the deal level. The unit of observation corresponds to the contribution of a lender in a deal. The results in Columns (1)-(3) remained largely unchanged. Second, I manually compute lender shares for lenders with missing information. For loans with information on shares of all lenders, I used the reported loan shares for the corresponding lenders. For loans with reported share information of a limited number of lenders, I

<sup>27</sup>Although the legal system in Scotland is a combination of civil law and common law, I still remove all UK observations for simplicity.

follow [De Haas and Van Horen \(2013\)](#) and divide the loan amount equally among the syndicate members after deducting loan amounts of lenders with reported lender share. The coefficients in Columns (4)-(6) are still consistent with the baseline results. Third, I extend the time window for the reformed countries. Specifically,  $\text{Reform}_{c,t}$  denotes a dummy variable that equals 1 after the country where a firm is registered has reformed its secured transaction laws and 0 otherwise. This alternative definition allows me to study whether and how the costs of collateral monitoring in the syndicate increased or decreased after the reform within the long-term period. Still, the results in Columns (7)-(9) remained quantitatively and economically similar.

I also explore the heterogeneity across different types of loans. In Table [C7](#) Columns (1)-(6), I investigate whether the association between law reform and collateral monitoring for foreign lenders differs between term loans and revolver loans. The results show a reduction in the probability of being a lead hold for both term loans and revolver loans. However, the positive coefficient on the triple interaction term, when the dependent variable is lender share, only survived for revolver loans. This is consistent with the fact that revolver loans are riskier than term loans. When the dependent variable is the lead lender share, the previous results did not hold for either loan type. In Columns (7)-(12), I focus on the heterogeneity of loan purpose. Following [Ivashina and Scharfstein \(2010\)](#) and [Giannetti and Laeven \(2012\)](#), I identified loans as real investment loans if their primary purpose was listed as "general purposes," "working capital," or "capital expenditures." [Chodorow-Reich \(2014\)](#) documented that those loans with corporate purposes are important for firms' real effects. I find that for real investment loans when lenders are foreign relative to a borrower in a reformed country, they are less likely to become a lead. I do not find evidence suggesting a higher lender share and lead lender share for issuing real investment loans. For other loans, the results suggest that it is likely the law reform makes collateral monitoring within the syndicate more costly. The coefficients of the triple interaction term were positive and statistically significant in Columns (11) and (12). For other results about robustness checks, see the [Appendix D](#).

## VII Reform and Credit Reallocation

The previous results consistently suggest that the collateral regime allowing movable collateral increases collateral monitoring in syndicates where foreign lenders lend to domestic borrowers. Specifically, I find that foreign lenders issuing new loans to firms operating in sectors with a high movable assets index are less willing to take on the role of lead arrangers. If they choose to be lead arrangers, they need to have higher shares in the syndicates, i.e., more skin in the game. In this section, I examine how the collateral monitoring issue induced by the law reform influences loan collateralization, terms, and lender portfolio allocation.

### A Credit Reallocation

The analysis in Section [VI](#) confirms that foreign lenders consider the secured transaction law reforms as a negative shock to the monitoring of movable collateral. How do foreign banks respond? The pre-

vious results suggest that foreign lenders decrease their acceptance of movable collateral. Still, how do they adjust lending to those treated firms? I postulate that the reform will trigger a credit reallocation from foreign to domestic lenders because monitoring movable collateral is more challenging for foreign lenders relative to domestic lenders than before. I will begin with the loan-level analysis and then move to the lender-firm-level analysis.

### A.1 Facility Level

I have already shown in Figure 3 that the loan volume treated and control firms could get did not differ from each other before the reform. Also, I do not find evidence that the law reforms successfully increase the loan volume treated firms could get. As a next step to analyze the credit reallocation effects, I estimate the following equation using facility-level data.

$$\begin{aligned}
Y_{f,i,t} = & \beta_{123} \text{Reform}_{c,t} \times \text{Treated}_s \times \text{High Foreign}_i \\
& + \beta_1 \text{Reform}_{c,t} \times \text{Treated}_s + \beta_2 \text{Reform}_{c,t} \times \text{High Foreign}_i \\
& + \beta_3 \text{Treated}_s \times \text{High Foreign}_i + \boldsymbol{\mu}' \mathbf{X}_{f,t} + \boldsymbol{\gamma}' \mathbf{Z}_{i,t} + \text{FE} + \varepsilon_{f,i,t}.
\end{aligned} \tag{5}$$

The challenge in examining the reallocation effects using loan-level data lies in capturing the degree of "foreign" in a syndicate. I follow the convention of calculating, for each syndicate, the fraction of the number of foreign lead arrangers over the total number of lead arrangers. This method takes into account the fact that only lead arrangers will take on the monitoring responsibility but ignores the potential coordination among lead arrangers. Further, I categorize ratios into two groups based on the median. Therefore,  $\text{High Foreign}_i$  is a dummy variable that equals one if the ratio of the number of foreign lead arrangers over the total number of lead arrangers within a package  $i$  is above the median, and zero otherwise. I include a rich set of fixed effects to saturate the model.

Table 7 presents the results. The dependent variable is the natural logarithm of the facility amount converted to US dollars. In Columns (1) and (2), I include both country-year and sector fixed effects to control for time-varying cross-country differences and unobserved sector heterogeneity. The coefficients in both specifications are negative and statistically significant. I further replace sector fixed effects with sector-year fixed effects to control for demand arising from the sector level. The estimates in the two columns are of similar magnitude and statistically significant at the 1% level. In Column (5), I use borrower-year fixed effects to directly control for loan demand arising from the firm level. This reduces the sample since only firms that have at least two facilities within a year will remain. Still, the coefficient is highly significant. These results show a large economic magnitude of loan amount reduction. On average, borrowing from a syndicate with a foreign lead arranger ratio above the median after the reform reduces the loan amount by approximately 50%, relative to borrowing from a syndicate with a foreign lead arranger ratio below the median.

## A.2 Lender Firm Level

The findings so far indicate reallocation effects at the loan level. However, one could argue that the measure of "foreign" is noisy since it incorporates coordination factors among all lead arrangers. Accordingly, the behavior is not solely determined by the individual foreign lender. It is still natural to ask how credit is allocated and whether reallocation effects exist at the lender-firm level following the legal change. To this end, I estimate the following equation:

$$\begin{aligned}
 Y = & \beta_{123} \text{Reform}_{c,t} \times \text{Treated}_s \times \text{Foreign}_l \\
 & + \beta_1 \text{Reform}_{c,t} \times \text{Treated}_s + \beta_2 \text{Reform}_{c,t} \times \text{Foreign}_l \\
 & + \beta_3 \text{Treated}_s \times \text{Foreign}_l + \text{FE} + \varepsilon.
 \end{aligned} \tag{6}$$

I use two dependent variables. First,  $Y_{l,f,c,s,t}$  denotes the amounts of *new loans* from a lender  $l$  to a borrower  $f$  in sector  $s$  in country  $c$  in year  $t$ . Second,  $Y_{l,c,s,t}$  is the ratio of the amounts of *new loans* granted by lender  $l$  to sector  $s$  in country  $c$  in year  $t$  over the total amount of new loans granted by a lender to all sectors in a country in a year. Calculating individual loan amounts requires information on lender shares. Given the limited coverage in DealScan, I follow the literature and manually compute lender shares for lenders with missing reported share information. More specifically, for lenders with no reported lender share, I divide the loan amount equally among all lenders after deducting the amount from lenders with reported shares. I further incorporate rich fixed effects into the model. I include country-sector-year fixed effects to eliminate any credit demand arising from the country-sector-year level that may influence loan allocation. I add lender-year fixed effects to control for time-varying cross-bank differences. This will only leave banks with lending to at least two different firms in a year. For some specifications, I include borrower country-lender country fixed effects, allowing me to exploit variations *within* a borrower-lender country pair and control for endogenous matching between two countries.

Table 8 Panel A reports the results where the dependent variable is the amount of all facilities issued from a lender to a borrower in a year. In Columns (1)-(2), I examine the overall loan allocation across different sectors, regardless of loan types. The coefficients of the triple interaction term are negative and statistically significant. The reallocation effect is economically large: the loan issuance amount from a foreign lender to a treated firm decreases by roughly 7%-9% following the legal change relative to a domestic lender. Next, I categorize loans based on their types and examine whether the effects on loan reallocation are driven by loan types. In Columns (3)-(4), I only include term loans. I find negative coefficients of the triple interaction term in both specifications, indicating that the overall results in Columns (1) and (2) are primarily driven by term loans. This highlights the risk associated with term loans, where loan terms are predetermined. Foreign lenders are more exposed to monitoring difficulty in these loans due to their inability to readjust loan terms based on the degree of collateral diversion ex-post. In Columns (5)-(6), I only include revolver loans. However, I do not find any significant results. This suggests that collateral monitoring concerns may be more relevant for term loans compared to revolver loans. This intuition stems from the flexibility advantage of revolvers, enabling foreign lenders to assess the collat-

eral risk and make adjustments accordingly. Table 8 Panel B presents the results where the dependent variable is the fraction of loan issuance amount to one sector over by the total loan issuance amount to all sectors. Consistent with the finding in Panel A, I find the reallocation effects, which are driven by term loans. In terms of the economic magnitude, I see an approximate 3 pp relative difference between foreign and domestic lenders in the share of loan issuance to treated sector firms after the law reform. The findings from this and the previous subsection help explain the insignificant results in Section V. The legal change inadvertently disadvantages foreign lenders by making ex-post monitoring more cumbersome for them, thereby disincentivizing them to lend against movable collateral as well.

## B Collateralization and Covenants

### B.1 Collateralization

One question naturally arises following the increased collateral monitoring in the credit market: Do firms still collateralize loans with movable assets? The answer to this question is crucial for helping me analyze the effect of legal reform, whose primary goal is to increase the collateral scope. To examine the effect of the law reform on loan collateralization, I perform a sub-sample analysis using packages (deals) with collateral information. The LoanConnector DealScan database provides collateral types for each package, although the coverage is not high.<sup>28</sup> To maximize the coverage of observations, I do not link the sample with Chava and Roberts (2008), and therefore, I do not have borrower controls.<sup>29</sup> Accordingly, the definition of lender and borrower locations will differ from the baseline analysis.

Table 9 provides an overview of the sample with different collateral types. Among 597 packages, property & equipment, all assets (i.e., floating liens), and others are mostly used as collateral, corresponding to 24.96%, 23.28%, and 19.43% of the sample. Packages backed by accounts and inventory, cash and marketable securities, and intangibles account for fewer in the overall sample. Figure B1 further illustrates sample characteristics. Panel (a) shows the dynamics of package amounts backed by movable assets and other assets. It is noteworthy that the total amount of loans collateralized by movable assets is significantly less than that collateralized by other assets. This seems consistent with the notion that loans are smaller for movable collateral Degryse et al. (2020). Panel (b) demonstrates how the number of packages in the sample is differently distributed among treated and control groups. Compared with the control group, treated sector firms have more loans backed by all assets and far fewer loans backed by real estate. Not surprisingly, they also more often employ movable assets as collateral, including intangibles, accounts receivables, and cash and marketable securities.

Now I conduct a formal regression analysis. I re-estimate Eq.(5) at the package level. Given that the collateral type is noisy since it does not distinguish between tangible and intangible movables, I use two dependent variables in the regression analysis.  $\mathbb{1}(\text{Movable collateral})_{f,i,t}$  is a dummy variable, and

<sup>28</sup> Among all packages with collateral type of information, only 10% packages record specific type, while the rest of 90% record "Unknown"

<sup>29</sup> The sample countries include Austria, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Ukraine, United Kingdom. The sample period is 1997-2017. Table C8 shows that the descriptive statistics for the sample with 'known' collateral information are comparable to those from the initial sample.

it equals one for packages whose collateral type includes movables but does not include immovables.  $\mathbb{1}(\text{Not tangible movable collateral})_{f,i,t}$  is a dummy variable, and it equals one for packages whose collateral type does NOT include only tangible movables.

I include firm sector fixed effects to absorb time-invariant sector unobservables that may influence loan outcomes. Firm location and lender location are identified based on DealScan variables "Country" and "Lender\_Operating\_Country", respectively.  $\text{Reform}_{c,t}$  is a dummy variable that equals one if the borrower "Country"  $c$  reformed the secured transaction law in year  $t$ , zero otherwise. The coefficient of interest is  $\beta_{123}$ . It is expected to be negative for using dependent variable  $\mathbb{1}(\text{Movable collateral})_{f,i,t'}$ , while to be positive for using dependent variable  $\mathbb{1}(\text{Not tangible movable collateral})_{f,i,t'}$ , suggesting negative effects on loan collateralization arising from increased monitoring costs.

Table 10 presents the results. I start with a basic regression including only  $\text{Reform}_{c,t}$  to assess the overall effects of law reforms. In Column (1), the coefficients for both dependent variables consistently suggest negative effects. Following the reform, facilities issued in reformed countries are less likely to be collateralized with movable assets compared to unreformed countries. I then introduce the interaction term  $\text{Reform}_{c,t} \times \text{Treated}_s$ , and the results are presented in Column (2). The estimates are not statistically significant, indicating that firms in treated sectors do not alter their collateralization behavior in response to the reform. In Columns (3) and (4), I include a triple interaction term  $\text{High Foreign}_i \times \text{Reform}_{c,t} \times \text{Treated}_s$ . Consistent with expectations, the coefficients are negative and statistically significant, suggesting that firms in treated sectors are less likely to collateralize loans with movables in facilities that involve more foreign lenders. This provides substantial and direct evidence of how the law reforms influence loan collateralization by affecting the costs of collateral monitoring for the first time. It also complements findings from [Cerqueiro et al. \(2016\)](#) that demonstrate how secured transaction law affects contract design.

## B.2 Covenants

Existing studies document the role of the covenant in financial contracting. It is a contractual device that helps mitigate firms' incentives to engage in risk-shifting activities. In this sense, analysis of how covenant inclusion responds to legal change can substantiate the previous results on collateral monitoring. Intuitively, the likelihood of including a covenant is expected to be higher from the foreign lenders than the domestic lenders after the reform. This is because foreign lenders have more concerns about firms' risk-shifting due to the disadvantage in collateral monitoring. I test this hypothesis by re-estimating Eq.(5) using package-level data.

Table 11 Panel A displays the results regarding the effects on covenant inclusion. I begin with the extensive margin. In Columns (1)-(4), the dependent variable is a dummy variable that equals one if a package includes covenants and zero otherwise. The coefficients of the triple interaction term are statistically significant. In terms of magnitude, a package with a ratio of foreign lead arrangers above the median, on average, has a 2pp-4pp higher likelihood of including covenants when issuing loans to treated firms after the reform relative to those packages that do not. At the intensive margin, the dependent variable

in Columns (5)-(8) represents the number of financial covenants included in a package. The effects are significant when the model is not highly saturated. The economic magnitude remains similar to that in the extensive margin case.

I further examine the effects on covenant types in Panel B. The outcome variable is a dummy variable indicating whether a package includes a Debt-Cash flow ratio covenant, a Senior debt-Cash flow ratio covenant, or a Debt-Equity ratio covenant, and zero otherwise. Through different estimated models, I include country-year and sector fixed effects. As shown in Columns (1)-(2), after the reform, the Debt-Cash flow ratio covenant is 1.9pp more likely to be included in a package with higher fractions of foreign lead arrangers compared to packages without it. This estimate has a similar magnitude as for the Debt-Equity ratio covenant, which is shown as 1.8pp in Columns (5)-(6). The estimates in Columns (3)-(4) show that the Senior debt-Cash flow ratio covenant is 0.8pp more likely to be included in a package with higher fractions of foreign lead arrangers compared to packages without it, which is smaller than the estimates for Debt-Cash flow ratio covenants and Debt-Equity ratio covenants.

The finding suggests that foreign lenders have incentives to use covenants to prevent risk-shifting activities. Especially, the profitability type of covenant, such as the Debt-Cash flow ratio covenant, is preferred since it better relates to manager actions and repayments.

## VIII Real Effects of The Reform

The results suggest that the law reform increases the moral hazard in monitoring collateral for foreign lenders. As a response to the legal shock, foreign lenders reduce loan issuance amounts to treated firms relative to domestic lenders. That is, there is a credit reallocation effect from foreign to domestic lenders when granting loans to treated firms. In this section, I study whether this credit reallocation effect has real effects on firm outcomes. I first study the effects at the firm level, and then at the aggregate level.

### A Firm Level

If the credit reallocation effect is at work, one could expect that the real outcomes of treated firms with ex-ante high exposure to foreign lenders might be affected more than treated firms with ex-ante low exposure to foreign lenders. To test this hypothesis, I estimate the following equation:

$$\begin{aligned}
Y_{f,t} = & \beta_{123} \text{Reform}_{c,t} \times \text{Treated}_s \times \text{Exposure}_f \\
& + \beta_1 \text{Reform}_{c,t} \times \text{Treated}_s + \beta_2 \text{Reform}_{c,t} \times \text{Exposure}_f \\
& + \beta_3 \text{Treated}_s \times \text{Exposure}_f + \mu' \mathbf{X}_{f,t} + \text{FE} + \varepsilon_{f,t},
\end{aligned} \tag{7}$$

where  $Y_{f,t}$  represents the firm's real outcomes.  $\text{Exposure}_f$  is a dummy variable that takes the value of one for firms that are highly exposed to foreign lenders and zero otherwise. The ex-ante exposure to foreign lenders is calculated as the ratio of the total loan amount borrowed from foreign lenders to the total loan amount borrowed from all lenders before the reformed year of the country where a firm is located. For



instance, for a firm located in Croatia, the ratio is computed using the total loan amount before 2006. The exposure variable can only be calculated for firms in countries that reform the law. Hence, the analysis sample only includes those reformed countries. To further control for the cross-country and cross-sector differences driving firm outcomes, I add country-year and sector-year fixed effects. In a more stringent specification, I use country-sector-year fixed effects to eliminate time-varying differences within a country and sector, essentially comparing firm outcomes within those boundaries. For all specifications, I include firm fixed effects to control for time-invariant unobserved factors influencing the outcomes. The coefficient of interest is  $\beta_{123}$ , which captures the difference in outcomes of treated firms highly affected by legal changes relative to those that are not.

Table 12 reports the results. In Columns (1)-(2), the dependent variable is the ratio of net income to lagged total assets. The coefficient of the triple interaction term is negative and statistically significant. It suggests that firms with a high movable assets index that borrow more from foreign lenders ex-ante are adversely affected, and their net income is reduced after the passage of the law reform, relative to treated firms that are less affected by law reforms. In Columns (3)-(4), I replace the dependent variable with the logarithm of the number of employees. Similarly, the coefficients are still negative and statistically significant across the two specifications. It indicates that in the years following the law reform, treated firms that are more exposed to foreign lenders ex-ante decrease the number of employees. The economic magnitude is substantial; the treated sector firms who ex ante borrow more from foreign lenders decrease employment by approximately 35%. In Columns (5)-(6), the dependent variable is the ratio of sales scaled by lagged total assets. Although the coefficients are negative, I do not observe any statistical significance.

## B Aggregate Level

After studying the firm-level real effects, I further look at the aggregate effects on total productivity factor (TFP) and outputs. Following [Sraer and Thesmar \(2023\)](#), the effects of the policy on aggregate allocative efficiency can be computed by estimating the treated effects on the distribution log marginal products of capital (IMRPK), which is the ratio of value-added over average capital stock. More particularly, one needs to compute the moments of the log-MRPK distribution: the mean and variance of log-MRPK ( $\Delta\widehat{\Delta\sigma^2}(s)$  and  $\Delta\widehat{\Delta\mu}(s)$ ), as well as the covariance of log-MRPK and log value-added ( $\Delta\widehat{\Delta\sigma_{\text{IMRPK, lpy}}}(s)$ ). These estimates can then be put into an aggregation formula to calculate aggregate allocative efficiency. Intuitively,  $\Delta\widehat{\Delta\sigma^2}(s)$  captures the change in the variance of log-MRPK for firms in a treated industry  $s$  relative to control industries.  $\Delta\widehat{\Delta\mu}(s)$  captures the effect of the policy change on the mean log-MRPK in industry  $s$ .  $\Delta\widehat{\Delta\sigma_{\text{IMRPK, lpy}}}(s)$  is the estimate of the effect of the policy change on the covariance between log output and log sales in an industry  $s$ .

The computation of the moments of the log-MRPK distribution is as follows. I first calculate the firm-year level log-MRPK using firm balance sheet data from Compustat. I calculate value-added as the difference between sales and cost of goods following [De Loecker et al. \(2020\)](#), and calculate capital stock as the average of the gross book value of total assets at the beginning and end of the fiscal year. I then

compute the moments of log-MRPK at the industry-country-year level.

To measure the exposure of foreign lenders for treated industries, I construct a variable  $Exposure_{s,c}$  using loan-level data from Dealscan. For countries that reform the secured transaction laws,  $Exposure_{s,c}$  is a ratio of a sector borrowing amounts from foreign lenders over a sector borrowing amounts from all lenders before the reform year. For countries that do not have reforms,  $Exposure_{s,c,t}$  is the average of the ratio of a sector borrowing amounts from foreign lenders over a sector borrowing amounts from all lenders in each year. I merge the exposure data with log-MRPK data, which yields a dataset with 50 unique 4-digit SIC sectors from 8 countries spanning from 1995-2019.<sup>30</sup> Table 13 Panel A displays the summary statistics of the moments of log-MRPK and sector-level exposures. Figure B3 shows the log normality of firm-level IMRPK before the reform, which is the assumption for regression analysis.

To examine the effects of credit reallocation from foreign lenders, I estimate the following equation:

$$M_{s,c,t} = \beta Exposure_{s,c} \times Reform_{c,t} + \alpha Reform_{c,t} + \gamma Exposure_{s,c} + FE + \varepsilon_{s,c,t}, \quad (8)$$

where  $s$ ,  $c$ , and  $t$  denote sector, country and year, respectively. The dependent variables are the moments of log-MRPK:  $Var(\log\text{-MRPK})_{s,c,t}$  is the sector-country level variance of log-MRPK,  $Mean(\log\text{-MRPK})_{s,c,t}$  is the sector-country level mean of log-MRPK,  $Cov(\log\text{-MRPK}, \log\text{VA})_{s,c,t}$  is the sector-country level covariance between log-MRPK and log value-added. Following [Sraer and Thesmar \(2023\)](#), I further construct a quartile exposure variable,  $Q_j\text{-}Exposure_{s,c,t}$  which is a dummy variable if the exposure of a sector's exposure is in the  $j$ th quartile of the exposure distribution in a year, and zero otherwise. I also include country-year and country-sector fixed effects to wipe out any systematic difference between countries. Robust standard errors are clustered at the country-sector level.

Table 13 Panel B reports the regression results. In Columns (1), (3) and (5), I use  $Exposure_{s,c,t}$  for treatment intensity, while I use  $Q_j\text{-}Exposure_{s,c,t}$  in Columns (2), (4) and (6). The estimates in Columns (1)-(4) show that the treated sectors ex-ante more exposed to foreign lenders neither exhibit a significant decrease in capital allocation nor an increase in inefficiency in credit allocation between firms. However, In Column (6), we find significant and positive effects of the reform on  $\Delta\Delta\sigma_{\widehat{IMRPK, \log\text{VA}}}(s)$ , the covariance between log-MRPK and log value-added. It indicates that the covariance between log-MRPK and firm output becomes larger for treated sectors, while the average credit wedges did not change.

## IX Conclusion

This paper documents that legal reforms that make collateral monitoring more prone to information frictions can trigger credit reallocation from foreign to domestic lenders. I uncover that the laws substantially increase the moral hazard in monitoring movable collateral for foreign lenders. Accordingly, foreign lenders decrease loan issuance and acceptance of movable assets as collateral from treated firms, while increasing the use of covenants. I further study the real effects of credit reallocation on firms. The

<sup>30</sup>The sample is limited because of the missing value for calculating log-MRPK and the requirement for at least 5 firms to calculate the moments of log-MRPK.

results show that firms in treated sectors, which have a higher exposure to the law reform ex-ante, i.e., borrowing more from foreign lenders, experience declines in net incomes and employment in the post-reform period. Overall, this study emphasizes the important role of frictions associated with monitoring and collateralization in determining credit outcomes.

Results from this paper are likely to support the idea that fixing a market failure may trigger unintended consequences and diminish social welfare, as emphasized by [Vig \(2013\)](#). I find that the legal changes fail to facilitate credit supply to treated sectors even by allowing them to pledge more types of assets. I further find that this is because the reform alters lenders' incentives to lend against such assets and reshuffles the credit supply across foreign and domestic lenders. Foreign lenders choose to lend less toward treated firms because of agency concerns about movable assets. This induces credit reallocation from foreign to domestic lenders. The reallocation effects have implications for policymakers. It does not achieve the goal of credit democratization. Rather, it may hinder competition in the banking market.

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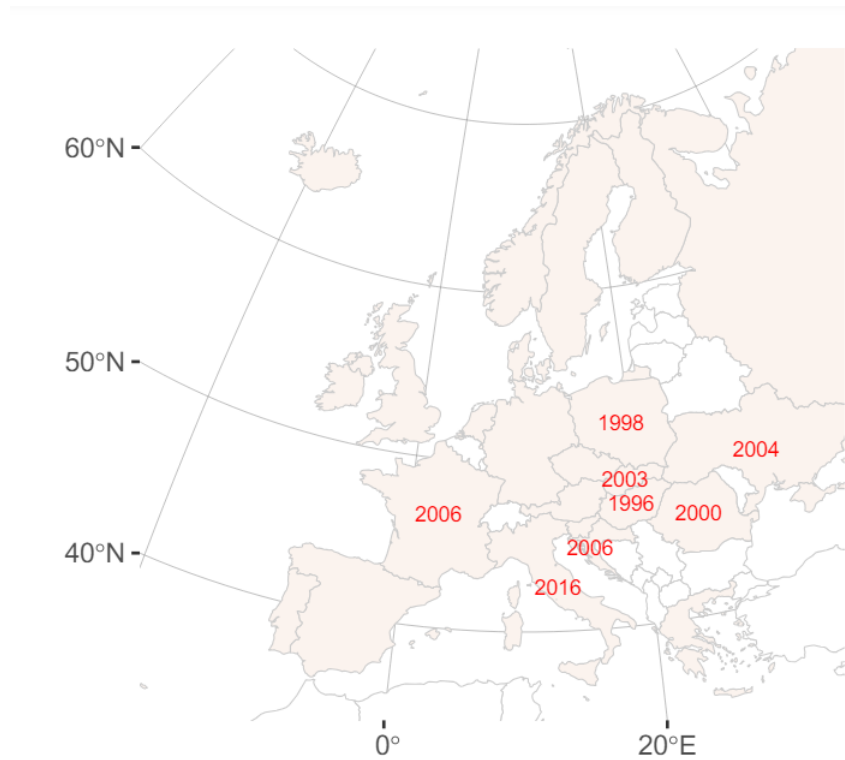
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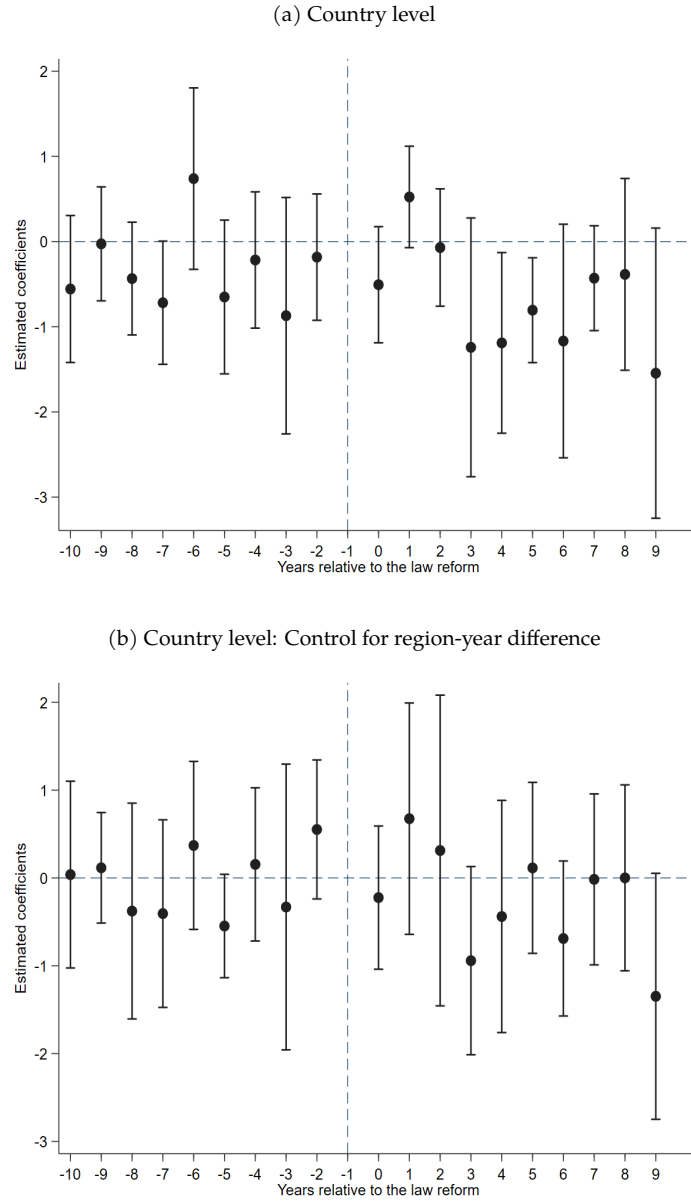


Figure 1: Map of Sample Countries



**Notes:** This figure shows countries included in the sample. The pink-shaded areas represent all sample countries. Countries with numbers have reformed secured transaction laws, with the numbers indicating the years in which the laws entered into force. For more details, see Table A1 and A2.

Figure 2: The Dynamic Effects of Law Reforms on Loan Volume

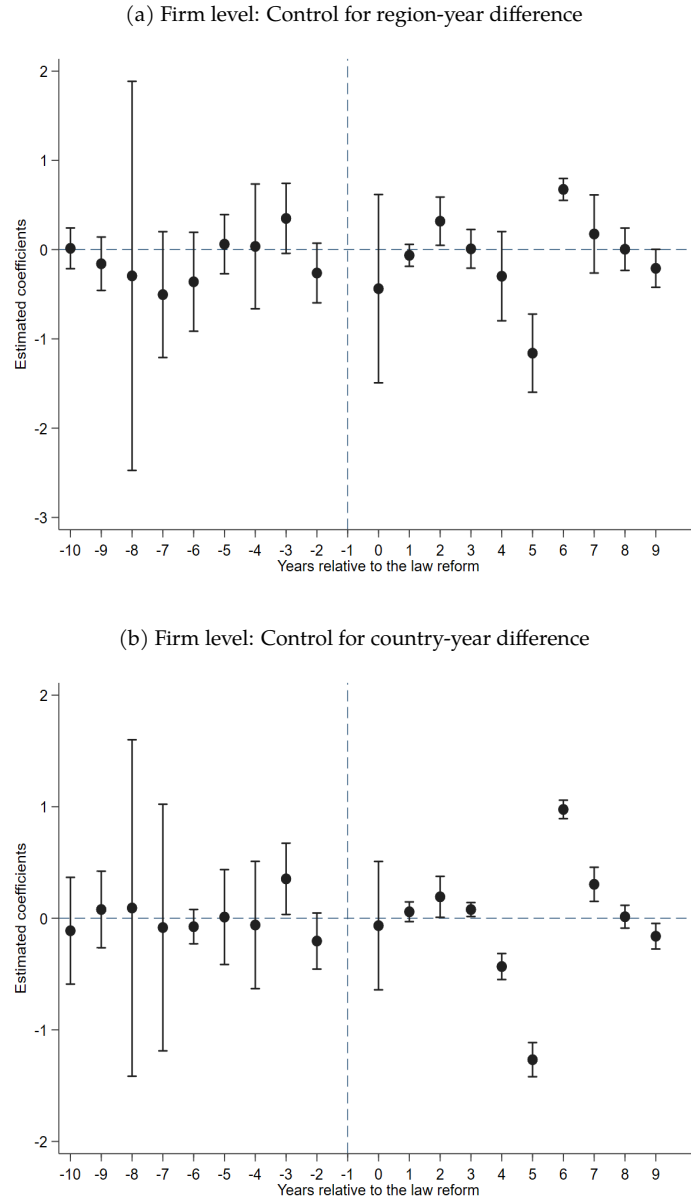


**Notes:** This figure presents the dynamics treatment effects of the law reform on country loan volume by estimating the following equation:

$$Y_{c,t} = \sum_{n=-10, n \neq -1}^{n=9} \beta_n \text{Reform}_{c,n} + \mu' \mathbf{Z}_{c,t} + \text{FE} + \varepsilon_{c,t},$$

where  $c$  and  $t$  denote borrower country and year, respectively.  $Y_{c,t}$  is the sum of all deal amounts issued to a country.  $\text{Reform}_{c,t}$  denotes a dummy variable that equals one if the borrower country, where a firm is registered, has reformed its secured transaction laws in a year, and zero otherwise. I restrict the years within a  $[-10,10]$  time window around the reform for reformed countries.  $\mathbf{Z}_{c,t}$  denotes a set of country-level macroeconomic controls. Figure 2(a) estimates a regression model including country and year fixed effects. Figure 2(b) estimates a regression model including country and region-year fixed effects.

Figure 3: The Dynamic Effects of Law Reforms on Firm Loan Volume

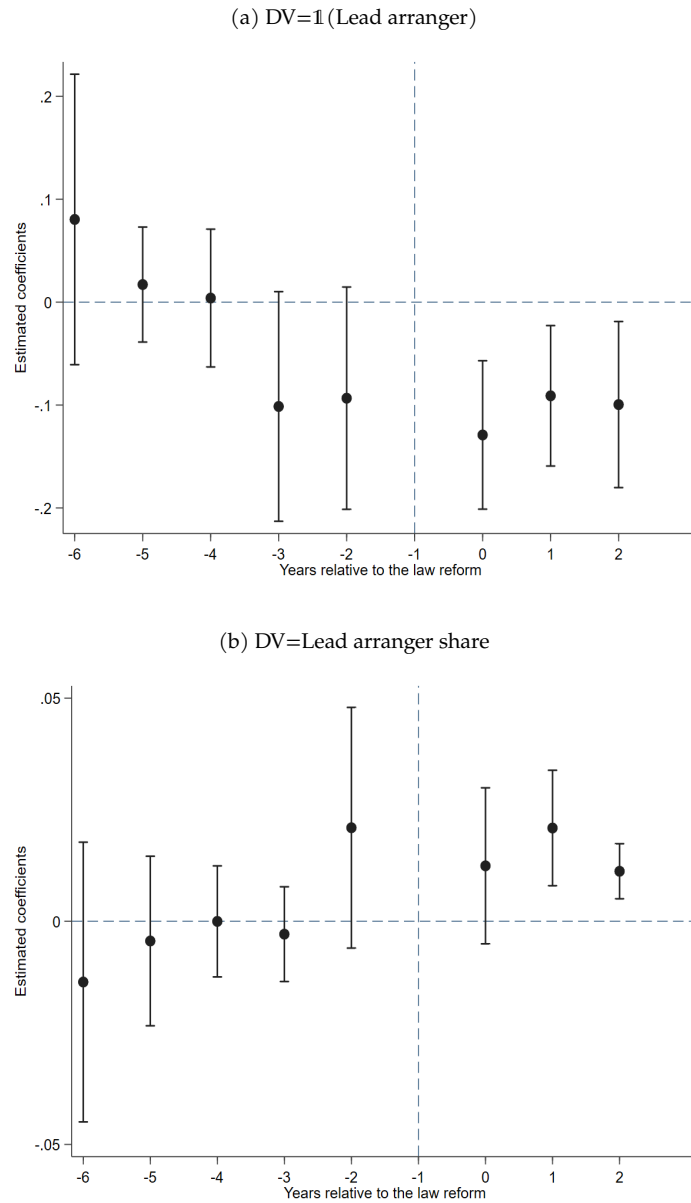


**Notes:** This figure presents the dynamics treatment effects of the law reform on firm loan volume by estimating the following equation:

$$Y_{f,i,t} = \sum_{n=-10, n \neq -1}^{n=9} \beta_n \text{Reform}_{c,n} \times \text{Treated}_s + \boldsymbol{\mu}' \mathbf{X}_{f,t} + \text{FE} + \varepsilon_{f,i,t},$$

where  $f$ ,  $c$ ,  $s$ ,  $i$ , and  $t$  denote firm, borrower country, sector, facility, and year, respectively.  $Y_{f,i,t}$  is the facility amounts issued to a firm in a year.  $\text{Treated}_s$  is a dummy variable that equals one if a firm operates in a sector (defined at the 2-digit SIC level) with a movable assets index above the median value, and zero otherwise.  $\text{Reform}_{c,t}$  denotes a dummy variable that equals one if the borrower country, where a firm is registered, has reformed its secured transaction laws in a year, and zero otherwise. I restrict the years within a  $[-10,10]$  time window around the reform for reformed countries.  $\mathbf{X}_{f,t}$  denotes a set of firm controls. Figure 3(a) estimates a regression model including region-year fixed effects. Figure 3(b) estimates a regression model including country-year fixed effects.

Figure 4: The Dynamic Effects of Law Reforms on Collateral Monitoring for Treated Firms



**Notes:** This figure presents the dynamics treatment effects of the law reform on collateral monitoring for treated sector firms estimating Eq.(4). Figure 3(a) illustrates the estimated coefficients on the probability of being a lead arranger by foreign lenders relative to domestic lenders. Figure 3(b) illustrates the estimated coefficients on the lead arranger share by foreign lenders relative to domestic lenders.

Table 1: Summary Statistics

Panel A		Main variables				
Variable	#Obs	Mean	Sd	Min	Median	Max
1 (Lead)	59,831	0.450	0.497	0	0	1
Lender share	14,942	0.092	0.112	0	0.056	1
Lead share	6,073	0.143	0.141	0	0.095	1
Foreign lender	59,831	0.674	0.469	0	1	1
Log(Firm size)	59,649	8.860	2.116	4.684	8.697	16.039
Debt ratio	59,649	0.267	0.169	0	0.244	0.822
PPE	59,649	0.297	0.219	0.007	0.246	0.912
Current ratio	59,627	0.364	0.185	0.045	0.339	0.864
Log(Facility amount)	59,672	5.902	1.417	-1.238	5.992	9.692
Log(Facility maturity)	57,911	4.012	0.509	0.435	4.095	6.244
Loan secure	59,831	0.244	0.429	0	0	1
AISD	42,643	149.376	129.873	3	110	1325

Panel B		Variables by treatment			
	<i>Treated=0</i>		<i>Treated=1</i>		<i>Mean diff.</i>
	Mean	Sd	Mean	Sd	t
Firm size	8.206	2.154	8.140	1.950	1.001
Debt ratio	0.238	0.165	0.235	0.152	0.613
PPE	0.284	0.243	0.346	0.219	-8.224***
Current ratio	2.639	5.406	2.548	4.409	0.574

**Notes:** This table presents descriptive statistics. Panel A reports the statistics for the main variables. Panel B reports the statistics by treatment status of firms.

Table 2: Law Reform and Aggregate Loan Volume

Panel A	Country level: $\text{Ln}(\text{Package Amount})$				
	(1)	(2)	(3)	(4)	(5)
Reform $_{c,t}$	-0.301 (0.231)	-0.081 (0.217)	-0.146 (0.253)	-0.010 (0.176)	-0.180 (0.252)
Domestic credit to private sector (% GDP) $_{c,t}$		0.012*** (0.002)		0.014*** (0.003)	0.012*** (0.003)
Ln(GDP per capita) $_{c,t}$		1.536*** (0.446)		1.095 (0.707)	1.241 (1.128)
GDP per capita growth $_{c,t}$		0.038 (0.037)		0.016 (0.037)	0.029 (0.052)
Population growth $_{c,t}$		0.134 (0.117)		0.147 (0.112)	0.124 (0.158)
Inflation $_{c,t}$		-0.004 (0.041)		-0.043 (0.048)	0.026 (0.143)
Export to GDP $_{c,t}$		0.041*** (0.013)		0.065*** (0.021)	0.064 (0.039)
Import to GDP $_{c,t}$		-0.045** (0.019)		-0.061** (0.026)	-0.054 (0.041)
Enforcement cost $_{c,t}$					-0.024* (0.013)
Firm country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	N	N	N
Region*Year FE	N	N	Y	Y	Y
N	344	288	337	278	197
Adj $R^2$	0.784	0.823	0.811	0.831	0.805
Panel B	Firm level: $\text{Ln}(\text{Facility Amount})$				
	(1)	(2)	(3)	(4)	
Reform $_{c,t} \times \text{Treated}_s$	0.074 (0.133)	0.059 (0.137)	0.025 (0.107)	-0.023 (0.117)	
Reform $_{c,t}$	-0.095** (0.041)	-0.043 (0.044)			
Size $_{f,t}$		0.264*** (0.087)		0.315** (0.112)	
Debt ratio $_{f,t}$		0.575** (0.266)		0.567** (0.269)	
PPE $_{f,t}$		-0.331 (0.200)		-0.240 (0.273)	
Current ratio $_{f,t}$		-0.906*** (0.204)		-0.921*** (0.262)	
Facility maturity $_{i,t}$		0.201*** (0.057)		0.222*** (0.055)	
Firm country*YearFE	N	N	Y	Y	
Region*Year FE	Y	Y	N	N	
Borrower FE	Y	Y	Y	Y	
N	6,146	5,711	6,095	5,661	
Adj $R^2$	0.505	0.542	0.514	0.553	

**Notes:** This table presents the estimation results of the specification:

$$Y_{f,i,t} = \beta \text{Reform}_{c,t} \times \text{Treated}_s + \delta \text{Treated}_s + \gamma \text{Reform}_{c,t} + \mu' \mathbf{X}_{f,t} + \gamma' \mathbf{Z}_{c,t} + \text{FE} + \varepsilon_{f,i,t},$$

where  $f$ ,  $c$ ,  $s$ ,  $i$ , and  $t$  denote firm, firm country, sector, facility/package, and year, respectively. The dependent variable in Panel A is the natural logarithm of the sum of deal amounts issued to a country in a year. The dependent variable in Panel B is the natural logarithm of facility amounts issued to a firm in a year.  $\text{Treated}_s$  is a dummy variable that equals one if a firm is in a sector with a sector movable assets index higher than the median value, zero otherwise. I calculate the sector movable assets index using US nonfinancial firm data between 1983 and 1994.  $\text{Reform}_{c,t}$  is a dummy variable that equals one if a firm in a country (as recorded in Compustat) reformed the secured transaction law in a year, zero otherwise. The time window is  $[-10,10]$  around the reform year for reformed countries. Robust standard errors clustered at the country level are in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table 3: Law Reform and Collateral Monitoring: Being A Lead Arranger

	$\mathbb{1}(Lead)$				
	(1)	(2)	(3)	(4)	(5)
$Foreign_l \times Reform_{c,t} \times Treated_s$	-0.068*** (0.015)	-0.077*** (0.015)	-0.067*** (0.016)	-0.068*** (0.011)	-0.062*** (0.014)
$Foreign_l \times Reform_{c,t}$	0.063*** (0.020)			0.037** (0.016)	
$Foreign_l \times Treated_s$	-0.022* (0.012)	0.010 (0.015)	0.011 (0.015)	-0.017 (0.011)	0.005 (0.013)
$Reform_{c,t} \times Treated_s$	0.001 (0.020)				
Firm controls	Y	Y	Y	N	N
Facility controls	Y	Y	Y	N	N
Facility type FE	Y	Y	Y	N	N
Package purpose FE	Y	Y	Y	N	N
Facility FE	N	N	N	Y	Y
Firm*Year FE	N	N	Y	N	N
Firm country*YearFE	Y	N	N	N	N
Firm country*Sector*Year FE	N	Y	N	N	N
Firm country*Lender country*Year FE	N	Y	Y	N	Y
Lender FE	Y	N	N	Y	N
Lender*Year FE	N	Y	Y	N	Y
N	54,943	52,201	52,310	56,616	53,841
Adj $R^2$	0.423	0.576	0.624	0.560	0.621

**Notes:** This table presents the estimation results of the specification:

$$\begin{aligned}
Y_{l,f,s,t} = & \beta_{123} Reform_{c,t} \times Treated_s \times Foreign_l \\
& + \beta_1 Reform_{c,t} \times Treated_s + \beta_2 Reform_{c,t} \times Foreign_l \\
& + \beta_3 Treated_s \times Foreign_l + \mu' X_{f,t} + \gamma' Z_{i,t} + FE + \varepsilon_{l,f,s,t},
\end{aligned}$$

where  $l, f, c, s, i,$  and  $t$  denote lender, firm, firm country, sector, facility, and year, respectively. The dependent variable is a dummy variable that takes value one if a lender is a lead arranger in a facility, and zero otherwise.  $Treated_s$  is a dummy variable that equals one if a firm is in a sector with a sector movable assets index higher than the median value, zero otherwise. I calculate the sector movable assets index using US nonfinancial firm data between 1983 and 1994.  $Reform_{c,t}$  is a dummy variable that equals one if a firm in a country (as recorded in Compustat) reformed the secured transaction law in a year, zero otherwise. The time window is  $[-10,10]$  around the reform year for reformed countries.  $Foreign_l$  is a dummy variable that equals one if a lender is not in the same location as the borrower, and zero otherwise. Robust standard errors clustered at the country level are in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table 4: Law Reform and Collateral Monitoring: Lead Arranger Share

	<i>Lead share</i>				
	(1)	(2)	(3)	(4)	(5)
$\text{Foreign}_l \times \text{Reform}_{c,t} \times \text{Treated}_s$	0.027*	0.011	0.019***	0.014***	0.019***
	(0.014)	(0.007)	(0.004)	(0.004)	(0.003)
$\text{Foreign}_l \times \text{Reform}_{c,t}$	-0.010			-0.011*	
	(0.009)			(0.006)	
$\text{Foreign}_l \times \text{Treated}_s$	0.007	0.004	-0.002	0.006	-0.002
	(0.006)	(0.006)	(0.004)	(0.004)	(0.003)
$\text{Reform}_{c,t} \times \text{Treated}_s$	-0.053***				
	(0.008)				
Firm controls	Y	Y	Y	N	N
Facility controls	Y	Y	Y	N	N
Facility type FE	Y	Y	Y	N	N
Package purpose FE	Y	Y	Y	N	N
Facility FE	N	N	N	Y	Y
Firm*Year FE	N	N	Y	N	N
Firm country*YearFE	Y	N	N	N	N
Firm country*Sector*Year FE	N	Y	N	N	N
Firm country*Lender country*Year FE	N	Y	Y	N	Y
Lender FE	Y	N	N	Y	N
Lender*Year FE	N	Y	Y	N	Y
N	5,686	4,648	4,581	5,365	4,423
Adj $R^2$	0.526	0.722	0.811	0.879	0.884

Notes: This table presents the estimation results of the specification:

$$\begin{aligned}
Y_{l,f,s,t} = & \beta_{123} \text{Reform}_{c,t} \times \text{Treated}_s \times \text{Foreign}_l \\
& + \beta_1 \text{Reform}_{c,t} \times \text{Treated}_s + \beta_2 \text{Reform}_{c,t} \times \text{Foreign}_l \\
& + \beta_3 \text{Treated}_s \times \text{Foreign}_l + \boldsymbol{\mu}' \mathbf{X}_{f,t} + \boldsymbol{\gamma}' \mathbf{Z}_{i,t} + \text{FE} + \varepsilon_{l,f,s,t},
\end{aligned}$$

where  $l, f, c, s, i,$  and  $t$  denote lender, firm, firm country, sector, facility, and year, respectively. The dependent variable is the share a lender contributes to a facility.  $\text{Treated}_s$  is a dummy variable that equals one if a firm is in a sector with a sector movable assets index higher than the median value, zero otherwise. I calculate the sector movable assets index using US nonfinancial firm data between 1983 and 1994.  $\text{Reform}_{c,t}$  is a dummy variable that equals one if a firm in a country (as recorded in Compustat) reformed the secured transaction law in a year, zero otherwise. The time window is  $[-10,10]$  around the reform year for reformed countries.  $\text{Foreign}_l$  is a dummy variable that equals one if a lender is not in the same location as the borrower, and zero otherwise. Robust standard errors clustered at the country level are in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .



Table 5: Timing of Law Reform: Hazard Model

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Avg_1(Lead) <sub>c,t</sub>	1.032 (0.996)		1.101 (0.693)	1.004 (0.662)	0.759 (1.004)			
Avg_Lead share <sub>c,t</sub>		2.182 (1.465)	0.307 (0.302)	0.482 (0.478)		-0.119 (0.759)		
Firm size <sub>c,t</sub>				0.444 (0.684)				
Debt ratio <sub>c,t</sub>				-0.166 (0.138)				
PPE <sub>c,t</sub>				0.313*** (0.072)				
Current ratio <sub>c,t</sub>				-0.017 (0.203)				
Capex <sub>c,t</sub>				-0.324* (0.166)				
CEQ <sub>c,t</sub>				-0.203 (0.138)				
Domestic credit to private sector (% GDP) <sub>c,t</sub>					0.024 (0.022)	0.020 (0.012)	0.023 (0.033)	
GDP per capita growth <sub>c,t</sub>					-0.091 (0.092)	-0.139*** (0.029)	-0.170 (0.113)	
Export to GDP <sub>c,t</sub>					0.139 (0.172)	0.071 (0.077)	0.078 (0.161)	
Import to GDP <sub>c,t</sub>					-0.043 (0.278)	-0.012 (0.102)	0.146 (0.133)	
Inflation GDP deflator <sub>c,t</sub>					0.104 (0.132)	0.434** (0.199)	0.104 (0.139)	
Ln(population) <sub>c,t</sub>					-1.070 (1.662)	-0.517 (0.456)	-0.371 (0.772)	
Population growth <sub>c,t</sub>					-0.404 (1.485)	-0.256 (0.688)	-0.363 (2.185)	
French Law <sub>c,t</sub>							-1.488 (0.998)	
$\left(\frac{\# \text{Foreign banks}}{\# \text{All banks}}\right)_{c,t}$								-3.146 (2.465)
N	337	229	229	226	277	196	277	351

**Notes:** This table presents the results of whether the pre-existing country-level degree of collateral monitoring predicts the timing in which a country adopts the secured transaction laws estimating the specification:

$$\mathbf{1}(\text{Reform})_{c,t} = \phi(\delta' \mathbf{M}_{c,t} + \zeta' \mathbf{F}_{c,t} + \pi' \mathbf{C}_{c,t}).$$

It follows Beck et al. (2010) and estimates a hazard model with a Weibull distribution of the hazard rate. The sample period is 1995-2017. The reformed countries include Croatia, France, Hungary, Italy, Poland, Romania, Slovakia, and Ukraine. The dependent variable is the natural logarithm of the expected time to the law change.  $\text{Avg\_1(Lead)}_{c,t}$  is the average probability of being a lead in country  $c$  in year  $t$ .  $(\text{Avg\_Lead share})_{c,t}$  is the average share of a lead in country  $c$  in year  $t$ .  $\left(\frac{\# \text{Foreign banks}}{\# \text{All banks}}\right)_{c,t}$  is the ratio of number of foreign banks divided by number of banks in a country in a year. The analysis is at the country-year level. Robust standard errors clustered at the country level are in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table 6: Law Reform and Collateral Monitoring: Effects Heterogeneity

	$\mathbb{1}(Lead)$	<i>Lead share</i>	$\mathbb{1}(Lead)$	<i>Lead share</i>	$\mathbb{1}(Lead)$	<i>Lead share</i>
	(1)	(2)	(3)	(4)	(5)	(6)
	No preexisting relationship		Low legal rights		Low information depth	
Reform <sub>c,t</sub> × Treated <sub>s</sub> × H <sub>l</sub>	-0.103*** (0.020)	0.033*** (0.011)	-0.070** (0.028)	0.024*** (0.005)	-0.071** (0.027)	0.023*** (0.003)
Facility controls	Y	Y	Y	Y	Y	Y
Facility type FE	Y	Y	Y	Y	Y	Y
Package purpose FE	Y	Y	Y	Y	Y	Y
Firm*Year FE	Y	Y	Y	Y	Y	Y
Firm country*Lender country*Year FE	Y	Y	Y	Y	Y	Y
Lender*Year FE	Y	Y	Y	Y	Y	Y
N	48,854	4,336	34,829	3,789	37,183	3,988
Adj R <sup>2</sup>	0.625	0.815	0.616	0.819	0.617	0.815

**Notes:** This table presents the estimation results of the specification:

$$\begin{aligned}
Y_{l,f,s,t} = & \beta_{123} \text{Reform}_{c,t} \times \text{Treated}_s \times H_l \\
& + \beta_1 \text{Reform}_{c,t} \times \text{Treated}_s + \beta_2 \text{Reform}_{c,t} \times H_l \\
& + \beta_3 \text{Treated}_s \times H_l + \boldsymbol{\mu}' \mathbf{X}_{f,t} + \boldsymbol{\gamma}' \mathbf{Z}_{i,t} + \text{FE} + \varepsilon_{l,f,s,t},
\end{aligned}$$

where  $l$ ,  $f$ ,  $c$ ,  $s$ ,  $i$ , and  $t$  denote lender, firm, firm country, sector, facility, and year, respectively. The dependent variable in Columns (1)(3)(5) is a dummy variable that takes value one if a lender is a lead arranger in a facility, and zero otherwise. The dependent variable in Columns (2)(4)(6) is the share condition of being a lead arranger. *Treated<sub>s</sub>* is a dummy variable that equals one if a firm is in a sector with a sector movable assets index higher than the median value, zero otherwise. I calculate the sector movable assets index using US nonfinancial firm data between 1983 and 1994. *Reform<sub>c,t</sub>* is a dummy variable that equals one if a firm in a country (as recorded in Compustat) reformed the secured transaction law in a year, zero otherwise. The time window is [-10,10] around the reform year for reformed countries. In Columns (1)-(2)  $H_l$  is a dummy variable that equals one if a lender is foreign and the relationship intensity is below the median, and zero otherwise. In Columns (3)-(4)  $H_l$  is a dummy variable that equals one if a lender is foreign and its borrower is located in a country with a legal rights index below the median value. In Columns (5)-(6)  $H_l$  is a dummy variable that equals one if a lender is foreign and its borrower is located in a country with a credit information depth index below the median value. Robust standard errors clustered at the country level are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table 7: Law Reform and Credit Reallocation: Facility Level

	<i>Facility amount</i>				
	(1)	(2)	(3)	(4)	(5)
High Foreign <sub><i>i</i></sub> × Reform <sub><i>c,t</i></sub> × Treated <sub><i>s</i></sub>	-0.271*	-0.486**	-0.512***	-0.543***	-1.113***
	(0.155)	(0.178)	(0.104)	(0.150)	(0.357)
High Foreign <sub><i>i</i></sub> × Reform <sub><i>c,t</i></sub>	0.341***	0.148*	0.324***	0.104	-0.005
	(0.067)	(0.072)	(0.108)	(0.130)	(0.234)
High Foreign <sub><i>i</i></sub>	0.381***	-0.065	0.391***	-0.048	-0.031
	(0.056)	(0.086)	(0.058)	(0.100)	(0.257)
High Foreign <sub><i>i</i></sub> × Treated <sub><i>s</i></sub>	-0.088	-0.002	-0.050	0.029	-0.128
	(0.090)	(0.116)	(0.096)	(0.131)	(0.349)
Reform <sub><i>c,t</i></sub> × Treated <sub><i>s</i></sub>	0.130*	0.163**	0.185	0.122	
	(0.072)	(0.059)	(0.145)	(0.088)	
Firm controls	N	Y	N	Y	Y
Facility type FE	Y	Y	Y	Y	Y
Package purpose FE	Y	Y	Y	Y	Y
Firm*Year FE	N	N	N	N	Y
Firm country*Year FE	Y	Y	Y	Y	N
Sector FE	Y	Y	N	N	N
Sector*Year FE	N	N	Y	Y	N
N	5,990	5,971	5,821	5,802	4,008
Adj <i>R</i> <sup>2</sup>	0.218	0.403	0.271	0.432	0.670

Notes: This table presents the estimation results of the specification:

$$\begin{aligned}
Y_{f,i,t} = & \beta_{123} \text{Reform}_{c,t} \times \text{Treated}_s \times \text{High Foreign}_i \\
& + \beta_1 \text{Reform}_{c,t} \times \text{Treated}_s + \beta_2 \text{Reform}_{c,t} \times \text{High Foreign}_i \\
& + \beta_3 \text{Treated}_s \times \text{High Foreign}_i + \text{FE} + \varepsilon_{f,i,t},
\end{aligned}$$

where  $f$ ,  $c$ ,  $s$ ,  $i$ , and  $t$  denote firm, firm country, sector, facility, and year, respectively. The dependent variable is the natural logarithm of the facility amount.  $\text{Treated}_s$  is a dummy variable that equals one if a firm is in a sector with a sector movable assets index higher than the median value, zero otherwise. I calculate the sector movable assets index using US nonfinancial firm data between 1983 and 1994.  $\text{Reform}_{c,t}$  is a dummy variable that equals one if a firm in a country (as recorded in Compustat) reformed the secured transaction law in a year, zero otherwise. The time window is  $[-10,10]$  around the reform year for reformed countries.  $\text{High Foreign}_i$  is a dummy variable that equals one if the ratio of the number of foreign lead arrangers over the total number of lead arrangers within a facility is above the median, and zero otherwise. Robust standard errors clustered at the country level are in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table 8: Law Reform and Credit Reallocation: Lender Firm Level

	(1)	(2)	(3)	(4)	(5)	(6)
<i>Loan issuance amount</i>						
Panel A: Lender-borrower-year level	All loan sample			Term loan sample		Revolver sample
$\text{Foreign}_l \times \text{Reform}_{c,t} \times \text{Treated}_s$	-0.069** (0.031)	-0.096*** (0.027)	-0.106* (0.056)	-0.117* (0.061)	-0.004 (0.032)	-0.024 (0.032)
$\text{Foreign}_l \times \text{Reform}_{c,t}$	0.236*** (0.041)	0.313*** (0.043)	0.254*** (0.069)	0.164** (0.067)	0.098* (0.048)	0.247*** (0.038)
$\text{Foreign}_l \times \text{Treated}_s$	0.007 (0.026)	0.024 (0.028)	-0.023 (0.071)	-0.026 (0.078)	0.082*** (0.025)	0.102*** (0.024)
$\text{Foreign}_l$	-0.102*** (0.014)		-0.122** (0.052)		-0.141*** (0.018)	
N	31,678	31,575	13,433	13,323	24,397	24,320
Adj $R^2$	0.597	0.598	0.645	0.646	0.608	0.607
<i>Share to treated sectors over total loan issuance amount</i>						
Panel B: Lender-sector-year level	All loan sample			Term loan sample		Revolver sample
$\text{Foreign}_l \times \text{Reform}_{c,t} \times \text{Treated}_s$	-0.036*** (0.012)	-0.021** (0.010)	-0.045* (0.022)	-0.046** (0.017)	-0.008 (0.009)	0.012 (0.007)
$\text{Foreign}_l \times \text{Reform}_{c,t}$	-0.038 (0.026)	0.030 (0.018)	-0.012 (0.035)	0.091*** (0.027)	-0.066** (0.031)	0.007 (0.022)
$\text{Foreign}_l \times \text{Treated}_s$	0.011 (0.008)	0.001 (0.006)	-0.009 (0.019)	-0.002 (0.015)	0.020** (0.008)	0.008 (0.007)
$\text{Foreign}_l$	0.227*** (0.012)		0.251*** (0.019)		0.220*** (0.013)	
N	27,624	27,520	12,310	12,200	21,565	21,488
Adj $R^2$	0.635	0.663	0.585	0.603	0.641	0.668
Firm country*Sector*Year FE	Y	Y	Y	Y	Y	Y
Firm country*Lender country FE	N	Y	N	Y	N	Y
Lender*Year FE	Y	Y	Y	Y	Y	Y

**Notes:** This table presents the estimation results of the specification:

$$\begin{aligned}
Y = & \beta_{123} \text{Reform}_{c,t} \times \text{Treated}_s \times \text{Foreign}_l \\
& + \beta_1 \text{Reform}_{c,t} \times \text{Treated}_s + \beta_2 \text{Reform}_{c,t} \times \text{Foreign}_l \\
& + \beta_3 \text{Treated}_s \times \text{Foreign}_l + \text{FE} + \varepsilon,
\end{aligned}$$

The dependent variable in Panel A is the loan issuance amount from lender  $l$  to a borrower  $f$  in sector  $s$  in a country  $c$  in year  $t$ . The dependent variable in Panel B is the ratio of the loan amount granted by a lender  $l$  to a sector  $s$  in a country  $c$  in a year  $t$  scaled by the total amount of loan granted by a lender to all sectors in a country in a year.  $\text{Treated}_s$  is a dummy variable that equals one if a firm is in a sector with a sector movable assets index higher than the median value, zero otherwise. I calculate the sector movable assets index using US nonfinancial firm data between 1983 and 1994.  $\text{Reform}_{c,t}$  is a dummy variable that equals one if a firm in a country (as recorded in Compustat) reformed the secured transaction law in a year, zero otherwise. The time window is  $[-10,10]$  around the reform year for reformed countries.  $\text{Foreign}_l$  is a dummy variable that equals one if a lender is not in the same location as the borrower, and zero otherwise. Robust standard errors clustered at the country level are in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table 9: Packages with Collateral Information

Collateral Type	Freq	Percent	Cum.
Accounts Receivable and Inventory	61	10.22	10.22
Accounts Receivable and Inventory, Agency Guarantee, Cash and Marketable Securities, Property & Equipment	1	0.17	10.39
Accounts Receivable and Inventory, Cash and Marketable Securities	1	0.17	10.55
Accounts Receivable and Inventory, Intangibles, Other	1	0.17	10.72
Agency Guarantee	3	0.50	11.22
Agency Guarantee, Cash and Marketable Securities, Intangibles	1	0.17	11.39
All Assets	139	23.28	34.67
All Assets, Cash and Marketable Securities, Intangibles	1	0.17	34.84
All Assets, Cash and Marketable Securities, Property & Equipment	1	0.17	35.01
All Assets, Intangibles	1	0.17	35.18
Cash and Marketable Securities	23	3.85	39.03
Cash and Marketable Securities, Property & Equipment	1	0.17	39.20
Intangibles	19	3.18	42.38
Other	116	19.43	61.81
Other, Ownership of Options/Warrants	1	0.17	61.98
Other, Real Estate	1	0.17	62.14
Ownership of Options/Warrants	2	0.34	62.48
Plant	4	0.67	63.15
Property & Equipment	149	24.96	88.11
Real Estate	71	11.89	100.00
Total	597	100.00	

**Notes:** This table presents packages (deals) with collateral information for countries: Austria, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Ukraine, United Kingdom. The sample period is 1997-2017.

Table 10: Law Reform and Collateralization

	Collateralization			
	(1)	(2)	(3)	(4)
Panel A	1 (Movable collateral)			
Reform <sub>c,t</sub>	-0.252*** (0.083)			
Reform <sub>c,t</sub> × Treated <sub>s</sub>		0.121 (0.079)	0.247 (0.199)	
High Foreign <sub>i</sub> × Reform <sub>c,t</sub> × Treated <sub>s</sub>			-0.325 (0.552)	-1.363*** (0.369)
N	579	505	505	220
Adj R <sup>2</sup>	0.399	0.414	0.428	0.405
Panel B	1 (Not tangible movable collateral)			
Reform <sub>c,t</sub>	0.115 (0.072)			
Reform <sub>c,t</sub> × Treated <sub>s</sub>		-0.063 (0.107)	-0.214 (0.139)	
High Foreign <sub>i</sub> × Reform <sub>c,t</sub> × Treated <sub>s</sub>			0.424 (0.488)	1.373*** (0.404)
N	579	505	505	220
Adj R <sup>2</sup>	0.403	0.468	0.480	0.461
Package controls	Y	Y	Y	Y
Package purpose FE	Y	Y	Y	Y
Firm country FE	Y	N	N	N
Firm country*YearFE	N	Y	Y	N
Borrower Sector FE	N	Y	Y	N
Firm country*Sector*Year FE	N	N	N	Y
Year FE	Y	N	N	N

**Notes:** This table presents the estimation results of the specification:

$$\begin{aligned}
Y_{f,i,t} = & \beta_{123} \text{Reform}_{c,t} \times \text{Treated}_s \times \text{High Foreign}_i \\
& + \beta_1 \text{Reform}_{c,t} \times \text{Treated}_s + \beta_2 \text{Reform}_{c,t} \times \text{High Foreign}_i \\
& + \beta_3 \text{Treated}_s \times \text{High Foreign}_i + \text{FE} + \varepsilon_{f,i,t},
\end{aligned}$$

where  $f$ ,  $c$ ,  $s$ ,  $i$ , and  $t$  denote firm, firm country, sector, package, and year, respectively. For the dependent variable,  $\mathbb{1}(\text{Movable collateral})_{i,t}$  is a dummy variable that equals one if a package is collateralized by movable assets, zero otherwise.  $\mathbb{1}(\text{Movable collateral})_{i,t}=1$  means that the DealScan variable "Collateral\_Security\_Type" is specified either (1) Accounts receivable and inventory, (2) Cash and cash equivalents, (3) Intangible, (4) Property & Equipment, (5) Accounts Receivable and Inventory, Cash and Marketable Securities, (6) Cash and Marketable Securities, Property & Equipment.  $\mathbb{1}(\text{Not tangible movable collateral})_{i,t}$  is a dummy variable that equals one if a package is NOT collateralized by tangible movable assets, zero otherwise.  $\mathbb{1}(\text{Not tangible movable collateral})_{i,t}=1$  means that the DealScan variable "Collateral\_Security\_Type" is specified either (1) Agency Guarantee, (2) Agency Guarantee, Cash and Marketable Securities, Intangibles, (3) All Assets, (4) All Assets, Cash and Marketable Securities, Intangibles, (5) All Assets, Intangibles, (6) Cash and Marketable Securities, (7) Intangibles, (8) Other, (9) Other, Ownership of Options/Warrants, (10) Other, Real Estate, (11) Ownership of Options/Warrants, (12) Plant, (13) Real Estate.  $\text{Treated}_s$  is a dummy variable that equals one if a firm is in a sector with a sector movable assets index higher than the median value, zero otherwise. I calculate the sector movable assets index using US nonfinancial firm data between 1983 and 1994.  $\text{High Foreign}_i$  is a dummy variable that equals one if the ratio of the number of foreign lead arrangers over the total number of lead arrangers within a package is above the median, and zero otherwise. Firm location and lender location are identified based on DealScan variables "Country" and "Lender\_Operating\_Country", respectively. Data is from LoanConnector DealScan. I only keep term loans and revolver loans. The countries included are Austria, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Ukraine, United Kingdom.  $\text{Reform}_{c,t}$  is a dummy variable that equals one if a firm in a country (as recorded in Compustat) reformed the secured transaction law in a year, zero otherwise. Robust standard errors clustered at the country level are in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table 11: Law Reform and Covenants

Panel A	$\mathbb{1}(\text{Covenants})$				#Fin-Covenants			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
High Foreign <sub>i</sub> × Reform <sub>c,t</sub> × Treated <sub>s</sub>	0.019 (0.013)	0.019* (0.010)	0.041** (0.019)	0.042* (0.020)	0.050** (0.023)	0.047** (0.018)	0.090 (0.062)	0.095 (0.066)
Firm controls	N	Y	N	Y	N	Y	N	Y
Package purpose FE	Y	Y	Y	Y	Y	Y	Y	Y
Sector FE	Y	Y	N	N	Y	Y	N	N
Firm country*Year FE	Y	Y	N	N	Y	Y	N	N
Firm country*Sector*Year FE	N	N	Y	Y	N	N	Y	Y
N	4,209	4,197	2,829	2,819	4,209	4,197	2,829	2,819
Adj R <sup>2</sup>	0.032	0.039	0.134	0.129	0.031	0.036	0.153	0.135
Panel B	Debt-Cash flow		Senior debt-Cash flow		Debt-Equity			
	(1)	(2)	(3)	(4)	(5)	(6)		
High Foreign <sub>i</sub> × Reform <sub>c,t</sub> × Treated <sub>s</sub>	0.019** (0.007)	0.017*** (0.006)	0.008** (0.003)	0.005** (0.002)	0.018*** (0.003)	0.018*** (0.003)		
Firm controls	N	Y	N	Y	N	Y		
Package purpose FE	Y	Y	Y	Y	Y	Y		
Sector FE	Y	Y	Y	Y	Y	Y		
Firm country*Year FE	Y	Y	Y	Y	Y	Y		
N	4,209	4,197	4,209	4,197	4,209	4,197		
Adj R <sup>2</sup>	0.013	0.018	0.080	0.088	0.011	0.010		

**Notes:** This table presents the estimation results of the specification:

$$\begin{aligned}
Y_{f,i,t} = & \beta_{123} \text{Reform}_{c,t} \times \text{Treated}_s \times \text{High Foreign}_i \\
& + \beta_1 \text{Reform}_{c,t} \times \text{Treated}_s + \beta_2 \text{Reform}_{c,t} \times \text{High Foreign}_i \\
& + \beta_3 \text{Treated}_s \times \text{High Foreign}_i + \text{FE} + \varepsilon_{f,i,t},
\end{aligned}$$

where  $f$ ,  $c$ ,  $s$ ,  $i$ , and  $t$  denote firm, firm country, sector, package, and year, respectively. In Panel A, the dependent variable in Columns (1)-(4) is a dummy variable that equals one if a package includes covenants, and zero otherwise, while it represents the number of financial covenants included in a package in Columns (5)-(8). In Panel B, the dependent variable is a dummy variable indicating if a package includes Debt-Cash flow ratio covenant, Senior debt-Cash flow ratio covenant, or Debt-Equity ratio covenant, and zero otherwise.  $\text{Treated}_s$  is a dummy variable that equals one if a firm is in a sector with a sector movable assets index higher than the median value, zero otherwise. I calculate the sector movable assets index using US nonfinancial firm data between 1983 and 1994.  $\text{High Foreign}_i$  is a dummy variable that equals one if the ratio of the number of foreign lead arrangers over the total number of lead arrangers within a package is above the median, and zero otherwise.  $\text{Reform}_{c,t}$  is a dummy variable that equals one if a firm in a country (as recorded in Compustat) reformed the secured transaction law in a year, zero otherwise. The time window is  $[-10,10]$  around the reform year for reformed countries. Robust standard errors clustered at the country level are in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table 12: Law Reform and Real Outcomes: Firm Level

	<i>Income</i>		<i>Employment</i>		<i>Sales</i>	
	(1)	(2)	(3)	(4)	(5)	(6)
Exposure <sub>f</sub> × Reform <sub>c,t</sub> × Treated <sub>s</sub>	-0.024*	-0.017	-0.356**	-0.379***	-0.038	-0.034
	(0.012)	(0.011)	(0.140)	(0.129)	(0.067)	(0.064)
Exposure <sub>f</sub> × Reform <sub>c,t</sub>	0.012	0.009	0.039	0.053	0.023	0.024
	(0.008)	(0.007)	(0.079)	(0.070)	(0.044)	(0.042)
Reform <sub>c,t</sub> × Treated <sub>s</sub>	-0.001		0.278**		-0.047	
	(0.023)		(0.138)		(0.065)	
Firm controls	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
Firm country*Year FE	Y	N	Y	N	Y	N
Sector*Year FE	Y	N	Y	N	Y	N
Firm country*Sector*Year FE	N	Y	N	Y	N	Y
N	3,260	2,923	2,857	2,584	3,816	3,437
Adj R <sup>2</sup>	0.477	0.459	0.970	0.968	0.864	0.859

**Notes:** This table presents the estimation results of the specification:

$$\begin{aligned}
Y_{f,t} = & \beta_{123} \text{Reform}_{c,t} \times \text{Treated}_s \times \text{Exposure}_f \\
& + \beta_1 \text{Reform}_{c,t} \times \text{Treated}_s + \beta_2 \text{Reform}_{c,t} \times \text{Exposure}_f \\
& + \beta_3 \text{Treated}_s \times \text{Exposure}_f + \mu \mathbf{X}_{f,t} + \text{FE} + \varepsilon_{f,t},
\end{aligned}$$

where  $f$ ,  $s$ , and  $t$  denote firm, sector, and year, respectively. The dependent variable in Columns (1)(2) is the ratio of net income to lagged total assets, in Columns (3)(4) is the logarithm of employment, and in Columns (5)(6) is the ratio of sales to lagged total assets.  $\text{Exposure}_f$  is a dummy variable that equals one if a firm in a sector with a ratio measuring firm borrowing from foreign lenders above the median, and zero otherwise. The ratio is computed as the ratio of the amount of loans borrowed from foreign lenders over the total amount of loans borrowed from all lenders before the law reform.  $\text{Treated}_s$  is a dummy variable that equals one if a firm is in a sector with a sector movable assets index higher than the median value, zero otherwise. I calculate the sector movable assets index using US nonfinancial firm data between 1983 and 1994.  $\text{Reform}_{c,t}$  is a dummy variable that equals one if a firm in a country (as recorded in Compustat) reformed the secured transaction law in a year, zero otherwise. The time window is  $[-10,10]$  around the reform year for reformed countries. Only countries that have reforms are included in the sample. Robust standard errors clustered at the country-sector level are in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .



Table 13: Law Reform and Real Outcomes: Aggregate Level

Panel A		Summary Statistics				
	N	mean	sd	min	p50	max
$\sigma^2$	494	0.618	0.751	0.009	0.360	5.026
$\mu$	494	-0.905	0.603	-3.746	-0.913	0.693
$\sigma_{\text{IMRPK, lpy}}$	494	0.516	1.204	-2.166	0.248	6.719
Exposure	494	0.586	0.233	0.046	0.625	1
Panel B		Regression Results				
	Var(log-MRPK)		Mean(log-MRPK)		Cov(log-MRPK, logVA)	
	(1)	(2)	(3)	(4)	(5)	(6)
Exposure <sub>s,c</sub> × Reform <sub>c,t</sub>	-0.278		0.852		0.729	
	(0.875)		(0.908)		(0.672)	
Q4_Exposure <sub>s,c</sub> × Reform <sub>c,t</sub>		-0.706		0.631		-1.604
		(1.038)		(0.695)		(1.670)
Q3_Exposure <sub>s,c</sub> × Reform <sub>c,t</sub>		0.171		0.341		0.943**
		(0.678)		(0.641)		(0.414)
Q2_Exposure <sub>s,c</sub> × Reform <sub>c,t</sub>		-0.001		0.631		0.780***
		(0.438)		(0.710)		(0.265)
Firm country*Year FE	Y	Y	Y	Y	Y	Y
Firm country*Sector FE	Y	Y	Y	Y	Y	Y
N	458	458	458	458	458	458
Adj R <sup>2</sup>	0.381	0.376	0.794	0.792	0.393	0.394

Notes: This table Panel B presents the estimation results of the specification:

$$M_{s,c,t} = \beta \text{Exposure}_{s,c} \times \text{Reform}_{c,t} + \alpha \text{Reform}_{c,t} + \gamma \text{Exposure}_{s,c} + \text{FE} + \varepsilon_{s,c,t},$$

where  $s$ ,  $c$ , and  $t$  denote sector, country and year, respectively. The dependent variables are the moments of log-MRPK:  $\text{Var}(\log\text{-MRPK})_{s,c,t}$  is the sector-country level variance of log-MRPK,  $\text{Mean}(\log\text{-MRPK})_{s,c,t}$  is the sector-country level mean of log-MRPK,  $\text{Cov}(\log\text{-MRPK}, \log\text{VA})_{s,c,t}$  is the sector-country level covariance between log-MRPK and log value-added.  $\text{Exposure}_{s,c}$  is a ratio of firm borrowing amounts from foreign lenders over firm borrowing amounts from all lenders before the reform.  $Q_j \text{Exposure}_{s,c}$  is a dummy variable if the exposure of a sector's exposure is in the 4th/3rd/2nd quartile of the exposure distribution in a year, and zero otherwise.  $\text{Reform}_{c,t}$  is a dummy variable that equals one if a firm in a country (as recorded in Compustat) reformed the secured transaction law in a year, zero otherwise. The time window is  $[-10, 10]$  around the reform year for reformed countries. Robust standard errors clustered at the country-sector level are in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

# Appendices

## A Details on Secured Transaction Law Reforms

Table A1: Overview of Secured Transaction Law in Sample Countries

Panel A: Reformed countries			
Country	Law	Type of Security	Perfection
Croatia	Law on the Registry of Court and Public-Notary Security Interests on Movables and Rights in 2006	Nonpossessory pledge	Registration
France	Ordinance no 2006-346	Nonpossessory pledge	Registration
Hungary	Act XXXVI of 1996		Registration
Italy	Decree n59 of 3 May 2016	Nonpossessory pledge	Registration
Poland	The Law of 6 December 1996 on the Registered Pledge and the Pledge Registry	Nonpossessory pledge	Registration
Romania	Law No. 99 of 26 May 1999	Movable mortgage	Registration
Slovakia	Act No.526/2002 Coll	Nonpossessory security interests (Unspecified)	Registration
Ukraine	Law on Securing Creditors' Claims and Registration of Encumbrances	Nonpossessory pledge	Registration
Panel B: Unreformed countries			
Country	Type of security	Perfection	
Austria	Transfer of title	Symbolic delivery	
Czech Republic	Nonpossessory pledge, Transfer of title	Registration	
Denmark	Chattel mortgage, Floating lien	Registration	
Finland	Floating charge	Registration	
Germany	Transfer of title	Precise description of the assets	
Greece	Nonpossessory pledge, Floating charge	Registration	
Iceland	Hypothecation	Registration	
Ireland	Floating charge	Registration	
Netherlands	Mortgage, Nonpossessory pledge	Registration	
Norway	Floating charge	Registration	
Portugal	Mortgage	registration	
Russia	Nonpossessory pledge	Registration	
Slovenia	/	Registration	
Spain	Chattel mortgages, Nonpossessory pledge	Registration	
Sweden	Floating charge	Registration	
United Kingdom	Fixed charge, Floating charge	Registration	

**Notes:** This table summarizes the security interests over movable property in sample countries. The information is from multiple sources, including the Secured Transactions Law Reform Project, Thomson Reuters Practical Law, and other academic publications.

Table A2: Overview of Sample

Country	Reformed year	#Obs	%Obs
Austria	Unreformed	473	0.79
Croatia	2006	165	0.28
Czech Republic	Unreformed	56	0.09
Denmark	Unreformed	746	1.25
Finland	Unreformed	1,245	2.08
France	2006	11,067	18.50
Germany	Unreformed	7,877	13.17
Greece	Unreformed	419	0.70
Hungary	1996	118	0.20
Iceland	Unreformed	104	0.17
Ireland	Unreformed	898	1.50
Italy	2016	3,156	5.27
Netherlands	Unreformed	4,045	6.76
Norway	Unreformed	1,566	2.62
Poland	1998	467	0.78
Portugal	Unreformed	239	0.40
Romania	2000	42	0.07
Russia	Unreformed	2,593	4.33
Slovakia	2003	65	0.11
Slovenia	Unreformed	21	0.04
Spain	Unreformed	6,381	10.67
Sweden	Unreformed	2,954	4.94
Ukraine	2004	4	0.01
United Kingdom	Unreformed	15,130	25.29
Total		59,831	100.00

## B Variable Definition

Table B1: Variable Definitions

Variable	Definition	Source
<i><u>Dependent variables</u></i>		
1 (Lead)	A dummy variable equals one if a lender is a lead arranger, and zero otherwise. The identifying information is based on the DealScan variable lead_arranger, which is a string variable showing the exact name of lead arrangers.	DealScan
Lender share(%)	The share of the loan a lender has.	DealScan
Loan issuance	The natural logarithm of loan issuance amount from a lender to a firm in a year.	Own calculation
Sector share	The ratio of the loan amount granted by a lender to a sector in a country in a year scaled by the total amount of loan granted by a lender to all sector in a country in a year.	DealScan
<i><u>Explanatory variables</u></i>		
Reform	A dummy variable that equals one if a firm in a country c (as recorded in Compustat) reformed the secured transaction law in year t, zero otherwise. The time window is [-10,10] around the reform year for reformed countries.	DealScan
Treated	A dummy variable that equals one if a firm is in a sector with a sector movable assets index higher than the median value, zero otherwise. I calculate the sector movable assets index using US nonfinancial firm data (Compustat variables: ppenme and invt) between 1983 and 1994.	Compustat
Foreign	A dummy variable that equals one if a lender is not in the same location as the borrower, and zero otherwise. Lender location is identified based on DealScan variable: Lender_Operating_Country, while borrower location is identified based on Compustat variable: fic.	DealScan and Compustat
High Foreign	The ratio of the number of foreign lead arrangers over total number of lead arrangers within a loan.	DealScan
Relationship	A dummy variable that equals one if a lender is foreign and the relationship length is below the median. This length is calculated as the number of years between the current loan origination date and the first loan origination date for a firm and a lender.	DealScan
Legal rights	A index of the strength of legal rights, which range from 0 to 10/12.	World Bank Doing Business
Credit Information Depth	A index measures the depth of credit information, which ranges from 0 to 6/8.	World Bank Doing Business
<i><u>Loan characteristics</u></i>		
Loan type	I include two types of loans: term loans and revolvers.	DealScan
Loan purpose	Primary purpose of the deal.	DealScan
Loan secure	A dummy variable that equals one if a loan is secured and zero otherwise.	DealScan
Loan maturity	Calculated as the natural logarithm of loan maturity in months.	DealScan
Loan amount	Natural logarithm of facility amount.	DealScan
Loan covenant	A dummy variable that equals one if a deal includes covenants and zero otherwise.	DealScan
Loan financial covenant	A dummy variable that equals one if a deal includes a financial covenant, and zero otherwise.	DealScan
Debt-Cash flow ratio covenant	A dummy variable equals one if a package includes a debt-cash flow ratio covenant, zero otherwise.	
Senior debt-Cash flow ratio covenant	A dummy variable equals one if a package includes a senior debt-cash flow ratio covenant, zero otherwise.	DealScan

Debt-Equity ratio covenant	A dummy variable equals one if a package includes a debt-equity ratio covenant, zero otherwise.	DealScan
<b><i>Firm characteristics</i></b>		
Size	Natural logarithm of total assets.	Compustat
Debt ratio	Long-term debt/Total assets.	Compustat
Current ratio	Current assets/Total assets.	Compustat
Tangibility	Net fixed assets/Total assets.	Compustat
Employment	Natural logarithm of number of employees.	Compustat
Net sales	Net sale/Total assets.	Compustat
Capital expenditure	Capital expenditure/Total assets.	Compustat
<b><i>Macro variables</i></b>		
GDP per capita growth	Annual growth rate of GDP per capita for a country. GDP per capita is calculated as gross domestic product divided by midyear population.	World Bank
Export to GDP	The percentage of exports of goods and services to GDP.	World Bank
Import to GDP	The percentage of imports of goods and services to GDP.	World Bank
Inflation GDP deflator	Inflation measured by the annual growth rate of the GDP	World Bank
Ln(population)	Natural logarithm of the total population of a country.	World Bank
Population growth	Annual growth rate from year $t - 1$ to $t$ ,	
French Law	A dummy variable that equals one if a country follows French law origin, zero otherwise.	
$\frac{\text{\#Foreign banks}}{\text{\#All banks}}$	Number of foreign-owned banks over the total number of banks in a country.	Claessens and Van Horen (2015)
Domestic credit to private sector	The percentage of amounts of credit provided to private sectors to GDP.	World Bank

## C Additional Results

Table C1: Law Reform and Collateral Monitoring: Stacked DD

	(1)	(2)	(3)
Panel A	DV=1 (Lead)		
Foreign <sub>l</sub> × Reform <sub>c,t</sub> × Treated <sub>s</sub>	-0.055*** (0.005)	-0.048*** (0.004)	-0.048*** (0.005)
Foreign <sub>l</sub> × Treated <sub>s</sub>	-0.007* (0.004)	-0.009** (0.003)	-0.009*** (0.003)
N	325,586	325,579	325,536
Adj R <sup>2</sup>	0.673	0.721	0.737
Panel B	DV=Lead share		
Foreign <sub>l</sub> × Reform <sub>c,t</sub> × Treated <sub>s</sub>	0.011*** (0.003)	0.019*** (0.002)	0.019*** (0.001)
Foreign <sub>l</sub> × Treated <sub>s</sub>	0.003 (0.003)	-0.001 (0.002)	-0.001 (0.001)
N	33,632	33,650	34,130
Adj R <sup>2</sup>	0.890	0.928	0.977
Firm controls	Y	N	N
Facility controls	Y	Y	N
(Cohort-)Facility type FE	Y	Y	N
(Cohort-)Package purpose FE	Y	Y	N
(Cohort-)Facility FE	N	N	Y
(Cohort-)Firm*Year FE	N	Y	N
(Cohort-)Firm country*Sector*Year FE	Y	N	N
(Cohort-)Firm country*Lender country*Year FE	Y	Y	Y
(Cohort-)Lender*Year FE	Y	Y	Y

**Notes:** This table presents the estimation results of Eq.(2). The sample period is 1995-2017. The reformed countries include Croatia, France, Hungary, Italy, Poland, Romania, Slovakia, and Ukraine. Data is from LoanConnector DealScan. I only keep term loans and revolver loans. Firm location is identified by linking to Compustat using table by [Chava and Roberts \(2008\)](#). *Treated<sub>s</sub>* is a dummy variable that equals one if a firm is in a sector with a sector movable assets index higher than the median value, zero otherwise. I calculate the sector movable assets index using US nonfinancial firm data between 1983 and 1994. *Reform<sub>c,t</sub>* is a dummy variable that equals one if a firm in a country *c* (as recorded in Compustat) reformed the secured transaction law in year *t*, zero otherwise. The time window is [-10,10] around the reform year for reformed countries. *Foreign<sub>l</sub>* is a dummy variable that equals one if a lender is not in the same location as the borrower, and zero otherwise. Robust standard errors clustered at the country level are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table C2: Law Reform and Collateral Monitoring: Borrower Country Equals Country of Syndication

	(1)	(2)	(3)
Panel A		DV=1 (Lead)	
Foreign <sub>l</sub> × Reform <sub>c,t</sub> × Treated <sub>s</sub>	-0.084*** (0.016)	-0.086*** (0.016)	-0.083*** (0.015)
Foreign <sub>l</sub> × Treated <sub>s</sub>	0.021 (0.016)	0.019 (0.015)	0.014 (0.015)
N	44,194	44,313	45,635
Adj R <sup>2</sup>	0.587	0.631	0.625
Panel B		DV=Lead share	
Foreign <sub>l</sub> × Reform <sub>c,t</sub> × Treated <sub>s</sub>	0.011* (0.005)	0.018*** (0.004)	0.018*** (0.003)
Foreign <sub>l</sub> × Treated <sub>s</sub>	0.005 (0.005)	-0.000 (0.004)	-0.000 (0.003)
N	3,907	3,853	3,726
Adj R <sup>2</sup>	0.764	0.845	0.883
Firm controls	Y	N	N
Facility controls	Y	Y	Y
Facility type FE	Y	Y	N
Facility FE	N	N	Y
Package purpose FE	Y	Y	N
Firm*Year FE	N	Y	N
Firm country*Sector*Year FE	Y	N	N
CountryofSyndication*Lender country*Year FE	Y	Y	Y
Lender*Year FE	Y	Y	Y

**Notes:** This table presents the estimation results of Eq. (2) with the sample that only includes observations that the borrower country is the same as the country of syndication. The sample period is 1995-2017. The reformed countries include Croatia, France, Hungary, Italy, Poland, Romania, Slovakia, and Ukraine. Data is from LoanConnector DealScan. I only keep term loans and revolver loans. Firm location is identified by linking to Compustat using table by Chava and Roberts (2008). *Treated<sub>s</sub>* is a dummy variable that equals one if a firm is in a sector with a sector movable assets index higher than the median value, zero otherwise. I calculate the sector movable assets index using US nonfinancial firm data between 1983 and 1994. *Reform<sub>c,t</sub>* is a dummy variable that equals one if the "Country of syndication" *c* reformed the secured transaction law in year *t*, zero otherwise. The time window is [-10,10] around the reform year for reformed countries. *Foreign<sub>l</sub>* is a dummy variable that equals one if a lender is not in the same location as the borrower, and zero otherwise. Robust standard errors clustered at the country (Country of syndication) level are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table C3: Law Reform and Collateral Monitoring: Alternative Definition of Reformed Countries

	(1)	(2)	(3)
Panel A		DV=1 (Lead)	
Foreign <sub>l</sub> × Reform <sub>c,t</sub> × Treated <sub>s</sub>	-0.086*** (0.019)	-0.091*** (0.019)	-0.092*** (0.018)
Foreign <sub>l</sub> × Treated <sub>s</sub>	0.020 (0.015)	0.017 (0.015)	0.016 (0.014)
Foreign <sub>l</sub> × Reform <sub>c,t</sub>	0.130*** (0.040)	0.137*** (0.042)	0.137*** (0.040)
N	47,791	47,912	47,753
Adj R <sup>2</sup>	0.589	0.631	0.624
Panel B		DV=Lead share	
Foreign <sub>l</sub> × Reform <sub>c,t</sub> × Treated <sub>s</sub>	0.009 (0.007)	0.016** (0.006)	0.018*** (0.004)
Foreign <sub>l</sub> × Treated <sub>s</sub>	0.007 (0.006)	0.001 (0.005)	-0.000 (0.003)
Foreign <sub>l</sub> × Reform <sub>c,t</sub>	0.009 (0.018)	0.003 (0.020)	0.009 (0.012)
N	4,262	4,205	4,024
Adj R <sup>2</sup>	0.780	0.848	0.894
Firm controls	Y	N	N
Facility controls	Y	Y	Y
Facility type FE	Y	Y	N
Facility FE	N	N	Y
Package purpose FE	Y	Y	N
Firm*Year FE	N	Y	N
Firm country*Sector*Year FE	Y	N	N
CountryofSyndication*Lender country*Year FE	Y	Y	Y
Lender*Year FE	Y	Y	Y

**Notes:** This table presents the estimation results of Eq.(2) with alternative definition of reformed countries. The sample period is 1995-2017. The reformed countries include Croatia, France, Hungary, Italy, Poland, Romania, Slovakia, and Ukraine. Data is from LoanConnector DealScan. I only keep term loans and revolver loans. Firm location is identified by linking to Compustat using table by [Chava and Roberts \(2008\)](#). *Treated<sub>s</sub>* is a dummy variable that equals one if a firm is in a sector with a sector movable assets index higher than the median value, zero otherwise. I calculate the sector movable assets index using US nonfinancial firm data between 1983 and 1994. *Reform<sub>c,t</sub>* is a dummy variable that equals one if the "Country of syndication" *c* reformed the secured transaction law in year *t*, zero otherwise. The time window is [-10,10] around the reform year for reformed countries. *Foreign<sub>l</sub>* is a dummy variable that equals one if a lender is not in the same location as the borrower, and zero otherwise. Robust standard errors clustered at the country (Country of syndication) level are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.



Table C4: Law Reform and Collateral Monitoring: Geographical Location Difference

	$\mathbb{1}(Lead)$	<i>Lead share</i>	$\mathbb{1}(Lead)$	<i>Lead share</i>
	(1)	(2)	(3)	(4)
	Borrower same location only		Lender same location only	
$Foreign_l \times Reform_{c,t} \times Treated_s$	-0.068*** (0.021)	0.018*** (0.005)	-0.090*** (0.020)	0.017* (0.010)
$Foreign_l \times Treated_s$	0.016 (0.018)	-0.001 (0.005)	0.015 (0.014)	0.005 (0.004)
Facility controls	Y	Y	Y	Y
Facility type FE	Y	Y	Y	Y
Package purpose FE	Y	Y	Y	Y
Firm*Year FE	Y	Y	Y	Y
Firm country*Lender country*Year FE	Y	Y	Y	Y
Lender*Year FE	Y	Y	Y	Y
N	44,563	3,860	45,759	4,378
Adj $R^2$	0.628	0.844	0.635	0.846

**Notes:** This table presents the estimation results of Eq.(2) using deal level data. The sample period is 1995-2017. The reformed countries include Croatia, France, Hungary, Italy, Poland, Romania, Slovakia, and Ukraine. Data is from LoanConnector DealScan. I only keep term loans and revolver loans. Firm location is identified by linking to Compustat using table by [Chava and Roberts \(2008\)](#).  $Treated_s$  is a dummy variable that equals one if a firm is in a sector with a sector movable assets index higher than the median value, zero otherwise. I calculate the sector movable assets index using US nonfinancial firm data between 1983 and 1994.  $Reform_{c,t}$  is a dummy variable that equals one if a firm in a country  $c$  (as recorded in Compustat) reformed the secured transaction law in year  $t$ , zero otherwise. The time window is  $[-10,10]$  around the reform year for reformed countries.  $Foreign_l$  is a dummy variable that equals one if a lender is not in the same location as the borrower, and zero otherwise. Robust standard errors clustered at the country level are in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table C5: Law Reform and Lending Through Subsidiaries

	(1)	(2)	(3)
	1 (borrower country subsidiary loan)		
Parent Foreign <sub><i>l</i></sub> × Reform <sub><i>c,t</i></sub> × Treated <sub><i>s</i></sub>	0.030*** (0.011)	0.031** (0.011)	0.031** (0.012)
Parent Foreign <sub><i>l</i></sub> × Treated <sub><i>s</i></sub>	0.013 (0.011)	0.015 (0.012)	0.014 (0.013)
Parent Foreign <sub><i>l</i></sub> × Reform <sub><i>c,t</i></sub>	0.076 (0.075)	0.082 (0.075)	0.087 (0.075)
Parent Foreign <sub><i>l</i></sub>	-0.754*** (0.035)	-0.751*** (0.036)	-0.751*** (0.036)
Firm controls	Y	N	N
Facility controls	Y	Y	N
Facility type FE	Y	Y	N
Package purpose FE	Y	Y	N
Facility FE	N	N	Y
Firm*Year FE	N	Y	N
Firm country*Sector*Year FE	Y	N	N
Lender*Year FE	Y	Y	Y
N	32,142	31,976	31,355
Adj R <sup>2</sup>	0.737	0.743	0.723

**Notes:** This table presents the estimation results. The sample period is 1995-2017. The reformed countries include Croatia, France, Hungary, Italy, Poland, Romania, Slovakia, and Ukraine. Data is from LoanConnector DealScan. I only keep term loans and revolver loans. Firm location is identified by linking to Compustat using table by [Chava and Roberts \(2008\)](#). The dependent variable in Columns (1)-(3) is a dummy variable that equals one if the loan originated from a subsidiary of a lender parent where this subsidiary is located in the borrower's country. *Treated<sub>s</sub>* is a dummy variable that equals one if a firm is in a sector with a sector movable assets index higher than the median value, zero otherwise. I calculate the sector movable assets index using US nonfinancial firm data between 1983 and 1994. *Reform<sub>c,t</sub>* is a dummy variable that equals one if a firm in a country *c* (as recorded in Compustat) reformed the secured transaction law in year *t*, zero otherwise. The time window is [-10,10] around the reform year for reformed countries. *Parent Foreign<sub>l</sub>* is a dummy variable that equals one if a lender parent is not in the same location as the borrower, and zero otherwise. Robust standard errors clustered at the country level are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table C6: Law Reform and Collateral Monitoring: Robustness Checks

Panel A	Alternative sample					
	$\mathbb{1}(Lead)$	<i>Lead share</i>	$\mathbb{1}(Lead)$	<i>Lead share</i>	$\mathbb{1}(Lead)$	<i>Lead share</i>
	(1)	(2)	(3)	(4)	(5)	(6)
	France only		Reformed countries only		No UK and Ireland	
Foreign <sub><i>l</i></sub> × Reform <sub><i>c,t</i></sub> × Treated <sub><i>s</i></sub>	-0.132*	0.024**	-0.135**	0.025***	-0.076***	0.019***
	(0.076)	(0.009)	(0.059)	(0.009)	(0.023)	(0.005)
Foreign <sub><i>l</i></sub> × Treated <sub><i>s</i></sub>	0.074*	-0.006	0.084**	-0.008	0.016	-0.002
	(0.040)	(0.008)	(0.032)	(0.008)	(0.021)	(0.005)
SE cluster	Borrower	Borrower	Country*Sector	Country*Sector	Country	Country
N	9,670	779	11,531	1,034	37,519	3,647
Adj R <sup>2</sup>	0.626	0.936	0.641	0.922	0.623	0.777
Panel B	Alternative data structure					
	$\mathbb{1}(Lead)$	<i>Lead share</i>	$\mathbb{1}(Lead)$	<i>Lead share</i>	$\mathbb{1}(Lead)$	<i>Lead share</i>
	(1)	(2)	(3)	(4)	(5)	(6)
	Deal level		Computed lender share		Longer period	
Foreign <sub><i>l</i></sub> × Reform <sub><i>c,t</i></sub> × Treated <sub><i>s</i></sub>	-0.036	0.480***	-0.067***	0.009***	-0.064***	0.019***
	(0.021)	(0.004)	(0.016)	(0.002)	(0.017)	(0.004)
Foreign <sub><i>l</i></sub> × Treated <sub><i>s</i></sub>	-0.004	-0.001	0.011	0.001	0.011	-0.002
	(0.019)	(0.004)	(0.015)	(0.002)	(0.016)	(0.004)
N	32,402	2,536	52,310	23,028	54,015	4,668
Adj R <sup>2</sup>	0.520	0.685	0.624	0.866	0.627	0.815
Facility controls	Y	Y	Y	Y	Y	Y
Facility type FE	Y	Y	Y	Y	Y	Y
Package purpose FE	Y	Y	Y	Y	Y	Y
Firm*Year FE	Y	Y	Y	Y	Y	Y
Firm country*Lender country*Year FE	N	N	N	Y	Y	Y
Lender*Year FE	Y	Y	Y	Y	Y	Y

**Notes:** This table presents the estimation results of Eq. (2) using alternative sample. The sample period is 1995-2017. The reformed countries include Croatia, France, Hungary, Italy, Poland, Romania, Slovakia, and Ukraine. Data is from LoanConnector DealScan. I only keep term loans and revolver loans. Firm location is identified by linking to Compustat using table by [Chava and Roberts \(2008\)](#). The dependent variable in Columns (1)(3)(5) is a dummy variable that takes value one if a lender is a lead arranger in a facility, and zero otherwise. The dependent variable in Columns (2)(4)(6) is the share condition of being a lead arranger. *Treated<sub>s</sub>* is a dummy variable that equals one if a firm is in a sector with a sector movable assets index higher than the median value, zero otherwise. I calculate the sector movable assets index using US nonfinancial firm data between 1983 and 1994. *Reform<sub>c,t</sub>* is a dummy variable that equals one if a firm in a country *c* (as recorded in Compustat) reformed the secured transaction law in year *t*, zero otherwise. The time window is [-10,10] around the reform year for reformed countries. *Foreign<sub>l</sub>* is a dummy variable that equals one if a lender is not in the same location as the borrower, and zero otherwise. Robust standard errors clustered at the country level are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table C7: Law Reform and Collateral Monitoring: Loan Heterogeneity

	$\mathbb{1}(\text{Lead})$	<i>Lead share</i>	$\mathbb{1}(\text{Lead})$	<i>Lead share</i>	$\mathbb{1}(\text{Lead})$	<i>Lead share</i>	$\mathbb{1}(\text{Lead})$	<i>Lead share</i>
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Term loan only		Revolver only		Real investment loans		Other loans	
Foreign <sub><i>l</i></sub> × Reform <sub><i>c,t</i></sub> × Treated <sub><i>s</i></sub>	-0.070***	0.037	-0.067***	0.002	-0.097***	0.011	-0.018	0.029**
	(0.023)	(0.027)	(0.020)	(0.005)	(0.011)	(0.023)	(0.022)	(0.013)
Foreign <sub><i>l</i></sub> × Treated <sub><i>s</i></sub>	0.031	0.006	-0.001	-0.001	0.023	0.010	-0.001	0.005
	(0.024)	(0.013)	(0.016)	(0.003)	(0.017)	(0.008)	(0.019)	(0.006)
Facility controls	Y	Y	Y	Y	Y	Y	Y	Y
Facility type FE	Y	Y	Y	Y	Y	Y	Y	Y
Package purpose FE	Y	Y	Y	Y	Y	Y	Y	Y
Firm*Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Firm country*Lender country*Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Lender*Year FE	Y	Y	Y	Y	Y	Y	Y	Y
N	23,349	2,130	25,512	2,182	31,918	2,522	18,583	2,081
Adj R <sup>2</sup>	0.655	0.788	0.555	0.924	0.635	0.845	0.643	0.834

**Notes:** This table presents the estimation results of Eq.(2) using split sample. The sample period is 1995-2017. The reformed countries include Croatia, France, Hungary, Italy, Poland, Romania, Slovakia, and Ukraine. Data is from LoanConnector DealScan. I only keep term loans and revolver loans. Firm location is identified by linking to Compustat using table by Chava and Roberts (2008). The dependent variable in Columns (1)(3)(5)(7) is a dummy variable that takes value one if a lender is a lead arranger in a facility, and zero otherwise. The dependent variable in Columns (2)(4)(6)(8) is the share condition of being a lead arranger. *Treated<sub>s</sub>* is a dummy variable that equals one if a firm is in a sector with a sector movable assets index higher than the median value, zero otherwise. I calculate the sector movable assets index using US nonfinancial firm data between 1983 and 1994. *Reform<sub>c,t</sub>* is a dummy variable that equals one if a firm in a country *c* (as recorded in Compustat) reformed the secured transaction law in year *t*, zero otherwise. The time window is [-10,10] around the reform year for reformed countries. *Foreign<sub>l</sub>* is a dummy variable that equals one if a lender is not in the same location as the borrower, and zero otherwise. Robust standard errors clustered at the country level are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table C8: Law Reform and Collateralization: Sample representativeness

Variable	N	Mean	SD	Min	p50	Max
Panel A: Secured loans in initial sample						
1 (Lead)	14583	0.489	0.500	0	0	1
Lender share	2981	0.128	0.149	0	0.076	1
Foreign lender	14583	0.709	0.454	0	1	1
Log(Facility amount)	14534	5.401	1.374	-0.916	5.496	8.997
Log(Facility maturity)	14237	4.247	0.561	1.258	4.277	6.244
AISD	11153	252.039	131.883	3	225	1200
Panel B: Secured loans in the sample without linking to Compustat						
1 (Lead)	68453	0.478	0.500	0	0	1
Lender share	12146	0.166	0.168	0	0.108	1.211
Foreign lender	68453	0.597	0.491	0	1	1
Log(Facility amount)	68159	4.620	1.470	-1.427	4.615	9.616
Log(Facility maturity)	66945	4.337	0.509	-1.017	4.431	6.244
AISD	51337	262.200	115.193	2	237.5	2000
Panel C: Secured loans with known collateral information						
1 (Lead)	5417	0.465	0.499	0	0	1
Lender share	1622	0.181	0.169	0.002	0.125	1.056
Foreign lender	5417	0.664	0.472	0	1	1
Log(Facility amount)	5372	5.074	1.522	-0.654	5.026	9.616
Log(Facility maturity)	5291	4.221	0.565	0.082	4.277	5.887
AISD	3776	229.483	106.052	14.5	225	900

## D Robustness Checks

Table D1: Law Reform and Collateral Monitoring: Alternative Standard Error Computation

	$\mathbb{1}(Lead)$	<i>Lead share</i>	$\mathbb{1}(Lead)$	<i>Lead share</i>	$\mathbb{1}(Lead)$	<i>Lead share</i>
	(1)	(2)	(3)	(4)	(5)	(6)
	Bootstrap SE		Double cluster country-sector		Country*Sector	
Foreign <sub><i>l</i></sub> × Reform <sub><i>c,t</i></sub> × Treated <sub><i>s</i></sub>	-0.067**	0.019	-0.068***	0.019***	-0.068	0.019***
	(0.032)	(0.016)	(0.018)	(0.005)	(0.060)	(0.006)
Foreign <sub><i>l</i></sub> × Treated <sub><i>s</i></sub>	0.074*	-0.006	0.010	-0.002	0.010	-0.002
	(0.040)	(0.008)	(0.014)	(0.005)	(0.017)	(0.005)
Facility controls	Y	Y	Y	Y	Y	Y
Facility type FE	Y	Y	Y	Y	Y	Y
Package purpose FE	Y	Y	Y	Y	Y	Y
Firm*Year FE	Y	Y	Y	Y	Y	Y
Firm country*Lender country*Year FE	N	N	Y	Y	Y	Y
Lender*Year FE	Y	Y	Y	Y	Y	Y
N	52,310	4,581	52,134	4,581	52,134	4,581
Adj <i>R</i> <sup>2</sup>			0.624	0.811	0.631	0.831

**Notes:** This table presents the estimation results of Eq.(2). The sample period is 1995-2017. The reformed countries include Croatia, France, Hungary, Italy, Poland, Romania, Slovakia, and Ukraine. Data is from LoanConnector DealScan. I only keep term loans and revolver loans. Firm location is identified by linking to Compustat using table by [Chava and Roberts \(2008\)](#). *Treated<sub>s</sub>* is a dummy variable that equals one if a firm is in a sector with a sector movable assets index higher than the median value, zero otherwise. I calculate the sector movable assets index using US nonfinancial firm data between 1983 and 1994. *Reform<sub>c,t</sub>* is a dummy variable that equals one if a firm in a country *c* (as recorded in Compustat) reformed the secured transaction law in year *t*, zero otherwise. The time window is [-10,10] around the reform year for reformed countries. *Foreign<sub>l</sub>* is a dummy variable that equals one if a lender is not in the same location as the borrower, and zero otherwise. Robust standard errors clustered at the country level are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table D2: Law Reform and Collateral Monitoring: Banks

	$\mathbb{1}(Lead)$	<i>Lead share</i>	$\mathbb{1}(Lead)$	<i>Lead share</i>
	(1)	(2)	(3)	(4)
	No institutional tranches		Banks only	
$Foreign_l \times Reform_{c,t} \times Treated_s$	-0.056*** (0.018)	0.020*** (0.005)	-0.044** (0.016)	0.020*** (0.003)
$Foreign_l \times Treated_s$	0.007 (0.016)	-0.003 (0.004)	0.006 (0.013)	-0.002 (0.003)
Facility controls	Y	Y	Y	Y
Facility type FE	Y	Y	Y	Y
Package purpose FE	Y	Y	Y	Y
Firm*Year FE	Y	Y	Y	Y
Firm country*Lender country*Year FE	Y	Y	Y	Y
Lender*Year FE	Y	Y	Y	Y
N	48,063	4,485	48,854	4,336
Adj $R^2$	0.614	0.805	0.624	0.814

**Notes:** This table presents the estimation results of Eq.(2). The sample period is 1995-2017. The reformed countries include Croatia, France, Hungary, Italy, Poland, Romania, Slovakia, and Ukraine. Data is from LoanConnector DealScan. I only keep term loans and revolver loans. Firm location is identified by linking to Compustat using table by [Chava and Roberts \(2008\)](#).  $Treated_s$  is a dummy variable that equals one if a firm is in a sector with a sector movable assets index higher than the median value, zero otherwise. I calculate the sector movable assets index using US nonfinancial firm data between 1983 and 1994.  $Reform_{c,t}$  is a dummy variable that equals one if a firm in a country  $c$  (as recorded in Compustat) reformed the secured transaction law in year  $t$ , zero otherwise. The time window is  $[-10,10]$  around the reform year for reformed countries.  $Foreign_l$  is a dummy variable that equals one if a lender is not in the same location as the borrower, and zero otherwise. Robust standard errors clustered at the country level are in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table D3: Law Reform and Collateral Monitoring: Deal Level Additional Results

	(1)	(2)	(3)
Panel A		DV=1 (Lead)	
Foreign <sub>l</sub> × Reform <sub>c,t</sub> × Treated <sub>s</sub>	-0.053** (0.023)	-0.031 (0.025)	-0.036 (0.023)
Foreign <sub>l</sub> × Treated <sub>s</sub>	-0.009 (0.019)	-0.006 (0.019)	-0.007 (0.019)
Foreign <sub>l</sub> × Reform <sub>c,t</sub>	0.090** (0.033)	0.062** (0.030)	0.062** (0.028)
N	33,587	33,511	33,378
Adj R <sup>2</sup>	0.473	0.526	0.546
Panel B		DV=Lead share	
Foreign <sub>l</sub> × Reform <sub>c,t</sub> × Treated <sub>s</sub>	0.008 (0.012)	0.017*** (0.006)	0.016** (0.006)
Foreign <sub>l</sub> × Treated <sub>s</sub>	0.000 (0.006)	0.003 (0.004)	0.004 (0.005)
Foreign <sub>l</sub> × Reform <sub>c,t</sub>	-0.008 (0.006)	-0.018*** (0.005)	-0.017*** (0.004)
N	3,048	2,956	2,919
Adj R <sup>2</sup>	0.646	0.775	0.861
Firm controls	Y	N	N
Package controls	Y	Y	N
Package purpose FE	Y	Y	N
Deal FE	N	N	Y
Firm*Year FE	N	Y	N
Firm country*Sector*Year FE	Y	N	N
Lender parent*Year FE	Y	Y	Y

**Notes:** This table presents the estimation results of Eq.(2) using deal level data. The sample period is 1995-2017. The reformed countries include Croatia, France, Hungary, Italy, Poland, Romania, Slovakia, and Ukraine. Data is from LoanConnector DealScan. I only keep term loans and revolver loans. Firm location is identified by linking to Compustat using table by [Chava and Roberts \(2008\)](#). *Treated<sub>s</sub>* is a dummy variable that equals one if a firm is in a sector with a sector movable assets index higher than the median value, zero otherwise. I calculate the sector movable assets index using US nonfinancial firm data between 1983 and 1994. *Reform<sub>c,t</sub>* is a dummy variable that equals one if a firm in a country *c* (as recorded in Compustat) reformed the secured transaction law in year *t*, zero otherwise. The time window is [-10,10] around the reform year for reformed countries. *Foreign<sub>l</sub>* is a dummy variable that equals one if a lender is not in the same location as the borrower, and zero otherwise. Robust standard errors clustered at the country level are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.



Table D4: Law Reform and Collateral Monitoring: Foreign Relative to All Reformed Countries

	(1)	(2)	(3)
<b>Panel A</b>			
		DV=1 (Lead)	
Alternative $\text{Foreign}_l \times \text{Reform}_{c,t} \times \text{Treated}_s$	-0.045** (0.019)	-0.036* (0.017)	-0.038** (0.016)
Alternative $\text{Foreign}_l \times \text{Treated}_s$	-0.012 (0.022)	-0.010 (0.021)	-0.013 (0.019)
N	52,201	52,310	53,841
Adj $R^2$	0.576	0.624	0.621
<b>Panel B</b>			
		DV=Lead share	
Alternative $\text{Foreign}_l \times \text{Reform}_{c,t} \times \text{Treated}_s$	0.015** (0.007)	0.022*** (0.005)	0.020*** (0.002)
Alternative $\text{Foreign}_l \times \text{Treated}_s$	-0.000 (0.008)	-0.005 (0.004)	-0.002 (0.002)
N	4,648	4,585	4,423
Adj $R^2$	0.722	0.811	0.884
Firm controls	Y	N	N
Facility controls	Y	Y	N
Facility type FE	Y	Y	N
Package purpose FE	Y	Y	N
Facility FE	N	N	Y
Firm*Year FE	N	Y	N
Firm country*Sector*Year FE	Y	N	N
Firm country*Lender country*Year FE	Y	Y	Y
Lender parent*Year FE	Y	Y	Y

**Notes:** This table presents the estimation results of Eq.(2). The sample period is 1995-2017. The reformed countries include Croatia, France, Hungary, Italy, Poland, Romania, Slovakia, and Ukraine. Data is from LoanConnector DealScan. I only keep term loans and revolver loans. Firm location is identified by linking to Compustat using table by [Chava and Roberts \(2008\)](#).  $\text{Treated}_s$  is a dummy variable that equals one if a firm is in a sector with a sector movable assets index higher than the median value, zero otherwise. I calculate the sector movable assets index using US nonfinancial firm data between 1983 and 1994.  $\text{Reform}_{c,t}$  is a dummy variable that equals one if a firm in a country  $c$  (as recorded in Compustat) reformed the secured transaction law in year  $t$ , zero otherwise. The time window is [-10,10] around the reform year for reformed countries.  $\text{Alternative Foreign}_l$  is a dummy variable that equals one if a lender is not in one of the reformed countries, and zero otherwise. Robust standard errors clustered at the country level are in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table D5: Law Reform and Collateral Monitoring: Weighted Least Square Estimation

	1 ( <i>Lead</i> )	<i>Lead share</i>
	(1)	(2)
Panel A	All countries	
$\text{Foreign}_l \times \text{Reform}_{c,t} \times \text{Treated}_s$	-0.065*** (0.016)	0.019*** (0.003)
$\text{Foreign}_l \times \text{Treated}_s$	0.010 (0.017)	-0.001 (0.003)
N	52,134	4,581
Adj $R^2$	0.615	0.836
SE cluster	Country	Country
Panel B	Reformed countries only	
$\text{Foreign}_l \times \text{Reform}_{c,t} \times \text{Treated}_s$	-0.132** (0.061)	0.024** (0.009)
$\text{Foreign}_l \times \text{Treated}_s$	0.078** (0.034)	-0.006 (0.008)
N	11,531	1,034
Adj $R^2$	0.625	0.931
SE cluster	Country*Sector	Country*Sector
Facility controls	Y	Y
Facility type FE	Y	Y
Package purpose FE	Y	Y
Firm*Year FE	N	Y
Firm country*Lender country*Year FE	Y	Y
Lender parent*Year FE	Y	Y

**Notes:** This table presents the estimation results of Eq.(2). The sample period is 1995-2017. The reformed countries include Croatia, France, Hungary, Italy, Poland, Romania, Slovakia, and Ukraine. Data is from LoanConnector DealScan. I only keep term loans and revolver loans. Firm location is identified by linking to Compustat using table by Chava and Roberts (2008).  $\text{Treated}_s$  is a dummy variable that equals one if a firm is in a sector with a sector movable assets index higher than the median value, zero otherwise. I calculate the sector movable assets index using US nonfinancial firm data between 1983 and 1994.  $\text{Reform}_{c,t}$  is a dummy variable that equals one if a firm in a country  $c$  (as recorded in Compustat) reformed the secured transaction law in year  $t$ , zero otherwise. The time window is  $[-10,10]$  around the reform year for reformed countries.  $\text{Foreign}_l$  is a dummy variable that equals one if a lender is not in the same location as the borrower, and zero otherwise. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table D6: Law Reform and Syndicate Structure

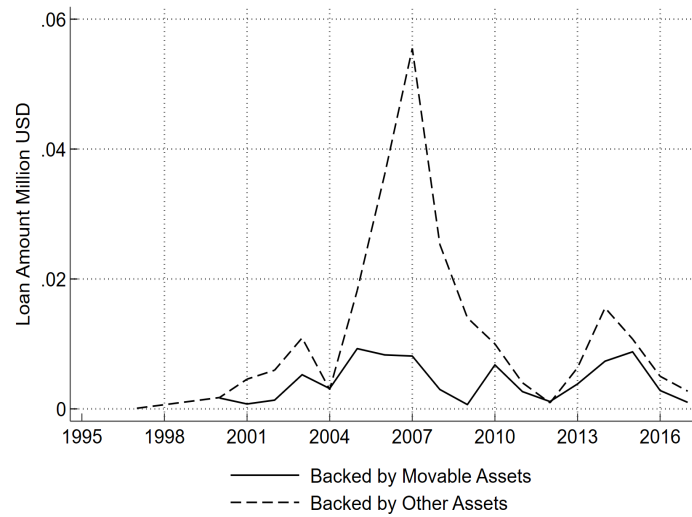
	Facility level					
	#Lenders		#Lead arrangers		#Participants	
	(1)	(2)	(3)	(4)	(5)	(6)
High Forign <sub><i>i</i></sub> × Reform <sub><i>c,t</i></sub> × Treated <sub><i>s</i></sub>	-0.261*** (0.083)	-0.484* (0.250)	-0.130 (0.081)	-0.607** (0.289)	-0.219* (0.106)	-0.008 (0.293)
High Forign <sub><i>i</i></sub> × Reform <sub><i>c,t</i></sub>	0.022 (0.063)	0.356** (0.168)	0.013 (0.040)	0.163 (0.099)	0.012 (0.082)	0.644*** (0.220)
High Forign <sub><i>i</i></sub>	0.094* (0.046)	-0.112 (0.159)	0.051* (0.029)	-0.098 (0.083)	0.063 (0.055)	-0.145 (0.190)
Borrower 2 SIC-digit FE	Y	Y	Y	Y	Y	Y
Borrower Country FE	Y	N	Y	N	Y	N
Year FE	Y	N	Y	N	Y	N
Firm country*YearFE	N	Y	N	Y	N	Y
N	5,981	4,008	5,981	4,008	5,981	4,008
Adj R <sup>2</sup>	0.292	0.784	0.397	0.825	0.324	0.805

**Notes:** This table presents the estimation results of Eq.(1). The sample period is 1995-2017. The reformed countries include Croatia, France, Hungary, Italy, Poland, Romania, Slovakia, and Ukraine. Data is from LoanConnector DealScan. I only keep term loans and revolver loans. Firm location is identified by linking to Compustat using table by Chava and Roberts (2008). The dependent variable in Columns (1)(2) is the facility amount, and in Columns (3)(4) is the facility maturity. The dependent variable in Columns (5)(6) is a dummy variable that takes the value of one if the deal includes a covenant, and zero otherwise. The dependent variable in Columns (7)(8) is a dummy variable that takes the value of one if the deal includes a financial covenant, and zero otherwise. *Treated<sub>s</sub>* is a dummy variable that equals one if a firm is in a sector with a sector movable assets index higher than the median value, zero otherwise. I calculate the sector movable assets index using US nonfinancial firm data between 1983 and 1994. *Reform<sub>c,t</sub>* is a dummy variable that equals one if a firm in a country *c* (as recorded in Compustat) reformed the secured transaction law in year *t*, zero otherwise. The time window is [-10,10] around the reform year for reformed countries. *High Forign<sub>i</sub>* is the ratio of the number of foreign lead arrangers over total number of lead arrangers within a facility. Robust standard errors clustered at the country level are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

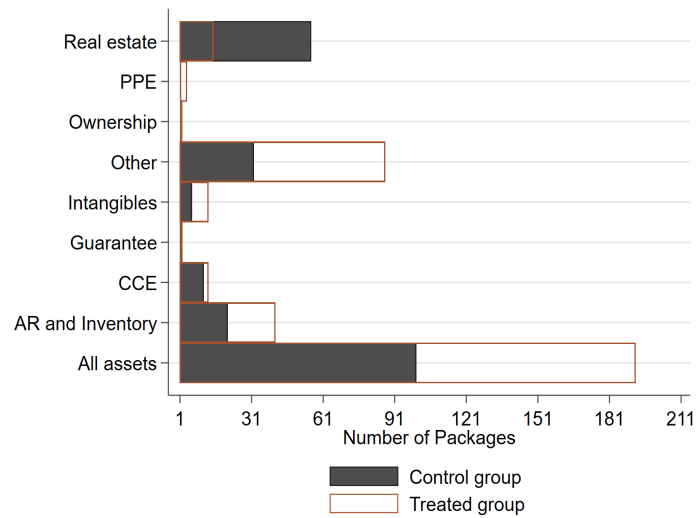
## E Figures

Figure B1: Packages and Collateral

(a) Facility Amount Backed by Collateral

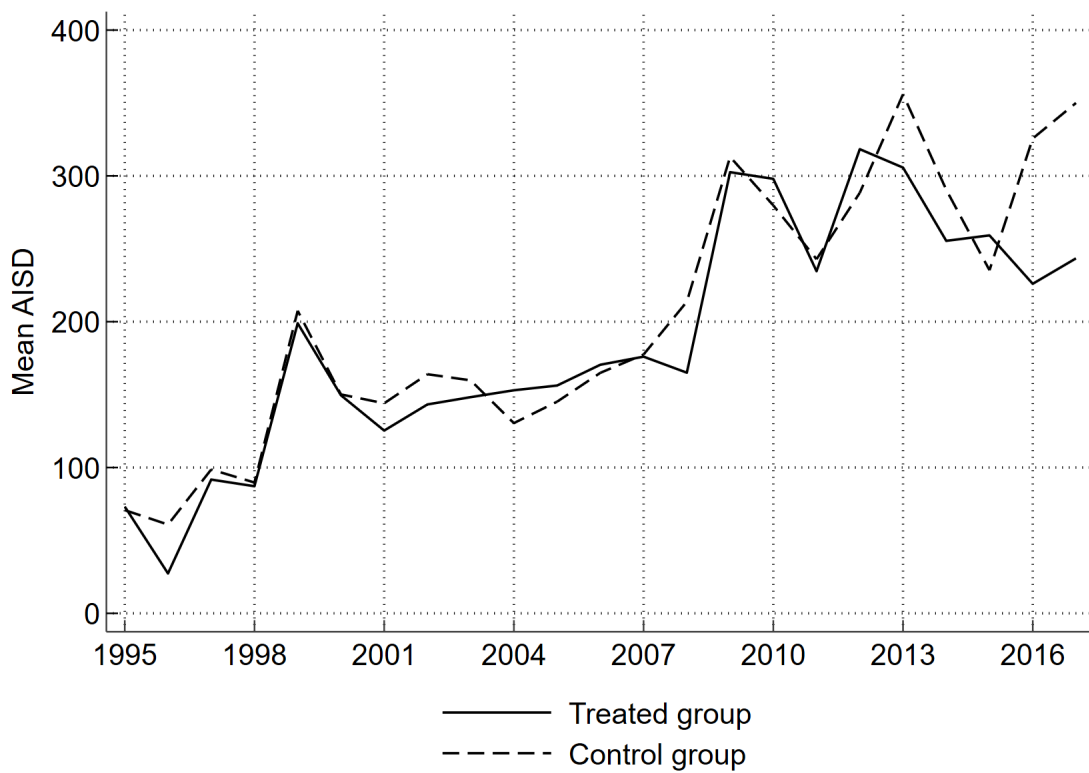


(b) Collateral Distribution of Treated and Control Group



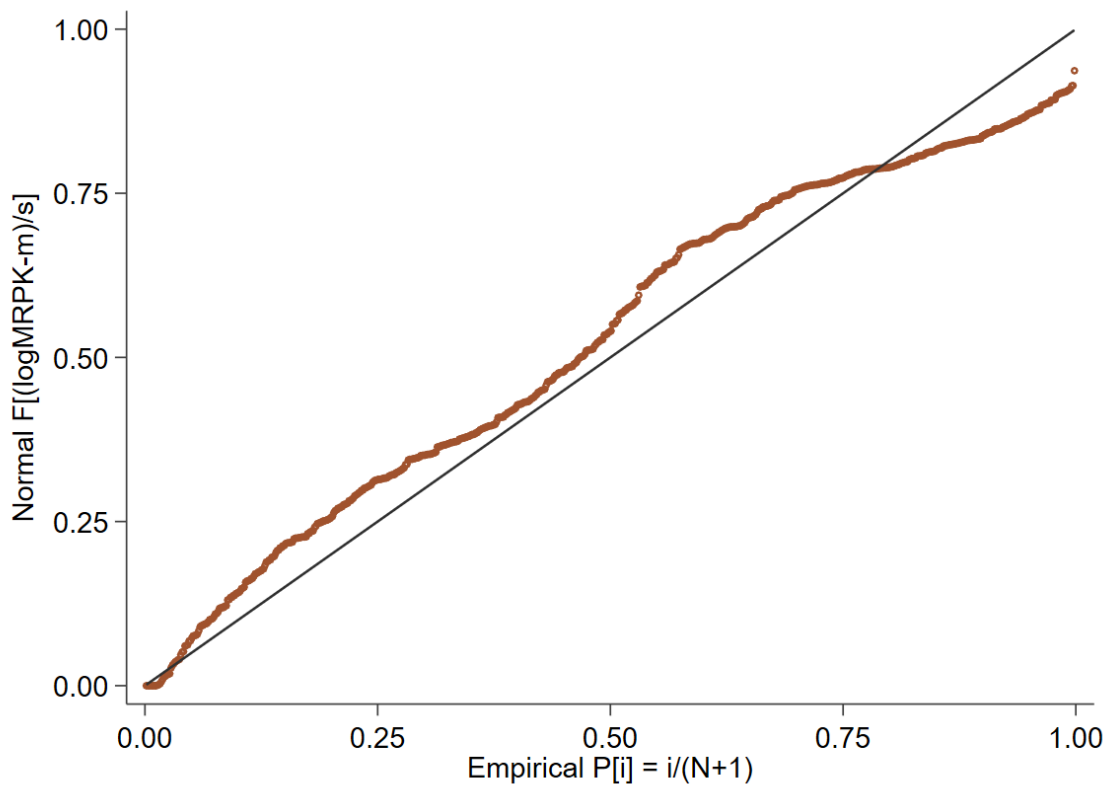
**Notes:** This figure presents the dynamics of collateralization of packages with collateral information. Panel (a) illustrates the loan amount backed by different movable assets and other assets. Panel (b) illustrates the collateral distribution over packages among treated and control groups.

Figure B2: Borrower Quality of Treated and Control Group



**Notes:** This figure illustrates the borrower quality for treated and control groups using the loan spread (All\_In\_Spread\_Drawn) as a proxy. I average the loan spread for all facilities borrowed from the treated and control sectors, respectively, and plot two lines.

Figure B3: Log-Normality of MRPKs



**Notes:** This figure illustrates the log normality of MRPKS for firm-level data before the reform. The MRPK is computed as the ratio of value-added over the gross value of book assets.

## F Proofs

### *Proof of Demand of Lead Arranger Shares*

I show that the demand of lead arranger share  $\lambda$  will increase as  $\beta$  increases and as  $c$  increases. Define

$$F = p + (1 - p)V(m, \theta, \beta) - 1.$$

We have

$$\frac{\partial F}{\partial \lambda} = (1 - p) \frac{\partial V(m, \theta, \beta)}{\partial m} \frac{\partial m}{\partial \lambda} = (1 - p)[\theta + (1 - \beta)(1 - \theta)] \frac{\partial m}{\partial \lambda} > 0.$$

Further,

$$\frac{\partial F}{\partial \beta} = (1 - p) \frac{\partial V(m, \theta, \beta)}{\partial \beta} < 0.$$

By implicit theorem,

$$\frac{\partial \lambda}{\partial \beta} = - \frac{\frac{\partial F}{\partial \beta}}{\frac{\partial F}{\partial \lambda}} > 0.$$

This shows that the demand of  $\lambda$  is an increasing function of  $\beta$ . Similarly, it is easy to show that  $\lambda$  is an increasing function of  $c$  as well.

$$\frac{\partial F}{\partial c} = (1 - p) \frac{\partial V(m, \theta, \beta)}{\partial m} \frac{\partial m}{\partial c} = (1 - p)[\theta + (1 - \beta)(1 - \theta)] \frac{\partial m}{\partial c} < 0,$$

$$\frac{\partial \lambda}{\partial c} = - \frac{\frac{\partial F}{\partial c}}{\frac{\partial F}{\partial \lambda}} > 0.$$

### *Proof of Supply of Lead Arranger Shares*

I show that the supply of lead arranger share  $\lambda$  will increase as  $\beta$  increases and as  $c$  decreases. Define

$$G = \lambda p + \lambda(1 - p)V(m, \theta, \beta) - \frac{cm^2}{2}.$$

We have,

$$\frac{\partial G}{\partial \lambda} = p + (1 - p)V(m, \theta, \beta) + \lambda(1 - p) \frac{\partial V(m, \theta, \beta)}{\partial m} \frac{\partial m}{\partial \lambda} > 0.$$

Further,

$$\frac{\partial G}{\partial \beta} = \lambda(1 - p) \frac{\partial V(m, \theta, \beta)}{\partial \beta} < 0$$

$$\frac{\partial \lambda}{\partial \beta} = - \frac{\frac{\partial G}{\partial \beta}}{\frac{\partial G}{\partial \lambda}} > 0.$$

Similarly, it is easy to show that  $\lambda$  is an increasing function of  $c$ .

$$\frac{\partial G}{\partial c} = (1 - p) \frac{\partial V(m, \theta, \beta)}{\partial m} \frac{\partial m}{\partial c} = (1 - p)[\theta + (1 - \beta)(1 - \theta)] \frac{\partial m}{\partial c} < 0$$

$$\frac{\partial \lambda}{\partial c} = - \frac{\frac{\partial G}{\partial c}}{\frac{\partial G}{\partial \lambda}} > 0.$$