

Enhancing the Contracting Space: Collateral Menus, Access to Credit, and Economic Activity *

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Abstract

A recent wave of reforms across Eastern European countries gave more flexibility and information for parties to engage in secured debt transactions, also reducing court involvement. Critically, the menu of assets accepted as pledges in secured transactions was increased to include “movable assets” (e.g., machinery and equipment). Contrasting firms operating in industries with differential use of movable and immovable assets, difference-in-differences tests show that firms operating more movable assets borrowed more, invested more, hired more, and became more efficient and profitable following those changes in contracting. The reforms also democratized access to credit, with more firms (particularly small ones) abandoning their zero-leverage status. Notably, results are modulated by the level of efficiency of local courts, with larger credit expansion taking place in jurisdictions where courts were previously less efficient. The financial deepening we document triggered important capital and employment reallocation effects: Firms whose assets are most sensitive to the reform observe a sharp increase in their share of capital stock and employment in the economy.

JEL Classification Numbers: G32, K22, O16.

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1 Introduction

In imperfect capital markets, access to credit is a function of the menu of assets that can be offered as collateral by borrowers, verified by courts, and liquidated by creditors (Hart and Moore (1994)). To facilitate contracting in those markets, policy has favored the introduction of mechanisms that enhance the bargaining power of creditors and deepen the involvement of courts in adjudicating disputes. These policies have focused on the allocation of control rights over assets in liquidation, with mixed results. In contrast to early research highlighting the positive effects of strengthening creditors' rights (e.g., La Porta et al. (1997, 1998)), recent work shows that reforms boosting creditors' bargaining power often lead to less — not more — credit taking (Lilienfeld-Toal et al. (2012) and Vig (2013)). At the same time, policies that rely on court involvement become inevitably tied to the quality of court systems. On that front, evidence shows that court inefficiency has hampered the success of various initiatives meant to facilitate access to credit (Jappelli et al. (2005), Chemin (2010), and Ponticelli (2013)). These results make it important to take a step back and rethink how the contracting environment affects credit access and economic outcomes.

According to theory, the contracting space and information made available to agents will determine the terms of the agreements they sign; for example, the amount of credit offered, its maturity, and price. To enable contracting based on collateral an effective framework must integrate a number of legal constructs. First, it must identify assets over which agents can establish security interests; that is, determine the types of assets that can be offered as collateral (a construct called “creation”). The framework must also ensure that creditors can discover information on all claims against assets pledged as collateral (“perfection”). Finally, it must ensure that creditors can seize assets that were pledged when borrowers default (“enforcement”). In most developed economies, parameters governing secured transactions have evolved slowly, reflecting the steady development of the legal and economic frameworks in which these transactions take place. But in recent years, a number of countries have experimented with sharp changes in those parameters, some of which are not centered around the idea of strengthening creditors' rights or judicial enforcement. The timing and the extent to which those changes take place can be used to glean unique insights on the relation between collateral and credit.

In this paper, we consider the case of Romania as a basis to understand how enlarging the contracting space (larger “collateral menus”) and the information available to parties to secured transactions determine the availability of credit to firms, ultimately affecting other aspects of economic activity. We then generalize our findings across comparable countries in the same region;

some of which witnessed similar regulatory changes, but at different points in time, while others never passed any reforms. The type of reforms we examine set our study apart from others not only because it is centered around the concepts of facilitating contracting and information flow, but also because it de-emphasizes the use of courts in enforcing control rights.

Throughout the 1990s, Romania's Commercial Code only allowed for secured transactions involving "immovable assets" (land and buildings). For practical purposes, "movable assets" (machinery and equipment) could not be pledged as collateral — those assets were dubbed "dead capital." Regarding creation, pledges required the physical transfer of possession of the original collateral asset to the pledgee. Regarding perfection, there was no uniform system for the registration of creditor seniority over pledged assets. Finally, enforcement of secured agreements had to be implemented through the court system, bound to be a long, wasteful process. Around the world, companies' movable assets comprise about half of their total tangible assets; yet in Romania, those assets could not be pledged. In May of 1999, the Romanian parliament rushed through Law 99 introducing new rules regarding the "Legal Treatment of Security Interests in Movable Assets," aiming at securing the fulfillment of obligations arising from contracts between natural or legal persons. Law 99 came into effect in 2000.

The 2000 law transformed the framework in which debt contracts were written. First, the reform expanded the range of assets that could serve as collateral. It introduced a broad system of security interests and allowed parties to establish security interests over movable assets without transferring physical possession. The law also made it possible for firms to give creditors "substitute assets" (e.g., cash equivalents) if mutually agreed. Second, it introduced a uniform electronic system of real-time information on seniority in interests over movable assets. Finally, the law allowed for creditors — without court intervention — to repossess and sell secured assets of borrowers in default. Such wide-ranging reform bears ex-ante and ex-post implications for debt contracting that are worth stressing. Debt is burdened by costs associated with verification in bad states (default and bankruptcy). The feasibility of debt contracting is hampered when those costs are large and the likelihood of entering bad states is high. However, when contracts are more flexible (more collateral substitutes) and written with more information to all parties (registries offering data on asset liens), it becomes less likely that parties enter in agreements that end up in court to begin with. Moreover, when courts are less important in the enforcement of contracts (use of self-help in recovering collateral), their efficiency becomes less relevant for contracting. We study these distinctive features in our analysis of contracting and credit.

The Romanian reform explicitly identifies the *types* of assets that would allow for credit expan-

sion. Since the law allowed firms to pledge *movable assets* as collateral for the first time, it should benefit firms operating in sectors that make intensive use of machinery and equipment. *Immovable assets*, on the other hand, were allowed to be pledged before the law was passed, and the reform had no bearing on contracts secured by immovable assets. This unique institutional feature combines a difference-in-differences and a falsification test, helping us identify the link between collateral menus and credit. To estimate the causal effect of the reform, we take advantage of the fact that, for technological reasons, some sectors of the economy demand more machinery and equipment than others. As such, we rank sectors in Romania according to a movable assets demand index, which stems from the nature of firms' production processes. We then conduct a difference-in-differences test in which we contrast firms operating in sectors with high versus low demand for movable assets, before and after the passage of the law. We benchmark results from this test against a test that uses pre-post reform changes along the high versus low demand for immovable assets.

Our base tests show that firms operating in industries with more overall tangible assets (the total sum of land, buildings, machinery and equipment) observe an increase in their leverage ratios after the reform. As we break these effects across movable and immovable assets we find that *only* those firms operating in high (as opposed to low) movable assets-intensive industries observe an enhancement of their ability to borrow after the reform. We look not only at the amount of debt firms raise (intensive margin), but also at the likelihood firms start using debt in the first place (extensive margin). On this front, our results point to a democratization of credit access: firms operating more movable assets increase in their propensity to contract debt for the first time, abandoning their "zero-leverage" status.¹ Those same firms also accumulate less cash in their balance sheets. Whether firms operate more or less immovable assets, in contrast, leads to no additional access to credit after the reform (intensive or extensive margins). The immovable assets margin also fails to drive changes in corporate savings.

The enhancement in credit capacity that stems from operating more movable assets is economically sizable. To illustrate this, one may compare the average firm operating in the paper industry (on the top quartile of the distribution of the movable assets index) with the average firm in the precious metal industry (bottom quartile of the index). Controlling for key capital structure determinants such as firm size, age, profitability, and even overall asset tangibility, the firm in the paper business observes a relative increase in its leverage ratio of 2.4 percentage points after 2000. This is a significant number when one considers that the average debt-to-asset ratio of Romanian firms is just 10.5%; that is, a 23% increase relative to the baseline. Using the same comparison,

¹Relatedly, recent work by Assunção et al. (2013) consider the democratization of credit for auto loans in Brazil.

the demand for cash of the firm in the paper business drops by 1.9 percentage points (24% of the sample mean). This points to a significant decline in those firms' need to maintain liquid balance sheets as their fixed assets became pledgeable.

Since the operation of courts charged with the application of commercial law might influence reform outcomes, we also gather data on court efficiency inside Romania. The country has 41 court jurisdictions (called *judetes*) and our results on the link between collateral and credit are directly affected by the level of efficiency of local courts. As these bodies become less important for debt contracting after 2000, we see larger credit expansions in jurisdictions where courts were less efficient before 2000. The debt ratios of firms with more movable assets go up twice as much in jurisdictions where the backlog of pending commercial cases per judge is above the national median than in jurisdictions where the case backlog is below that cutoff. Similarly, the proportion of firms raising debt for the first time after 2000 is almost 50% higher in less efficient court jurisdictions — notably, these are firms in the same industries operating in geographically adjacent counties.

Our analysis shows that laws changing the ability of firms and lenders to sign secured debt transactions have far-reaching implications for corporate outcomes. We show that firms with more movable assets not only raise more debt after the reform, but also invest in more tangible assets, which allow for more debt capacity. To gauge the effect of this spur in capital investment we consider a number of additional outcomes. First, we examine if firms change their investment in labor. We find that together with the increase in tangible assets, firms also hire more. We look at measures of profitability and find that they also increase for firms with more movable assets following the collateral reform. Finally, we examine if the increase in tangible assets and labor use leads to changes in productivity. We find that firms with more movable assets — and only those firms — observe an increase in total factor productivity after the reform. Our findings imply not only that firms raise more funds and grow more as a result of their enhanced debt capacity, but also seem to be able to establish a better asset mix. Looking at aggregate consequences of the reform, we document an important capital reallocation effect of the capital stock in the economy. Sectors that make heavier use of movable assets witness a stark increase in their share of the capital stock in the Romanian economy: from 37% to 52% between 1999 and 2005. These same sectors witness a significant increase of their share of employment in the economy.

The next step of our analysis is to consider external validity. We do so by extrapolating our tests to other Eastern European countries. Between 1997 and 2005 two other countries in the region enacted laws that resemble the reform passed by Romania (Latvia and Poland). At the same time, three other countries failed to pass any such laws (Czech Republic, Ukraine, and Russia).

Concomitantly, by the year 2000, other countries in the region had already long passed laws similar to Romania’s new law (Bulgaria, Estonia, Hungary, and Lithuania). While these economies are similar in a number of dimensions, the passage of collateral reforms were not contemporaneous, owing to various idiosyncrasies affecting the speed with which these countries attempted adopt “Western-like” credit laws.² This time variation in the wave of reforms allows us to exploit both within-country and cross-country contrasts. Similar to our estimation for Romania, we find that security transactions reforms increased leverage ratios of firms with movable assets by approximately 3.7 percentage points relative to firms with less movable assets in other transition economies. Similar patterns also emerge when we look at outcomes such as savings, investment, employment, productivity, profitability, and sales.

We subject our results to a long battery of checks. Among others, we falsify our experiment by testing for the introduction of “pretend reforms” in the year 2000 in the countries that share geographical borders with Romania (Bulgaria and Hungary) as well as its largest trade partner (Italy). None of these countries passed such reforms in or about 2000, yet one could worry that underlying economic, geopolitical, or technological factors may have allowed firms in some industries (those with high movable assets) to gain more access to debt starting in 2000. We, however, find no significant increase in the credit capacity of firms with movable assets in these “placebo countries.”

Only a small literature has analyzed the impact of sudden changes in the contracting environment using detailed, country-specific firm data as we do in this paper. Lilienfeld-Toal et al. (2012) and Vig (2013) look at reforms in India that empowered creditors in seizing assets of defaulting firms. They find that strengthening enforceability is detrimental to credit and leads to a decline in borrowing, especially for smaller firms. These papers are part of a stream of research arguing that enhancing creditors’ rights makes it harder for firms to access credit.³ Our results also speak to an emergent literature on court efficiency and economic outcomes (e.g., Chemin (2010) and Ponticelli (2013)), but are different in that the reform we consider makes courts *less* central to financial contracting.

Our paper adds to the capital structure literature that considers the supply of credit as a driver of observed leverage ratios (e.g., Faulkender and Petersen (2006) and Leary (2009)). A handful of papers in this literature study the impact of collateral on leverage. Among recent studies, the emphasis has been on variations in the value (Benmelech et al. (2005) and Gan (2007)), quantity supply

²While no regulation or law can be seen as exogenous, much of the design of this wave of reforms was conceived by institutional bodies outside the countries studied. Indeed, ample literature argues that those reforms were prompted by pressures from the European Union (EU) and the European Bank for Reconstruction and Development (EBRD). See Haselmann et al. (2009) for a study on the impact of these reforms on banking activities.

³A cross-country study by Acharya et al. (2010) shows that tougher bankruptcy laws lead firms to have less debt.

(Campello and Giambona (2013)), or salability (Benmelech (2009)) of tangible assets that can be used as collateral. While these examinations are important, our study is different as it identifies the impact of the enlargement of the contracting space — what is accepted as collateral — on corporate debt. Our paper also stands out in that real-side outcomes such as productivity, labor, or profitability are only rarely examined in conjunction with the impact of collateral on access to credit.⁴

Lastly, our paper has clear connections with the financial development literature. Previous studies link creditors' rights and financial development by documenting a positive cross-country relation between credit protection and the size of credit markets (La Porta et al. (1997, 1998) and Levine (1998, 1999)). These analyses are often conducted with country level data and do not show which characteristics of financial contracting matter most. By emphasizing a detailed, micro-level analysis of the impact of collateral law reforms that affect different types of assets in different ways, we are able to flesh out the relation between the development of financial institutions — in particular, laws governing financial contracting terms — and economic outcomes. In this way, our results are important for economic policy-makers, who cannot alter asset liquidation values or their supply in secondary markets, but can alter collateral menus as a way to enhance financial contractibility.

The remainder of the paper is organized as follows. Section 2 provides the institutional details of the collateral reform in Romania. Section 3 describes the data and explains our identification strategy. Section 4 reports our main results. Section 5 relates our findings to the efficiency of local courts. Section 6 discusses a series of broader economic consequences associated with the collateral reform. Section 7 contains a number of robustness and consistency checks. Section 8 concludes.

2 Institutional Setting: Romania's Secured Transactions Reform

An effective legal framework for secured transactions must contemplate and integrate three critical features. First, “creation”: ensuring that the law permits to establish a security interest over an asset for a certain transaction. Second, “perfection”: ensuring that creditors can promptly discover existing claimants (and their seniority) against an asset pledged as collateral. Third, “enforcement”: ensuring that a creditor can quickly seize and dispose of the asset pledged as collateral in the event of default. Romania provides for a textbook case analysis of a country enacting regulatory changes that significantly enhance the law of secured transactions. In this section, we provide the institutional context for Romania's collateral reform.

⁴One exception is Benmelech and Bergman (2011), who look at the impact of increases of creditors' rights on technological innovation and productivity in the airline industry across countries. Chaney et al. (2012) consider the impact of land prices on the connection between collateral and investment.

Throughout the 1990s, two major — often contradictory — codes governed secured transactions in Romania: the Civil Code and the Commercial Code.⁵ A creditor in Romania could secure a loan by creating a security interest over immovable assets (mortgage) and over movable assets (pledges). The legal framework for movable assets, however, was particularly cumbersome. Regarding creation, pledges required the physical transfer of possession of the collateral to the lender. Pledges took the form of *possessory* interests, with each asset specifically identified in the contract (e.g., each individual inventory item, piece of equipment, or receivable stub). This meant that pledges were non-substitutable; that is, the creditor could not be given similar assets of equal value, not even similar cash amounts. Such accountability system made it costly and risky for creditors to monitor any movable collateral offered by firms. The framework also made it difficult for firms to offer fractional ownership over collateralizable assets, essentially precluding creditor syndication. With respect to perfection, there was no consistent system of registration of security interests or any other practical way of determining their existence and the establishment of their priorities. The system was plagued by fraud as multiple ownership records of an asset often appeared (and even disappeared) across different registries (e.g., municipal jurisdictions). Finally, the enforcement of security agreements had to be implemented through the court system, which in most cases would take several years. The slow pace of enforcement often led to a complete loss of collateral value of movable assets in liquidation proceedings due to, for example, technological obsolescence, natural depreciation, and outright theft.

The weak framework for secured transactions produced high economic costs for Romania. Despite the fact that movable assets represent a large fraction of any firm's asset base, the existing laws prevented creditors from taking movable property as collateral for loans. Creditors often prefer to lend against hard collateral, and in Romania this meant that firms could only raise debt against their real estate via mortgages. Indeed, business surveys published by the World Bank report that nearly 90% of the loans in Romania required collateral, and on average, the value of the collateral exceeded 120% of the value of the loan granted. The highly-restricted access to credit is considered a major contributor to Romania's low growth during the 1990s (see Dahan and Simpson (2008)).

Since the early 1990s, the European Bank of Reconstruction and Development (EBRD) had been pushing for a secured transactions reform in Eastern Europe. In January 1999, the Center for the Economic Analysis of Law (CEAL), with the support of local attorneys and the World Bank,

⁵Romania's Common Law system resembles the French Civil Code. See Pena and Fleisig (2004) for a detailed description of the evolution of Romania's legal framework for secured transactions prior to 2000. Murrell (2001) describes the country's commercial court system.

drafted a law on security interests in movable property in Romania. Shortly after, in May 1999, the Romanian parliament passed Law 99/1999, whose Title VI contained the “Legal Treatment of Security Interests in Personal Property.” The new law regulated the legal treatment of security interests in movable assets. The law came into full force in December 2000.

Romania’s 2000 reform vastly expanded the range of assets that could serve as collateral. It introduced a broad system of security interests and derogated the old pledge regime. Importantly, the law allowed parties to establish security interests over movable assets without transferring possession of the asset to the creditor. The law also introduced the “Electronic Archive of Security Interests in Personal Property,” a fully-automated system of perfection for security interests over movable assets that instantaneously files into a database notices that a security interest has been taken over a movable asset.⁶ Finally, the law awarded the creditor legal powers to repossess pledged collateral without court intervention. In particular, it authorized creditors to use self-help to repossess collateral as long as a breach of the peace does not occur.

Figure 1 plots the evolution of the number of filings into the Electronic Archive from 1996 through 2005 (left vertical axis). The archive’s entries have grown exponentially since its inception in 2000. The movable assets archive system received 65,000 filings in 2001, rising to 360,000 filings in 2005. As of 2005, cumulative gross filings amounted to roughly one million. Since the notice of the security interest does not require filing the amount of the obligation secured, the amount of secured credit cannot be determined from the number of filings. Nonetheless, several other indicators are consistent with a rapid and large increase in the volume of credit granted to companies after the 2000 reform. For example, the number of borrowers reported in the Central Bank’s debtor registry rose from 18,000 in 2000 to more than 100,000 in 2005 (see Chaves et al. (2004)). Along these lines, Figure 1 displays the evolution of the total volume of corporate bank credit as a share of GDP from 1996 to 2005 (right vertical axis). The fraction of corporate credit to GDP almost tripled between 2000 and 2005, rising from 7% to 20%. In Section 6, we conduct a back-of-the-envelope calculation suggesting that the collateral reform contributed to 71% of this increase in financial deepening.

3 Data and Empirical Strategy

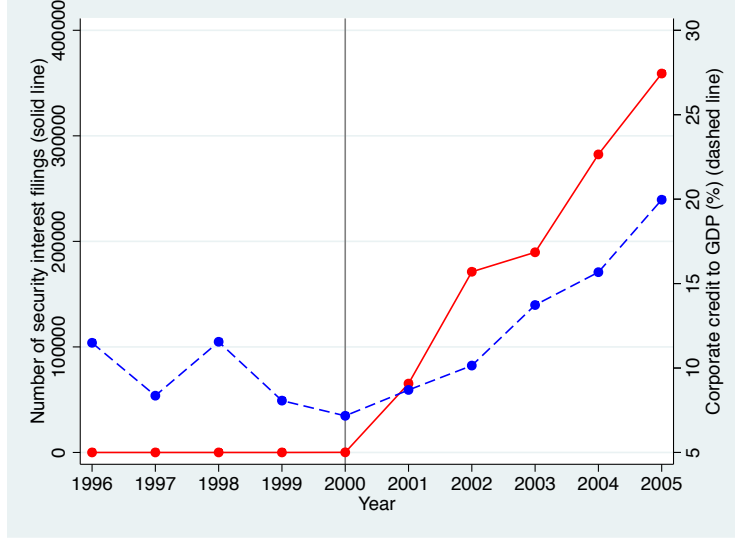
3.1 Data

We use firm-level information from Amadeus, a commercial dataset compiled by Bureau van Dijk. Amadeus contains financial statements from millions of companies operating in 35 European coun-

⁶Romania’s system was the world’s most advanced at its inception, being the first to accept filings over the internet.

Figure 1: **Evolution of Security Interest Filings and Corporate Credit to GDP**

The figure plots the evolution of the number of security interest filings in the Electronic Archive of Security Interests in Personal Property (red solid line) and the ratio between corporate credit and GDP in Romania (blue dashed line). The gray vertical line denotes the year of the collateral reform.



tries. In Romania, Bureau van Dijk collects financial statements from the Chamber of Commerce and Industry. All joint stock companies, partnerships, and limited liability companies are required to file their financial statements to the Romanian National Trade Register Office. As a result, the data coverage from Amadeus for Romania is quite comprehensive.⁷ The Amadeus dataset is released every year and each version includes up to ten years of information per firm. If a firm stops filing, it remains in the dataset for four subsequent years and it is then dropped. This creates a survivorship bias, which we overcome by appending various versions of Amadeus over the period of our study. Our final sample spans from 1996 to 2005.

We focus on small and medium enterprises in studying the democratization of access to credit via legal reforms.⁸ Our basic outcome variable is leverage, which can be affected by changes in the menu of assets firms are able to offer as collateral. We also glean additional insights into firms' borrowings by looking at their savings behavior; in particular, their need to carry cash balances. We measure *Leverage* as the ratio between total debt and the book value of assets. *Cash* is the ratio of cash holdings and cash equivalents to total assets. Our analysis controls for the standard

⁷Filing requirements for other Eastern European countries are less strict.

⁸We exclude publicly traded firms, which account for less than 0.5% of the total number of firms in Romania.

determinants of capital structure that are available in the data (e.g., Rajan and Zingales (1995) and Lemmon et al. (2008)). We measure *Size* as the log of total assets; *Age* is the number of years the firm is in operation; *Profitability* is the ratio of earnings before interest and taxes to total assets; and *OverallTangibility* as the ratio of fixed assets (property, plant and equipment or PP&E) to total assets. The Amadeus data does not provide information on the composition of fixed assets into movable and immovable assets.

We also study the effect of the reform on a set of real-side outcomes. *Investment* is the change in fixed assets between two consecutive years plus depreciation scaled by lagged fixed assets; *Employment* is the number of employees; total factor productivity (*Productivity*) is the residual from a Cobb-Douglas production function;⁹ *Sales* is the log of sales. Following the literature on asset tangibility and leverage, we focus on manufacturing firms (see, e.g., Campello and Giambona (2013)). To arrive at our final sample, we delete all observations with missing data for *Leverage*. We also winsorize these variables at the upper and lower 1% to avoid the impact of extreme outliers. The final dataset contains 34,382 companies over the 1996–2005 period.

Table 1 reports the descriptive statistics of our data. The mean value of *Leverage* of all firms is 10%. This figure is similar to that found in prior work on Romanian firms (Nivorozhkin (2005)). Interestingly, the 50th percentile value of *Leverage* is zero, indicating that there is sizable fraction of “zero-leverage firms” in the sample. We will later revisit this statistic to gauge the impact of the 2000 reform in the use of debt financing by Romanian firms. On average, fixed assets account for 38% of total assets, a statistic that resembles that of US companies. Firms hold on average 8% of their assets in cash, also in line with US counterparts at the time. The sample average firm in the sample is young and small, consistent with private sector enterprises in transition economies; it is seven years old; has total assets worth \$2 million (in 2000 US dollars); and hires 150 employees.

TABLE 1 ABOUT HERE

3.2 Test Strategy

Since the Romanian reform introduced provisions allowing firms to pledge movable assets as collateral, it should benefit particularly firms operating in sectors that make intensive use of movable assets such as machinery and equipment. To identify the causal effect of the reform, we take advantage of the fact that some sectors are inherently more intensive in machinery and equipment than others.

⁹We define *TFP* for firm i in year t as $\log(TFP)_{it} = \log(y)_{it} - \alpha \log(k)_{it} - (1 - \alpha) \log(l)_{it}$, where y denotes sales, k fixed assets, and l number of employees. We allow factor elasticities to vary across sectors. We measure the labor elasticity for each sector as the average labor share of value added. See Larrain and Stumpner (2013) for details.

We exploit ex-ante variation in asset-type demand that stems from the nature of firms’ production processes and conduct a difference-in-differences test around the passage of the law. To do so, we rank manufacturing sectors in Romania according to a movable assets demand index (explained shortly). We then assign to a “treatment group” those firms operating in industries at the high-end of that sectoral ranking. The “control group” consists of firms in the bottom of the ranking. Next, we calculate the pre- versus post-reform difference in the outcome variable of interest (e.g., *Leverage*) for the treated group, doing the same for the control group. Finally, we calculate the difference between these two group differences. Our estimation accounts for both individual firm- and year-fixed effects. As we discuss below, a number of checks on the validity of test strategy is provided.

3.3 Sectoral Asset Indices

In a legal framework where movable assets are considered dead capital, the movable asset usage is likely to be a distorted representation of the underlying demand for those assets. In particular, it is likely that movable assets are under-utilized. As such, even if Amadeus provided data on Romanian firms’ *observed use* of movable assets before 2000, we could not use that information to make predictions about the impact of the collateral reform. Instead, we need to gauge firms’ *desired use* of movable assets. To do so, we must identify comparable firms whose use of movable assets are unconstrained by the legal frictions observed in Romania before the 2000 reform.

3.3.1 Construction

To construct a measure gauging the extent to which firms operate movable assets in the absence of financing constraints, we look at data from the US. We do so assuming that firms in the US more closely utilize a *desired* mix of assets in their production processes. We take that such asset mix is driven by industry-specific characteristics and that different industries may make more or less intensive use of movable assets primarily for technological reasons. To wit, the asset mix characteristic that matters the most for our analysis of the collateral reform has to do with “asset hardness.” On that dimension, a regular firm operates both fixed assets and other (liquid) assets. To ease exposition, we can divide a firm’s assets accordingly as follows:

$$Total\ Assets = Fixed\ Assets + Other\ Assets \tag{1}$$

The first category encompasses assets such as machinery, equipment, land, and buildings. The second contemplates assets such as cash, accounts receivables, and inventory. Notably, the 2000

reform introduced significant increases in firms’ ability to pledge movable fixed assets such as machinery and equipment. That reform, however, did not alter the pledgeability of immovable assets such as land and buildings (which were already highly pledgeable). The unique manner in which the collateral reform affects some types of fixed assets suggests the following decomposition:

$$Total\ Assets = Movable\ Assets + Immovable\ Assets + Other\ Assets \quad (2)$$

With that legal differentiation in mind, we compile the movable assets index using data on US manufacturers as follows. First, we follow Campello and Giambona (2013) in identifying information on the decomposition of firms’ fixed assets between (1) machinery and equipment and (2) land and buildings. That window encompasses the 1984–1996 period in the Compustat database. For each individual firm, we then compute the time-average ratio of machinery and equipment to total assets. Next, we divide the sample into 48 industrial sectors.¹⁰ Then, for each sector, we calculate the “movable assets index” as the median of the movables-to-total asset ratio of the firms operating in that sector. We do the same calculation for the land and buildings-to-total assets ratio, thus computing the “immovable assets index.” A similar calculation using the fixed assets-to-total assets ratio yields the “overall tangibility index.”

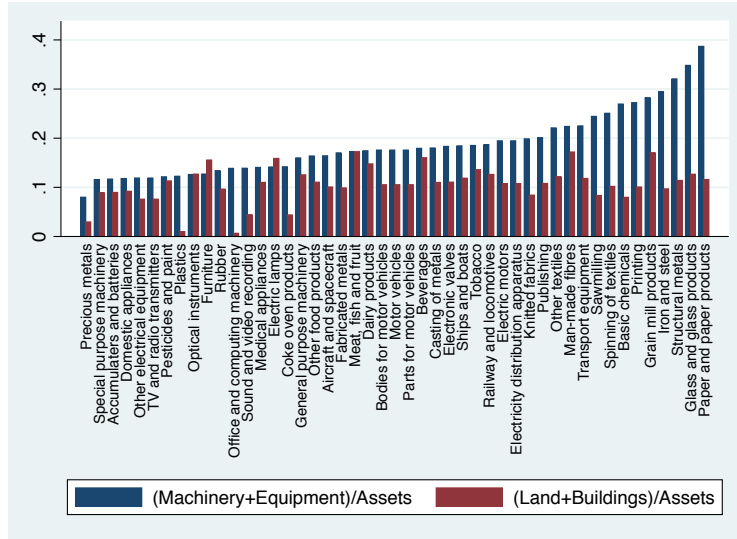
The examination of the indices just discussed provides some interesting insights. Overall tangibility equals 34% of total assets, on average. Movable assets, in turn, constitute 54% of the ratio between fixed assets and total assets. Notably, the correlation coefficient between the movable assets index and the overall tangibility index is high (0.55); a fact that we explore in our later robustness tests. More interestingly, however, we find that the correlation between the movable and immovable assets indices is positive, but low (only 0.30). This would point to some degree of complementarity (as opposed to substitution) between movable and immovable assets: firms may have high levels of *both* movable and immovable assets in their asset mix. Not surprisingly, we find that these firms have lower stocks of cash in their balance sheets.

Figure 2 plots the movable and immovable assets indices for the 48 industries examined. The figure reveals a substantial degree of cross-sectoral variation in the usage of movable assets. Manufacturing of precious metals, domestic appliances, and furniture are examples of industries with low intensity in movable assets. In these industries, machinery and equipment amounts to about only 10% of total assets. In contrast, the manufacturing of metals, glass, and paper constitute examples of industries with high usage of movable assets. In these sectors, machinery and equipment amounts to well over 30% of total assets. We can also observe a lot of variation in the usage of immovable assets

¹⁰We classify sectors using the International Standard Industrial Classification (ISIC), Revision 3.

Figure 2: Sectoral Indices of Movable and Immovable Assets Intensity

The figure plots the sectoral indices of movable assets and immovable assets for the 48 three-digit manufacturing sectors in the sample (ISIC, Revision 3). The movable (immovable) assets index is calculated as the median of the time-average ratio of machinery and equipment (land and buildings) to total assets across publicly traded firms in the US in each sector during the period 1984-1996. The figure has been sorted in ascending order with respect to the movables asset index.



across industries. In addition, the figure reveals the low correlation between both sectoral indices.

3.3.2 Working Assumption

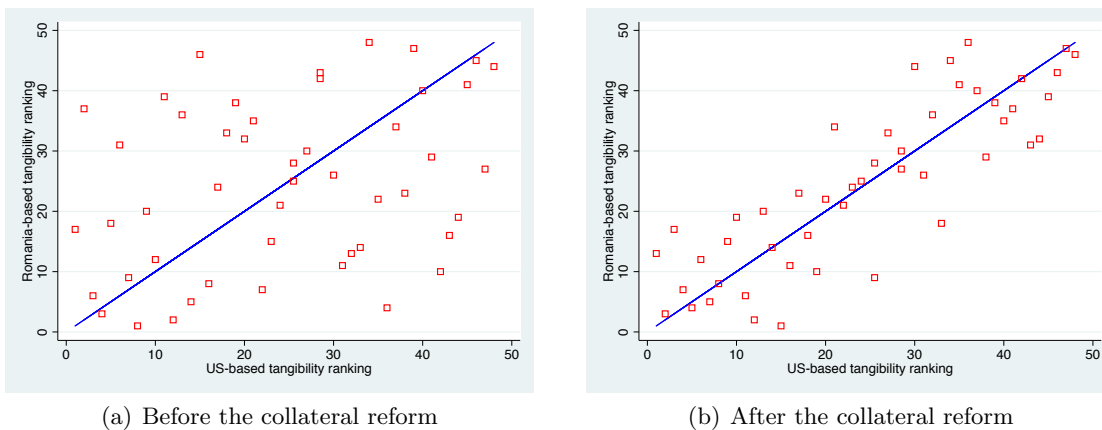
Our approach does not require that the value of the index in each sector is exactly the same in the US and Romania. The approach only assumes that the sectoral *ranking* of demand for movable assets is similar across these countries. For example, the manufacture of paper products demands intense use of large mills (heavy machinery and equipment), regardless of whether a factory is operated in the US or Romania. On the other hand, the manufacture of precious metal is relatively less dependent on machinery, with most assets composed of land and mining rights, again independent of the country in which firms operate. As we restrict our attention to traditional manufacturing activities in countries with sizable industrial sectors, our working hypothesis appears to be plausible.¹¹

Since we have data on overall tangibility for Romanian firms, we can compare that sectoral index across US and Romanian manufacturers as a way to check the validity of our strategy. Our prior is

¹¹Manufacturing firms have more homogenous production process around the world and many Romanian manufacturers present a fairly high level of competitiveness, with a presence in international markets for a number of goods.

Figure 3: **Comparison of Romania- and US-based Sectoral Index of Overall Tangibility**

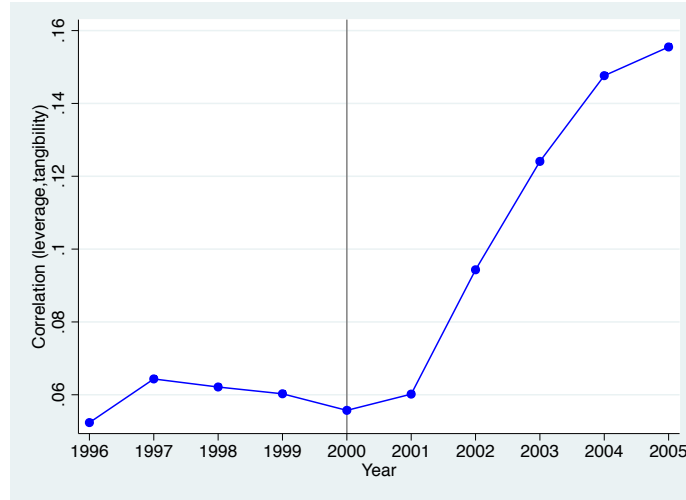
Panel A reports the scatter plot between the sectoral ranking of the Romania-based and the US-based index of overall tangibility, over the pre-reform period (1996-2000). The index is calculated as the median of the time-average ratio of fixed assets to total assets across firms in each three-digit sector in each country. The plot includes a 45 degree line for ease of reference. Panel B reports the scatter plot between the ranking of the Romania-based and the US-based index of overall tangibility, over the post-reform period (2001-2005).



that the observed asset mix of Romanian firms prior to the 2000 reform was distorted away from an optimal benchmark due to constraints in using movable assets to support debt financing. The collateral reform, in turn, should make Romanian firms more able to utilize an optimal asset mix. In Figure 3, we plot the ranking of the overall tangibility index using US data (our benchmark) against the ranking using Romania data, with a 45 degree line drawn for ease of reference. According to Panel A, the correlation coefficient in the pre-reform period for the two countries is only 0.32. The plot depicts a very noisy association between the use of fixed assets in similar industries across the US and Romania. Panel B, in contrast, suggests that the correlation in the post-reform period is much higher. Indeed, that correlation grows nearly three times to 0.83, becoming highly statistically significant (1% level). The figure suggests that following the collateral reform, firms in Romania display asset mix choices that resemble more closely those of comparable, unconstrained US firms. Prior to that reform, however, Romanian firms' asset mix was very different than that same US-based benchmark.

Figure 4: **Evolution of Correlation Between Leverage and Overall Tangibility**

The figure plots the evolution of the cross-sectional correlation between *Leverage* and *OverallTangibility* across firms in Romania. We calculate the correlation for each year separately between 1996 and 2005. *Leverage* is defined as the ratio of total debt to total assets. *OverallTangibility* is the ratio of fixed assets to total assets. The gray vertical line denotes the year of the collateral reform.



4 The Collateral–Credit Channel

4.1 Intertemporal Relation between Leverage and Tangibility

The Romanian reform allowed firms to pledge a broader set of tangible assets as collateral to creditors. At a basic level, one would expect to see an increase in the association between tangible assets and leverage (i.e., the debt capacity of tangible assets) following the reform. In Figure 4, we plot the evolution of the coefficient of correlation between *Leverage* and *OverallTangibility* across firms for each year between 1996 and 2005. Prior to the reform, the correlation is very low, hovering around 0.06.¹² After 2000, the correlation increased sharply reaching a value of 0.16, roughly three times the pre-reform estimate. Below, we show that the reform enlarged the debt capacity of tangible assets by allowing firms producing in sectors intensive in movable assets to borrow more.

¹²For sake of reference, this coefficient of correlation is 0.33 for US firms in the same period.

4.2 Empirical Specification

We estimate the following generalized panel difference-in-differences specification to gauge the causal effect of the collateral reform on firm financing:

$$Y_{ist} = \alpha_i + \alpha_t + \beta Post_t * HighAssetType_s + \gamma X_{ist} + \epsilon_{ist}, \quad (3)$$

where Y_{ist} denotes the outcome variable of interest (e.g., *Leverage*) for firm i in sector s in year t . $Post_t$ is a dummy that equals zero before the reform year (2000) and one afterwards. $HighAssetType$ is a dummy that equals one if the firm belongs to the treated group (sectors in the top quartile of a particular sectoral asset type index) and zero if the firm belongs to the control group (sectors in the bottom quartile of the index).¹³ X_{ist} denotes a vector of firm-level controls (e.g., *Size*, *Age*, *Profitability*, and *OverallTangibility*), and ϵ_{ist} is the error term. The specification includes a full set of firm-fixed effects (α_i) and year-fixed effects (α_t). The firm-fixed effects control for time-invariant firm characteristics. The year-fixed effects control for aggregate time-varying shocks. The standard errors are clustered at the firm level.¹⁴ The coefficient of interest is β , which captures the difference-in-differences effect. This coefficient measures the pre–post difference in the outcome of interest of firms operating in high-movable assets sectors, relative to the pre–post difference of firms in low-movable assets sectors.

4.3 Access to Credit: Intensive Margin

Table 2 reports the results for *Leverage*. To build intuition, we start by estimating the effect of the collateral reform across sectors with different intensities in overall asset tangibility, which includes all types of tangible assets (both movables and immovables). The estimates in column (1) suggest that the reform increased leverage in firms operating in sectors with high overall tangibility by 1.2 percentage points more than in firms in low tangibility sectors. This base result is statistically significant, but economically confounded since not all types of assets in a firm’s balance sheet were affected by the reform. Accordingly, we break the overall tangibility effect into its different components. In particular, since the collateral reform only boosts the pledgeability of movable assets, there should only be an effect in sectors that are intensive users of movable assets. This is what we find. According to the results of column (2), the collateral reform increased leverage of firms in movable-intensive sectors by 2.4 percentage points more than in sectors where firms operate

¹³In Section 7, we compare the effects across different quartiles of the movable asset distribution. We also show that the results are robust to using the original (continuous) version of the index.

¹⁴Our results are robust to collapsing and comparing the data into pre- and post-reform periods, which ensures that the standard errors are not artificially low due to serial correlation (see Bertrand et al. (2004)).

fewer movable assets. The effect is highly significant and of sizable magnitude: it amounts to 23% of the average sample leverage (=2.4%/10.5%). That is, for firms of the same average size, age, profitability, and even overall tangibility, those that operate in sectors that have higher use for movable assets observe a higher use of debt financing following the collateral reform.

TABLE 2 ABOUT HERE

In column (3), we examine the effect of the collateral reform on firms that hold different levels of immovable assets. This is akin to performing a falsification test since the reform did not affect the contractibility of immovable assets. The results show that the collateral reform had no differential impact on the leverage ratio across firms operating in sectors with different usage of immovable assets. In column (4), we conduct a horse-race between the two different components of overall tangibility, by including the interactions between the *Post* dummy and each of the sectoral indicators in Eq. (3). The results show that the reform increased leverage only in sectors intensive in movable assets; not in sectors intensive in immovable assets. Moreover, the estimated effect of movables asset intensity on leverage increases in absolute terms.

4.4 Access to Credit: Extensive Margin

The evidence above shows that the debt firms carry in their balance sheets increased after the collateral reform as a function of their movable assets. From the point of view of promoting access to credit it may be important to know whether firms that previously did not use debt (“zero-leverage firms”) are able to use this type of financing after the reform. If this is the case, one may argue that the reform was critical not only in expanding credit across firms that already used debt, but also in leading to a “democratization of credit” across the corporate sector in Romania. Such a financial deepening effect may have larger economic consequences than a statistical increase in the average corporate leverage.

To gauge this effect, we re-estimate Eq. (3) using as dependent variable a dummy that equals one if the firm has no debt in its balance sheet and zero otherwise (*ZeroLeverage*). Since the dependent variable is binary, we estimate a linear probability model. Table 3 reports the results. The collateral reform reduced the probability of a firm having zero leverage in industries intensive in movable assets by 16% (column (2)). As in Table 2, the effect of the reform is uniform across industries with different intensities in immovable assets (column (3)).

TABLE 3 ABOUT HERE

Our results about the increase in the population of firms with greater access to credit is new and deserves further characterization. We do so via a graphical analysis. Within movable-intensive sectors, we divide firms into deciles according to size, where size is measured as number of employees. Figure 5 reports the distribution of the fraction of zero-leverage firms within each size bin for the pre- and post-reform periods (Panels A and B). Before the reform, 83% of the firms in the smallest-size bin had no debt in their balance sheets. This fraction naturally declines as we move towards larger-size bins. After the reform, the fraction of zero-leverage firms declines across all size bins, but the effect is concentrated primarily in the smaller-size bins (deciles 1 through 7). Panels C and D replicate the results for the sectors not intensive in movables. Panel C shows that the fraction of zero-leverage firms of these sectors was significantly lower than that of movable-intensive sectors before the reform; an effect that can be verified across all size bins. After the reform (Panel D), there is only a modest reduction in zero-leverage firms across size bins, confirming that the effects of the reform are particularly strong in sectors intensive in movable assets. Notably, the previous contrast of zero-leverage firms across movable and immovable sectors disappears with the reform

4.5 Demand for Cash Savings

Intuition suggests that firms with an enlarged capacity to borrow need to carry less cash in their balance sheets — carrying cash is expensive if firms have easy access to credit (see Acharya et al. (2007)). We study the effect of the reform on corporate liquidity to better characterize our results. Savings capture the “dual” of debt, and using this alternative proxy as a dependent variable may help us guard against endogeneity concerns in our leverage tests. Notably, the economic environment in Romania does not suggest any changes on firms’ propensity to save around 2000.¹⁵

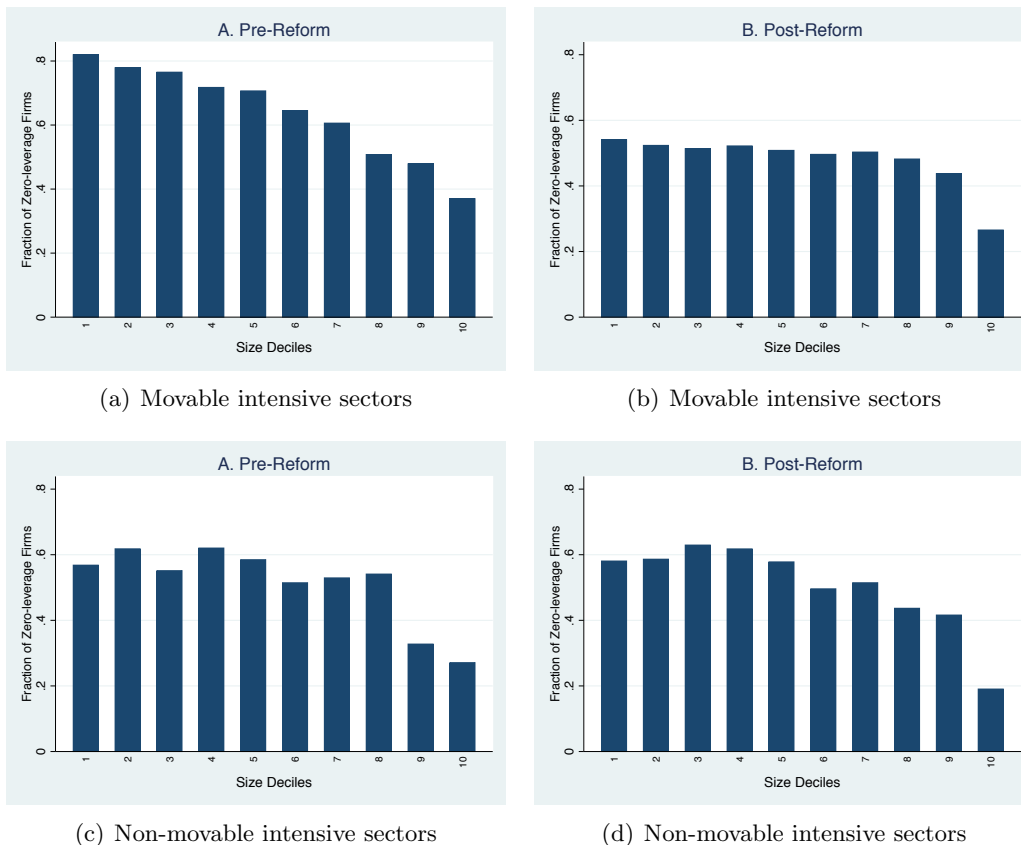
The results for regressions featuring the ratio of cash to assets as the dependent variable (*Cash*) are reported in Table 4. According to the estimates in the table, the reform reduced cash holdings of firms operating in sectors intensive in movable assets by 1.9 percentage points more than firms that do not make intensive use of those assets (column (2)). The effect is sizable, corresponding to 24% of the average cash-to-asset ratio in the sample (= 1.9%/7.9%). Our estimates imply that better contracting terms for movable assets seem to make these assets more liquid, and firms respond by moving away from hoarding cash.

TABLE 4 ABOUT HERE

¹⁵For example, interest rates and tax rates did not change significantly during this period.

Figure 5: **Distribution of Zero-leverage Firms Before and After the Reform**

The figure reports the distribution of the fraction of zero-leverage firms. Firms are divided into deciles according to size, where size is measured as number of employees. Panels A and B report the distribution for sectors intensive in movable assets, over the pre- and post-reform periods, respectively. Panels C and D report the distribution for sectors not intensive in movable assets, before and after the reform. Movable-intensive sectors are those above the top quartile of the movable sectoral index; non movable-intensive sectors are those below the bottom quartile of the index.



4.6 Real Effects of Access to Credit

Having established that the collateral reform increased access to credit, we take our analysis one step further and look at the real-side implications of these changes. Looking at how financing decisions eventually impact real outcomes like investment and efficiency sets our study apart from others in the literature and highlight the policy relevance of our findings.

In column (1) of Table 5, we show that the reform increased the investment rate in fixed assets in firms operating in sectors intensive in movables by 3.6 percentage points more than in sectors

that do not intensively demand those assets. The magnitude of the effect is sizable, amounting to more than 80% of the average sample investment rate ($= 3.6\%/4.3\%$). In column (2), we show that the effect on employment is positive, but is estimated imprecisely (p -value = 0.13). According to column (3), the productivity of firms in sectors with high movable usage increases by 4.8 percentage points. Column (4) shows that profitability increases by 6.7 percentage points. In column (4), we show that sales increase by 8.8 percentage points more in sectors intensive in movable assets.

TABLE 5 ABOUT HERE

The fact that firms invested more in fixed assets following the collateral reform is notable and consistent with a “credit multiplier” effect that has been long emphasized in the literature (e.g., Bernanke et al. (2000)).¹⁶ To wit, we have shown in Tables 2 and 3 that following reform, firms in sectors intensive in movable assets borrowed more. Results in Table 5 suggest that this extra borrowing was partly used to finance the acquisition of fixed assets, including machines and equipment. This further increased the debt capacity of those firms, since they could then pledge the new machines and equipment to borrow more, expanding their ability to acquire additional fixed assets.

There could be several reasons leading to the within-firm productivity improvements reported in Table 5. One possibility is that firms are changing the composition of their assets towards a more efficient mix as they become less credit constrained. The previous results on cash holdings, too, are consistent with this explanation. Firms responded to the reform by shifting away from liquid, idle assets towards more illiquid, productive assets. The tests we perform below shed light on this reallocation of capital type and mix in Romania after the collateral reform.

5 The Legal Channel: Bypassing Court Inefficiency

Section 2 describes how the Romanian reform made it easier for parties to write debt contracts in light of enhanced ability to choose more assets as guarantees, greater availability of information, and ease of collateral repossession. These features have wide-ranging implications for contracting in an environment plagued by financial and legal inefficiencies.

Debt financing is burdened by costs associated with verification in bad states (default and bankruptcy). The feasibility of debt contracting is hampered when those costs are large and the likelihood of entering bad states is high. When contracts are more flexible (e.g., allow for more collateral substitutes) and written with more information to all parties (registries offering data on

¹⁶Campello and Hackbarth (2012) provide evidence of a firm-level credit multiplier effect in the US.

outstanding asset liens), it becomes less likely that parties enter in agreements that end up in court to begin with. Moreover, when courts are less important in the enforcement of contracts (e.g., use of self-help in recovering collateral), their efficiency becomes less relevant for contracting. This last point has been highlighted in recent work on credit reforms — court efficiency has been shown to be a key element in enabling the success of those reforms.¹⁷

The Romanian reform is unique in changing the legal environment towards enhancing the contracting space and information available to the parties while reducing the need for extensive reliance on court action. This sets it apart from other reforms studied in the literature, which made court activity more central to contract feasibility (typically by giving more power to creditors). To the extent that the court inefficiency constrained firms’ access to credit until the reform, one would expect to observe pre-2000 court efficiency shaping the effects of the reform. In particular, disparities in the local court systems could induce heterogeneous effects on the outcomes associated with the reform, with more pronounced results in jurisdictions where the judicial system was particularly lacking. As it turns out, disparities in local court efficiency were salient in Romania before the reform.

Romania is divided into 41 official administrative divisions, denoted *judete* (counties). The territorial organization of the courts corresponds to that administrative structure, with each *judete* housing one *Tribunal*, the court ultimately charged with the handling of commercial cases. Following the literature on judicial efficiency (Ponticelli, 2013), we gather data on the number of pending commercial cases and the number of judges working for each *judete* in 1999 (from Murrell, 2001). With this data, we create a proxy for court efficiency based on the ratio of the number of cases pending in backlog before each court and the number of judges working in that court over the same period. Table 6 reports that information for the 41 Romanian counties in 1999, the year prior to the reform. The country’s average backlog per judge is 15 cases, but the table shows substantial variation in court efficiency across counties. On one extreme, Vrancea county has only 2 cases pending per judge, and on the other extreme, Bihor county has 51 cases.¹⁸ The backlog per judge in Bucharest-Ilfov (the county encompassing the country’s capital) is 29.

TABLE 6 ABOUT HERE

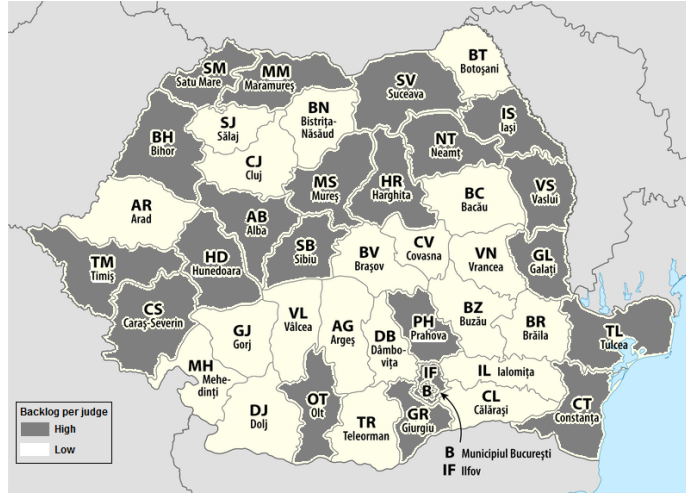
Differently from other countries, the Romanian law does not allow creditors or firms to choose the *judete* in which to file a legal motion (no “forum shopping”). As a result, the legal proceedings

¹⁷Ponticelli (2013) shows that a credit reform enhancing lenders’ rights in Brazil only had its intended consequences of facilitating bankruptcy proceedings in jurisdictions where local courts were efficient (had lower case backlogs). See also Jappelli et al. (2005), Laeven and Woodruff (2007), and Chemin (2012).

¹⁸Pronounced differences are verified even inside homogeneous regions of the country. In the Transylvania region, for example, Cosvana county has a backlog of 4 cases per judge, while its neighbor Mures county has a backlog of 38 cases.

Figure 6: **Court Efficiency Across Romania’s Counties**

The figure plots the map of the 41 *judete* (counties) of Romania, which constitute the territorial organization of the courts. The counties have been divided into two groups: above the median of backlog per judge in 1999 (grey) and below the median (white). Backlog per judge is defined the ratio between the number of pending cases in a court at the beginning of the year and the number of judges working in that court over the same year.



of commercial cases are shaped by the efficiency of local courts. To gauge how pre-reform court efficiency influences post-reform outcomes, we divide our sample firms into two groups: those operating in counties above the country’s median backlog per judge (12 counties) and these in counties below that cutoff. Figure 6 shows a map of the counties in Romania separated into those two court-efficiency categories.

In Table 7, we re-estimate Eq. (3) separately for the two groups. In the sample of high-backlog counties (Panel A), the reform increases the leverage of firms operating in industries that make intensive use of movable assets by 3.4 percentage points more than in non-intensive industries (see column (1)). In the sample of low-backlog counties (Panel B), the effect is only 1.8 percentage points. While the effect is positive and significant in both samples, the magnitude of the effect is twice as large in counties with high backlog per judge. Similarly, the effect of the reform on the probability of having zero leverage is one third larger in counties with inefficient courts (column (2)). Finally, the effect on cash in counties with inefficient courts is twice the effect in counties with efficient courts (column (3)).

TABLE 7 ABOUT HERE

Our county-level analysis shows that a reform that diminishes the importance of court involvement helps precisely those firms operating in localities with most inefficient courts systems. While consistent with existing work on the importance of court efficiency, our findings push knowledge further in showing that reforms that make courts less important are beneficial to contracting, particularly in places where legal system frictions seem most pronounced.

6 Larger Economic Consequences of the Collateral Reform

6.1 Industrial Composition Effects

Ample research suggests that under arcane legal frameworks, movable assets cannot be pledged as collateral and become “dead capital.” As a natural consequence, firms underinvest in activities that make intensive use of movable assets. Since some industries are inherently more intensive in movable assets than others, this distorts the industrial composition of the economy. By allowing movable assets to be pledged, the collateral reform could trigger a factor reallocation process, changing the industrial composition of Romania towards sectors intensive in movables. The results in Table 5 suggest this effect working at the firm-level, and even point to the functioning of a credit multiplier effect in which firms end up making large use of movables assets. The results from that table also indicate that firms become more efficient and profitable, which also point to improvements in the mix of different types of assets used by individual firms in their production process. It is important, however, to assess the aggregate implications of such findings.

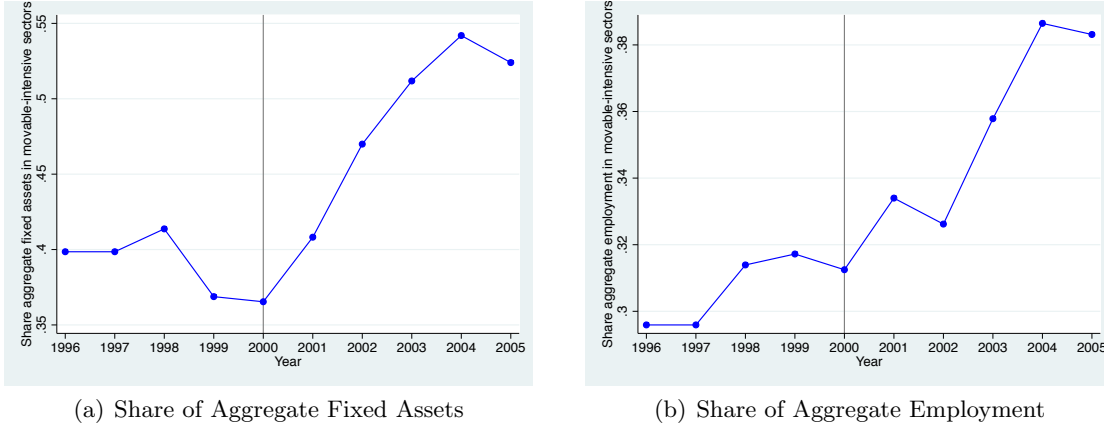
To do this, we calculate the share of aggregate fixed assets and aggregate employment allocated to sectors intensive in movable assets. In Figure 7, we plot the evolution of these shares over the 1996–2005 period. According to Panel A, before the reform, roughly 40% of total fixed assets in the economy were used in movable intensive sectors. After the reform, this share increases steadily, reaching nearly 55%. Likewise, from Panel B, we observe that the share of labor allocated to sectors intensive in movables increases from roughly 30% in 1996 to more than 38% in 2005. This constitutes a significant change in the industrial composition of the Romanian economy. It is rarely the case that a contractual reform leads to such fast and pronounced changes in a country’s industrial base and asset utilization mix.

6.2 Financial Deepening

In Section 2, we documented that financial depth in Romania (the ratio of private credit to GDP) increased substantially after 2000. Countries strive to achieve higher levels of financial deepening

Figure 7: **Share of Aggregate Fixed Assets and Employment in Movable-intensive Sectors**

The figure plots the evolution of the share of aggregate fixed assets (Panel A) and the share of aggregate employment (Panel B) allocated to sectors intensive in movable assets, for the period 1996-2005. Movable-intensive sectors are defined as those above the top quartile of the movable sectoral index.



as this is thought to act as a facilitator of economic growth. While it is difficult to assess how much a given policy contributes to that goal, in this section we conduct a back-of-envelope calculation to gauge how the collateral reform contributed to the financial deepening observed in the Romanian economy between 1996 and 2005.

Since we want to sum of the effect across all sectors (not only the top and bottom quartiles), we start by re-writing Eq. (3) using the original sectoral index of machinery and equipment:

$$Leverage_{ist} = \alpha_i + \alpha_t + \beta Post_t * Mach\&Equip_s + \gamma X_{ist} + \epsilon_{ist}, \quad (4)$$

where $Mach\&Equip$ is the original (continuous) sectoral movable intensity index. Next, we sort all sectors in ascending order according to $Mach\&Equip$. We denote the pre-post change in sectoral leverage as $\Delta Leverage_s$. As such, according to Eq. (4), the sectoral change in leverage in two consecutive sectors is: $\Delta Leverage_s - \Delta Leverage_{s-1} = \beta(Mach\&Equip_s - Mach\&Equip_{s-1})$. We can define the aggregate effect of the reform as:

$$\Delta Leverage = \sum_{s \geq 0} \omega_s Leverage_s,$$

where ω_s denotes the share of fixed assets of sectors s to aggregate fixed assets. Our empirical methodology gives an expression for the *differential* effect of the reform across industries. In order

to pin down the *level* effect, we assume that the change in the sector with lowest *Mach&Equip* is zero, which implies that $\Delta Leverage_s = \beta(Mach\&Equip_s - Mach\&Equip_0)$, for $s > 0$. By doing this, we will be estimating a lower bound of the reform’s aggregate effect:

$$\Delta Leverage = \beta \sum_{s>0} \omega_s (Mach\&Equip_s - Mach\&Equip_0)$$

According to the dosage regression described below in Section 7, we know that $\beta = 0.047$. According to the data, $\sum_{s>0} \omega_s (Mach\&Equip_s - Mach\&Equip_0) = 0.257$. Therefore, the aggregate effect is $0.047 * 0.257 = 1.23\%$. Finally, note that financial depth is defined as the ratio of private credit to GDP, not to assets. Since $Leverage = Debt/Assets$, we can re-write the aggregate effect as: $\Delta Leverage = \Delta[(Debt/GDP) * (GDP/Assets)]$. Following the macro literature, we assume that the ratio of total assets to GDP is 2.5, which for simplicity we assume to be unchanged by the reform. As a result, we have:

$$\Delta(Debt/GDP) = (Assets/GDP) * \Delta Leverage = 2.5 * 1.23\% = 3.08\%$$

According to Figure 1, the average pre–post change in financial depth in Romania over the 1996–2005 period is 4.31% (= 13.6% – 9.3%). Therefore, our back-of-the-envelope calculation implies that the collateral reform explains 71% of this financial deepening (= 3.08%/4.31%).

7 Robustness, Validity, and Consistency Checks

While attractive for identification purposes, difference-in-differences test strategies naturally call for checks on several dimensions. We conduct multiple tests designed to check the robustness, external validity, and internal consistency of our base results. These tests are detailed in turn.

7.1 Parallel Trends

Our difference-in-differences strategy assumes that, in absence of the reform, the change in the outcome variables (e.g., *Leverage*) would have been the same for firms in the treated and control groups. Accordingly, it is important to check whether trends in the outcome variables of interest for both treated and control groups were similar (“parallel”) prior to the reform. We do so looking at the secular evolution of changes in leverage ratios, the proportion of zero-leverage firms, and cash holdings before the reform. The treated group is comprised by all firms in sectors in the top quartile of the movable assets index, while the control group by firms in sectors in the bottom quartile. Panel A of Table 8 reports the results for *Leverage*. The difference between the change

in leverage for the treated and control groups is not statistically different from zero. This holds for all pre-reform horizons we consider, going back up to the beginning of our sample period in 1996. Panels B and C show similar patterns for *Zero-leverage* and *Cash* in the two comparison groups. In sum, there are no discernible differences in secular trends for either debt or cash ratios for firms in the high and low movable assets categories before the 2000 reform.

TABLE 8 ABOUT HERE

7.2 Confounding Effects

Another concern with our difference-in-differences strategy is that there could have been confounding events causing users of movable assets to use more debt after 2000. In this section, we tackle this concern by exploiting observable data on within-industry *cross-firm* variation as well as via a cross-country placebo test.

7.2.1 Industry Shocks

While we do not have firm-level data on movable assets for Romania, we have a firm-level measure for overall asset tangibility. This is useful since, based on our benchmark US data, we know that the variation in movable assets explains 70% of the within-industry variation in overall tangibility. If our results were driven by concurrent sector-specific shocks around 2000, we should observe that within high-movable asset industries, firms with different levels of overall tangibility would display similar behaviors after 2000. In contrast, if our enhanced pledgeability story is true, we should expect the effect to be stronger for firms with more ability to offer collateral (captured by overall tangibility).

To explore this idea, we rank firms within each industry before the reform according to *OverallTangibility*. Next, we split the sample into two groups, firms above the median of the overall tangibility ranking in their respective sector and firms below the median. In Table 9, we re-estimate Eq. (3) separately for each of the two groups. In the sample of high-tangibility firms (Panel A), the reform increased leverage in sectors intensive in movables by 3.5 percentage points more than in sectors not intensive in movables. In the sample of low-tangibility firms (Panel B), the effect is positive but not statistically significant. Although the effect on the probability of having zero leverage is not significant in either sample, the magnitude of the effect in the sample of high-tangibility firms is twice the magnitude than in the sample of low tangibility firms. Finally, the reform decreased cash holdings only in the sample of firms with high overall tangibility.

If our prior results were confounded with unobserved industry-level shocks, then *all* firms in high-movables industries should observe an increase in the use of debt. The evidence presented in

this section suggests that this was not the case.

TABLE 9 ABOUT HERE

7.2.2 Placebo Tests

As a second way of ruling out the alternative story of sectoral shocks, we conduct a placebo test looking at countries exposed to similar sectoral shocks. Our premise is that relevant industry shocks that could confound our results would affect not only Romania, but also its neighbors and main commercial partners. Our experiment falsely assumes that the two neighbors of Romania with similar industrial structure (Bulgaria and Hungary) and its main commercial partner (Italy) passed collateral reforms the same year than Romania.¹⁹

We start by providing evidence that the change in leverage in movable-intensive sectors in Romania prior to 2000 is not statistically different from the change in leverage in movable sectors in its two neighbors and its main commercial partner.²⁰ Next, we re-estimate Eq. (3) separately for each of the three countries. Table 10 reports the results. Each estimation shows that there is no effect on the credit capacity of firms operating in high-movable assets industries. Since we only observe a 2000-specific effect in Romania and given evidence of similar pre-reform trends across the countries examined, the results from Table 10 suggest that our results are not driven by industry-specific shocks affecting firms in industries operating more movable assets.

TABLE 10 ABOUT HERE

7.3 External Validity: Cross-Country Analysis

An important advantage of our test setting is that we can extend our study to a multi-country analysis. We have collected information on collateral reform dates for nine additional Eastern European countries. While these economies are similar in a number of dimensions — they inherit much of the same legacy of centralized, socialist-oriented, large manufacturing base — the passage of collateral reforms were not contemporaneous, owing to various idiosyncrasies. Some of these countries have reformed their collateral frameworks early on (Bulgaria, Estonia, Hungary, and Lithuania); others reformed in the middle of our sample window (Latvia and Poland); and others did not implement reform during the time period we study (Czech Republic, Ukraine, and Russia). Using data from all these transition economies, we estimate the following generalized difference-in-differences

¹⁹Italy amounts to 20% of Romania’s total exports and 23% of its total imports.

²⁰The results, which are not reported to conserve space, are available upon request.

specification:

$$Y_{isct} = \alpha_i + \alpha_{ct} + \beta Post_{ct} * HighMovableAssets_s + \gamma X_{isct} + \epsilon_{isct}, \quad (5)$$

where Y_{isct} denotes the outcome variable of interest for firm i in sector s in country c in year t . $Post_{ct}$ is a dummy equal to zero before the reform date and one afterwards for each country. $HighMovableAssets_s$ is the sectoral treatment indicator. The specification includes a full set of firm-fixed effects (α_i) and country-year-fixed effects (α_{ct}). The country-year-fixed effects control for all country-level, time-varying shocks. This constitutes a major advantage of this specification. The standard errors are clustered at the country level.

Table 11 reports the cross-country results. Columns (1) through (3) report the results for the financial outcomes, while columns (4) through (8) refer to real corporate outcomes. Collateral reforms aimed at freeing “dead capital” increased leverage in firms operating in sectors intensive in movable assets by 4.1 percentage points more than in firms in non-intensive sectors (column (1)). In addition, the reform reduced the probability of being a zero-leverage firm by 18% (column (2)). The effect on cash holdings is, as before, negative and significant (column (3)). Regarding the real outcomes we consider, the reform led to higher investment in fixed assets (column (4)), higher employment (column (5)), higher productivity (column (6)), higher profitability (column (7)), and increased sales (column (8)) across the different transition economies.

TABLE 11 ABOUT HERE

Adding external validity to our analysis, the results we document for Romania are also observed in a larger sample of transition economies. They suggest that the gains associated to policies that ease contracting among parties are not specific to the Romanian context. Such policies seem to have potentially positive effects in other comparable contexts as well.

7.4 Internal Consistency of Estimates

According to our results, the collateral reform increased leverage in firms operating in industries intensive in movable assets by 2.4 percentage points more than in firms in non-intensive industries. In this section, we study whether this estimate is sensible given the setting in which our analysis takes place. In particular, we compare this number with would have happened if firms had pledged *all* their movable assets to secure new debt financing after 2000 — the upper bound of the collateral impact on debt capacity.

To estimate how much debt firms could have raised, we calculate the product between the liquidation value of movable assets and the amount creditors lend against each dollar of movables in liquidation (the “loan-to-value” ratio). The liquidation value of movables, in turn, equals the product between the book value of movables and the liquidation value creditors recover for each dollar of book value of movables. Our upper bound calculation takes the form:

$$\frac{DebtLimit}{Assets} = \underbrace{\frac{Mach\&Equip}{Assets} * \frac{LiquidationValue}{Mach\&Equip}}_{\text{Liquidation Value of Movables}} * \underbrace{\frac{DebtLimit}{LiquidationValue}}_{\text{Loan-to-value of Movables}} \quad (6)$$

We start by considering firms producing in movable-intensive sectors. On average, the ratio of the book value of machinery and equipment to assets in sectors in the top quartile of the sectoral movables index is 27.3% (i.e., $Mach\&Equip/Assets = 0.273$). To establish a link between book and liquidation value of movables, we follow Berger et al. (1996), who report that a dollar’s book value of fixed assets produces 54 cents in liquidation value in the US (i.e., $LiquidationValue/Mach\&Equip = 0.54$).²¹ Finally, to calculate how much debt firms could have raised with this liquidation value, we follow Calomiris et al. (2014), who report that a dollar’s liquidation value of machinery and equipment in Romania in 2004 raises up to 40 cents of debt (i.e., $DebtLimit/LiquidationValue = 0.4$).²²

From Eq. (6), we calculate that firms producing in movable-intensive sectors could have raised debt equal to 5.8% of total assets ($= 0.273 * 0.54 * 0.4$). For firms in the bottom quartile of the sectoral movables index, the average ratio of the book value of machinery and equipment to assets is 12.2%. This implies that firms producing in non-intensive sectors could have raised debt equal to 2.6% of total assets ($= 0.122 * 0.54 * 0.4$). According to this counterfactual calculation, the reform could have increased leverage in firms in movable intensive industries by 3.2 percentage points more than in firms in non-intensive industries ($= 5.8\% - 2.6\%$). Therefore, our 2.4 estimate can be seen as relevant and fairly close effect to this counterfactual upper bound in which firms pledge all their movable assets as collateral after reform.

²¹We do not have this valuation proxy for Romania and imagine the actual number might be lower than 0.54. Since our exercise concerns the estimation of an upper bound for debt capacity, we adopt the high US-based figure.

²²This number is calculated as the average ratio between the loan granted and the liquidation value of the asset pledged as collateral. The data used in Calomiris et al. comes from a large multinational bank, which provides detailed loan-level information, including an internal assessment of the liquidation value of the asset being pledged.

7.5 Dosage Effects

Throughout the paper, we have defined the treated group as the firms in sectors in the top quartile of the movable assets index and the control group as the firms in the bottom quartile. In this section, we look into “dosage effects” of the collateral reform, by comparing outcomes across different quartiles of the movable assets distribution. If our test strategy is sound, we would expect differences in outcomes to be larger (smaller) the farther (closer) is the distance between treated and control groups in the movables distribution. In this exercise, we first classify as treated those sectors in the third quartile and as control the sectors in the bottom quartile. We then classify as treated the sectors in the third quartile and as control the sectors below the second quartile. Finally, in order to fully exploit the information in the movables sectoral distribution, we use the original (continuous) movables index instead of the binary version.

Table 12 reports the results. For ease of comparison, column (1) re-displays the results for our benchmark treated–control classification. Column (2) reports the results for the first alternative classification, where we compare firms in the third and first quartiles of the index. As expected, the effect is smaller in magnitude and estimated less precisely than in the benchmark case. Column (3) reports the results for the second alternative classification. In this case, the effect is not statistically different from zero. In sum, if we compare sectors closer within the movable assets distribution, the observed effect are smaller. In the last column of the table, we use the original index. According to the results, the effect of the reform is increasing in the movable intensity of the sector (the point estimate is 0.047). This means that our results about the impact of the reform are robust to how we treat the movables asset index for testing.

TABLE 12 ABOUT HERE

8 Concluding Remarks

Until the mid 1990s, the legal framework for secured transactions in Eastern Europe was very weak. For practical purposes, creditors accepted only “immovable assets” (land and buildings) as collateral; they did not accept “movable assets” (machinery and equipment). As a result, movable assets did not have debt capacity and were considered “dead capital.” In 2000, Romania implemented a law that drastically improved the legal treatment of movable assets as collateral. The law allowed firms to create security interests over movable assets without transfer of possession, created a modern electronic registry to make public such security interests, and allowed creditors to repossess collateral

in the event of default without court intervention. In this paper, we study the impact of this reform on the availability of credit and real economic activity in Romania and other transition economies.

Since the reform allowed firms to pledge movable assets as collateral, it should benefit firms operating in sectors that make intensive use of machinery and equipment. To identify the causal effect of the reform, we take advantage of the fact that some sectors in the economy are inherently more intensive in machinery and equipment than others. To do so, we rank sectors in Romania according to a movable assets demand index, which stems from the nature of firms' production processes. We then conduct a difference-in-differences test where we contrast firms operating in sectors with high and low demand for movable assets, before and after the passage of the law.

We find that after the reform, firms operating in sectors with more intensive use of movable assets borrowed significantly more and hoarded less cash. Moreover, the reform allowed a high fraction of firms that were entirely financed with equity to raise debt, leading to a "democratization of credit." We take our analysis one step further and study the real-side implications of the increased credit availability. According to our results, after the law was passed, firms in movable-intensive sectors invested more in fixed assets, employed more workers, and became more productive and profitable. We generalize our analysis to a broader group of nine additional Eastern European countries, passing similar laws during the same sample period. We observe the same pattern of findings in this broader sample, which adds external validity to our results.

From an aggregate perspective, we show that the reform contributed substantially to the process of financial deepening in Romania. In addition, the reform had a profound effect in the industrial structure of the economy, leading to an increase in the share of aggregate fixed assets and employment allocated to sectors intensive in movable assets. Finally, since the law allowed creditors to bypass the court system to repossess collateral, we explore how our results were shaped by the efficiency of local courts. We find that the effects on access to credit were more pronounced in the jurisdictions where local courts were initially more congested.

By emphasizing a detailed, micro-level analysis of the impact of collateral laws that affect different types of assets differentially, we are able to describe the dynamics of the relation between the development of financial institutions — in particular, laws governing financial contracting terms — and economic activity. In this way, our results are markedly important for policy-makers in developing economies, who do not have control over collateral values, yet can alter collateral menus as a way to enhance financial contractibility.

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Table 1: **Summary Statistics of Main Variables**

The table reports the summary statistics of the main variables used in the paper, for the period 1996-2005. *Leverage* is defined as the ratio of total debt to total assets; *OverallTangibility* is the ratio of fixed assets to total assets; *Cash* is the ratio of cash holdings to total assets; *Size* is the log of total assets; *Age* is the number of years in operation; *Profitability* is the ratio of EBIT to assets; *Sales* is the log of sales; *Investment* is the ratio between the change in fixed assets plus depreciation and lagged fixed assets; *Employment* is the log of the number of employees; and *TFP* is the log of total factor productivity.

	Mean	Std Dev	p25	p50	p75	Obs
<i>Leverage</i>	0.105	0.229	0.000	0.000	0.076	209415
<i>OverallTangibility</i>	0.383	0.248	0.176	0.365	0.570	238412
<i>Cash</i>	0.079	0.140	0.000	0.019	0.088	225707
<i>Size</i>	11.116	2.182	9.616	10.978	12.437	238558
<i>Age</i>	6.621	3.266	4.000	6.000	9.000	231813
<i>Profitability</i>	0.116	0.355	0.000	0.088	0.272	223124
<i>Sales</i>	11.716	2.069	10.278	11.581	13.015	238558
<i>Investment</i>	0.043	0.499	0.000	0.061	0.200	168805
<i>Employment</i>	2.258	1.625	1.099	1.946	3.135	238558
<i>TFP</i>	9.448	1.225	8.592	9.393	10.267	238558

Table 2: **Effect of Collateral Reform on Leverage: Intensive Margin**

The table presents the results from the following regression:

$$Leverage_{ist} = \alpha_i + \alpha_t + \beta Post_t * HighAssetType_s + \gamma X_{ist} + \epsilon_{ist},$$

where *Leverage* is the ratio of total debt to total assets for firm *i* in sector *s* in year *t*. *Post* is a dummy equal to zero before the reform date and one afterwards. *HighAssetType_s* is a dummy defined for each asset tangibility index of sector *s*. The dummy is equal to one for all sectors above the top quartile of the corresponding sectoral index and zero for sectors below the bottom quartile. *X* is a vector of firm controls. The specification includes a full set of firm-fixed effects (α_i) and year-fixed effects (α_t). The standard errors are clustered at the firm level.

	(1)	(2)	(3)	(4)
<i>Post*High OverallTangibility</i>	0.012** (0.006)			
<i>Post*High MovableAssets</i>		0.024*** (0.006)		0.037*** (0.013)
<i>Post*High ImmovableAssets</i>			0.005 (0.006)	-0.019 (0.013)
<i>Size</i>	0.017*** (0.002)	0.018*** (0.002)	0.019*** (0.002)	0.019*** (0.002)
<i>Age</i>	0.009*** (0.001)	0.008*** (0.001)	0.010*** (0.001)	0.009*** (0.001)
<i>Profitability</i>	-0.061*** (0.004)	-0.061*** (0.004)	-0.064*** (0.004)	-0.062*** (0.004)
<i>OverallTangibility</i>	0.022*** (0.006)	0.019*** (0.006)	0.021*** (0.006)	0.019*** (0.006)
Firm-fixed effects	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes
Observations	111,959	111,880	110,240	90,492
R-squared	0.584	0.584	0.585	0.580

Table 3: Effect of Collateral Reform on Leverage: Extensive Margin

The table presents the results from the following linear probability regression:

$$ZeroLeverage_{ist} = \alpha_i + \alpha_t + \beta Post_t * HighAssetType_s + \gamma X_{ist} + \epsilon_{ist},$$

where *ZeroLeverage* is a dummy equal to one if firm *i* in sector *s* in year *t* has zero leverage and zero otherwise. *Post* is a dummy equal to zero before the reform date and one afterwards. *HighAssetType_s* is a dummy defined for each asset tangibility index of sector *s*. The dummy is equal to one for all sectors above the top quartile of the corresponding sectoral index and zero for sectors below the bottom quartile. *X* is a vector of firm controls. The specification includes a full set of firm-fixed effects (α_i) and year-fixed effects (α_t). The standard errors are clustered at the firm level.

	(1)	(2)	(3)	(4)
<i>Post*High OverallTangibility</i>	-0.133** (0.057)			
<i>Post*High MovableAssets</i>		-0.159*** (0.056)		-0.324 (0.337)
<i>Post*High ImmovableAssets</i>			0.017 (0.139)	0.184 (0.338)
<i>Size</i>	-0.052*** (0.002)	-0.053*** (0.002)	-0.074*** (0.003)	-0.052*** (0.002)
<i>Age</i>	-0.283*** (0.012)	-0.281*** (0.012)	-0.297*** (0.018)	
<i>Profitability</i>	0.057*** (0.005)	0.058*** (0.005)	0.068*** (0.005)	0.058*** (0.006)
<i>OverallTangibility</i>	-0.116*** (0.010)	-0.111*** (0.010)	-0.109*** (0.011)	-0.111*** (0.012)
Firm-fixed effects	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes
Observations	124,257	123,946	122,719	100,331
R-squared	0.635	0.634	0.635	0.631

Table 4: **Effect of Collateral Reform on Cash Holdings**

The table presents the results from the following regression:

$$Cash_{ist} = \alpha_i + \alpha_t + \beta Post_t * HighAssetType_s + \gamma X_{ist} + \epsilon_{ist},$$

where *Cash* is the ratio of cash holdings to total assets for firm *i* in sector *s* in year *t*. *Post* is a dummy equal to zero before the reform date and one afterwards. *HighAssetType_s* is a dummy defined for each asset tangibility index of sector *s*. The dummy is equal to one for all sectors above the top quartile of the corresponding sectoral index and zero for sectors below the bottom quartile. *X* is a vector of firm controls. The specification includes a full set of firm-fixed effects (α_i) and year-fixed effects (α_t). The standard errors are clustered at the firm level.

	(1)	(2)	(3)	(4)
<i>Post*High OverallTangibility</i>	-0.017*** (0.004)			
<i>Post*High MovableAssets</i>		-0.019*** (0.004)		-0.026*** (0.010)
<i>Post*High ImmovableAssets</i>			-0.016 (0.009)	0.010 (0.009)
<i>Size</i>	-0.014*** (0.001)	-0.015*** (0.001)	-0.015** (0.005)	-0.015*** (0.001)
<i>Age</i>	0.011*** (0.001)	0.011*** (0.001)	0.011*** (0.002)	0.011*** (0.001)
<i>Profitability</i>	0.067*** (0.002)	0.068*** (0.002)	0.065*** (0.007)	0.067*** (0.003)
<i>OverallTangibility</i>	-0.050*** (0.003)	-0.051*** (0.003)	-0.053*** (0.014)	-0.053*** (0.003)
Firm-fixed effects	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes
Observations	123,805	123,510	122,298	99,968
R-squared	0.624	0.623	0.627	0.619

Table 5: **Effect of Collateral Reform on Other Corporate Outcomes**

The table presents the results from the following regression:

$$Y_{ist} = \alpha_i + \alpha_t + \beta Post_t * HighMovableAssets_s + \epsilon_{ist},$$

where Y is the outcome variable for firm i in sector s in year t . $Post$ is a dummy equal to zero before the reform date and one afterwards. $HighMovableAssets_s$ is a dummy equal to one for all sectors above the top quartile of the movable assets index and zero for sectors below the bottom quartile. The specification includes a full set of firm fixed effects (α_i) and year-fixed effects (α_t). The standard errors are clustered at the firm level. $Investment$ is the ratio between the change in fixed assets plus depreciation and lagged fixed assets; $Employment$ is the log of number of employees; $Productivity$ is the log of total factor productivity; $Profitability$ is the ratio between EBIT and total assets; and $Sales$ is the log of sales.

	(1)	(2)	(3)	(4)	(5)
	<i>Investment</i>	<i>Employment</i>	<i>Productivity</i>	<i>Profitability</i>	<i>Sales</i>
<i>Post*High MovableAssets</i>	0.036** (0.017)	0.040 (0.027)	0.048* (0.025)	0.067** (0.032)	0.088*** (0.033)
Firm-controls	No	No	No	No	No
Firm-fixed effects	Yes	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	131,513	185,730	185,730	176,542	185,730
R-squared	0.499	0.921	0.823	0.414	0.916

Table 6: **Court Enforcement Efficiency in Romania**

The table presents the court enforcement quality data for the 41 *judete* (counties) in Romania. Each county has one *Tribunal* court, which is a first instance court that has separate sections, one handling only commercial cases. Column (1) reports the number of judges working in each *Tribunal* court during 1999, the year before the reform. Column (2) reports the initial stock of commercial cases at the beginning of 1999. Column (3) reports our (inverse) measure of enforcement efficiency, backlog per judge, which is defined as the number of initial pending cases per judge.

County Name	(1) Number of judges	(2) Initial stock of cases	(3) Backlog per judge
Alba	15	312	20.8
Arad	20	133	6.7
Arges	28	179	6.4
Bacau	23	237	10.3
Bihor	16	817	51.1
Bistrita-Nasaud	16	133	8.3
Botosani	18	148	8.2
Brasov	29	322	11.1
Braila	17	125	7.4
Buzau	25	86	3.4
Caras-Severin	16	199	12.4
Calarasi	10	117	11.7
Cluj	27	263	9.7
Constanta	28	1092	39.0
Covasna	8	36	4.5
Dasmbovita	26	180	6.9
Dolj	31	246	7.9
Galati	19	343	18.1
Giurgiu	9	124	13.8
Gorj	28	92	3.3
Harghita	9	160	17.8
Hunedoara	21	306	14.6
Ialomita	12	127	10.6
Iasi	23	582	25.3
Maramures	18	259	14.4
Mehedinti	25	85	3.4
Mures	17	646	38.0
Neamt	23	757	32.9
Olt	23	466	20.3
Prahova	26	462	17.8
Satu Mare	18	261	14.5
Salaj	10	70	7.0
Sibiu	18	383	21.3
Suceava	22	599	27.2
Teleorman	14	97	6.9
Timis	25	567	22.7
Tulcea	11	146	13.3
Vaslui	15	419	27.9
Valcea	25	125	5.0
Vrancea	21	48	2.3
Bucharest - Ilfov	94	2720	28.9

Table 7: **Effect of Collateral Reform, by Court Enforcement Efficiency**

The table presents the results from the following regression:

$$Y_{ist} = \alpha_i + \alpha_t + \beta Post_t * HighMovableAssets_s + \gamma X_{ist} + \epsilon_{ist},$$

where Y is the outcome variable for firm i in sector s in year t . $Post$ is a dummy equal to zero before the reform date and one afterwards. $HighMovableAssets_s$ is a dummy equal to one for all sectors above the top quartile of the movable assets index and zero for sectors below the bottom quartile. Panel A reports the results for the sample of counties with backlog per judge above the median across counties; panel B reports the results for the sample of counties below the median. Backlog per judge, our inverse measure of enforcement efficiency, is calculated as the number of initial pending cases per judge in 1999. X is a vector of firm controls. The specification includes a full set of firm-fixed effects (α_i) and year-fixed effects (α_t). The standard errors are clustered at the firm level. $Leverage$ is the ratio of total debt to total assets, $ZeroLeverage$ is a dummy equal to one if a firm has zero leverage and zero otherwise, and $Cash$ is the ratio of cash holdings to total assets.

	(1)	(2)	(3)
	<i>Leverage</i>	<i>Zero-Leverage</i>	<i>Cash</i>
<i>A. Above-median backlog counties</i>			
<i>Post*High MovableAssets</i>	0.034*** (0.010)	-0.223*** (0.080)	-0.031*** (0.011)
Firm-controls	Yes	Yes	Yes
Firm-fixed effects	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes
Observations	48,512	60,992	48,420
R-squared	0.573	0.643	0.550
<i>B. Below-median backlog counties</i>			
<i>Post*High MovableAssets</i>	0.018** (0.009)	-0.169** (0.084)	-0.016* (0.010)
Firm-controls	Yes	Yes	Yes
Firm-fixed effects	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes
Observations	55,232	53,959	55,138
R-squared	0.591	0.638	0.565

Table 8: **Pre-reform Trends in Treated and Control Groups**

The table reports the average change in *Leverage* (panel A), *ZeroLeverage* (panel B), and *Cash* (panel C) for firms in the treated and control groups going back different years prior to the reform. The treated group is conformed by firms in sectors above the top quartile of the movable assets index; the control group by firms in sectors below the bottom quartile. The first row in each panel reports statistics for the change going back one year prior to the reform. A similar calculation is reported in the second row of the table, but the data goes back two years prior to the reform. Subsequent rows go back further in time at larger increments. The table also reports the differences in means and the P-value associated with a test statistic for the differences. *Leverage* is the ratio of total debt to total assets, *ZeroLeverage* is a dummy equal to one if a firm has zero leverage and zero otherwise, and *Cash* is the ratio of cash holdings to total assets.

Years prior to reform	Treated	Control	Difference	P-value
<i>A. Change in Leverage</i>				
One	0.006	0.006	0.000	0.945
Two	0.018	0.017	0.001	0.856
Three	0.026	0.029	-0.002	0.771
Four	0.030	0.025	-0.004	0.696
<i>B. Change in Zero-leverage</i>				
One	-0.001	-0.002	0.000	0.356
Two	-0.002	-0.004	0.001	0.207
Three	-0.004	-0.005	0.004	0.215
Four	-0.004	-0.009	0.005	0.228
<i>C. Change in Cash</i>				
One	-0.003	-0.006	0.002	0.697
Two	-0.009	-0.013	0.004	0.617
Three	-0.020	-0.026	0.005	0.523
Four	-0.009	-0.016	0.007	0.607

Table 9: **Effect of Collateral Reform, by Firm-level Asset Tangibility**

The table presents the results from the following regression:

$$Y_{ist} = \alpha_i + \alpha_t + \beta Post_t * HighMovableAssets_s + \gamma X_{ist} + \epsilon_{ist},$$

where Y is the outcome variable for firm i in sector s in year t . $Post$ is a dummy equal to zero before the reform date and one afterwards. $HighMovableAssets_s$ is a dummy equal to one for all sectors above the top quartile of the movable assets index and zero for sectors below the bottom quartile. Panel A reports the results for the sample of firms with $OverallTangibility$ above the median of the $OverallTangibility$ ranking within each sector before the reform; panel B reports the results for the firms with $OverallTangibility$ below the median. X is a vector of firm controls. The specification includes a full set of firm-fixed effects (α_i) and year-fixed effects (α_t). The standard errors are clustered at the firm level. $Leverage$ is the ratio of total debt to total assets, $ZeroLeverage$ is a dummy equal to one if a firm has zero leverage and zero otherwise, and $Cash$ is the ratio of cash holdings to total assets.

	(1) <i>Leverage</i>	(2) <i>Zero-Leverage</i>	(3) <i>Cash</i>
<i>A. Above-median tangibility firms</i>			
<i>Post*High MovableAssets</i>	0.035*** (0.010)	-0.202 (0.248)	-0.029*** (0.008)
Firm-controls	Yes	Yes	Yes
Firm-fixed effects	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes
Observations	55,582	61,777	61,572
R-squared	0.650	0.719	0.710
<i>B. Below-median tangibility firms</i>			
<i>Post*High MovableAssets</i>	0.015 (0.010)	-0.101 (0.268)	-0.006 (0.004)
Firm-controls	Yes	Yes	Yes
Firm-fixed effects	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes
Observations	56,298	62,169	61,938
R-squared	0.647	0.670	0.642

Table 10: **Effect of Collateral Reform: Placebo Tests**

We falsely assume that Romania's two neighboring countries (Bulgaria and Hungary) and its main commercial partner (Italy) implemented a collateral reform in the same year than Romania. For each country, we estimate the following regression:

$$Leverage_{ist} = \alpha_i + \alpha_t + \beta Post_t * HighMovableAssets_s + \gamma X_{ist} + \epsilon_{ist},$$

where *Leverage* is the ratio of total debt to total assets for firm *i* in sector *s* in year *t*. *Post* is a dummy equal to zero before 2000 and one afterwards. *HighMovableAssets_s* is a dummy equal to one for all sectors above the top quartile of the movable assets index and zero for sectors below the bottom quartile. *X* is a vector of firm controls. The specification includes a full set of firm-fixed effects (α_i) and year-fixed effects (α_t). The standard errors are clustered at the firm level.

	(1) Bulgaria	(2) Hungary	(3) Italy
<i>Post*High MovableAssets</i>	-0.017 (0.017)	-0.015 (0.049)	0.002 (0.002)
Firm-controls	Yes	Yes	Yes
Firm-fixed effects	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes
Observations	6,539	4,700	242,837
R-squared	0.715	0.991	0.626

Table 11: Effect of Collateral Reform: Cross-country Analysis

The table presents the results from the following regression:

$$Y_{isct} = \alpha_i + \alpha_{ct} + \beta Post_{ct} * HighMovableAssets_s + \gamma X_{isct} + \epsilon_{isct},$$

where Y denotes either *Leverage*, *DebtMaturity*, or *Cash* for firm i in sector s in country c in year t . $Post$ is a dummy equal to zero before the reform date and one afterwards for each country. *HighMovableAssets_s* is a dummy equal to one for all sectors above the top quartile of the movable sectoral index and zero for sectors below the bottom quartile. X is a vector of firm controls. The specification includes a full set of firm-fixed effects (α_i) and country-year-fixed effects (α_{ct}). The standard errors are clustered at the country level. The sample includes the following ten countries: Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Ukraine, and Russia. *Leverage* is the ratio of total debt to total assets, *ZeroLeverage* is a dummy equal to one if a firm has zero leverage and zero otherwise, *Cash* is the ratio of cash holdings to total assets, *Investment* is the ratio between the change in fixed assets plus depreciation and lagged fixed assets; *Employment* is the log of number of employees; *Productivity* is the log of total factor productivity; *Profitability* is the ratio between EBIT and total assets; and *Sales* denotes the log of sales.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<i>Leverage</i>	<i>Zero-Leverage</i>	<i>Cash</i>	<i>Investment</i>	<i>Employment</i>	<i>Productivity</i>	<i>Profitability</i>	<i>Sales</i>
<i>Post*High MovableAssets</i>	0.041*** (0.003)	-0.180*** (0.018)	-0.007*** (0.002)	0.047*** (0.001)	0.015*** (0.001)	0.076*** (0.001)	0.016 (0.011)	0.061*** (0.001)
Firm-controls	Yes	Yes	Yes	No	No	No	No	No
Firm-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	174,774	188,963	187,585	238,017	352,173	352,173	338,510	352,173
R-squared	0.623	0.663	0.678	0.492	0.949	0.819	0.532	0.948

Table 12: **Effect of Collateral Reform: Dosage Effects**

The table presents the results from the following regression:

$$Leverage_{ist} = \alpha_i + \alpha_t + \beta Post_t * HighMovableAssets_s + \gamma X_{ist} + \epsilon_{it},$$

where *Leverage* is the ratio of total debt to total assets for firm *i* in sector *s* in year *t*. *Post* is a dummy equal to zero before the reform date and one afterwards. *HighMovableAssets_s* is a dummy equal to one for all sectors above the top quartile of the movable assets index and zero for sectors below the bottom quartile (column (1)); equal to one for sectors in the third quartile and zero for sectors below the bottom quartile (column (2)); equal to one for sectors in the third quartile and zero for sectors below the two bottom quartiles (column (3)), and equal to the original sectoral index (column (4)). *X* is a vector of firm controls. The specification includes a full set of firm-fixed effects (α_i) and year-fixed effects (α_t). The standard errors are clustered at the firm level.

	(1)	(2)	(3)	(4)
<i>Post*High MovableAssets_{Q4-Q1}</i>	0.024*** (0.006)			
<i>Post*High MovableAssets_{Q3-Q1}</i>		0.015* (0.008)		
<i>Post*High MovableAssets_{Q3-Q2}</i>			-0.005 (0.006)	
<i>Post*MovableAssets</i>				0.047** (0.022)
Firm-controls	Yes	Yes	Yes	Yes
Firm-fixed effects	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes
Observations	103,744	23,214	48,236	64,302
R-squared	0.582	0.612	0.595	0.595