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

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Abstract

We study how firms respond to the repayment of accumulated arrears. We exploit as a natural experiment a large-scale financing plan of the Spanish government in 2012 that repaid accumulated arrears of local governments to their suppliers (about 3% of Spain's GDP). Our identification strategy relies on comparing firms included in the first phase of the program against firms that were accidentally left out and were repaid a year later. Repayment significantly increases corporate investment, reduces firm leverage, and increases cash reserves. Firms linked to banks with poor financial health respond by increasing investment and repaying suppliers. On the contrary, less financially constrained firms react by repaying debt. 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 had large real effects.

JEL classification: G31; G32; G38; E51
Keywords: arrears; liquidity; investment; procurement; trade credit

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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, in 2020, public procurement represents between 13% and 20% of the world GDP, while global expenditure in procurement was close to 9.5 trillion US dollars.[1] Central and local governments are important customers for many small local businesses, and they provide a more stable demand than other non-public customers, especially in recession periods (Goldman, 2020). However, governments can sometimes delay the repayment of procurement contracts, and arrears often accumulate. This was the case 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 implications of the supplier-government entity relationship, especially the impact of accumulated arrears repayment, remain underexplored. In developed economies, government agencies in distress may delay their payments, yet a default is typically unexpected, ensuring suppliers ultimately recoup their debts. Given this, in a frictionless financial market, firms should be able to borrow using their government arrears as collateral, implying the arrears' repayment speed wouldn't alter corporate actions. However, financial frictions may force firms to deviate from this unconstrained benchmark, and the delayed payment of government arrears can be costly to firms. The uncertainty in payment timelines that government arrears introduce can prompt firms to postpone investments and shy away from future procurement contracts. In this paper, we show that the accelerated payment of government arrears significantly increases corporate investment, reduces firm leverage, and increases cash reserves.

Therefore, the extent to which government arrears are costly to firms is a relevant empirical question closely linked to the presence of financing constraints and for which we have limited empirical evidence. A major challenge in examining this issue empirically arises from the fact that the payment terms for arrears are frequently endogenous and influenced

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

by the specific circumstances of both the buyer and the seller. Consequently, this creates 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.

This paper uses a program that accelerated the repayment of regional government arrears in Spain as a natural experiment that mimics this ideal field experiment. In this program, some firms received a large unexpected liquidity inflow and reduced accounts receivables, while other comparable firms did not. The effects of this program are useful to understand the effects of reducing government arrears and providing liquidity to firms. They are also informative about the cost that government arrears entail for firms and how firms had previously accommodated their strategies to minimize these costs according to their investment opportunities and financing constraints.

A large and unexpected liquidity injection was conducted by the Spanish government in 2012, affecting more than 60,000 firms. In the five years before this liquidity injection, regional governments had been accumulating arrears owed to suppliers. The volume of arrears totaled €30 billion (equivalent to 3% of Spanish GDP). This positive liquidity shock was largely unanticipated by firms by 2011.[2] An interesting element of this liquidity injection is that the program accidentally left out a group of firms from its initial repayment program (phase I). Suppliers that worked for groups of municipalities (*mancomunidades*) were overlooked by the authorities in the laws passed in 2012. These firms were then included in an amended plan (phase II) and received the payment of their arrears 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. The firms in Phase II are an ideal control group since they exhibit similar characteristics and selection margins to firms in Phase I and constitute a natural control group for Phase I firms during 2012. They allow us to control for the potential selection of firms that work for local governments that accumulated arrears. Importantly, phase II firms received the liquidity shock a year later for exogenous reasons. Thus, the unexpected nature

[2]The press discusses the liquidity injection for the first time in mid-January 2012, the law passed in March, and the payments were made between May and July. See Figure 2 for details on the news coverage.

of the program, jointly with having a natural exogenous control group, makes this liquidity injection an ideal setting to study the effects of the repayment of accumulated arrears.

Our results show that the repayment program affects corporate investment, leverage, and liquidity decisions for Phase I firms relative to Phase II firms in 2012. These are all indicative of real effects associated with the accelerated payment of government arrears. In particular, we find that an unexpected liquidity shock equivalent to more than 10% of a firm's assets leads firms to increase their investments by 14%, reduce their leverage by 10%, and increase their cash reserves by 44%. These corporate decisions are statistically and economically important, representing around 30%, 20%, and 40% of the standard deviation of firm investment, leverage, and liquidity growth of the firms in our sample, respectively.

Furthermore, our findings are also indicative of the previous actions that firms had taken to address the accumulation of arrears and late payments. In particular, our results suggest that firms with unpaid bills from their customers are likely to delay investment opportunities and borrow to continue in operation. The accumulation of liquidity by these firms after the shock is consistent with the presence of financial frictions and the risk and uncertainty about future payment delays from customers.

These results also hint at a heterogeneous response across firms and, in particular, that firms' responses should vary across the ability of firms to borrow during the accumulation of arrears. We, therefore, extend our analysis by conditioning our results 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 increased their investment and reduced their payables to suppliers after their liquidity injection. This suggests that financially constrained firms were delaying investment opportunities and delaying payments to suppliers. This indicates that, in contrast with the unconstrained benchmark, large government arrears can indeed be costly to firms facing financing constraints and can create spillover effects through the corporate supply chain. Conversely, financially unconstrained firms do not increase their investments after the

liquidity injection. They accumulate cash and reduce their liabilities. These firms were able to obtain financial debt by borrowing against their collateral or future cash flows and possibly against their accounts receivable with the local governments. Lastly, we observe that firms tend to increase their cash reserves, irrespective of their existing financing constraints. This result is consistent with the fact that, after facing an episode of delayed payments, firms decide to hold onto more cash to help cover future late payments and other short-term costs, even if these firms had the capacity to borrow against these unpaid bills.

Finally, we study how the repayment of accumulated arrears by public administrations affects procurement contracts. We show that when there are large arrears, firms decrease public contracting. However, when arrears are low, the effect can vanish. These effects disappear once arrears are paid.

Our study is linked to several strands of literature. First, it contributes to the literature on the financial aspects of procurement. The procurement channel has been shown to be useful in providing firms with a stable income during recessions (Goldman, 2020). Di Giovanni et al. (2022) expands on this idea to show the implications of firms using their procurement relationships as a form of collateral that eases their financing constraints. Similarly, (Gabriel, 2022) focuses on Portugal and shows that firms use procurement contracts as collateral to increase their amount of lending. Bonfim et al. (2021) shows a symmetric effect. When government spending was unexpectedly cut during the financial crises, procurement-prone firms found it harder to borrow. Barrot and Nanda (2020) focuses directly on the formal trade credit in procurement contracts and shows that having shorter formal payment periods can have a positive effect on firms. In particular, Barrot and Nanda (2020) find a positive effect on employment when the US government accelerated payments to business contractors but only on those labor markets that were not too tight. Relatedly Checherita-Westphal et al. (2016) show that increased delays in some European governments' payments can affect the liquidity and the profits of the private sector. Lee (2021) shows that procurement-awarded firms grow more, and this is especially true for financially constrained firms. Relative to Barrot and Nanda (2020) and Checherita-Westphal et al. (2016), we focus on government

arrears and not on the formal trade credit terms of procurement. Our natural experiment is also based on a large one-off reduction of arrears rather than a smaller but more persistent one. We also place emphasis on the interaction of the late payment of arrears with financing constraints.

Second, we contribute to the literature on the different stimulus policies to channel liquidity to the corporate sector (Bach, 2014; Banerjee and Duflo, 2014). The impact of any directed policy is typically difficult to evaluate, primarily because of potential selection biases. In our natural experiment, the government performs an unorthodox form of fiscal policy in which it borrows from the financial sector to accelerate the repayment of accumulated arrears. Despite the fact that government liabilities remain unchanged with this policy, it has real effects. In particular, for financially constrained firms.

Finally, we contribute to several streams of the trade credit literature. We show the potential costs for suppliers to finance a large buyer via trade credit (Murfin and Hjorge, 2015; Klapper et al., 2012). We also contribute to the understanding of the costs of late payment (i.e., overdue credits beyond their stated maturity) and its interaction with financing constraints. While the literature has long documented the existence of late payment (Petersen and Rajan, 1997), the theoretical literature on late payment focuses on its role as insurance for the buyers (Cuñat, 2007; Wilner, 2001), which is unlikely to be relevant in the case of public debt. Moreover, the empirical literature on late payment is, so far, very limited. Implicitly, we also contribute to the very scarce literature on trade credit factoring by implicitly showing the inability of firms to discount government arrears even when the creditworthiness of the government is good.[3]

The rest of the paper is organized as follows. In Section 2, we provide an analytical framework and background information on the institutional setting in which the shock takes place. Section 3 describes the data used for the analysis and the construction of the main variables. The empirical strategy and results are shown in Section 4. Section 5 discusses how financing frictions may affect our results. Section 6 discusses the effects of late payment by

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

public entities on procurement contracts, and Section 7 concludes.

2 Analytical framework

This paper aims to understand the real effects of delayed payment in procurement by examining how firms respond to accelerated repayment of accumulated arrears. In this section, we provide a framework on how we approach this question and how it links to the institutional setting of our data and the natural experiment that we use for identification purposes.

2.1 Procurement, late payment, and financing constraints

In the absence of financing constraints, late payments in procurement contracts shouldn't significantly impact firms as long as the payment of the procurement contracts is eventually guaranteed. Firms can borrow against the future cash flows of their procurement contracts and neutralize the impact of late payments. Firms can use any form of borrowing to accommodate late payment, but, in particular, they can use trade credit itself as a form of explicit collateral or the commercial relationship with the public administration as a form of implicit collateral. Therefore, any real effects stemming from late payment or from the resolution of a late payment situation hinge on the inability of firms to borrow in general, including not being able to borrow against their trade credit invoices.

In the case of Spain, municipal and regional authorities' procurement trade credit contracts are explicitly backed by the central government. So one would expect that procurement invoices would mechanically produce enough collateral to finance any late payment. We show empirically that this is not the case.

In order to do so, we need an empirical setting in which several elements concur. i) an accumulation of procurement arrears, ii) a policy that repays these arrears unexpectedly, iii) a group of comparable treatment and control firms. Figure 1 summarizes the setting of our paper and our estimation strategy. We describe each of these three elements in the following

three subsections.

2.2 Procurement arrears, and the financial crisis in Spain

The Spanish economy suffered a severe credit crunch that originated from the financial crisis that burst in 2008 (Bentolila et al. 2013; Jimenez et al. 2014). The financial crisis had a substantive impact on the Spanish 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 funding problems in the capital markets, just like local banks, and they also delayed payments to suppliers. [4] In Panel A of Figure 3, we show the evolution of municipal and regional trade credit and its arrears. There is a clear increase in the amount of trade credit used (orange line). More importantly, there is a marked increase in the use of late payment (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) happens in 2011, just before the government intervention in 2012, which we describe in the next section.[5] At the same time, municipalities increased total expenditure, and the budget deficit was exacerbated (see Panels B and C of Figure 3). As of December 2011, the result was that the commercial debt in arrears accumulated by regional and local governments amounted almost to €30 bn (almost 3% of GDP).

Simultaneously, the financial crisis created a contraction of the factoring market. The factoring market allows firms to borrow by getting advance payment of invoices at some discount. The discount implicitly determines the interest on the loan, and the invoices act as a form of collateral. Figure 4 compares the evolution of sales (turnover index) with the evolution of factoring loans. While sales decreased by between 2007 and 2012 by 19%, factoring loans as a fraction of GDP is decreasing by 58%. Note that, during this period, GDP is decreasing,

[4]The increase in trade credit maturities was generalized during this period but more pronounced in the public sector. In Figure IA.2 in the Appendix, we show the evolution of delayed payment days between the private and the public sector.

[5]Just to get a sense of the severity of late payment by 2011, 35% of total municipal outstanding trade credit is due by more than 12 months, 16% by more than 24 months, and 9% by more than 36 months.

and the prevalence and maturity of trade credit are increasing, so the fraction of invoices that are being factored is shrinking even further.

While the arrears of public invoices mitigated the financial constraints of regional and local governments, it created a liquidity problem for the supplier firms that interacted with their financing constraints.

2.3 An unconventional fiscal stimulus

The Spanish central government approved the *Plan de Pago a Proveedores* (Supplier Payment Program) to alleviate liquidity problems faced by suppliers of regional and local governments. The program involved the creation of a new State-owned vehicle, FFPS (Fund for Financing Payments to Suppliers), and was approved through two laws passed in February and March 2012. The FFPS made payments directly to suppliers of regional and local governments, converting their commercial debt into financial debt held by the FFPS. The first announcement in the press related to the FFPS appeared in mid-January 2012, and the liquidity injection occurred between May and July 2012, with the ICO injecting €27.3 bn into the real economy.

Funding for regional and local governments was guaranteed through the retention of their share of state tax receipts. The funding costs for these governments were the Spanish Treasury's funding cost plus a maximum margin of 145 basis points, which were favorable conditions compared to what they could obtain in the capital markets. To prevent moral hazard, these governments were required to submit a fiscal adjustment program to the central government. As shown in Panel C of Figure 3, the financial situation of municipalities deteriorated from 2008 to 2011 and improved after the central government intervention in 2012.

To finance the program, the FFPS gathered funds from a syndicated loan worth €30 bn, with the option to go up to €35 bn, granted by a pool of most of the Spanish banks. Given the State-owned nature of the FFPS, the loan was guaranteed by the State, making it attractive for participating banks. However, the liabilities of the FFPS became part of the

central government debt.

It is important to note that this is an unconventional form of fiscal policy. As reflected in Figure 1, all the different agents substitute an asset for an asset or a liability for another one. The FFPS did not incur additional liabilities for the central government. Instead, the government borrowed directly from banks what it needed to pay local governments to repay their debts. This allowed local governments to be released from their debts with suppliers while acquiring an implicit debt with the central government. Firms substitute an asset (invoices) with another one (cash). However, the policy provided firms with a way to bypass their inability to borrow via factoring. While the implicit guarantee of the central government may not have been enough for firms to factor their arrears, the explicit borrowing of the central government provided liquidity to firms.

2.4 The natural experiment

We use the FFPS as an 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 (that we label Phase I)

In Spain, some municipalities may channel some or all of their purchases through *mancomunidades*. These are legal entities that pool several municipalities for the purpose of procurement, aiming 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 initial laws of the repayment program accidentally forgot to mention that debts with mancomunidades were included in the program, and thus, their debts were not paid in 2012.[6]

In February 2013, another law was ratified, resulting in a new round (that we label phase II) of the FFPS. It was approved to pay the arrears to the suppliers of *mancomunidades*. Again, ICO transferred 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

[6]For further details, see FEMP, (2012).

this new phase was a matter of an error in the laws of the first phase (they did not include *mancomunidades*), which is unrelated to the characteristics of the suppliers. Figure IA.1 shows an example of water treatment procurement in the region of Andalucia. Some municipalities contract their water treatment directly, while others do so via mancomunidades. There are no major selection margins that select municipalities into using mancomunidades for their procurement. More importantly, the firms that supply mancomunidades and municipalities are very similar, or indeed, it is often the case that firms supply both, municipalities and mancomunidades. For our main analysis, we use firms that only appear in Phase I as our treated group (e.g., Firm A in the figure) and firms that only participate in Phase II as our control group (e.g., Firm B in the figure).[7] Both groups 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 affects treated firms in 2012 (phase I firms) but does not affect firms in 2012, a quasi-randomly selected group of firms with similar characteristics, including their exposure to local government arrears (phase II firms).

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 and sources

The main data for our analysis is provided by ICO. It includes anonymous firm information at an annual frequency 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 its amount and the dates on which they were paid.

The data is matched by ICO to exhaustive firm-level financial data from the Iberian

[7]Note that we drop the firms that appear both in phase I and phase II (e.g., Firm C in Figure IA.1).

Balance Sheet Analysis System (SABI).[8]

For Phase I, matched firms account for 48.2% of all suppliers (64,879 out of 134,568) and almost 70% of the funds injected (€19 bn out of €27.3 bn). For Phase II, the ICO data set includes 1,848 firms, of which 1,201 are firms that already received funds in Phase I, and 647 are firms that only receive funds in Phase II.

We obtain data on aggregate amounts of arrears and accounting information of municipalities and regions from the Spanish Ministry of Economy database. We obtain the dates of each unpaid invoice from the Spanish Tax Agency. We also use data from Opentender, a procurement portal available in more than 30 countries. This database contains public procurement information on contractors, public buyer identifiers, and contract descriptions, including prices and amounts. Data on the business turnover index and factoring (unpaid bills of exchange) come from the Spanish Statistical Office.

Finally, we measure the media coverage of Phase I and Phase II from Factiva, which covers the universe of news in Spain. [9] We use it to explore the coverage of the Supplier Payment Program of Phase I and Phase II in the media.

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. The average liquidity shock (i.e., repayment) for firms in phase I is €142,360, whilst the average liquidity shock for firms in phase II is €102,105. To measure the liquidity shock for each firm, we aggregate all the unpaid invoices with different local and regional governments. This is the total amount of arrears that each firm has. We also have information on seized amounts by the central government.[10] For each firm, we measure the liquidity shock as the total amount of arrears minus the total amount

[8]SABI data is provided by INFORMA D&B in collaboration with Bureau Van Dijk, and 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.

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

[10]Seized amounts are due to debts that firms had with the central government. These seized amounts are deducted by ICO from the total amount of arrears that are paid to the firm.

seized by the government. This results in the effective amount of euros transferred from ICO to the firm. For firms in Phase I, the average total assets are above €5 mm, and average total liabilities are above €3 mm. For firms in Phase II, the average total assets are above €6.5 mm, and average total liabilities are above €4.5 mm. As for cash, firms in Phase I and Phase II have about €280,000 and €250,000, respectively.[11]

On average, we do not observe any significant differences when comparing averages of variables across firms in Phase I and firms in Phase II. This suggests that these two groups of firms are comparable. Nevertheless, in Panel B, we match firms in Phase II to firms in Phase I using entropy matching (Hainmueller, 2012) on the first moment of the liquidity shock, assets, and region. After matching, we observe that averages of firm characteristics become closer, and there are still no significant differences between the two groups.[12]

4 The effect of accelerated repayments on corporate decisions

In this section, 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. This unique setting is discussed

[11] In Table IA.1 of the Appendix we show aggregate descriptive statistics for our whole sample.

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

in detail in Section 2.4. Due to legislative oversights in 2012, the arrears of *mancomunidades* (groups of municipalities) were paid a year later.

In Section 3.2, we have shown that firms that work for *mancomunidades* closely resemble those that work for municipalities. In fact, numerous firms received payments in both phases since they had arrears with individual municipalities and *mancomunidades*. Therefore, firms in this second phase can be used as a control group to analyze the impact of accelerated repayment of arrears on corporate decisions. Firms involved in the first phase will be our treated group (they experienced a liquidity injection in mid-2012), and those participating in the second phase will be our control group (they had a similar liquidity boost in mid-2013). This approach helps us control for potential endogeneity stemming from the specifics of companies with outstanding arrears with the public sector. As per Table 1, both groups appear fairly similar across all observable dimensions. Our underlying assumption is that the only difference between firms in Phase I and Phase II is that the former received the repayment in mid-2012, while the latter received the liquidity injection a year later, in August 2013. Some of our specifications use entropy matching to improve the resemblance 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 the first difference of the logarithm of fixed assets, total liabilities, and cash, for firm j, in year t; $PhaseI_{\{j \in Ph1\}}$ is a dummy variable that takes value 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 value 0 for each year prior to the index and value 1 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 (i.e., those that receive the liquidity shock in 2012) versus firms in phase II (i.e., those that receive the liquidity shock in 2013). 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 on investment of being paid a year later, we should observe a differential effect of the liquidity shock for the $Phase\ I$ x $PostYear_{2012}$ coefficient.

Next, we exploit the heterogeneity in the treatment, that is, in the amount of arrears that were repaid. In particular, we sort the firms in Phase I into four different groups according to the amount of liquidity over total assets they receive: below 1%, between 1% and 5%, between 5% and 10%, and above 10%. We predict the strongest response from firms experiencing the largest liquidity shock, that is, those that accumulated more arrears before the repayment program. At the same time, we also expect that firms that are part of the repayment program but have a lower accumulation of public arrears will have a more muted 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, based on total assets and liquidity shock. This matching approach allows us to directly compare firms that receive a liquidity shock in Phase I against firms of a similar size that are expecting a similar liquidity shock a year later in Phase II. As in the previous specification, all the results presented in this section include *year*, *industry*, and *region* fixed effects, and standard errors are 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. We exploit the plan's random repayment schedule and proceed based on the structure outlined in Equation 1.

Table 2 reports the main effects of this liquidity shock on investment, leverage growth, and liquidity growth. Year-fixed effects are included in columns 1, 3, and 5, whereas columns 2, 4, and 6 incorporate year, industry, and region fixed effects. We cluster the standard errors at the firm level. Including *year* fixed effects as the first step in the

regression analysis is important because it helps to control for time-specific shocks and trends that may affect all firms equally within a particular year. This is especially relevant in our setting since our period of analysis coincides with the great recession. Subsequently, incorporating *industry* and *region* fixed effects is important to control for any unobserved time-invariant heterogeneity across different industries and regions that may systematically affect firms' corporate decisions. Additionally, clustering the standard errors by firm is necessary to account for potential within-firm correlation or heteroscedasticity.

The baseline results shown in Panel A suggest that firms from Phase I and Phase II exhibit a similar pattern in terms of investment, leverage, and liquidity decisions for the period of 2009-2011. We do observe weakly significant results for investment and liquidity growth in 2012. To further reduce any potential differences between the treatment and control groups before 2012, we also implement an entropy-balancing matching approach. This method re-weights the two groups based on the size of the liquidity shock and total assets in 2011. In Panel B of Table 2, we show that the results remain quite similar after applying entropy matching, corroborating the findings from Table 1 that both groups are closely comparable.

These tests aggregate all firms with arrears and provide an "overall effect" of repayment. However, it is likely that the amount of the repayment will influence the intensity of the firms' response. The current approach gives equal weight to firms that receive minor liquidity injections and those that receive larger ones. The wide diversity in the size of the repayment shock across firms might contribute to the mildly significant outcomes, as the amount of arrears varies greatly from company to company. Thus, we expect that for firms with small arrears, the timing of repayment in 2012 or 2013 shouldn't significantly affect their business decisions.

To account for the heterogeneity in the size of the liquidity 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 total assets they receive: below 1%, between 1% and 5%, between 5% and 10%, and above 10%. First, we assess firms' responses in terms of investment decisions. Whether firms with larger amounts of arrears will react to early repayment by

increasing their investments is not clear. Firms that accumulate large amounts of unpaid bills might obtain short-term debt by either obtaining trade credit from suppliers or borrowing against their accounts receivables. However, in the presence of financial frictions, financially constrained firms might be forced to delay investment opportunities until they recoup their receivables. The results presented in Table 3 are consistent with the hypothesis that firms exposed to late payment might have forgone investment opportunities and react by increasing their investments upon receiving the liquidity shock. We find a clear, monotonic relationship between the magnitude of the liquidity shock and the firm's investment response. Firms experiencing the most substantial shocks – those above 10% of their total assets – show a significant 14% increase in their investments compared to their Phase II counterparts. Given the results presented in Table IA.1 in the Appendix about the distribution of the firm variables used in our study, 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 trend aligns well with our theoretical expectations, reinforcing the idea that an accelerated repayment of arrears can indeed spur investment activity, particularly for firms experiencing large liquidity shocks. As discussed in Section 2.2, firms aiming to make investments should be able to borrow from banks using public arrears as collateral. However, financial constraints could hinder this process. These constraints could arise from imperfect financial markets, which could deter banks from lending even with fairly safe collateral. We further explore this channel in Section 5.

Next, we study the impact of the liquidity shock on corporate leverage decisions. Table 4 shows that firms reduce their liabilities upon receiving a liquidity shock equivalent to at least 10% of their total assets. Treated firms reduced their leverage growth by about 10% relative to firms in Phase II. In economic terms, this reduction represents about 22% (0.10/0.44=0.22) 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 prominent for firms that have substantial

arrears, as they would receive a larger liquidity shock, enabling them to pay down a more significant portion of their liabilities.

Lastly, we study the impact on cash accumulation and present the results in Table 5. We find a positive, monotonic relationship between the size of the liquidity injection and the increase in cash holdings. Firms experiencing the most substantial shocks – again, those above 10% of their total assets – hoard about 44.4% more cash compared to Phase II firms. This increase is economically meaningful. Given the distribution of changes in liquidity by firms in our sample, the increase in liquidity 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 larger liquidity shock, as they would have a greater influx of funds to retain. This result validates our experimental framework and suggests that firms are using the liquidity shock not just for investments and to decrease liabilities, 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 hoard cash as a buffer against financial distress and gain more flexibility in their operational and strategic decisions in the future.

The key point to emphasize from these findings is that the magnitude of the repayment significantly influences the firm's responses. The effect of the liquidity shock becomes more pronounced as the repayment's size increases, particularly when it reaches 10% of the firm's total assets. Thus, the results underline the importance of sorting the sample into different levels of repayment magnitudes when evaluating the effect of accelerated payment of arrears on firm decisions. We follow this approach for all the remaining tests in the paper.

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-Diferences (DiD) setting. Thus, rather than compare firms in Phase I against firms in Phase II along different years in our sample, we compare the corporate decisions of firms in Phase I and Phase II in the period before (2009-2011) relative to the period after (2012) the liquidity 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 1, 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 are also including *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 are very similar to those described in Table 3. In particular, as the liquidity shock size 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 received a liquidity shock greater than 10% of their total assets, increasing investments by approximately 7%. The t-statistic of 2.47 indicates this result is statistically significant at the 5% level. Panel B evaluates the effect of liquidity shocks on leverage decisions. Here, we see that only firms receiving a large liquidity shock (greater than 10% of their total assets) show a significant reduction of 16% 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. Panel C investigates the relationship between the amount of the repayment shock and liquidity decisions. Here, we see a significant effect for firms receiving liquidity shocks larger than 5% of their total assets. Again, the effect is strongest for firms with a liquidity shock exceeding 10% of their assets. In economic terms, these firms increased their cash holdings by more than 45%.

Taken together, these results provide strong evidence that larger liquidity shocks lead to more significant changes in corporate decisions. Firms experiencing the most substantial shocks are more likely to boost investments, decrease their liabilities, and hoard larger cash holdings. [13]

[13]Table **??** in the Appendix analyzes the effect of accelerated repayment on other accounting variables. Almost by construction, we find that receivables drop monotonically after 2012 following the repayment of

To add an additional layer of 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, reweighting a combination of units from the control group. This approach can be particularly advantageous when the treatment effect is heterogeneous or when the parallel trends assumption may not hold strictly. This procedure is often applied when there is a limited number of treated units, which is the case for the firms in Phase II. Thus, in this analysis, the treatment group is the firms in Phase II, 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, and thus they capture any possible trends. The difference between the observed outcomes post-adoption and the predicted outcomes are the estimated treatment effects from the method in Abadie (2021). Results are shown in Table 7 and are similar to those in Table 6. We find that firms in Phase II significantly reduce investment (5%), increase leverage (9.4%), and deplete cash (28.4%) relative to firms in Phase I.

By confirming that the results hold under the SDiD approach, we can be more confident 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

public arrears. We also show that the decrease in liabilities observed in Table 6 is driven by short-term liabilities since we only find significance in current liabilities and not in non-current liabilities. Within current liabilities, we observe a strong decrease in short-term financial debt and payables in the group of firms that received the higher shock.

for financially constrained firms after the governmental cash injection. However, as observed in Figure 4, factoring became less of an option during this period due to the severe Spanish credit crunch. In 2007, factoring was above 30% of Spanish GDP, but after the financial crisis burst, it decreased steadily to almost one-third of its previous volume. This decrease was much more severe than, for example, the decrease in the Spanish business turnover index.

We analyze whether the effect of the liquidity shock on several corporate outcomes depends on how financially constrained the firms are. As a measure of financing constraints, we analyze the banking relations of the firms. In particular, we classify firms into "Top Banks" if they work with at least one top bank. We define top banks as those that have a core equity tier 1 (CET 1) capital ratio above 8% (Basel Accord establishes a capital ratio of 8%) in the EBA stress tests developed in 2011.[14] Bank stress tests were widely conducted after the global financial crisis. They are an indicator of a bank's vulnerability and capacity to lend since banks with low capital ratios were asked to build up or preserve capital. Banking relations were particularly important during our period of analysis (2008-2012) since Spain experienced a severe credit crunch after the burst of the financial crisis (Bentolila et al. (2013), Jimenez et al. (2014)). In Figure IA.3 in the Appendix, we show the average amount of factoring of Spanish SPP arrears by top banks vs. non-top banks. We observe 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 1 and split firms into "Top Banks" or "Excluding Top Banks" depending on whether, in 2009, they worked with at least one top bank. Moreover, following our findings in Section 4.2, we split firms according to the size of the liquidity injection received. In particular, we analyze firms that received a liquidity shock below 1% of their total assets and firms that received a liquidity shock above 10% of their total assets. Firms in the low liquidity group act as an additional control group for our analyses. Firms in the high liquidity group receive a larger shock and are the most "treated" firms, so consistent

[14]See the Presentation of the 2011 EBA stress tests results for Spanish Institutions in https://www.bde.es/bde/es/secciones/prensa/infointeres/evaluacion-de-la/actuaciones-de-l/pruebas-de-resis/index2011.html

with our results of Section 4.2, they are expected to react more to the shock. By providing information on these two groups, we can also extract conclusions on whether the reaction of firms to late payment depends on the size of the accumulated arrears.

In Panel A of Table 8, we show that only firms that do not operate with top banks significantly increase investment after the liquidity injection of 2012. This suggests that firms operating with top banks are not financially constrained and do not curtail investment, despite the accumulation of arrears. In particular, firms that do not operate with a top bank and receive a large liquidity shock devote 11% of the cash transfers to increase investment in 2012.

In Panel B of Table 8, we observe that firms that have at least a top bank significantly reduce liabilities once they receive the liquidity shock in 2012. This shows that firms operating with top banks that receive a large liquidity shock devote more than 19% of these funds to repay debt. However, for firms that do not operate with top banks, the amount devoted to repaying debt is smaller (11% of the funds).

In Panel C of Table 8, we observe that both groups of firms significantly hoard cash after receiving the liquidity injection. Firms with top banks increase cash by 47%, and firms without top banks increase cash by 43%. Firms without top banks may be willing to hoard cash even if they are more financially constrained since higher cash balances make them safer. Harford et al. (2014) show that firms mitigate higher refinancing risk by increasing their cash holdings and saving cash from cash flows. It is clear that firms significantly hoard cash, independently of whether they work with top banks or not. This may be due to the time period in which they receive the liquidity. In 2012, Spain was still in the middle of a crisis, and investment opportunities were probably limited. 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 higher investment opportunities.

In Table 9 we further analyze the impact of late payment on firms' liabilities. In Panel A we show that firms with top banks that had many arrears significantly reduce financial debt.

This suggests that these firms were able to increase their debt levels temporarily to offset the financing needs originated from the accumulation of arrears. However, in column 4 of Panel A we show that firms that did not operate with top banks could not increase their debt levels. In column 4 of Panel B we show that these firms (financially constrained firms) did significantly increase their accounts payable. These results suggest that financially constrained firms had to delay payments to suppliers because financial debt was unavailable to them. These results speak to how late payment of local governments may disseminate through the supply chain, particularly for financially constrained firms.[15]

In sum, our findings suggest that firms not borrowing from top banks (e.g., firms that are arguably more financially constrained) significantly increased investment upon the liquidity injection, implying that their financial constraints were eased. Conversely, companies borrowing from top-tier banks, which are less financially constrained, don't increase investment significantly in the period after the repayment. Instead, these less financially constrained firms allocate a larger portion of the liquidity injection to lower their outstanding liabilities. These results suggest that firms were able to obtain financial debt by borrowing against their accounts receivable with the local governments. Lastly, we find that both groups of companies significantly increased their cash holdings, suggesting that, after facing an episode of delayed payment, firms decide to hold more cash to help cover future late payments and other short-term costs, even if these firms had the capacity to borrow against these unpaid bills.

6 Public procurement contracts

In this section, we delve into the examination of how delayed payments by public administrations can influence procurement contracting. Focusing specifically on firms that enter into contracts with public administrations, our aim is to discern whether there's a distinct pattern in the public contracting behavior between firms that have unpaid bills and

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

those that do not. Public procurement contracts are of critical importance to both the firms and the public entities involved. For firms, these contracts 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 efficiently. Thus, the impact of late payments in this context is particularly pertinent.

In this section, we use data from Opentender to examine how delayed payments affect firms' public procurement decisions during the period 2009- 2012. Opentender is an online public procurement database that collects and provides information on government procurement activities. We aggregate the contract-level data into a firm-buyer-year level, where the buyer is a local government. We show the results in Table 10. In columns 1 and 2, the dependent variable takes a value of one if there is a new contract between a firm and a local government. Columns 3 and 4 explore a more continuous specification in which 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 a given year. The main explanatory variable is *Arrears*, a dummy that takes a value of one for firm-local government pairs where the local government has accumulated arrears owed to that firm, and zero otherwise. The control group is constituted of firms listed in Opentender without arrears with public administrations as of the end of 2011 (they are not in the FFPS).

We believe that the level of arrears will affect the contracting behavior of firms. Firms with few arrears are deemed not to respond to the late payment. Thus, we split the sample into firms in the lowest quartile of the liquidity shock and firms above it (below and above 1.5% of their total assets). We match these two samples of treated firms with arrears, with all the firms in Opentender without arrears, based on the buyer's municipality (the local government that is contracting with the firm) and the probability that the firm has a procurement contract in 2009. Effectively, we are comparing firms contracting with the same municipality and with the same probability of having a public procurement contract. This is relevant since Ferraz et al. (2015) show that procurement-awarded firms are more likely to win more future public auctions. To control for time-varying unobservable characteristics at the firm level, we include

year x firm fixed effects in all the specifications.

Results in column 1 suggest that the public procurement decisions of firms with fewer arrears by 2011 are not different from that of firms that do not have arrears in 2011. However, results in column 2 show that firms with large arrears in 2011 have a lower probability of contracting with the government in 2011 relative to firms that do not have arrears in 2011. In economic terms, we find that firms with arrears are about 18.6% less likely to sign a new contract with a public entity. This may imply that if the amount of delayed payments is large enough, firms do not contract with the government anymore. These results are corroborated when we analyze the amounts of contracts with public administrations. In column 4, firms with larger arrears in 2011 also have significantly lower amounts contracted with the government in 2011, whilst firms with fewer arrears in 2011 do not seem to be affected.

These findings provide key insights into the dynamics between firms and public procurement. Our results suggest that if public administrations accumulate substantial arrears, firms may become less inclined to obtain public procurement contracts. These relationships and their impacts on public procurement contracts deserve further attention, given their significant implications for both firms and public entities.

7 Conclusion

This paper studies the effect of the accelerated repayment of government arrears using the Spanish central government's large repayment plan in 2012 on firms with unpaid arrears from procurement contracts with local governments. This plan (the Plan de Pago a Proveedores – Supplier Payment Plan or SPP) was developed to aid firms suffering a severe credit crunch in a severe recessionary environment. Using a unique data set and a clean causal identification strategy, we find a positive and significant response of corporate investment to this unexpected governmental liquidity injection. This indicates that unorthodox stimulus policies can reactivate economic growth, especially for firms that work

with banks that may not provide sufficient credit. Indeed, we show that the impact of this policy is different across firms. Firms exposed to top banks do not seem to increase investment but instead use the liquidity received to repay debt and accumulate cash. On the other hand, firms working without top banks significantly increase investment and repay suppliers after the liquidity injection.

From a policy perspective, our results give important insight into how unorthodox fiscal policies that do not change overall public liabilities can be effective. They also show how the early repayment of arrears has heterogeneous effects across firms. While financially constrained firms increase investment, financially unconstrained firms repay debt and hoard cash.

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 forego investment opportunities. Implicitly, our research also sheds light on firms' inability to collateralize public arrears, thereby contributing to the sparse literature on financial factoring.

In conclusion, our findings underscore the influence of delayed payment of accumulated arrears by public administrations on procurement contracting. We unearth that firms burdened with substantial arrears tend to decrease their contracting with the public sector, a phenomenon predominantly observed among financially constrained firms. However, when arrears are minimal, this effect can reverse, and firms might actually increase their contracting. Future research should investigate how these findings might generalize to different contexts and periods beyond our setting.

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Table 1: Summary Statistics: 2011

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 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 measured in year 2011.

Panel A: Unmatched

	(1)	(2)	(3)	(4)
Variable	Phase I	Phase II	Difference	P-value
Liquidity Shock	142.360	102.105	-40.255	(0.460)
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)
Employment to assets	0.016	0.019	0.002	(0.359)
Leverage ratio	0.373	0.396	0.022	(0.197)
Total debt	1,554.632	2,323.752	769.120	(0.127)
Sales to assets	1.294	1.315	0.021	(0.749)
Sales growth	-0.006	0.036	0.042	(0.190)
ROE	7.345	13.836	6.491	(0.283)
Long-term debt	814.032	1,168.053	354.021	(0.178)
Short-term debt	578.430	792.305	213.875	(0.195)
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)
Observations	41,665	487	42,152	

Panel B: Matched

	(1)	(2)	(3)	(4)
Variable	Phase I	Phase II	Difference	P-value
Liquidity Shock	142.360	142.351	-0.009	(1.000)
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)
Employment to assets	0.016	0.017	0.001	(0.704)
Leverage ratio	0.373	0.381	0.008	(0.718)
Total debt	1,554.632	1,736.338	181.706	(0.656)
Sales to assets	1.294	1.329	0.035	(0.679)
Sales growth	-0.006	0.011	0.018	(0.610)
ROE	7.345	6.321	-1.025	(0.929)
Long-term debt	814.032	873.492	59.460	(0.786)
Short-term debt	578.430	629.969	51.539	(0.714)
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)
Observations	41,665	487	42,152	

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 liquidity in Phase I (2012) and zero for firms that received liquidity 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 liquidity 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 A: 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 from panel matching regressions explaining 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 liquidity 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 liquidity in Phase I (2012) and zero for firms that received liquidity 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 liquidity 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 from panel matching regressions explaining 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 liquidity 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 liquidity in Phase I (2012) and zero for firms that received liquidity 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 liquidity 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 from panel matching regressions explaining 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 liquidity 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 liquidity in Phase I (2012) and zero for firms that received liquidity 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 liquidity 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 a Diff-in-Diff 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 liquidity 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 liquidity in Phase I (2012) and zero for firms that received liquidity 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 liquidity 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 liquidity in Phase II (2013) and zero for firms that received liquidity 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 liquidity 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 from panel matching 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). Firms from Phase I and Phase II within the same bank type are matched based on total assets and the liquidity shock. *Phase I* is a dummy that takes a value of 1 for firms that received liquidity in Phase I (2012) and zero for firms that received liquidity 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 liquidity 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 8. 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: Decomposing Leverage: Bank Heterogeneity

This table presents estimates from panel matching regressions explaining 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 liquidity in Phase I (2012) and zero for firms that received liquidity 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 liquidity shock below 1% of their total assets, and above 10%. 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 8. 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 from panel matching regressions explaining firms' public procurement decisions for the period 2009 to 2012. In this analysis, the unit of observation is at the firm-buyer-year level, where buyer is a local government. 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. We sort our sample into firms that received a liquidity shock below 1.5% (bottom quartile) and above 1.5% of their total assets. All regressions include year x 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.

	New Contract		New Contract Price	
	$< 1.5\%$	$> 1.5\%$	$< 1.5\%$	$> 1.5\%$
Arrears × Post 2009	0.125	0.088	1.486	1.258
	(0.94)	(1.56)	(0.94)	(1.55)
Arrears × Post 2010	-0.000	0.117	0.019	1.644
	(-0.49)	(1.34)	(0.97)	(1.31)
Arrears × Post 2011	-0.125	-0.186**	-1.507	-2.615**
	(-0.94)	(-2.07)	(-0.94)	(-2.08)
Arrears × Post 2012	0.000	-0.100	-0.000	-1.103
	(0.02)	(-0.91)	(-0.04)	(-0.73)
Year x Firm FE	Yes	Yes	Yes	Yes
Observations	16692	17408	16692	17408
Adjusted R^2	0.785	0.444	0.819	0.424

Figure 1: Analytical Framework

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

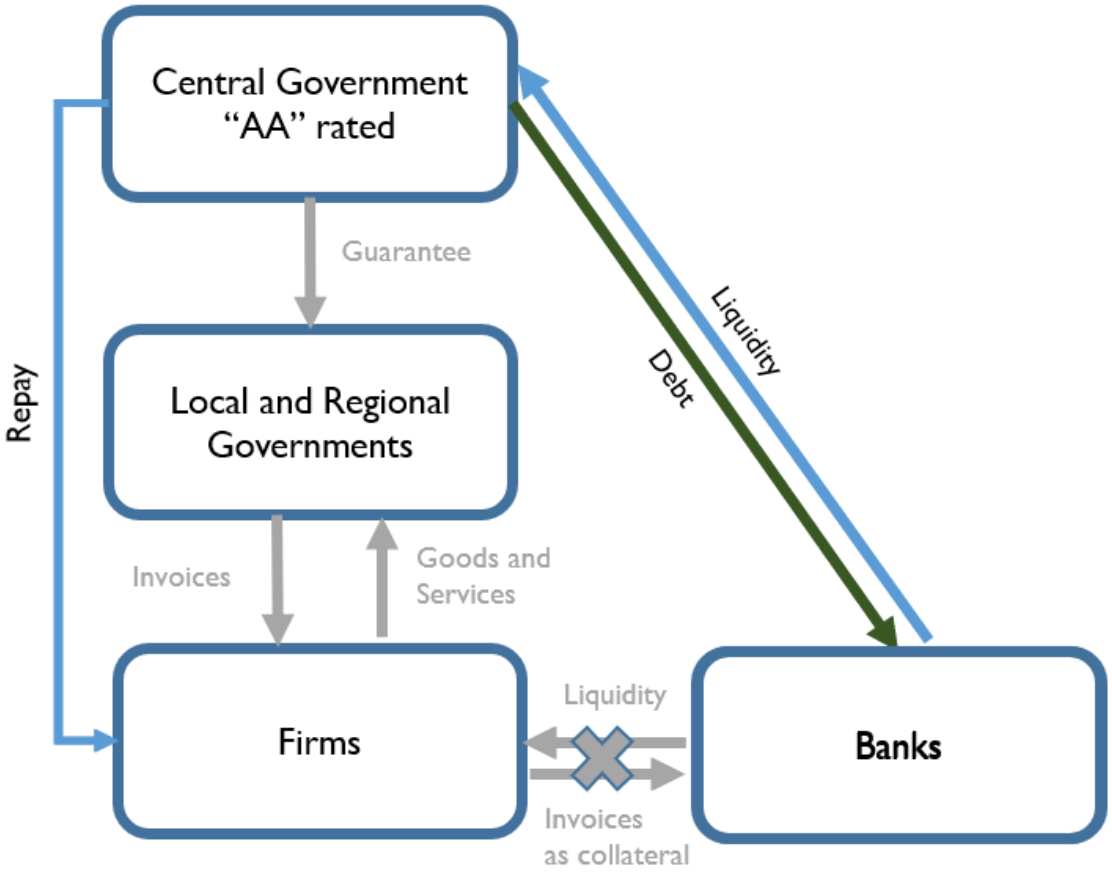


Figure 2: Appearance of SPP news in Spanish Newspapers

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.

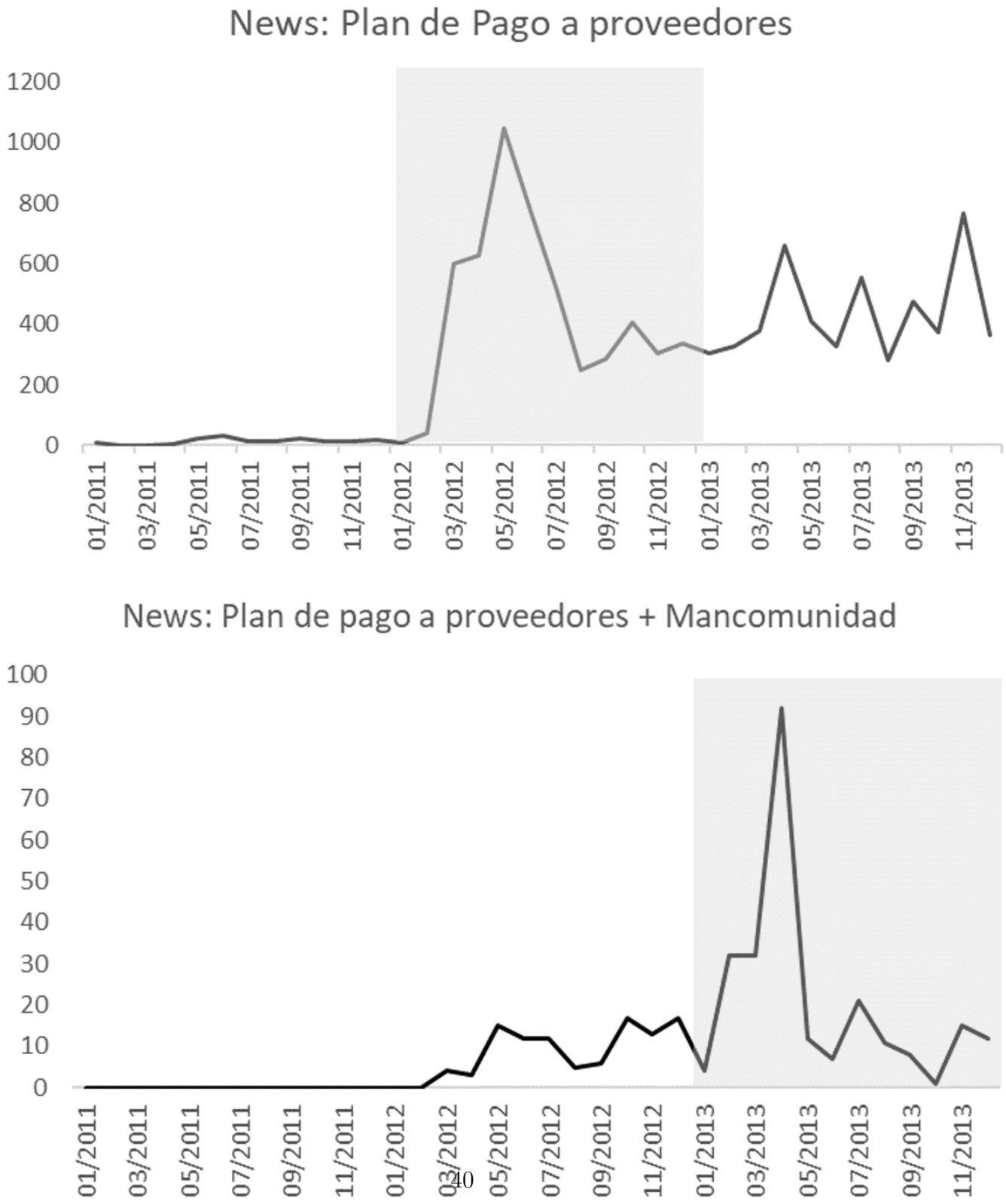
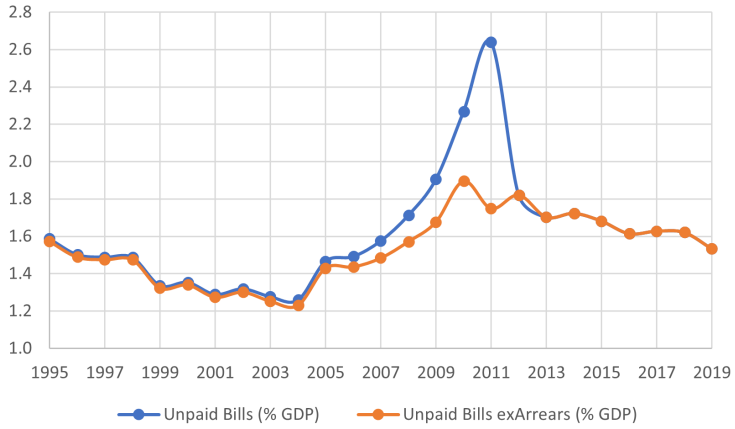


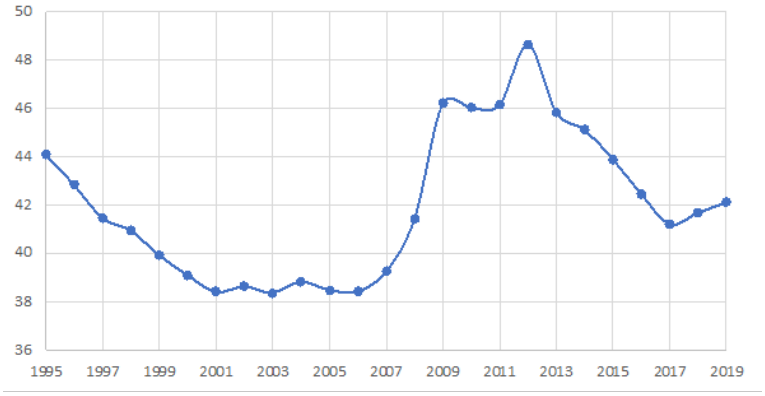
Figure 3: Spanish Municipalities

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)

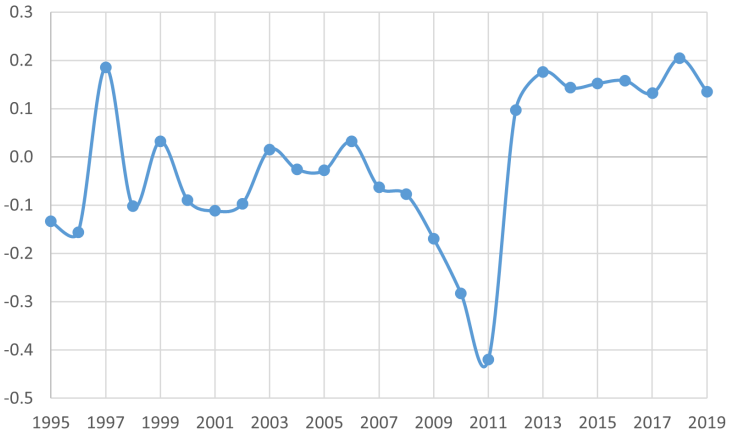
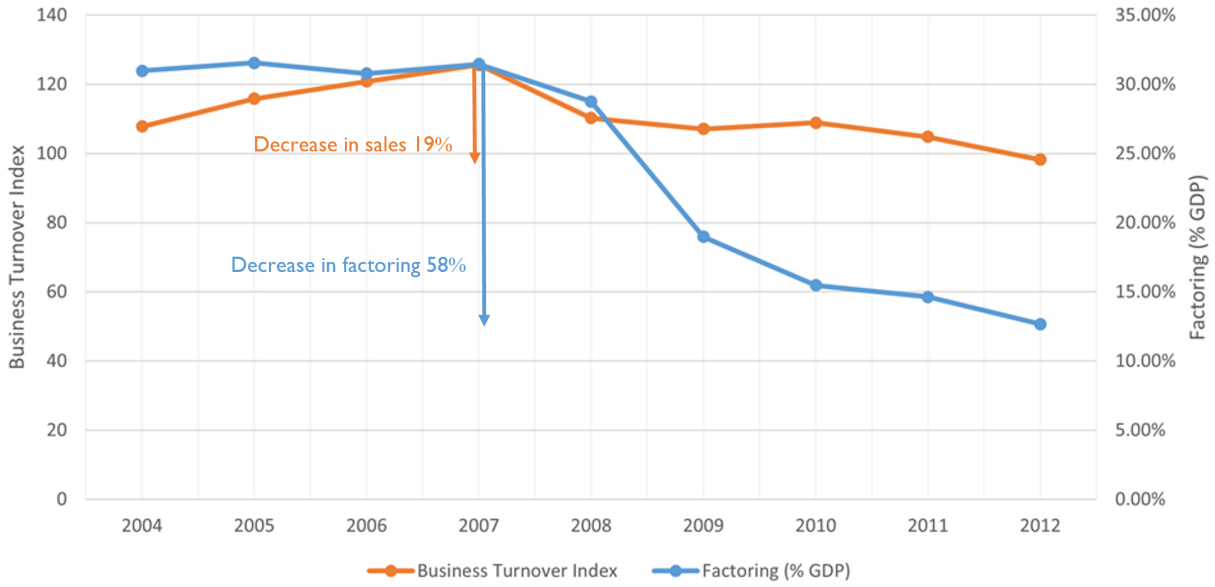


Figure 4: Factoring and Business Turnover Index

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: 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.

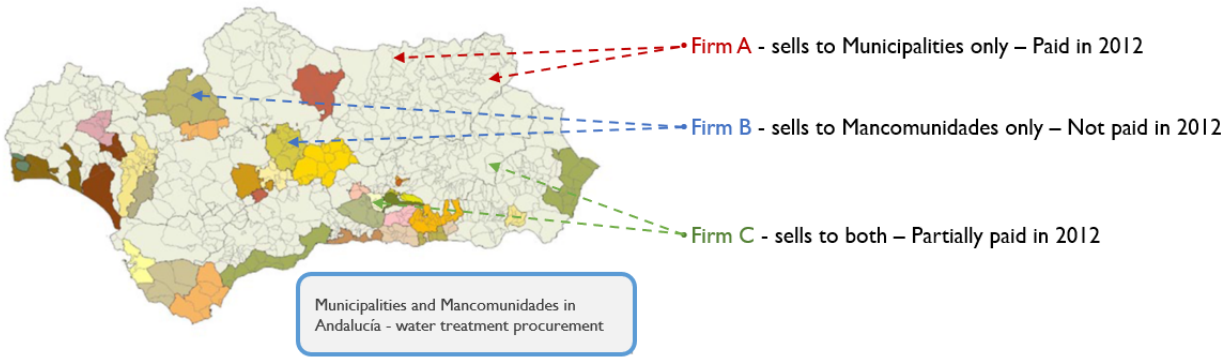


Figure IA.2: Average payment delay (days) per sector, 2005-11

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.

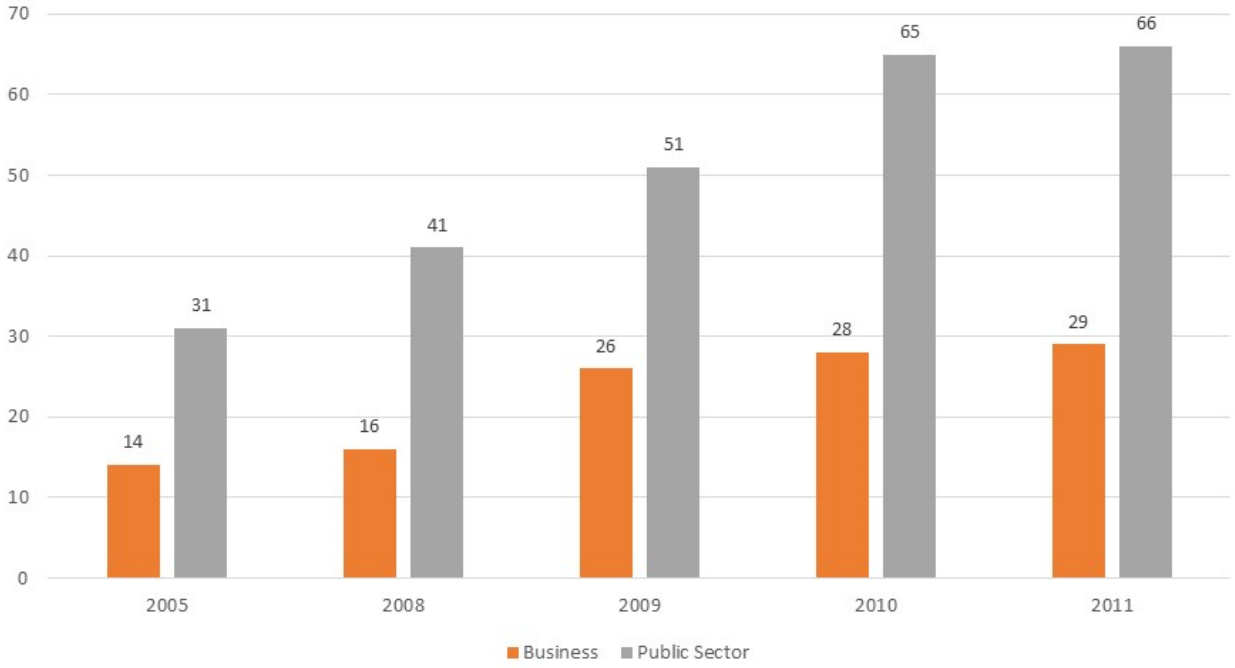


Figure IA.3: Factoring of Arrears by Bank Type

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 8 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.

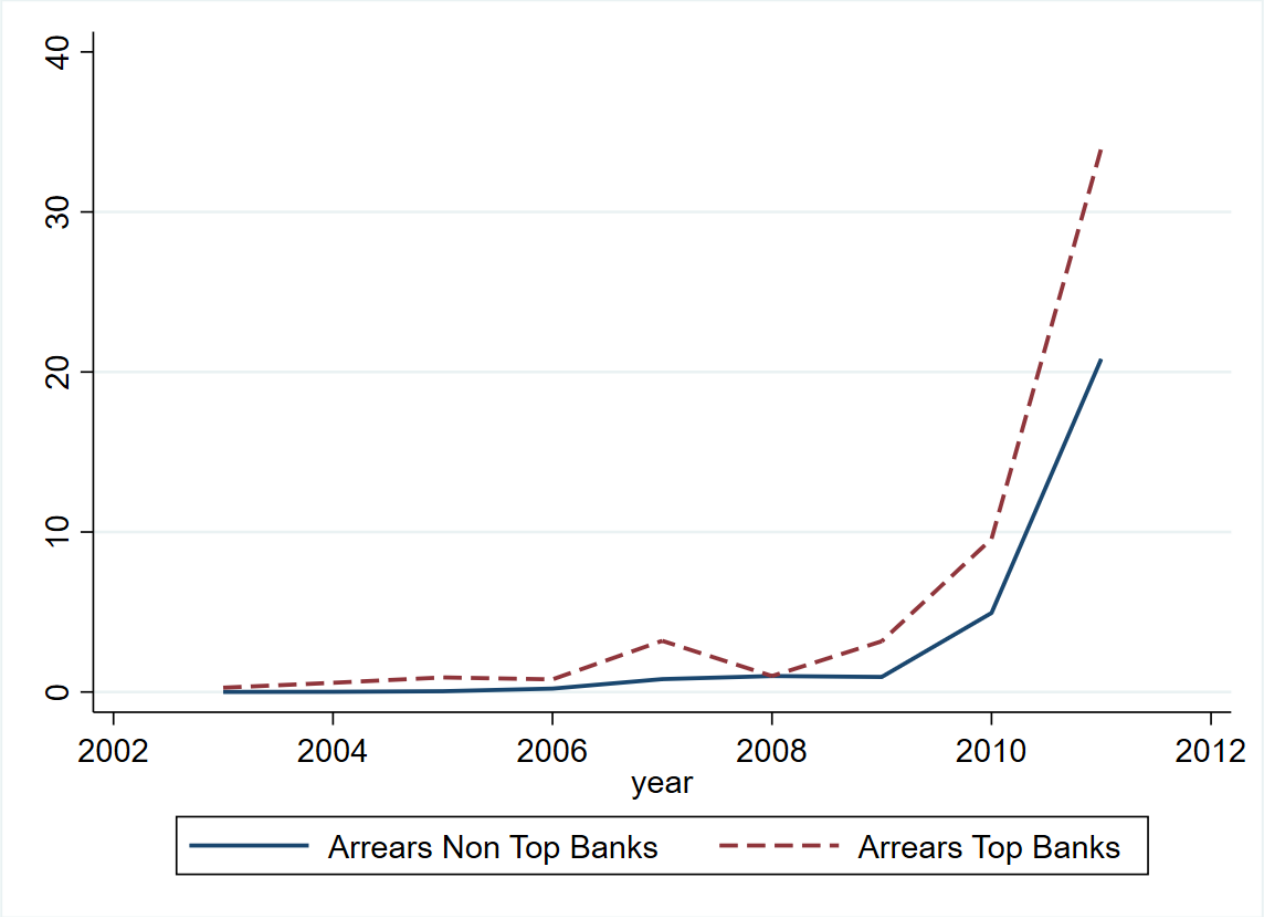


Table IA.1: Descriptive Statistics: 2009-2012

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
Liquidity 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
Cash	294.62	1000.47	14.78	53.00	179.00	155219
Employment to assets	0.02	0.03	0.01	0.01	0.02	155888
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
Sales to assets	1.32	1.21	0.62	1.03	1.64	158593
Sales growth	-0.02	0.53	-0.22	-0.07	0.05	158097
ROE	10.77	111.45	-0.20	8.64	24.15	165923
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
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

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 liquidity shock in year 2012, and Phase II includes firms that received the liquidity shock in 2013. Firms from Phase I and Phase II are matched based on total assets, liquidity 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
Liquidity Shock	140.266	140.262	-0.003	(1.000)
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)
Employment to assets	0.017	0.017	-0.000	(0.939)
Leverage ratio	0.366	0.361	-0.005	(0.815)
Total debt	1,551.979	1,730.285	178.306	(0.629)
Sales to assets	1.396	1.463	0.066	(0.392)
Sales growth	0.043	0.101	0.058	(0.346)
ROE	13.335	2.202	-11.133	(0.356)
Long-term debt	813.712	781.347	-32.365	(0.850)
Short-term debt	578.011	701.646	123.635	(0.517)
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)
Observations	42,708	489	43,197	

Panel B: 2009

	(1) Phase I	(2) Phase II	(3) Difference	(4) P-value
Liquidity Shock	139.862	139.859	-0.003	(1.000)
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)
Employment to assets	0.018	0.018	0.000	(0.955)
Leverage ratio	0.364	0.353	-0.010	(0.626)
Total debt	1,506.419	1,578.632	72.213	(0.818)
Sales to assets	1.430	1.522	0.092	(0.248)
Sales growth	-0.048	0.021	0.069	(0.081)*
ROE	16.857	11.428	-5.429	(0.538)
Long-term debt	782.284	786.162	3.879	(0.981)
Short-term debt	574.788	658.844	84.056	(0.581)
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)
Observations	42,394	468	42,862	

Table IA.3: 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 liquidity 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 liquidity in Phase I (2012) and zero for firms that received liquidity 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 liquidity 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 & 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 & 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 & Firm FE	Yes	Yes	Yes	Yes
Observations	70646	36788	13426	16435
Adjusted R^2	-0.156	-0.156	-0.170	-0.164