Government Arrears and Corporate Decisions: Lessons from a Natural Experiment*

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Abstract

We study the effects of late payment in procurement (arrears). We exploit as a natural experiment a large-scale financing plan of the Spanish government in 2012 that unexpectedly repaid accumulated arrears of local governments to their suppliers (amounting to about 3% of Spain's GDP). Our identification strategy relies on comparing firms included in the first phase of the program and firms accidentally omitted but repaid a year later. Repayment significantly increases corporate investment, reduces firm leverage, and increases cash reserves. Financially constrained firms respond by increasing investment and transmit the effect to the supply chain through trade credit. Less financially constrained firms react by repaying debt. We also show the accumulation of arrears deteriorates procurement relations, which recover upon repayment. Our results highlight the negative effects of procurement arrears and their interaction with financing frictions. We also provide evidence of the effectiveness of an unconventional fiscal policy that has large real effects.

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1 Introduction

Government procurement, the purchase of goods and services on behalf of a public authority, accounts for a substantial part of the global economy. According to the World Bank, public procurement in 2020 represented between 13% and 20% of world GDP, while global expenditure on procurement was close to 9.5 trillion US dollars.[1] Government contracts have some advantages. Among them, that they are important for many small local businesses (García-Santana and Santamaría, 2023) and provide a more stable demand over non-public customers, especially in recession periods (Goldman, 2020). However, governments can be slow in payment, and arrears often accumulate. This indeed occurred during the European sovereign debt crisis that followed the global financial crisis.

While there is an extensive literature on the economics of procurement, the financial aspects of supplier-government relationships are less explored. In this paper, we contribute to filling this gap by exploiting a large-scale financing plan of the Spanish government that repaid accumulated arrears of local governments to their suppliers in two different phases. Repayment significantly affects suppliers' corporate investment, leverage, and liquidity and shows heterogeneous responses according to firm-bank linkages. This heterogeneous reaction of firms to the early repayment of arrears allows us to infer how they dealt with the accumulation of arrears in the first place.

The issue of late payments by the public sector is a concern that regulators worldwide share. For instance, the European Commission issued a late-payment directive (LPD) in 2011 to standardize payment terms, impose late payment penalties, and establish uniform regulations. [2] Similarly, in the U.S., States such as Illinois, New York, or Massachusetts enforce interest penalties for late payments on public projects to induce prompt repayment and to ease the financial strain that delayed payments can put on the private sector.[3] Although

[1] See https://www.worldbank.org/en/news/feature/2020/03/23.

[2] This directive mandates that payments from government to business that are not completed within 30 days should allow creditors to claim interest and recovery costs. See Directive 2011/7/EU, On Combating Late Payment in Commercial Transactions, 2011 O.J. [L. 48], 2 for more details.

[3] This trend of requiring interest on unpaid bills has expanded to other states. For example, Louisiana

establishing a late payment interest incentivizes early payment, state comptrollers routinely report the late payment of procurement invoices and compute the interest paid accordingly.

In developed economies, government agencies in distress may delay payments. However, default is extremely rare, and suppliers are ultimately paid. Given this, in a frictionless financial market, firms ought to be able to borrow using their government arrears as collateral, implying that repayment speed would not alter corporate actions. Financial frictions, however, may force firms to change their plans, and the delayed payment of government arrears can thus be costly. Uncertainty about payment times can, therefore, cause firms to postpone investments and avoid future procurement contracts. Given this, the extent to which government arrears are costly to firms is a relevant empirical question linked to the presence of financing constraints. We approach this question by analyzing firms' reactions to the accelerated repayment of arrears.

A major challenge in examining this issue empirically is that the payment terms for arrears are frequently influenced by the specific circumstances of both buyer and seller, creating a standard endogeneity problem. To address this problem, one potential approach would involve randomly accelerating the repayment of government arrears for a subset of firms, offering an unexpected intervention. We take advantage of a natural experiment that mimics this ideal field experiment: A program in Spain in 2012 accelerated the repayment of regional government arrears. Some firms received a sizeable unexpected payment and reduced accounts receivable, while other comparable firms did not.

In 2012, the Spanish government paid overdue amounts to over 60,000 firms. In the five years before this, regional governments had accumulated arrears owed to suppliers. The volume of arrears totaled €30 billion (equivalent to 3% of Spanish GDP). In 2011, this cash injection had been largely unanticipated by firms.[4]

Governor John Bel Edwards enacted Act No. 566 on May 30, 2018. This update to the Louisiana Revised Statute Section 38:2191(B), effective August 1, 2018, mandates that public entities pay interest on late payments. According to the amendment, payments are considered late, and interest starts accruing 45 days after the public entity receives a proper request for payment. The interest rate is set at 0.5% daily, capped at 15%.

[4]News coverage on the repayment program appeared for the first time in mid-January 2012. Legislation

A key element of this repayment program is that the program accidentally omitted a group of firms from the initial repayment program (Phase I). Suppliers that worked for groups of municipalities (*mancomunidades*) were first overlooked. These firms were then included in an amended plan (Phase II) and received payment a year later. In total, more than 7,000 firms (with arrears amounting to around €1 billion) were paid in mid-2013 instead of in mid-2012. Importantly, the firms in Phase II received the cash injection a year later for exogenous reasons. We show they constitute a valid control group because they have characteristics and selection margins similar to those of firms in Phase I. The unanticipated nature of the program and the presence of a natural exogenous control group make this liquidity injection an ideal setting to study the effects of the repayment of accumulated arrears.

Our results show that there are real effects associated with the accelerated payment of government arrears. The repayment program affected corporate investment, leverage, and liquidity decisions differently for Phase I firms and Phase II firms. In particular, we find that an unexpected repayment shock equivalent to more than 10% of a firm's assets led firms to increase their investments by 14%, reduce their leverage by 10%, and increase their cash reserves by 44%. These measures are statistically and economically important, representing (respectively) around 30%, 20%, and 40% of the standard deviation of firm investment, leverage, and liquidity growth of the firms in the sample. The consequences of this program help us understand the effects of reducing government arrears and providing liquidity to firms. The effects are also informative about the cost that government arrears entail for firms and how firms have made changes in strategies to minimize these costs, given investment opportunities and financing constraints.

Our findings shed light on the actions that firms took to address the accumulation of arrears and late payments. The results suggest that firms with unpaid customer bills will likely delay investment opportunities and borrow to continue operations. The added liquidity in these firms after the repayment is consistent with the presence of financial frictions and

passed in March, and the payments were made between May and July. See Figure 1 for details on the news coverage.

with a costly uncertainty about future payment delays.

In theory, absent financial constraints, arrears should have no effect on economic activity. However, we do expect a heterogeneous response across firms with different financing constraints. In particular, firms' responses should vary across the ability of firms to borrow during the accumulation of arrears. In principle, firms with government arrears should be able to borrow against their public invoices, using them as collateral in factoring contracts with banks. However, this is a period in which factoring activity is shrinking due to regulatory frictions and banks' liquidity constraints. Moreover, this reduction in factoring activity is heterogeneous across banks. We show that banks that are in a better financial position expand their factoring activity relative to those that are more constrained. Better banks may also be able to extend other forms of borrowing to their customers to help them accommodate the liquidity needs induced by the accumulation of public arrears.

We extend the analysis on the accelerated repayment of arrears by conditioning on the financial constraints of firms. We proxy financial constraints using the firms' pre-determined exposure to specific banks that got more or less affected by the crisis (See Chodorow-Reich (2014), Jimenez et al. (2014) and Bentolila et al. (2013) for a similar approach). The results show that financially constrained firms increase their investment after the liquidity injection while they reduce a small fraction of their leverage. This suggests that financially constrained firms delayed investment opportunities and indicates that, in contrast with the unconstrained benchmark, large government arrears can indeed be costly to firms that face financing constraints. Conversely, financially unconstrained firms do not increase their investments after the repayment program and reduce a larger fraction of their leverage instead. This shows that these firms were able to borrow against their collateral or future cash flows and possibly against their accounts receivable with the local governments.

This reduction in leverage is also heterogeneous across financing constraints. Financially unconstrained firms reduce more leverage, and this is mostly financial debt. Conversely, we find that financially constrained firms mostly decrease their accounts payable following the

cash injection. This suggests that trade credit might serve as a substitute for bank financing, although it is insufficient to avoid the decrease in investment. Additionally, this finding sheds light on how the effect of government arrears may be transmitted to the supply chain through trade credit.

We also observe that firms tend to increase their cash reserves, irrespective of their financing constraints. This result is consistent with the fact that firms facing an episode of delayed payments decide to hold onto more cash to help cover future late payments and other short-term costs, even if these firms have the capacity to borrow against these unpaid bills.

Finally, we study how the repayment of accumulated government arrears affects the relationship dynamics between firms and public procurement. Our findings indicate that if public administrations delay their payments, their customers may reduce public procurement contracting with them. This result is significant in terms of the probability and volume of contracting. However, this effect vanishes after the repayment program, which talks about the importance of this intervention to preserve procurement relations between firms and the government.

Our study is linked to several strands of the literature. First, we contribute to the literature on the financial aspects of procurement. The procurement channel is helpful in providing firms with a stable income during recessions (Goldman, 2020). Di Giovanni et al. (2022) expand on this idea to show the implications of firms using their procurement relationships as a form of collateral that can ease financing constraints. Similarly, (Gabriel, 2022) shows that Portuguese firms use procurement contracts as collateral to increase their amount of lending. Lee (2021) shows that particularly procurement-dependent firms grow more, which is especially true for financially constrained firms. These papers show different beneficial aspects of procurement for firms, but in our paper we focus on analyzing delayed payment of procurement.

Closer to our paper, Barrot and Nanda (2020) focus directly on formal trade credit terms in procurement contracts and show that shorter formal payment periods can have a positive effect

on firms. In particular, they find a positive effect on employment when the US government accelerates payments to business contractors, but only in labor markets that are not too tight. Bonfim et al. (2021) show that when government spending is unexpectedly cut during a financial crisis, procurement-prone firms find it harder to borrow. Relatedly, Checherita-Westphal et al. (2016) show that increased delays in some European governments' payments can affect the liquidity and profits of the private sector, whereas Conti et al. (2021) show that stricter regulation to minimize late payment reduces firms' exit rate. We focus specifically on government arrears (i.e., late payment) rather than on the formal trade credit terms of procurement (i.e., the contractual maturity). Our natural experiment posits a large one-off reduction of arrears rather than a smaller but more persistent one. We also focus on the interaction of the late payment of arrears with financing constraints.

More broadly, our paper also contributes to the literature on the different stimulus policies to channel liquidity to the corporate sector (Lelarge et al., 2010; Bach, 2014; Banerjee and Duflo, 2014; Brown and Earle, 2017). The impact of any directed policy is typically difficult to evaluate, primarily because of potential selection biases. In our natural experiment, the government effectively executes an unorthodox form of fiscal policy. It borrows from banks to accelerate the repayment of accumulated arrears. Even though government liabilities remain unchanged, this policy has real effects, particularly for financially constrained firms.

Finally, our work contributes to several streams of the trade credit literature. We show the potential costs for suppliers when they finance a large buyer via trade credit (Murfin and Hjorge, 2015; Klapper et al., 2012). We add to the understanding of the costs of late payment and its interaction with financing constraints. While late payment has been well documented in the literature (Petersen and Rajan, 1997), the theoretical literature focuses on its role as insurance for the buyer (Cuñat, 2007; Wilner, 2001), which is unlikely relevant in the case of public debt. Moreover, the empirical literature on late payment is very limited so far. We also contribute to the very scarce literature on trade credit factoring by implicitly showing that firms cannot discount government arrears even when the creditworthiness of the government

is good.[5]

The rest of the paper is organized as follows. In Section 2, we provide an analytical framework and background information on the institutional setting for the repayment program. Section 3 describes the data and the construction of the main variables. The empirical strategy and results are presented in Section 4. Section 5 discusses how financing frictions may affect the results. Section 6 discusses the effects of late payment by public entities on procurement contracts, and Section 7 concludes.

2 Institutional background

Our work aims to understand the real effects of delayed payment in procurement by examining how firms respond to accelerated repayment of accumulated arrears. We first describe the procurement process and the institutional setting, and we lay out the natural experiment that we use for identification purposes.

2.1 Procurement, late payment, and financing constraints

From the perspective of a supplier firm, government arrears can be characterized as an illiquid asset with uncertain maturity. In principle, if suppliers are paid with such illiquid assets, it could lead them to liquidity constraints, potentially affecting the firm's ability to invest or continue production.

However, late payments in procurement contracts should not significantly impact firms' decision-making, provided that the firms can use arrears as collateral. Arrears can mechanically create liquidity by offering a viable means for obtaining loans. If government arrears are perceived as safe assets, firms may leverage them against future cash flows from their procurement contracts, thus mitigating the effects of delayed payments. In Spain, as in most developed countries, procurement trade credit contracts with municipal and regional

[5]See Smith and Schnucker (1994) as one of the few contributions to understanding the factoring contract.

authorities are implicitly guaranteed by the central government, suggesting that, barring financing constraints, procurement invoices should effectively generate sufficient collateral to offset any late payments.

The first empirical question of this paper is to evaluate if this holds true. Specifically, we examine whether the anticipated repayment of government arrears produces tangible effects, indicating firms' inability to leverage their government invoices with banks. The unconventional fiscal policy that we use as a natural experiment replaces one illiquid asset (arrears) with a liquid one (cash) in the balance sheet of supplier firms. In principle, if arrears generate their own collateral and liquidity, this fiscal policy should have no effects. However, our results suggest that this is not the case. Despite their "safe" label, arrears are an imperfect form of collateral, and factoring contracts or other types of financing are not adequately protecting firms against illiquidity. In the next section, we provide some arguments explaining why this may be the case.

Figure 2 conceptualizes this setting. The gray arrows show the flow of funds and contracts of the different agents, while the blue and black arrows show the flows of the unconventional fiscal policy of the government. Note that from the joint perspective of the entire government (central, local, and regional), a liability with firms is replaced with a liability with banks. So, this policy does not entail any additional liabilities for the government as a whole. However, we show empirically that this policy has real effects.

Another empirical question is whether financially constrained and unconstrained firms have a different reaction to government arrears. Even if arrears are an imperfect form of collateral, they should not affect firms that are financially unconstrained in a broader sense. Specifically, firms can offset the liquidity constraints imposed by government arrears if they have access to alternative forms of collateral, sufficient cash flows, or can leverage their commercial relationship with the government. If financially unconstrained firms borrow during the accumulation of arrears to keep investment at its optimal levels, their early repayment will entail a reduction of leverage and an accumulation of liquid assets.

Conversely, financially constrained firms facing government arrears would reduce investment, use all their available liquidity, and distort their decisions to reduce their needs for liquidity. The firms that had to postpone investment due to illiquidity problems should increase investment after the repayment.[6]

In order to answer these two empirical questions, we take advantage of an empirical setting in which several elements concur: i) an accumulation of procurement arrears, ii) a policy that repays these arrears unexpectedly, iii) groups of comparable treatment and control firms, iv) a classification of firms into financially constrained and unconstrained ones. These elements are all present in our empirical design. The next sections describe our empirical setting in more detail.

2.2 Public arrears and the Spanish setting

The Spanish economy suffered a severe credit crunch that originated from the global financial crisis that developed in 2008 (Bentolila et al. 2013; Jimenez et al. 2014). The financial crisis had a considerable impact on the private sector, leading to higher unemployment and depressed domestic demand (Campos and Reggio, 2015). The public sector was not left unscathed. Spain's public administrations, particularly at the municipal and regional level, experienced capital market funding problems, just like local banks, and they delayed payments to suppliers. [7]

Panel A of Figure 3 shows the evolution of municipal and regional trade credit and the arrears. There is a clear increase in the amount of trade credit used (orange line). More importantly, there is a marked increase in late payments (blue line), that is, trade credit that goes beyond its contractual maturity. The peak of total trade credit use (not yet due and on arrears) happened in 2011, just before the government intervention of 2012.[8] At the same

[6] A similar argument about the differential response of constrained and unconstrained firms in the face of a positive liquidity shock can be found in Banerjee and Duflo (2014)

[7] Trade credit maturities were generally extended during this period, but the effect was more pronounced in the public sector. Figure IA.2 in the Appendix compares the evolution of delayed payment days in the private and public sectors.

[8] To get a sense of the severity of late payment by 2011, 35% of total municipal outstanding trade credit

time, municipalities increased total expenditures, exacerbating budget deficits (see Panels B and C of Figure 3). The result was that the commercial debt in arrears accumulated by regional and local governments as of December 2011 amounted almost to €30 bn (about 3% of GDP).

Simultaneously, the financial crisis created a contraction of the factoring market. The factoring market allows firms to borrow in anticipation of payment of invoices by selling them to banks at some discount. The invoices serve as a form of collateral, and the discount implicitly determines the interest on the loan. Figure 4 compares the evolution of sales (turnover index) with the evolution of factoring loans. While sales declined by 19% between 2007 and 2012, factoring loans as a fraction of GDP fell by 58%. During this period, GDP declined as well, while the prevalence and maturity of trade credit increased, so the fraction of invoices that were being factored shrank even further than 58%. All this evidence, together with a context in which firms had an increased demand for liquidity, suggests that the sizable reduction of factoring was considerably driven by supply factors. Some of the reasons that may have induced factoring to shrink are regulatory. Despite the explicit guarantees of the central government, the European Banking regulations did not consider factoring for regional government invoices as a safe form of lending. Municipal and local government arrears require more regulatory capital than other forms of loans. Also, banks were not able to re-discount the arrears at the European Central Bank during this period. Facing limited lending capacity, banks shifted their focus to alternative forms of lending, such as sovereign lending (Acharya et al., 2018; Ongena et al., 2019).

2.3 An unconventional fiscal stimulus

The Spanish central government approved the *Plan de Pago a Proveedores* (Supplier Payment Program) to alleviate these liquidity problems of suppliers to regional and local governments. The program established a new state-owned vehicle, FFPS (Fund for Financing Payments to

was overdue by more than 12 months, 16% by more than 24 months, and 9% by more than 36 months.

Suppliers) in March 2012. The FFPS made payments directly to the suppliers of regional and local governments that held arrears dated before 2012, converting their commercial debt into financial debt held by the FFPS. The FFPS was announced in mid-January 2012, and the repayment occurred between May and July 2012. At that time, the FFPS via the Instituto de Crédito Oficial (ICO) injected €27.3 bn into the program. Regional and local governments paid the Spanish Treasury's funding cost plus a maximum margin of 145 basis points, favorable conditions compared to those offered in the capital markets. Their funding was guaranteed by their respective shares in the pool of state tax receipts. To prevent moral hazard, the local governments were required to submit a fiscal adjustment program to the central government. Panel C of Figure 3 shows how the financial situation of municipalities deteriorated from 2008 to 2011 but improved after the central government intervention.

To finance the program, the FFPS gathered funds from a syndicated loan worth €30 bn, granted by a pool of most of the Spanish banks. The State guarantee made the loan attractive for participating banks. The liabilities of the FFPS became part of the central government debt.

This was an unconventional form of fiscal policy. As Figure 2 shows, all the agents involved substituted an asset for an asset or a liability for a liability. The FFPS did not incur additional liabilities for the local government. Rather, the central government borrowed directly from banks what was needed to pay local government debts. Local governments were thus released from their debts with suppliers while acquiring debt with the central government. Firms substituted one asset (invoices) with another asset (cash). The plan provided firms with a way to overcome their inability to borrow via factoring. While the implicit guarantee of the central government may not have been enough to allow firms to factor their arrears, the explicit borrowing of the central government provided them with liquidity.

2.4 The natural experiment

We use the establishment of the FFPS to study the unexpected accelerated repayment of local government arrears. To estimate the causal effect of the policy, we take advantage of an administrative mistake that left some municipalities out of the 2012 phase of the plan (which we label Phase I).

Spanish municipalities may channel some or all of their purchases through *mancomunidades*. These are legal pools of several municipalities engaged in procurement that seek to achieve some economies of scale and improve their bargaining power. Although from an economic standpoint, municipalities and *mancomunidades* are very similar, they have different legal statuses. The first phase of legislation accidentally did not specify that debts with *mancomunidades* were included in the program, so their debts were not paid in 2012.

In February 2013, another law was passed, resulting in a new round of the FFPS, which we label Phase II. With approval to pay the arrears to the suppliers of *mancomunidades*, the ICO transferred in August 2013 over €1 bn to suppliers of regional and local governments.

The important fact for our analysis is that the reason why some firms participated in Phase II was due to an error in the plan's original legislation (it did not include *mancomunidades*), which was unrelated to the characteristics of the suppliers. Firms in Phase I and firms in Phase II have exposure to the public sector, have public arrears, and are very similar in characteristics. This is the basis of our identification strategy. We use the FFPS as a random shock that affected treated firms in 2012 (Phase I firms), but that did not affect control firms, a quasi-randomly selected group of firms with similar characteristics (Phase II firms).[9] Last, to explore the role of financial frictions in our setting, we classify firms into

[9]Figure IA.1 in the Appendix shows an example of water treatment procurement in the region of Andalucia. Some municipalities contract directly for water treatment, while others do so via *mancomunidades*. There are no major selection margins between the two groups. More importantly, the firms that supply *mancomunidades* and municipalities are very similar; indeed, often, firms supply both municipalities and *mancomunidades*. In our main analysis, we use firms that participate only in Phase I as the treated group (e.g., Firm A in the figure) and firms that participate only in Phase II as the control group (e.g., Firm B in the figure). Note that we drop any firms that appeared both in Phase I and Phase II (e.g., Firm C in Figure IA.1).

financially constrained and unconstrained firms by exploiting their banking relations before the repayment of Phase I.

3 Data

In this section, we describe the data used in this study. First, we elaborate on the data collection process and data sources and then provide summary statistics.

3.1 Data collection

The main data for our analysis are provided by the Instituto de Crédito Oficial (ICO). They include anonymous firm information from different phases of the FFPS. The data set includes information on each unpaid bill between a firm and each regional and local government, including amounts and payment dates.

The data are matched by the ICO to exhaustive firm-level financial data from the Iberian Balance Sheet Analysis System (SABI).[10]

For Phase I, the firms in the sample (i.e., those that can be matched to SABI) account for 48.2% of all suppliers (64,879 of 134,568) and almost 70% of the funds injected (€19 bn of €27.3 bn). For Phase II, the ICO data set includes 1,848 firms, of which 1,201 are firms that had earlier received funds in Phase I, and 647 are firms that received funds only in Phase II.

ICO's data are also matched to Opentender. This database includes public procurement information on contractors, public buyer identifiers, and contract descriptions, including prices and amounts in more than 30 countries.

We obtain data on accounting information on municipalities and regions from a Spanish Finance Ministry database.

Data on the business turnover index and factoring (unpaid bills of exchange) come from

[10]SABI data are provided by INFORMA D&B in collaboration with Bureau Van Dijk, which obtains financial information from the Spanish business register. SABI covers the vast majority of companies that are incorporated in Spain but does not cover some very small companies or self-employed individuals.

the Spanish Statistical Office.

Finally, we measure the media coverage of Phase I and Phase II using Factiva, which aims to cover the universe of news in Spain. [11]

3.2 Summary statistics

Panel A of Table 1 presents summary statistics for firms in Phase I (column 1) and Phase II (column 2) in 2011, just before the repayment. We aggregate all the unpaid invoices with all local and regional governments to calculate the total amount of arrears that each firm has.

We also have information on seized amounts by the central government.[12] For each firm, we measure the repayment shock as the total amount of arrears minus the total amount seized by the government. This results in the effective amount of euros transferred from ICO to the firm. The average repayment shock for firms in Phase I is €142,360, compared to €102,105 for firms in Phase II.

Firms in Phase I had average total assets of over €5 mm and average total liabilities of over €3 mm. Firms in Phase II had average total assets of more than €6.7 mm and average total liabilities of over €4.5 mm. As for cash, firms in Phase I and Phase II had about €280,000 and €270,000, respectively.[13]

On average, we do not observe any significant differences in the averages of variables across firms in Phase I and firms in Phase II. This suggests that the two groups of firms are comparable. Nevertheless, in Panel B of Table 1, we match firms in Phase II to firms in Phase I using entropy matching (Hainmueller, 2012) on the first moment of the repayment shock, assets, and region. After matching, we can see that the differences between firm characteristics become even smaller, and there are still no significant differences between the two groups.[14]

[11] Factiva, provided by Dow Jones, gives access to more than 6 million articles every year in more than 200 Spanish national, regional, and local newspapers and magazines.

[12] Seized amounts represent debts that firms had with the central government. These seized amounts were deducted from the total amount of arrears paid to the firm.

[13] In Table IA.1 of the Appendix, we show aggregate descriptive statistics for the entire sample.

[14] We include matched summary statistics for firms in Phase I and Phase II in 2010 (Panel A) and 2009 (Panel B) in Table IA.2 of the Appendix. We do not find any significant differences with respect to the 2011

We use this same matching criterion in parts of the analysis.

4 Accelerated repayments and corporate decisions

We are interested in estimating the effect of late payment of arrears of procurement contracts. In particular, we aim to understand whether corporate investments, leverage decisions, and cash hoardings are affected by an accelerated repayment of arrears.

4.1 Empirical strategy

To assess the causal impact of an accelerated repayment of government arrears, we require a treatment group that experiences an unexpected repayment of these arrears and a control group that, despite having a similar amount of unpaid arrears, does not get repaid at the same time. We attempt to mirror the ideal randomized experiment by leveraging the potentially random distribution of the repayment plan's implementation, as we have discussed. It was legislative oversight in 2012 that effectively created two groups of municipalities paid at different times.

Our underlying assumption is that the only difference between firms in Phase I and Phase II is that the former received repayment in mid-2012, while the latter received it a year later, in August 2013. Some of our specifications use entropy matching to improve the balance of both groups of firms.

We use the following specification:

$$y_{jt} = \beta_t PhaseI_{\{j \in Ph1\}} \times PostYear_{(t)} + \Lambda + \varepsilon_{jt} \tag{1}$$

where y_{jt} is a set of corporate decisions, including investment, leverage growth, and liquidity growth for firm j, in year t. These three variables are measured as the first difference of the logarithm of fixed assets, total liabilities, and cash, respectively, so the

statistics.

results can be interpreted in terms of net investment, change in total liabilities and change in cash. $PhaseI_{\{j \in Ph1\}}$ is a dummy variable that takes a value of one for firms that participate in Phase I and zero for firms that participate in Phase II. $PostYear_{(t)}$ are dummy variables indexed from 2009 to 2012 that take a value of zero for each year prior to the index and one for each year after the index. We also add a set of fixed effects (Λ), which includes *year*, *industry*, and *region* effects. The coefficient of interest is β_{2012}, which indicates the effect of accelerated repayment on corporate decisions for firms in Phase I versus firms in Phase II. The coefficients β_{2009} to β_{2011} correspond to placebo treatments in which the treated year is the index year, and the control years are the years before. These placebo coefficients measure the differential pre-trends in the corporate investment of the groups. If the groups are comparable, we should observe insignificant coefficients before 2012. If there is an effect of late payment on investment, we should observe a differential effect of the repayment shock for the $Phase\ I$ x $PostYear_{2012}$ coefficient.[15]

Next, we exploit the heterogeneity in the treatment, that is, in the amount of arrears that are repaid. We sort the firms in Phase I into four different groups according to the amount of repayment over total assets that they receive: below 1%, between 1% up to 5%, between 5% up to 10%, and above 10%. We predict the strongest response from firms that experience the largest repayment shock, that is, those that accumulate more arrears before the repayment program. We also expect that firms that have less accumulated public arrears will have less of a reaction. This "no-effect" result would also serve as a placebo test that confirms that the different reactions from firms in Phase I and Phase II are indeed due to the accelerated repayment.

We match each of the four groups of treated firms in Phase I, with all the firms in Phase II, according to total assets and repayment shock. This matching approach allows a direct comparison of firms that receive a repayment shock in Phase I and firms of a similar size that experience a similar repayment shock a year later in Phase II. As in the previous specification,

[15]The estimated magnitude should be considered a lower bound if some firms in Phase 2 anticipating repayment in 2013 and changed their corporate decisions already in 2012.

all the results include *year*, *industry*, and *region* fixed effects, with standard errors clustered at the firm level.

4.2 Investment, leverage, and liquidity decisions

We first analyze the impact of the central government's repayment of arrears on various corporate decisions (investment, leverage growth, and liquidity growth). We exploit the plan's random repayment schedule using the structure outlined in Equation 2.

Table 2 reports the main effects of the repayment shock on investment, leverage growth, and liquidity growth. To control for time-specific shocks, we include year-fixed effects in all columns. Columns 2, 4, and 6 also include industry and region fixed effects to control for unobserved time-invariant heterogeneity across different industries and regions.[16] We cluster standard errors at the firm level to account for potential within-firm correlation or heteroscedasticity.

The baseline results shown in Panel A suggest that firms in Phase I and Phase II exhibit a similar pattern in terms of investment, leverage, and liquidity decisions for the period of 2009-2011. When the positive liquidity shock hits, we observe significantly higher levels of investment and increases in cash holdings. We do not observe significant changes in leverage growth in 2012. To further reduce any potential differences between the treatment and control groups before 2012, we implement an entropy-balancing matching approach. This method reweighs the two groups according to the size of the liquidity shock and total assets in 2011. Panel B of Table 2 shows that the results remain similar after applying entropy matching, corroborating the findings in Table 1 that both groups are closely comparable and that investment grows after the positive liquidity shock. The point estimates on liquidity growth are similar in both regressions but not statistically significant in matched specifications.

[16] Results are similar if we include a more saturated model with a triple interaction of year, industry, and region fixed effects. However, to retain enough degrees of freedom, we opt for an intermediate approach where we control for time trends and for time-invariant regional and industry characteristics.

These tests aggregate all firms with arrears and provide an "overall effect" of repayment. This approach, though, gives equal weight to firms that receive minor repayments and those that receive larger ones. The vast diversity in the size of the repayment shock across firms might contribute to the mildly significant outcomes, as the level of arrears varies significantly from company to company. Thus, we expect that for firms with smaller arrears, the timing of repayment in 2012 or 2013 should not significantly affect their corporate decisions.

To account for the heterogeneity in the size of the repayment shock, we group firms according to the amount of arrears repaid. We sort the firms in Phase I into four different groups according to the amount of cash over the total assets they receive: below 1%, between 1% up to 5%, between 5% up to 10%, and above 10%.

First, we assess firms' responses in terms of investment decisions. The results are presented in Table 3. Each column shows the level of investment of firms in Phase I, stratified by level of arrears, versus a matched sample of firms in Phase II. The results show that firms increase investment monotonically with the level of the repayment shock in 2012. These results are consistent with the hypothesis that firms exposed to late payment might have forgone investment opportunities and reacted by increasing investments upon receiving the repayment shock. We find a clear, monotonic relation between the size of the repayment shock and the firm investment response. Firms experiencing the most substantial repayment shocks (those above 10% of their total assets) show a significant 14% increase in investments compared to their Phase II counterparts. Table IA.1 in the Appendix indicates this increase in investment is economically important, as it represents about 30% ($0.14/0.47 = 0.30$) of the standard deviation of the investment growth of the firms in our sample.

This result is consistent with our hypothesis that an accelerated repayment of public arrears can indeed spur investment activity. While firms aiming to make investments should be able to borrow from banks using public arrears as collateral, financial constraints could hinder the process. We hypothesize that imperfect financial markets could deter banks from lending even with fairly safe collateral. We explore this hypothesis in Section 5.

Next, we study the impact of a repayment shock on corporate leverage decisions. Table 4 shows that firms significantly reduce leverage upon receiving a repayment shock above 10% of their total assets. Treated firms reduce their leverage growth by about 10% compared to firms in Phase II. In economic terms, this reduction represents about 23% ($0.10/0.44 = 0.23$) of the standard deviation of changes in leverage during our sample period. These results suggest that when firms receive an unexpected injection of liquidity, they use these funds to pay off their outstanding liabilities, which would not only reduce their debt burden but also improve their financial health. The repayment is especially pronounced for firms that have substantial arrears, as they receive a greater positive repayment shock, enabling them to reduce their leverage.

Lastly, we study the impact on cash accumulation and present the results in Table 5. We find a positive, monotonic relation between the size of the liquidity injection and the increase in cash holdings after repayment. Firms experiencing the most substantial repayment shocks (again, those above 10% of their total assets) keep about 44.4% more cash than Phase II firms. This increase is economically meaningful. Given the distribution of changes in repayment by firms in our sample, the increase in repayment represents about 41% ($0.44/1.08 = 0.41$) of the standard deviation. As expected, the cash accumulation is particularly evident in firms receiving a greater repayment shock, as they would have more funds to retain.

This result implies that firms use the repayment shock not just for investment and to reduce leverage but also for cash accumulation. A potential explanation for this increase in cash holdings might be that firms that suffer from late payments decide to keep cash as a buffer against financial distress and to gain more flexibility in their future operational and strategic decisions.

Overall, this set of results shows that the intensity of the positive repayment shock affects the firm response, which is monotonically increasing in the level of the shock across all three specifications. In all specifications, we are matching each group of treated firms (Phase I) to a comparable group of non-treated firms (Phase II). In the next set of specifications, we

propose alternative specifications to explore this heterogeneous response.

4.3 Robustness: DiD and Synthetic DiD

Next, we follow an alternative empirical approach and estimate the impact of accelerated repayment on corporate decisions in a Differences-in-Differences (DiD) setting. Rather than compare firms in Phase I against firms in Phase II for different years, we compare the corporate decisions of firms in Phase I and Phase II in the period before (2009-2011) and the period after (2012) the repayment shock. By comparing changes over time in the treatment group to changes in the control group, the DiD design helps to isolate the causal effect of the treatment (repayment shock) on the firm's corporate decisions. Furthermore, the DiD approach allows us to mitigate biases in the estimated treatment effect stemming from common firm trends.

In Table 6, we estimate a specification similar to that in Equation 2, but we add a firm fixed effect and collapse all year dummies ($PostYear_t$) into a unique time indicator variable that takes a value of one in 2012, and a value of zero for the period 2009-2011 (*Post 2012*). Effectively, we are comparing the period 2009-2011 to 2012. Because we also include *year* and *firm* fixed effects, our variable of interest is the interaction term *Phase I x Post 2012*.

Panel A details the effect on firm investment decisions. Results in Table 3 are confirmed. In particular, as the extent of the repayment shock increases (from below 1% to above 10% of total assets), we observe a monotonic increase in the effect on investment. The impact is most significant for firms that receive a repayment shock greater than 10% of their total assets, increasing investment by approximately 7% on average. The t-statistic of 2.47 indicates this result is statistically significant at the 5% level.

Panel B evaluates the effect of repayment shocks on leverage decisions. Here, we see that only firms receiving a large repayment shock (greater than 10% of their total assets) show a significant reduction of 16% on average in their leverage. This effect is highly statistically significant, with a t-statistic of -5.11, indicating that the effect is robust at the 1% level. These results are in line with the findings in Table 4.

Panel C investigates the relation between the amount of the repayment shock and liquidity decisions. Here, we see a significant effect for firms receiving repayment shocks amounting to more than 5% of their total assets. Again, the effect is strongest for firms with a repayment shock above 10% of their assets. In economic terms, these firms increase their cash holdings by more than 45%. Results are in line with those described in Table 5.

Taken together, these results provide strong evidence that greater repayment shocks lead to more significant changes in corporate decisions. All the point estimates are monotonically linked to the size of the shock, and the effects are statistically significant for the most affected group of firms. Firms experiencing the most substantial shocks are more likely to increase investments, reduce their leverage, and retain larger cash holdings.

To add robustness to the main results, we also develop a synthetic differences-in-differences (SDiD) approach following the estimator for causal effects with panel data described in Arkhangelsky et al. (2021). The SDiD approach constructs a synthetic control group that best mimics the treatment group's trend in the pre-treatment period. Each treatment firm is replicated by re-weighting a sparse combination of units from the control group. For the re-weighting, more importance is given to those observations closer in time to the treatment point. This approach can be particularly advantageous when the treatment effect is heterogeneous or when the assumption of parallel trends may not be strictly held. This procedure is often applied when there is a limited number of treated or control units, which is the case for the firms in Phase II.

Thus, in this part of the analysis, we designate the firms in Phase II as the treatment group, and the control group is the firms in Phase I. The weights are chosen to optimally match the pre-adoption outcomes of the firms in Phase II, so they capture any possible trends. The difference between the observed outcomes post-adoption and the predicted outcomes is the estimated treatment effects using the method in Abadie (2021). The results, as shown in Table 7, are similar to those in Table 6. We find that firms in Phase II significantly reduce investment (5.0%), increase leverage (9.4%), and deplete cash (28.4%) compared to firms in

Phase I.

By confirming that the results hold under the SDiD approach, we show that our results are not driven by any particular specification of the control group or any potential violation of the parallel trends assumption. In essence, this conservative approach provides a more stringent test of the treatment effect and helps to underscore the robustness of our main findings: An accelerated repayment of accumulated public arrears has significant implications for firm investment, leverage, and liquidity decisions.

5 The role of financing frictions

In a frictionless financial market, firms should be able to borrow using their government arrears as collateral. If this were the case, we should not observe an increase in investment for financially constrained firms after the government cash injection. As Figure 4 shows, factoring became less of an option during this period due to the severe Spanish credit crunch. In 2007, factoring was above 30% of the Spanish GDP, but after the financial crisis burst, it dropped steadily to almost a third of its previous volume. Such a decline was much more severe than the reduction in economic activity, which can be seen in the Spanish business turnover index.

We analyze whether the effect of the repayment shock on several corporate outcomes depends on how financially constrained firms may be. As a measure of financing constraints, we use the firms' banking relations. We classify firms into "Top Banks" if they worked with at least one top bank in 2009.[17] We define top banks as those with a core equity tier 1 (CET1) capital ratio above 7.4% of risk-weighted assets, which was the average CET1 capital ratio for the overall Spanish banking sector in the adverse scenario of the stress tests run by the European Banking Authority (EBA) in 2011.[18]

Bank stress test results are an indicator of a bank's vulnerability and its capacity to lend.

[17] If the company does not report bank relations in 2009, we use the last available reported relationship before 2009. If the company does not report any bank information before 2010, we use 2010 information.

[18] See the presentation of the 2011 EBA stress tests results for Spanish banks in https://www.bde.es/wbe/en/noticias-eventos/otros-temas-interes/pruebas-resistencia-sector-bancario-europeo/

Banking relations are quite stable in Spain,[19] and they were particularly important during our period of analysis, as Spain experienced a severe credit crunch after the burst of the financial crisis that affected banks heterogeneously (Bentolila et al. (2013), Jimenez et al. (2014)). Relatedly, and more closely linked to our paper, factoring transactions shrank sharply during this period (as shown in Figure 3), and they did so differently across banks. Figure IA.3 in the Appendix shows the average amount of factoring of Spanish SPP arrears by top banks vs. non-top banks. One can see that top banks were able to provide more factoring than non-top banks, particularly after the onset of the financial crisis in 2008.

We use the specification in Equation 2 and split firms into "Top Banks" or "Excluding Top Banks," depending on whether, in 2009, they worked with at least one top bank.[20] We also split firms according to the size of the repayment received. We look particularly at firms that received a repayment shock below 1% of their total assets and firms that received a repayment shock above 10% of their total assets. Firms in the lower repayment group act as an additional control group for our analyses. Firms in the higher repayment group received a greater shock and are the most "treated" firms, so consistent with our results of Section 4.2, they are expected to react more to the shock. The information on these two groups allows us to extract conclusions on whether the reaction of firms to late payment depends on the extent of the accumulated arrears.

Panel A of Table 8 shows that only firms that were not linked to top banks and had accumulated substantial arrears increase their investment significantly after the repayment of 2012. This suggests that firms operating with top banks are not financially constrained and do not curtail investment despite their accumulation of arrears. In particular, firms that did not use a top bank and receive a large repayment shock devote 11% of the cash transfers to increase investment.

In Panel B of Table 8, one can see that firms that use at least a top bank significantly

[19] While firms could eventually move their businesses to other banks, there is plenty of evidence showing that bank-firm relationships are sticky (Petersen and Rajan, 1994; Santos and Winton, 2008; Darmouni, 2020).

[20] In Table IA.3 in the Internet Appendix, we show that Phase I and Phase II firms are very similar in 2011, regardless of whether they work with top banks or not.

reduce liabilities once they receive the repayment shock in 2012. This shows that firms using top banks that receive a large repayment shock repay liabilities to reduce their leverage growth by 19%. Firms that do not use top banks devote less to reduce leverage (11% reduction). This is an important result, as it highlights that firms that were less financially constrained were able to borrow more and invest more (as shown in Panel A) during the accumulation of arrears. Once the arrears are paid, less constrained firms devote a larger share of their liquidity injection to reduce leverage. This is consistent with having accumulated more liabilities and with having already invested in their most profitable investment opportunities.

Note in Panel C of Table 8 that both groups of firms significantly retain cash after receiving the repayment. Firms with top banks increase cash holdings growth by 47%, and firms without top banks increase cash holdings growth by 43%. This accumulation of cash may be a buffer for future investments or some other form of precautionary saving. Bates et al. (2009) find evidence of precautionary motives driving firms to increase their cash ratios in riskier times. This speaks to the interpretation of all our previous results. For example, our results in Panel A of Table 8 may be interpreted as a lower bound of the effect that a similar program could have in the context of expanded investment opportunities. Firms without top banks might be willing to retain cash even if they simultaneously increase investment because greater cash balances make them safer. Harford et al. (2014) show that firms mitigate greater refinancing risk by increasing cash holdings and conserving cash.

In Table 9, we further analyze the impact of late payment on firms' leverage. Panel A shows that firms with top banks that had many arrears significantly reduce financial debt. This confirms the interpretation of Panel B of Table 8 and suggests that less financially constrained firms were able to increase debt levels temporarily to offset the financing needs that originated from the accumulation of arrears. In column 4 of Panel A, however, we show that firms that did not use top banks do not significantly reduce financial debt after repayment, which suggests they could not increase debt levels when arrears accumulated before 2012. Column 4 of Panel B shows that financially constrained firms significantly decreased their accounts payable after

repayment in 2012. These results suggest that financially constrained firms had to recourse to delayed payments to suppliers before 2012 because financial debt was unavailable to them. Thus, these results evidence that late payments by local governments may spread through the supply chain, particularly for financially constrained firms.[21] Moreover, these findings speak to the importance of the government policy that we are analyzing, as the repayment program may not only impact firms with arrears, but also connected firms.

Overall, our findings in this section suggest that firms not borrowing from top banks (e.g., firms that are arguably more financially constrained) significantly increase investment and reduce their accounts payable upon the repayment, implying the easing of their financial constraints. Conversely, companies that had the possibility to borrow from top-tier banks, which are less financially constrained, do not increase investment significantly in the period after the repayment. Rather, these less financially constrained firms allocate a greater portion of the repayment to reduce their outstanding leverage and, in particular, financial debt. These results suggest that firms were able to obtain financial debt by borrowing against their accounts receivable with the local governments. Both groups of companies significantly increase their cash holdings, suggesting that, after facing an episode of delayed payments, firms decide to hold more cash to help cover future late payments and other short-term costs, even when they had the capacity to borrow against these unpaid bills.

6 Public procurement contracts

So far, we have focused on how corporate decisions are affected by the accumulation and early repayment of arrears. Nevertheless, a relevant complementary question is how delayed payments by public administrations influence further procurement contracting. In principle, several effects could be at play. Firms with existing arrears may want to contract with the same public administrations more as a way to enforce the repayment of arrears by keeping

[21] Alfaro et al. (2021) explore the Spanish setting and show that bank credit shocks can propagate downstream in the supply chain and affect suppliers.

the commercial relationship open. Conversely, firms may want to cut their commercial relationship with the public administrations if the existing arrears signal further late repayments that they cannot face. The relevance of each of these forces may also depend on the degree of financing constraints of the firms as well.

In this section, we focus on firms that have contracts with public administrations and study whether there's a distinct behavior in public contracting between firms with unpaid public arrears and firms paid timely. Public procurement contracts are critically important to both firms and public entities. For firms, these contracts can offer a stable and often substantial revenue stream (Goldman, 2020). For public entities, procuring goods and services from private firms allows them to fulfill their public service mandate. Thus, the impact of late payments in this context is particularly relevant.

To examine the impact of delayed payments on public procurement relationships we use a new specification that compares firms with procurement arrears with those with similar procurement contracts that do not have arrears. To do so, we merge the ICO database with the Opentender database. Opentender is a comprehensive European-level public online database that compiles extensive information on government procurement activities. We aggregate the contract-level data in Opentender to a firm-customer-year level, where "customer" refers to a local government of a municipality and "firm" to a potential supplier listed in Opentender. That is, each observation contains data about the volume and pricing of contracts for each local government-firm-year combination. This data allows us to assess the likelihood of firms engaging in new business relationships with public entities, particularly in the context of payment delays. We estimate the following specification:

$$Contract_{jit} = \beta_t Arrears_{j,i} \times PostYear_{(t)} + \lambda_{jt} + \varepsilon_{jit} \tag{2}$$

where $Contract_{jit}$ denotes whether firm j enters a new public procurement contract with local government i in year t. $Arrears_{j,i}$ is a dummy variable that takes a value of one for firm-local government pairs where the local government has unpaid bills to that firm (before 2012)

and zero otherwise. $PostYear_{(t)}$ are dummy variables indexed from 2009 to 2012 that takes a value of zero for each year before the index and one for each year after. We also include different sets of fixed effects (λ_{jt}). The coefficients of interest are β_{2011} and β_{2012}, which reflect the effect of late payment and prompt repayment on future business relationships. The coefficients β_{2009} to β_{2010} act as placebo treatments, where the treated year is the index year, and the control years are the preceding ones.

We hypothesize that a firm's level of unpaid bills, or "arrears," significantly affects its decisions regarding contract renewals with public governments. Specifically, we want to check whether firms are more or less inclined to continue contracts with local governments with whom they have outstanding payments still to be collected. To test this, we want to compare firms in the Opentender database with and without arrears. We do this in two different ways. First, firms with arrears are matched to other firms with procurement contracts in 2009 in the same geographic location, similar to a Metropolitan Statistical Area (MSA) in the United States. This matching allows us to consider firms in similar regions and with comparable histories of business interactions with and without arrears. This methodology also allows us to control for local economic conditions and for the propensity to have public contracts. This is crucial since Ferraz et al. (2015) shows that firms awarded procurement contracts have a higher likelihood of winning more public auctions in the future. We start by including year fixed effects to control for time trends and study the impact of arrears in the cross-section. In a different specification, we also include firm $\times$ year fixed effects to implicitly compare the contracting of one firm with a municipality that is not paying on time with the contracting of that same firm with a different municipality that is paying on time.

The results are shown in Table 10. In Columns 1 and 2, the dependent variable is one if there is a new contract between a firm and a local government and zero otherwise. Columns 3 and 4 adopt a more continuous specification where the dependent variable equals one plus the natural logarithm of the value of all awarded contracts between the firm and local government in a given year. Generally, the cross-sectional results presented in Columns 1 and 3 show that

public procurement decisions are not affected by public arrears. The muted response by firms experiencing late payments might be explained by several factors. First, it is possible that these firms are exclusively exposed to local governments with whom they have arrears. In this regard, the lack of alternative choices might lead these firms to continue contracting with existing clients. Second, it is also possible that the decision to contract with the public sector depends on other *omitted* factors that are also correlated with arrears (e.g., firms with more arrears have a higher economic activity and rely more on procurement). To address these two potential concerns, we control for time-varying unobservable characteristics at the firm level in Columns 2 and 4.

We find that firms that accumulated arrears with a certain client are less likely to contract with that client in the year before the repayment shock (2011).[22] Firms are about 18.3% less likely to initiate a new contract with local governments with whom they have arrears. We also find that public arrears not only affect the probability of starting a new contract but also the volume of those contracts. It is worth noting that while arrears affect procurement decisions, the impact is only temporary. We find no significant impact of arrears upon the repayment shock in 2012.

These findings shed light on the relationship dynamics between firms and public procurement, particularly regarding the impact of late payments on business ties between customers and suppliers. Our results indicate that if public administrations delay their payments, their customers might be hesitant to pursue public procurement contracts with them again in the future. The interruption of public contracting is probably mitigated by the findings in García-Santana and Santamaría (2023), which show there is local concentration in procurement, which is significantly explained by local governments' home bias. However, these effects seem short-lived, and once the creditworthiness of the buyers improves, commercial relationships are restored.

[22]While firms were also exposed to late payments in 2009 and 2010, the amount of accumulated arrears peaked in 2011.

7 Conclusion

We study the effect of government arrears on firms' policies. To do so, we exploit as a natural experiment a large accelerated repayment of the government in Spain in 2012. Using a unique data set and a clean causal identification strategy, we find firms' corporate decisions are significantly affected by the unexpected government repayment program.

We show that the impact of this policy is different across firms. Financially unconstrained firms do not increase investment but instead use the liquidity received to repay financial debt and accumulate cash. More financially constrained firms significantly increase investment and repay suppliers after the repayment program, evidencing how this policy had spillover effects in the supply chain through trade credit.

From a policy perspective, our results provide important insight into the effectiveness of an unorthodox fiscal policy that does not change overall public liabilities. Early repayment of arrears affects corporate investment and economic growth, and has heterogeneous effects across firms.

Further, our paper sheds light on firms' strategies to counter late payments during economic downturns. While less financially constrained firms can borrow to mitigate the effects of government arrears, financially constrained firms might have to forgo investment opportunities and delay payment to suppliers. Implicitly, our research also sheds light on firms' inability to collateralize public arrears, thereby contributing to the sparse literature on financial factoring.

Our findings also underscore the impact of the late payment of accumulated arrears by public administrations on procurement contracting. We see that firms burdened with substantial arrears tend to shrink from contracting with the public sector. The repayment of the arrears restores the contracting between firms and public administrations. These relationships and their impact on public procurement contracts deserve further attention, given their significant implications for both firms and public entities.

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Table 1: Summary Statistics: 2011

This table reports average firm characteristics for firms in Phase I and Phase II, the differences between the two groups of firms, and the p-values associated with those differences. Phase I includes the sample of firms that worked for local government entities that received the liquidity shock in year 2012, and Phase II includes firms that received the liquidity shock in 2013. Panel A compares firms in Phase I and Phase II before matching. In Panel B, firms from Phase I and Phase II are matched based on total assets, liquidity shock, and region. Firm characteristics are all measured in year 2011.

Panel A: Unmatched

Variable	(1) Phase I	(2) Phase II	(3) Difference	(4) P-value
Repayment Shock	142.360	102.105	-40.255	(0.460)
Investment	0.009	0.056	0.047	(0.136)
Leverage growth	-0.017	0.003	0.020	(0.408)
Liquidity growth	-0.151	-0.102	0.049	(0.364)
Total assets	5,139.655	6,743.966	1,604.311	(0.161)
Total liabilities	3,244.934	4,549.020	1,304.086	(0.123)
Cash	280.514	269.317	-11.197	(0.806)
Leverage ratio	0.373	0.396	0.022	(0.197)
Total debt	1,554.632	2,323.752	769.120	(0.127)
Long-term debt	814.032	1,168.053	354.021	(0.178)
Short-term debt	578.430	792.305	213.875	(0.195)

Panel B: Matched

Variable	(1) Phase I	(2) Phase II	(3) Difference	(4) P-value
Repayment Shock	142.360	142.351	-0.009	(1.000)
Investment	0.009	0.048	0.039	(0.230)
Leverage growth	-0.017	-0.001	0.016	(0.720)
Liquidity growth	-0.151	-0.105	0.046	(0.523)
Total assets	5,139.655	5,139.658	0.003	(1.000)
Total liabilities	3,244.934	3,336.247	91.313	(0.886)
Cash	280.514	311.054	30.540	(0.749)
Leverage ratio	0.373	0.381	0.008	(0.718)
Total debt	1,554.632	1,736.338	181.706	(0.656)
Long-term debt	814.032	873.492	59.460	(0.786)
Short-term debt	578.430	629.969	51.539	(0.714)

Table 2: Effects on Corporate Decisions

This table presents estimates from panel regressions explaining corporate decisions for the period 2009 to 2012. In both panels, the dependent variable in Columns 1 and 2 is the first difference in the logarithm of fixed assets (Investment), the first difference in the logarithm of total liabilities in Columns 3 and 4 (Leverage growth), and the first difference in the logarithm of cash in Columns 5 and 6 (Liquidity growth). *Phase I* is an indicator variable that takes a value of 1 for firms that received repayment in Phase I (2012) and zero for firms that received repayment a year later in Phase II. *Post 2009*, *Post 2010*, *Post 2011*, and *Post 2012* are indicator variables for years 2009-2012, 2010-2012, 2011-2012, and 2012, respectively. Columns 1, 3, and 5 include year fixed effects. Columns 2, 4, and 6 include year, region, and industry fixed effects. In Panel B, firms from Phase I and Phase II are matched based on total assets and the size of the repayment shock. Robust T-statistics are clustered at the firm level and shown in parentheses. ***, ** or * indicates that the coefficient is significant at the 1%, 5%, or 10% level, respectively.

Panel A: Unmatched Regressions

	Investment		Leverage growth		Liquidity growth	
	(1)	(2)	(3)	(4)	(5)	(6)
Phase I × Post 2009	0.005	0.009	-0.012	-0.006	0.054	0.054
	(0.28)	(0.48)	(-0.45)	(-0.22)	(1.01)	(1.01)
Phase I × Post 2010	-0.006	-0.006	-0.007	-0.007	-0.072	-0.073
	(-0.22)	(-0.23)	(-0.19)	(-0.19)	(-0.87)	(-0.88)
Phase I × Post 2011	-0.046	-0.046	-0.001	-0.001	-0.030	-0.031
	(-1.18)	(-1.18)	(-0.02)	(-0.02)	(-0.37)	(-0.38)
Phase I × Post 2012	0.079**	0.079**	0.002	0.003	0.136*	0.137*
	(2.13)	(2.14)	(0.07)	(0.09)	(1.67)	(1.69)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	No	Yes	No	Yes	No	Yes
Industry FE	No	Yes	No	Yes	No	Yes
Observations	155881	155881	157309	157309	142338	142338
Adjusted R^2	0.001	0.003	0.007	0.010	0.005	0.006

Panel B: Matched Regressions

	Investment		Leverage growth		Liquidity growth	
	(1)	(2)	(3)	(4)	(5)	(6)
Phase I × Post 2009	0.006	0.007	-0.006	-0.001	0.042	0.037
	(0.29)	(0.37)	(-0.20)	(-0.03)	(0.75)	(0.67)
Phase I × Post 2010	-0.013	-0.013	-0.026	-0.026	-0.067	-0.070
	(-0.45)	(-0.46)	(-0.65)	(-0.66)	(-0.78)	(-0.81)
Phase I × Post 2011	-0.042	-0.042	0.010	0.010	-0.009	-0.012
	(-1.05)	(-1.05)	(0.25)	(0.27)	(-0.10)	(-0.14)
Phase I × Post 2012	0.080**	0.080**	0.005	0.006	0.126	0.128
	(2.15)	(2.16)	(0.14)	(0.15)	(1.54)	(1.57)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	No	Yes	No	Yes	No	Yes
Industry FE	No	Yes	No	Yes	No	Yes
Observations	150320	150320	151653	151653	137486	137486
Adjusted R^2	0.003	0.005	0.007	0.013	0.005	0.010

Table 3: Effects on Investment Decisions

This table presents estimates panel matching regressions in which Phase I firms are matched to firms in Phase II. We explore investment decisions for the period 2009 to 2012. Firms from Phase I and Phase II are matched based on total assets and the size of the repayment shock. The dependent variable is the first difference in the logarithm of fixed assets. *Phase I* is a dummy that takes a value of 1 for firms that received repayment in Phase I (2012) and zero for firms that received repayment a year later in Phase II. *Post 2009*, *Post 2010*, *Post 2011*, and *Post 2012* are indicator variables for years 2009-2012, 2010-2012, 2011-2012, and 2012, respectively. We sort our sample into firms that received a repayment shock below 1% of their total assets, between 1% and 5%, between 5% and 10%, and above 10%. All regressions include year, region, and industry fixed effects. Robust T-statistics are clustered at the firm level and shown in parentheses. ***, ** or * indicates that the coefficient is significant at the 1%, 5%, or 10% level, respectively.

	Investment			
	$< 1\%$	$1\% - 5\%$	$5\% - 10\%$	$> 10\%$
Phase I × Post 2009	0.009	0.002	0.006	0.028
	(0.47)	(0.11)	(0.28)	(0.95)
Phase I × Post 2010	-0.007	-0.005	-0.016	-0.082
	(-0.23)	(-0.16)	(-0.45)	(-1.61)
Phase I × Post 2011	-0.046	-0.043	-0.037	-0.022
	(-1.15)	(-1.07)	(-0.89)	(-0.52)
Phase I × Post 2012	0.066*	0.079**	0.094**	0.139***
	(1.78)	(2.09)	(2.40)	(3.55)
Year FE	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	79553	41696	15232	18717
Adjusted R^2	0.006	0.005	0.004	0.005

Table 4: Effects on Leverage Decisions

This table presents estimates panel matching regressions in which Phase I firms are matched to firms in Phase II. We explore leverage decisions for the period 2009 to 2012. Firms from Phase I and Phase II are matched based on total assets and the size of the repayment shock. The dependent variable is the first difference in the logarithm of total liabilities. *Phase I* is a dummy that takes a value of 1 for firms that received repayment in Phase I (2012) and zero for firms that received repayment a year later in Phase II. *Post 2009*, *Post 2010*, *Post 2011*, and *Post 2012* are indicator variables for years 2009-2012, 2010-2012, 2011-2012, and 2012, respectively. We sort our sample into firms that received a repayment shock below 1% of their total assets, between 1% and 5%, between 5% and 10%, and above 10%. All regressions include year, region, and industry fixed effects. Robust T-statistics are clustered at the firm level and shown in parentheses. ***, ** or * indicates that the coefficient is significant at the 1%, 5%, or 10% level, respectively.

	Leverage Growth			
	$< 1\%$	$1\% - 5\%$	$5\% - 10\%$	$> 10\%$
Phase I × Post 2009	-0.020	0.000	0.020	0.080
	(-0.71)	(0.01)	(0.61)	(1.61)
Phase I × Post 2010	-0.002	-0.036	-0.051	-0.128*
	(-0.06)	(-0.89)	(-1.11)	(-1.92)
Phase I × Post 2011	0.014	0.013	0.000	0.023
	(0.37)	(0.33)	(0.01)	(0.54)
Phase I × Post 2012	0.014	0.028	0.014	-0.104**
	(0.39)	(0.75)	(0.35)	(-2.24)
Year FE	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	80015	42097	15398	19099
Adjusted R^2	0.013	0.012	0.012	0.024

Table 5: Effects on Liquidity Decisions

This table presents estimates panel matching regressions in which Phase I firms are matched to firms in Phase II. We explore liquidity decisions for the period 2009 to 2012. Firms from Phase I and Phase II are matched based on total assets and the size of the repayment shock. The dependent variable is the first difference in the logarithm of cash. *Phase I* is a dummy that takes a value of 1 for firms that received repayment in Phase I (2012) and zero for firms that received repayment a year later in Phase II. *Post 2009*, *Post 2010*, *Post 2011*, and *Post 2012* are indicator variables for years 2009-2012, 2010-2012, 2011-2012, and 2012, respectively. We sort our sample into firms that received a repayment shock below 1% of their total assets, between 1% and 5%, between 5% and 10%, and above 10%. All regressions include year, region, and industry fixed effects. Robust T-statistics are clustered at the firm level and shown in parentheses. ***, ** or * indicates that the coefficient is significant at the 1%, 5%, or 10% level, respectively.

	Liquidity growth			
	$< 1\%$	$1\% - 5\%$	$5\% - 10\%$	$> 10\%$
Phase I × Post 2009	0.036	0.040	0.035	0.017
	(0.64)	(0.70)	(0.52)	(0.16)
Phase I × Post 2010	-0.063	-0.060	-0.093	-0.083
	(-0.73)	(-0.68)	(-0.93)	(-0.56)
Phase I × Post 2011	-0.006	-0.030	-0.009	0.038
	(-0.07)	(-0.36)	(-0.10)	(0.42)
Phase I × Post 2012	0.049	0.096	0.197**	0.444***
	(0.59)	(1.16)	(2.24)	(4.41)
Year FE	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	72616	38091	13994	17309
Adjusted R^2	0.008	0.010	0.011	0.025

Table 6: Effects on Corporate Decisions: DiD

This table presents estimates from Difference-in-Differences panel egressions in which Phase I firms are matched to firms in Phase II. We explore corporate decisions for the period 2009 to 2012. Firms from Phase I and Phase II are matched based on total assets and repayment shock. The dependent variables are the first difference in the logarithm of fixed assets (Panel A: Investment), liabilities (Panel B: Leverage Growth), and cash (Panel C: Liquidity Growth). *Phase I* is a dummy that takes a value of 1 for firms that received repayment in Phase I (2012) and zero for firms that received repayment a year later in Phase II. *Post 2012* is an indicator that equals 1 for year 2012. We sort our sample into firms that received a repayment shock below 1% of their total assets, between 1% and 5%, between 5% and 10%, and above 10%. All regressions include year, region, and industry fixed effects. Robust T-statistics are clustered at the firm level and shown in parentheses. ***, ** or * indicates that the coefficient is significant at the 1%, 5%, or 10% level, respectively.

Panel A: Investment

	$< 1\%$	$1\% - 5\%$	$5\% - 10\%$	$> 10\%$
Phase I × Post 2012	0.027	0.039	0.051*	0.069**
	(1.11)	(1.52)	(1.87)	(2.47)
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	78135	40633	14764	17980
Adjusted R^2	0.078	0.072	0.052	0.057

Panel B: Leverage Growth

	$< 1\%$	$1\% - 5\%$	$5\% - 10\%$	$> 10\%$
Phase I × Post 2012	0.022	0.019	-0.017	-0.159***
	(0.77)	(0.65)	(-0.55)	(-5.11)
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	78624	41051	14937	18346
Adjusted R^2	0.042	0.033	0.011	0.024

Panel C: Liquidity Growth

	$< 1\%$	$1\% - 5\%$	$5\% - 10\%$	$> 10\%$
Phase I × Post 2012	0.042	0.069	0.164***	0.455***
	(0.69)	(1.15)	(2.60)	(7.32)
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	70646	36788	13426	16435
Adjusted R^2	-0.157	-0.156	-0.171	-0.165

Table 7: Effects on Corporate Decisions: SDiD

This table presents estimates from Synthetic Diff-in-Diff (Arkhangelsky et al. (2021)) regressions explaining corporate decisions for the period 2009 to 2012. The dependent variables are the first difference in the logarithm of fixed assets (Panel A: Investment), liabilities (Panel B: Leverage Growth), and cash (Panel C: Liquidity Growth). *Phase II* is a dummy that takes a value of 1 for firms that received repayment in Phase II (2013) and zero for firms that received repayment a year earlier in Phase I. *Post 2012* is an indicator that equals 1 for year 2012. We sort our sample into firms that received a repayment shock below 1% of their total assets, between 1% and 5%, between 5% and 10%, and above 10%. Robust T-statistics are shown in parentheses. ***, ** or * indicates that the coefficient is significant at the 1%, 5%, or 10% level, respectively.

Panel A: Investment

	$< 1\%$	$1\% - 5\%$	$5\% - 10\%$	$> 10\%$
Phase II × Post 2012	0.001	-0.010	-0.017	-0.050***
	(0.46)	(-0.73)	(-1.60)	(-3.79)

Panel B: Leverage Growth

	$< 1\%$	$1\% - 5\%$	$5\% - 10\%$	$> 10\%$
Phase II × Post 2012	-0.003	-0.003	0.026	0.094***
	(-0.14)	(-0.10)	(0.82)	(8.09)

Panel C: Liquidity Growth

	$< 1\%$	$1\% - 5\%$	$5\% - 10\%$	$> 10\%$
Phase II × Post 2012	-0.002	-0.021	-0.103*	-0.284***
	(-0.11)	(-0.84)	(-1.81)	(-5.78)

Table 8: Effects on Corporate Decisions: Bank Heterogeneity

This table presents estimates panel matching regressions in which Phase I firms are matched to firms in Phase II. We explore corporate decisions for the period 2009 to 2012. The dependent variables are the first difference in the logarithm of fixed assets (Panel A: Investment), liabilities (Panel B: Leverage Growth), and cash (Panel C: Liquidity Growth). Firms from Phase I and Phase II within the same bank type are matched based on total assets and the repayment shock. *Phase I* is a dummy that takes a value of 1 for firms that received repayment in Phase I (2012) and zero for firms that received repayment a year later in Phase II. *Post 2012* is an indicator that equals 1 for year 2012. We sort our sample into firms that received a repayment shock below 1% and above 10% of their total assets. The sample "Top Banks" includes all firms that in 2009 worked with at least one bank with a core equity tier 1 (CET 1) capital ratio above 7.4. The sample "Excluding Top Banks" includes all other firms. In Panel A, the dependent variable is the first difference in the logarithm of fixed assets. In Panel B, the dependent variable is the first difference in the logarithm of total liabilities. In Panel C, the dependent variable is the first difference in the logarithm of cash. All regressions include year, region, and industry fixed effects. Robust T-statistics are clustered at the firm level and shown in parentheses. ***, ** or * indicates that the coefficient is significant at the 1%, 5%, or 10% level, respectively.

Panel A: Investment

	Top Banks		Excluding Top Banks	
	$< 1\%$	$> 10\%$	$< 1\%$	$> 10\%$
Phase I × Post 2012	0.023	0.059	0.036	0.112***
	(0.67)	(1.43)	(1.15)	(3.27)
Year FE	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	28725	4353	50828	14364
Adjusted R^2	0.015	0.013	0.007	0.006

Panel B: Leverage Growth

	Top Banks		Excluding Top Banks	
	$< 1\%$	$> 10\%$	$< 1\%$	$> 10\%$
Phase I × Post 2012	0.007	-0.192***	0.023	-0.112***
	(0.20)	(-4.53)	(0.64)	(-3.02)
Year FE	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	28787	4372	51228	14727
Adjusted R^2	0.019	0.037	0.014	0.022

Panel C: Liquidity Growth

	Top Banks		Excluding Top Banks	
	$< 1\%$	$> 10\%$	$< 1\%$	$> 10\%$
Phase I × Post 2012	0.007	0.468***	0.032	0.433***
	(0.06)	(3.55)	(0.49)	(6.61)
Year FE	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	26782	4094	45834	13215
Adjusted R^2	0.013	0.029	0.009	0.025

Table 9: Financial Debt and Accounts Payable

This table presents estimates panel matching regressions in which Phase I firms are matched to firms in Phase II. We explore leverage decisions for the period 2009 to 2012. The dependent variables are the first difference in the logarithm of financial debt (Panel A), and accounts payable (Panel B). *Phase I* is a dummy that takes a value of 1 for firms that received repayment in Phase I (2012) and zero for firms that received repayment a year later in Phase II. *Post 2012* is an indicator that equals 1 for year 2012. We sort our sample into firms that received a repayment shock below 1% and above 10% of their total assets. The sample "Top Banks" includes all firms that in 2009 worked with at least one bank with a core equity tier 1 (CET 1) capital ratio above 7.4. The sample "Excluding Top Banks" includes all other firms. All regressions include year, region, and industry fixed effects. Robust T-statistics are clustered at the firm level and shown in parentheses. ***, ** or * indicates that the coefficient is significant at the 1%, 5%, or 10% level, respectively.

Panel A: Financial Debt Growth

	Top Banks		Excluding Top Banks	
	$< 1\%$	$> 10\%$	$< 1\%$	$> 10\%$
Phase I × Post 2012	-0.050	-0.328***	0.072	-0.074
	(-0.92)	(-5.20)	(1.34)	(-1.37)
Year FE	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	13047	1467	16838	3318
Adjusted R^2	0.022	0.045	0.026	0.053

Panel B: Accounts Payable Growth

	Top Banks		Excluding Top Banks	
	$< 1\%$	$> 10\%$	$< 1\%$	$> 10\%$
Phase I × Post 2012	0.050	-0.096	-0.005	-0.140***
	(0.98)	(-1.57)	(-0.11)	(-2.89)
Year FE	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	28434	4261	49298	13531
Adjusted R^2	0.018	0.015	0.005	0.010

Table 10: Effects on Public Procurement

This table presents estimates panel matching regressions in which Phase I firms are matched to firms in Phase II. We explore firms' public procurement decisions for the period 2009 to 2012. In this analysis, the unit of observation is at the firm-local government-year level. In columns 1 and 2, the dependent variable is a dummy taking value one if there is a new contract between a firm and a local government and taking value zero otherwise. In columns 3 and 4, the dependent variable is one plus the natural logarithm of the price of all the awarded contracts between the firm and the local government in that year. *Arrears* is a dummy that takes a value of 1 for firm-local government pairs where the local government has accumulated arrears owed to that firm, and zero otherwise. *Post 2009*, *Post 2010*, *Post 2011*, and *Post 2012* are indicator variables for years 2009-2012, 2010-2012, 2011-2012, and 2012, respectively. We use entropy matching on local government and the existence of a public contract in 2009. Robust T-statistics are clustered at the firm level and shown in parentheses. ***, ** or * indicates that the coefficient is significant at the 1%, 5% or 10% level, respectively.

	New Contract		New Contract Price	
	(1)	(2)	(3)	(4)
Arrears × Post 2009	0.053	0.090	0.716	1.253
	(1.08)	(1.63)	(1.06)	(1.59)
Arrears × Post 2010	0.041	0.114	0.602	1.604
	(0.67)	(1.37)	(0.71)	(1.34)
Arrears × Post 2011	-0.030	-0.183**	-0.426	-2.551**
	(-0.56)	(-2.16)	(-0.57)	(-2.16)
Arrears × Post 2012	-0.044	-0.090	-0.518	-0.988
	(-0.86)	(-0.88)	(-0.77)	(-0.71)
Year FE	Yes	Yes	Yes	Yes
Year x Firm FE	No	Yes	No	Yes
Observations	17460	17460	17460	17460
Adjusted R^2	0.011	0.463	0.012	0.449

Figure 1: Appearance of SPP news in Spanish Newspapers

The figure represents the total number of times that "Plan de Pago a Proveedores" (Supplier Payment Program) and "Plan de Pago a Proveedores" and the word "Mancomunidad" appear in the Spanish news every month from January 2011 to December 2013. Source: Factiva.

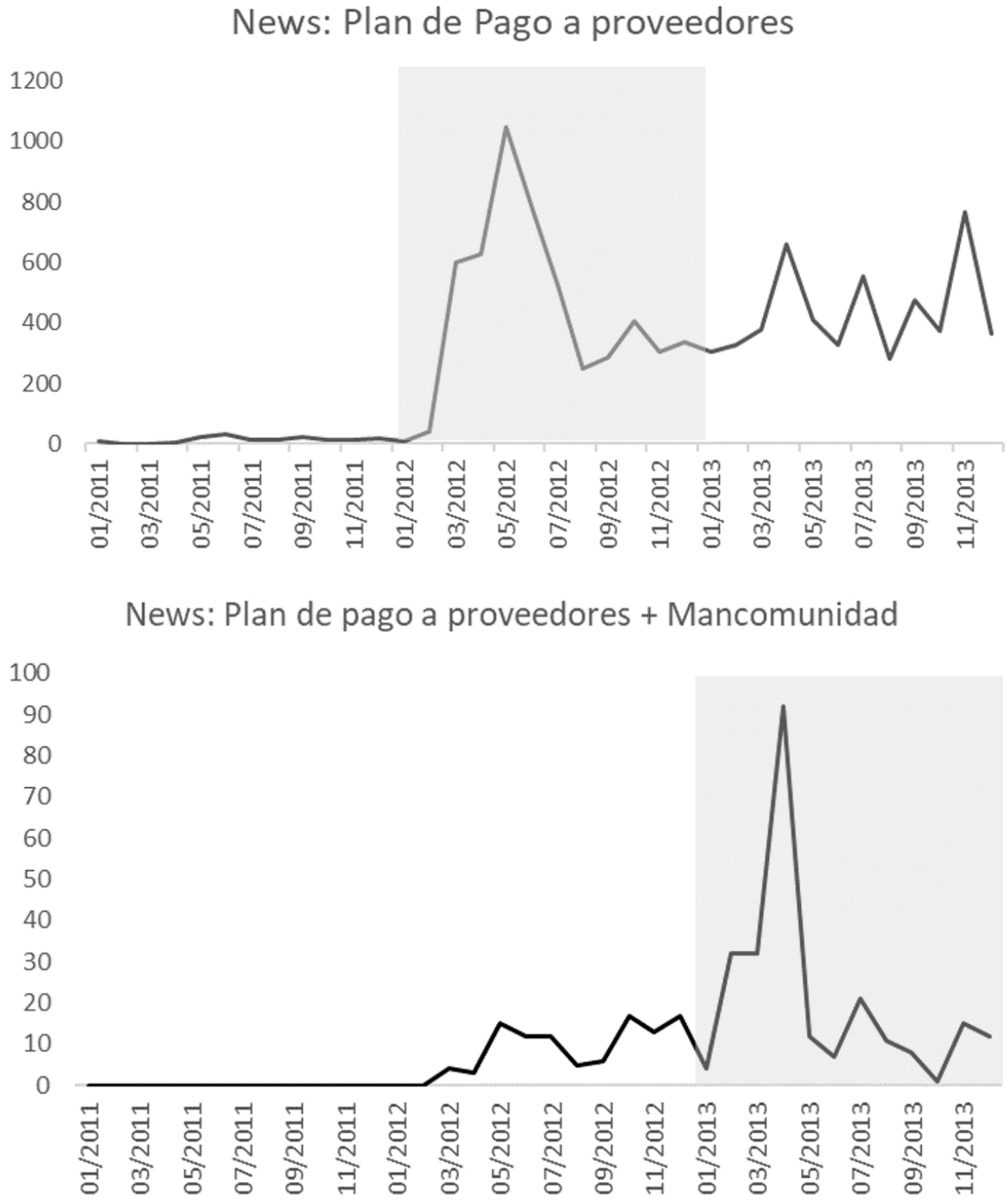


Figure 2: Analytical Framework

The figure represents the financial interrelations between the central government, local and regional governments, firms, and banks.

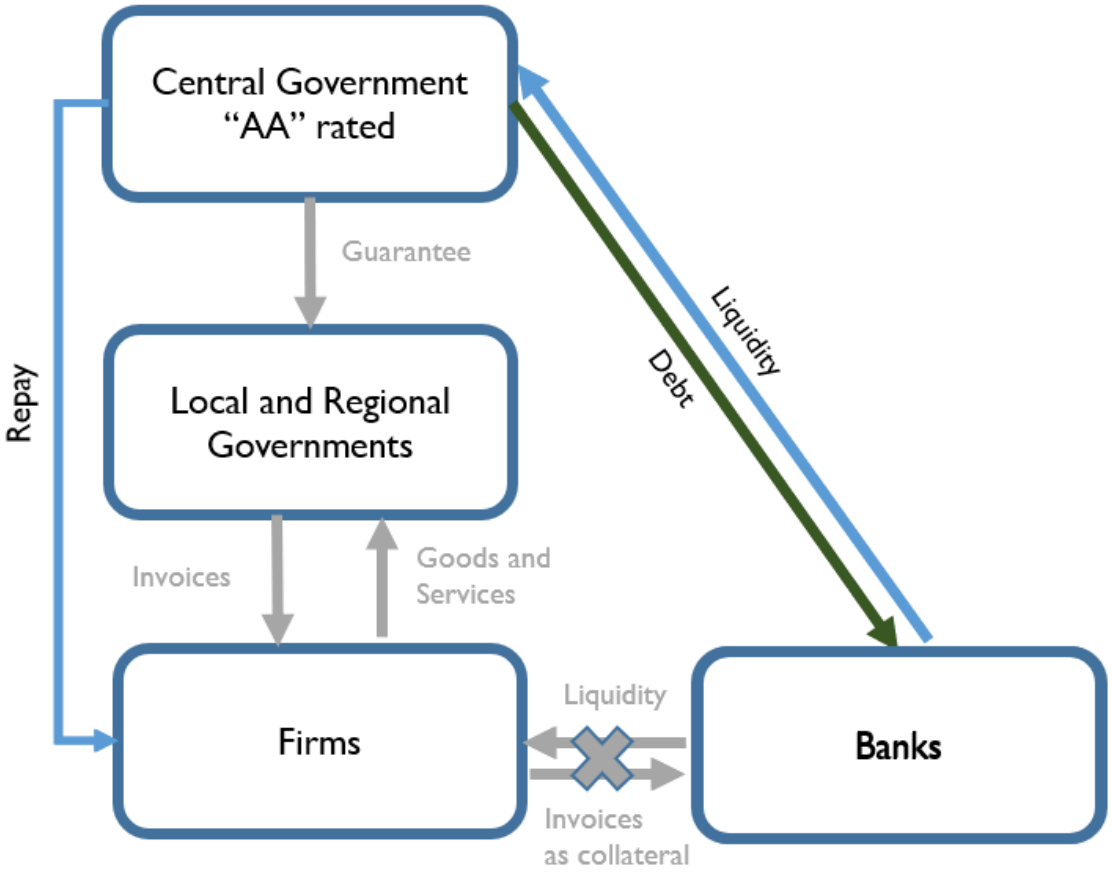
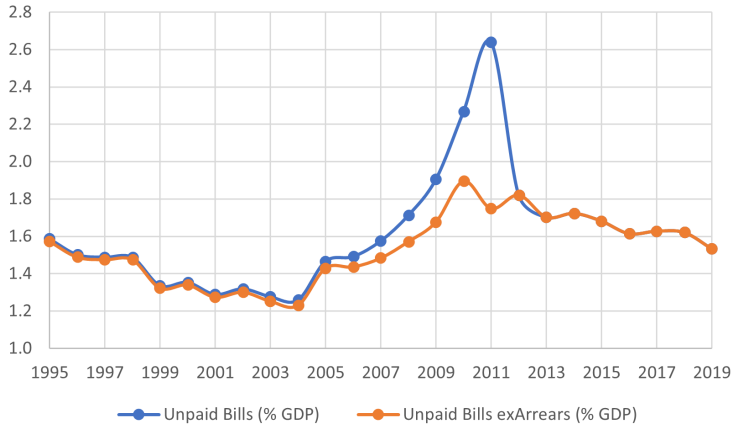


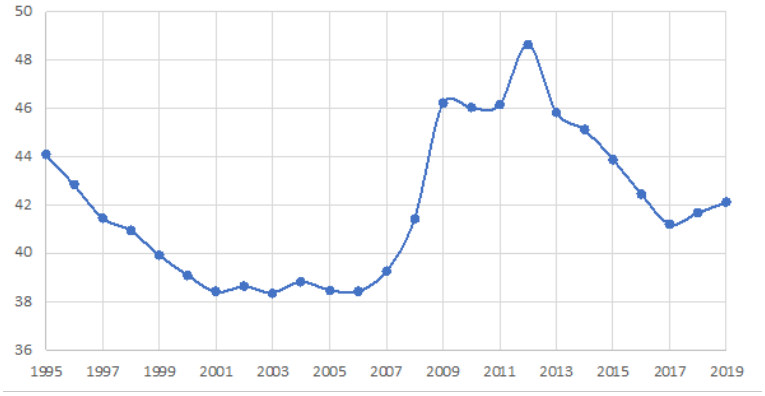
Figure 3: Spanish Municipalities

Panel A shows unpaid bills, with and without arrears, as a percentage of Gross Domestic Product (GDP) for Spanish municipalities. Panel B shows the total expenditure as a percentage of GDP for Spanish municipalities. Panel C shows the budget deficit as a percentage of GDP for Spanish municipalities. This information is obtained from the Bank of Spain. The sample covers the period 1995-2019.

Panel A: Unpaid Bills, with & without Arrears (% GDP)



Panel B: Total Expenditure (% GDP)



Panel C: Budget Deficit (% GDP)

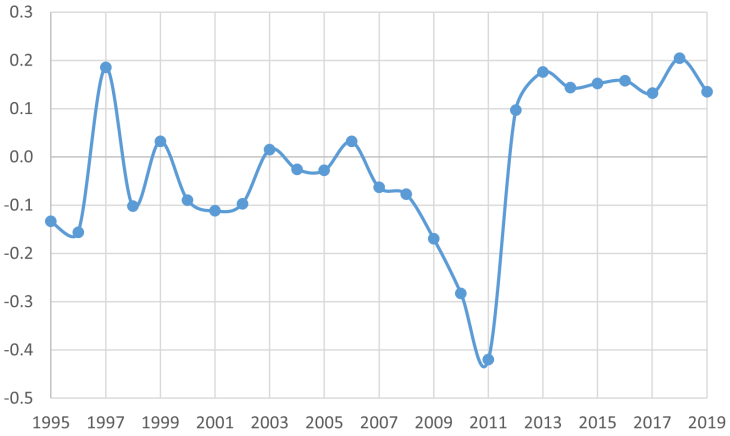
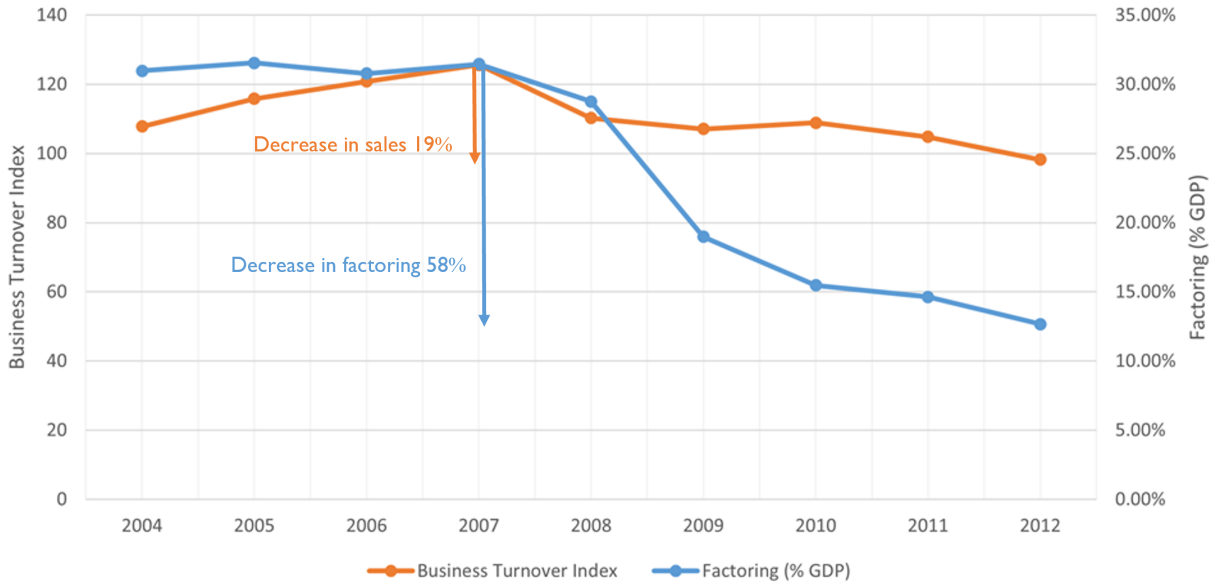


Figure 4: Factoring and Business Turnover Index

This graph shows the evolution of factoring of Spanish firms as a percentage of GDP and the Business Turnover Index for Spanish firms. This information is obtained from the Spanish Statistical Office. The period is 2004-2012.



Appendix for
"Government Arrears and Corporate Decisions: Lessons from a Natural Experiment"

Jose M. Abad, Vicente J. Bermejo, Vicente Cuñat and Rafael Zambrana

In this Appendix, we provide additional statistics and robustness tests for the analyses in the paper. Specifically:

- Figure IA.1: Mancomunidades and Municipalities
- Figure IA.2: Average Payment Delay (Days) per Sector, 2005-11
- Figure IA.3: Factoring of Arrears by Bank Type
- Table IA.1: Descriptive Statistics: 2009-2012
- Table IA.2: Summary Statistics: 2010 and 2009
- Table IA.3: Summary Statistics by Bank Heterogeneity: 2011
- Table IA.4: Effects on Corporate Decisions with Firm Fixed Effects

Figure IA.1: Mancomunidades and Municipalities

The figure shows the region of Andalucía in Spain and shows how municipalities in Spain can interact with suppliers as Municipalities that deal directly with suppliers or as Mancomunidades that join several municipalities to improve bargaining power. Source: add.

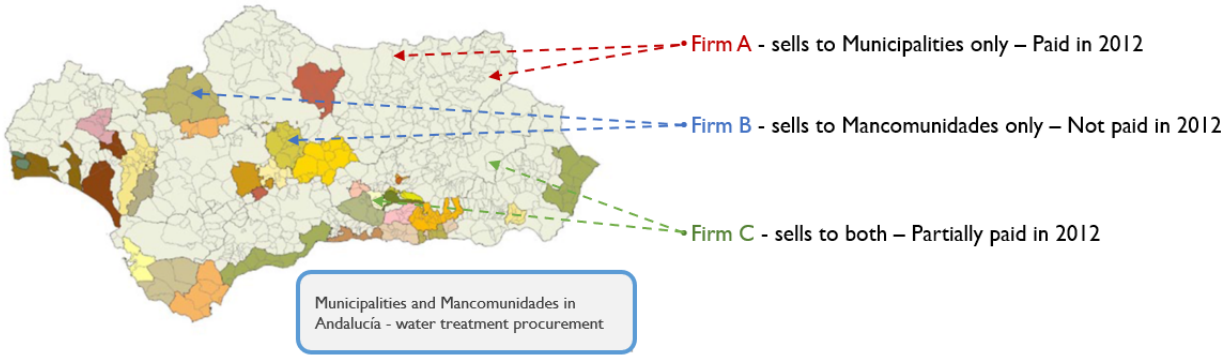


Figure IA.2: Average payment delay (days) per sector, 2005-11

The figure represents the average payment delay in days for the private sector companies (orange) and for the public sector (grey) for the years 2005, 2008, 2009, 2010, and 2011.

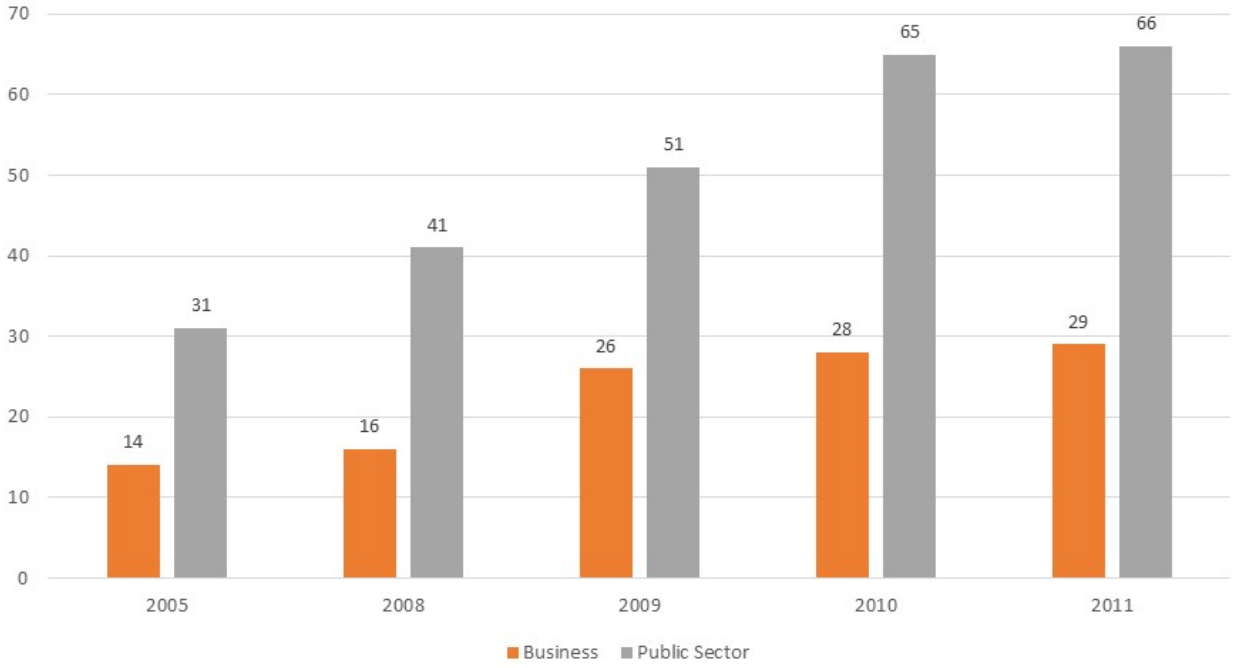


Figure IA.3: Factoring of Arrears by Bank Type

This graph shows the evolution of the factoring of arrears from the Spanish SPP by top banks and non-top banks. Top Banks include banks with a core equity tier 1 (CET 1) capital ratio above 8 in the EBA stress tests developed in 2011. Non-top banks include banks with a core equity tier 1 (CET 1) capital ratio below 7.4 in the EBA stress tests developed in 2011. We sum the amount of arrears that have been factored per year and bank and calculate a weighted average for top banks vs. non-top banks. We weigh each bank by their market share in 2011. We normalize the amounts in 2008. The period is 2003-2011.

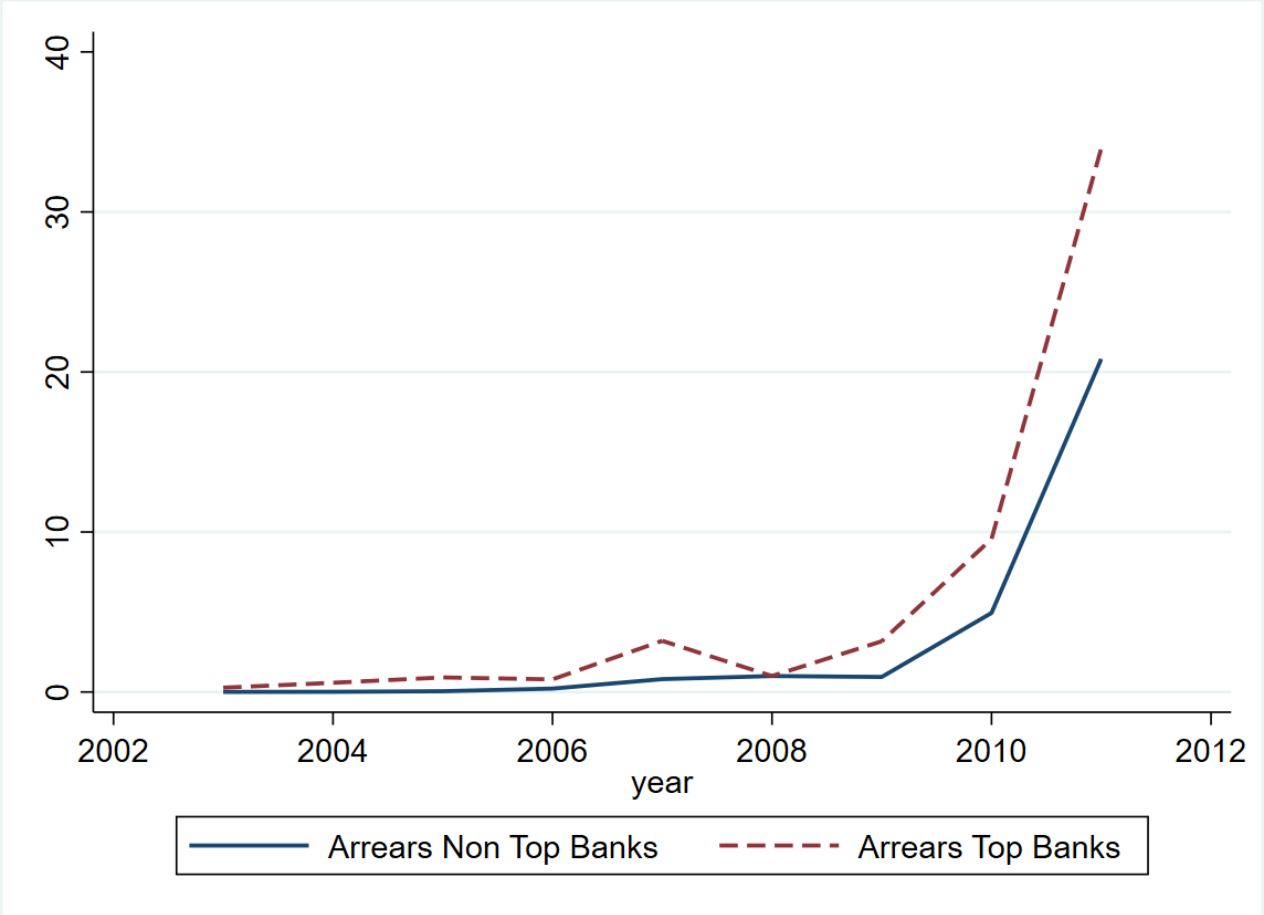


Table IA.1: Descriptive Statistics: 2009-2012

This table reports mean, standard deviation, 25th-percentile, median, 75th-percentile, and number of observations for several variables. The sample covers the period 2009-2012.

	Mean	Std.Deviation	Perc.25	Median	Perc.75	Observations
Repayment Shock	125.25	1232.91	1.69	7.30	32.48	203795
Total assets	5146.40	19227.50	383.33	890.00	2448.00	166244
Total liabilities	3255.29	13179.71	220.00	515.00	1392.00	166243
Investment	0.02	0.47	-0.12	-0.03	0.06	155881
Leverage growth	-0.02	0.44	-0.18	-0.02	0.13	157309
Liquidity growth	-0.05	1.08	-0.60	-0.04	0.47	142338
Cash	294.62	1000.47	14.78	53.00	179.00	155219
Leverage ratio	0.37	0.27	0.17	0.33	0.52	107068
Total debt	1528.13	4960.33	127.00	325.00	887.00	107068
Long-term debt	804.44	3082.30	41.00	148.00	438.00	123263
Short-term debt	564.50	2041.63	26.26	93.38	298.00	134762

Table IA.2: Summary Statistics: 2010 and 2009

This table reports the mean of firm characteristics for firms in Phase I and Phase II, the differences between the two groups of firms, and the p-values associated with those differences. Phase I include the sample of Spanish firms that worked for local government entities that received the repayment shock in year 2012, and Phase II includes firms that received the repayment shock in 2013. Firms from Phase I and Phase II are matched based on total assets, repayment shock, and region. Panel A compares firm characteristics in Phase I and Phase II in 2010. Panel B compares firm characteristics in Phase I and Phase II in 2009.

Panel A: 2010

	(1) Phase I	(2) Phase II	(3) Difference	(4) P-value
Repayment Shock	140.266	140.262	-0.003	(1.000)
Investment	0.029	0.041	0.012	(0.587)
Leverage growth	0.023	0.033	0.010	(0.698)
Liquidity growth	-0.057	-0.004	0.053	(0.367)
Total assets	5,180.161	5,180.271	0.111	(1.000)
Total liabilities	3,313.226	3,439.100	125.874	(0.829)
Cash	299.621	342.933	43.312	(0.710)
Leverage ratio	0.366	0.361	-0.005	(0.815)
Total debt	1,551.979	1,730.285	178.306	(0.629)
Long-term debt	813.712	781.347	-32.365	(0.850)
Short-term debt	578.011	701.646	123.635	(0.517)

Panel B: 2009

	(1) Phase I	(2) Phase II	(3) Difference	(4) P-value
Repayment Shock	139.862	139.859	-0.003	(1.000)
Investment	0.032	0.019	-0.014	(0.522)
Leverage growth	-0.004	-0.011	-0.007	(0.805)
Liquidity growth	0.062	-0.030	-0.092	(0.167)
Total assets	5,096.947	5,097.059	0.112	(1.000)
Total liabilities	3,277.663	3,215.841	-61.822	(0.903)
Cash	309.823	306.548	-3.275	(0.970)
Leverage ratio	0.364	0.353	-0.010	(0.626)
Total debt	1,506.419	1,578.632	72.213	(0.818)
Long-term debt	782.284	786.162	3.879	(0.981)
Short-term debt	574.788	658.844	84.056	(0.581)

Table IA.3: Summary Statistics by Bank Heterogeneity: 2011

This table reports average firm characteristics for firms in Phase I and Phase II, the differences between the two groups of firms, and the p-values associated with those differences. Phase I includes the sample of firms that worked for local government entities that received the repayment shock in year 2012, and Phase II includes firms that received the repayment shock in 2013. Firms from Phase I and Phase II are matched based on total assets, repayment shock, and region. Panel A compares firms in Phase I and Phase II for the sample of "Top Banks" (e.g., firms that in 2009 worked with at least one bank with a core equity tier 1 (CET 1) capital ratio above 7.4. Panel B compares firms in Phase I and Phase II for the sample of "Excluding Top Banks" (e.g., firms that in 2009 did not work with a top bank). Firm characteristics are all measured in year 2011.

Panel A: Excluding Top Banks

Variable	(1) Phase I	(2) Phase II	(3) Difference	(4) P-value
Repayment Shock	81.357	93.988	12.631	(0.869)
Investment	0.014	0.071	0.057	(0.181)
Leverage growth	-0.000	0.037	0.037	(0.500)
Liquidity growth	-0.140	-0.118	0.022	(0.800)
Total assets	2,627.548	2,816.406	188.858	(0.727)
Total liabilities	1,698.016	1,874.819	176.804	(0.714)
Cash	169.688	148.278	-21.410	(0.311)
Employment to assets	0.018	0.020	0.002	(0.630)
Leverage ratio	0.400	0.420	0.020	(0.450)
Total debt	905.104	980.392	75.288	(0.802)
Long-term debt	507.486	569.057	61.571	(0.721)
Short-term debt	314.369	305.689	-8.680	(0.920)

Panel B: Top Banks

Variable	(1) Phase I	(2) Phase II	(3) Difference	(4) P-value
Repayment Shock	285.558	292.644	7.086	(0.979)
Investment	-0.004	-0.017	-0.012	(0.746)
Leverage growth	-0.054	-0.109	-0.055	(0.333)
Liquidity growth	-0.175	-0.069	0.106	(0.412)
Total assets	11,036.557	12,359.460	1,322.904	(0.657)
Total liabilities	6,876.159	7,877.819	1,001.660	(0.626)
Cash	533.931	795.866	261.935	(0.460)
Leverage ratio	0.319	0.283	-0.037	(0.235)
Total debt	2,880.883	3,661.837	780.954	(0.523)
Long-term debt	1,482.203	1,706.474	224.271	(0.738)
Short-term debt	1,157.321	1,560.795	403.474	(0.390)

Table IA.4: Effects on Corporate Decisions with Firm Fixed Effects

This table presents estimates from panel matching regressions explaining corporate decisions for the period 2009 to 2012. Firms from Phase I and Phase II are matched based on total assets and repayment shock. The dependent variables are the first difference in the logarithm of fixed assets (Panel A: Investment), liabilities (Panel B: Leverage Growth), and cash (Panel C: Liquidity Growth). *Phase I* is a dummy that takes a value of 1 for firms that received repayment in Phase I (2012) and zero for firms that received repayment a year later in Phase II. *Post 2012* is an indicator that equals 1 for year 2012. We sort our sample into firms that received a repayment shock below 1% of their total assets, between 1% and 5%, between 5% and 10%, and above 10%. All regressions include year and firm fixed effects. Robust T-statistics are clustered at the firm level and shown in parentheses. ***, ** or * indicates that the coefficient is significant at the 1%, 5%, or 10% level, respectively.

	Investment			
	$< 1\%$	$1\% - 5\%$	$5\% - 10\%$	$> 10\%$
Phase I × Post 2010	0.006	0.003	-0.009	-0.078
	(0.20)	(0.12)	(-0.26)	(-1.51)
Phase I × Post 2011	-0.022	-0.024	-0.014	-0.006
	(-0.61)	(-0.65)	(-0.36)	(-0.16)
Phase I × Post 2012	0.040	0.053	0.062*	0.096***
	(1.17)	(1.53)	(1.72)	(2.68)
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	78135	40633	14764	17980
Adjusted R^2	0.078	0.072	0.051	0.058

	Leverage Growth			
	$< 1\%$	$1\% - 5\%$	$5\% - 10\%$	$> 10\%$
Phase I × Post 2010	0.011	-0.026	-0.043	-0.123*
	(0.28)	(-0.67)	(-0.98)	(-1.80)
Phase I × Post 2011	0.024	0.017	0.005	0.017
	(0.64)	(0.45)	(0.12)	(0.40)
Phase I × Post 2012	0.004	0.016	-0.007	-0.133***
	(0.11)	(0.42)	(-0.17)	(-2.74)
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	78624	41051	14937	18346
Adjusted R^2	0.042	0.033	0.011	0.026

	Liquidity Growth			
	$< 1\%$	$1\% - 5\%$	$5\% - 10\%$	$> 10\%$
Phase I × Post 2010	-0.110	-0.107	-0.138	-0.131
	(-1.26)	(-1.18)	(-1.33)	(-0.83)
Phase I × Post 2011	0.017	-0.018	-0.010	0.051
	(0.20)	(-0.21)	(-0.11)	(0.54)
Phase I × Post 2012	0.064	0.111	0.210**	0.462***
	(0.76)	(1.32)	(2.32)	(4.42)
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	70646	36788	13426	16435
Adjusted R^2	-0.156	-0.156	-0.170	-0.164