

Board of Governors of the Federal Reserve System

International Finance Discussion Papers

Number 1323

August 2021

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Please cite this paper as:

Morais, Bernardo, Javier Perez-Estrada, Jose-Luis Peydro, Claudia Ruiz-Ortega (2021). "Expansionary Austerity: Reallocating Credit Amid Fiscal Consolidation," International Finance Discussion Papers 1323. Washington: Board of Governors of the Federal Reserve System, <https://doi.org/10.17016/IFDP.2021.1323>.

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# Expansionary Austerity: Reallocating Credit Amid Fiscal Consolidation

**Bernardo Morais   Javier Perez-Estrada   José-Luis Peydró   Claudia Ruiz-Ortega\***

## *Abstract*

We study the impact of public debt limits on economic growth exploiting the introduction of a Mexican law capping the debt of subnational governments. Despite larger fiscal consolidation, states with higher ex-ante public debt grew substantially faster after the law, albeit at the expense of increased extreme poverty. Credit registry data suggests that the mechanism behind this result is a reduction in crowding out. After the law, banks operating in more indebted states reallocate credit away from local governments and into private firms. The unwinding of crowding out is stronger for riskier firms, firms borrowing from banks more exposed to local public debt, and for firms operating in states with lower public spending on infrastructure projects.

*JEL codes:* D72, G21, L33, P16.

*Keywords:* Crowding out, government lending, subnational debt, banks, emerging markets.

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## 1. Introduction

Following both the 2008-2009 global financial crisis and the current COVID-19 outbreak, many subnational governments—states, regions, and municipalities—increased their indebtedness to compensate for the decline in central transfers and tax revenues.<sup>1</sup> However, central government guarantees—even if implicit—may have created incentives for local governments to reach higher-than-optimal levels of debt, leading to financial crises and consequent reductions in economic activity and public spending.<sup>2</sup> Overall, the economic impact of these austerity programs is ambiguous. On the one hand, Alesina, Favaro, and Giavazzi (2019a, 2019b) argue that fiscal consolidation can have a positive impact on output through higher business confidence and private investment. On the other hand, Fatás, and Summers (2018) and House, Proebsting, and Tesar (2020) argue that austerity can have a permanent negative impact on output through reduced potential growth.

In this paper, we analyze the impact of limits to public debt on fiscal consolidation and on economic growth. For identification, we exploit the introduction of the Mexican “Law of Financial Discipline to States and Municipalities”. The Financial Discipline (FD) Law— enacted in April 2016— established debt ceilings to rein in the rise of local governments’ indebtedness.<sup>3</sup> To do so, the legislation introduced three indicators to monitor the financial health of local governments, with the ratio of *public debt to freely disposable income* being the main one. Based on these indicators, a system was created classifying indebtedness of subnational governments as *sustainable*, *under-watch*, or *high*. Governments with a *sustainable* indebtedness were allowed to borrow annual debt of up to 15 percent of their freely disposable income; governments with an indebtedness *under watch* were allowed to borrow at most 5 percent of their freely disposable income; while governments with *high* indebtedness were banned from obtaining financing unless a strict payment plan was negotiated with the federal government. Importantly, greater faculties

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<sup>1</sup> From 2011 to 2018 the share of public debt contracted by local governments worldwide increased from 14 to 22 percent (IMF, 2018). Similarly, the Fiscal Monitor of the IMF (2020) details a large increase in local government debt following the COVID-19 outbreak.

<sup>2</sup> The Spanish financial crisis in 2012 was in large part driven by the excessive indebtedness of local regions with the *Cajas* (Santos, 2017). Regarding implicit guarantees, for example, Danish municipalities receive specific financial help from the central government if they get into financial difficulties, and are put under administrative control (Mau, 2015). In Germany, the constitutional court ruled that the federal government had to bail out two *Länder* (states) in financial distress.

<sup>3</sup> When promulgating the FD Law, President Peña-Nieto noted that “[T]he priority of the law is to ensure the stability of the country’s public finances by establishing the requirements and conditions for the government to grant federal approval of the debt contracted by states and municipalities.”

were granted to the national congress to sanction non-complying authorities by, for example, not guaranteeing new debt. Therefore, with the FD Law, the federal government explicitly imposes conditions to guarantee the debt of local governments, increasing the risk profile of these liabilities.

At the time of implementation of the Law, the level of indebtedness of local governments (as well as the exposure of banks to public debt) varied significantly across states. For example, in the quarter preceding the implementation of the reform, the ratio of public debt to disposable income of Mexican states was on average 86 percent. However, while states in the bottom quartile had at most a 30 percent ratio of liabilities to free disposable income, that ratio in top quartile of states was of at least 100 percent. Similarly, there was large variation in the relative holdings of government debt across banks prior to the reform. While the median bank channeled 30 percent of its lending to local governments and state-owned firms, banks in the highest decile directed 75 percent of their lending to the public sector. As such, the Law presumably placed larger constraints not only on states with higher debt but also on banks with larger exposure to local governments. Exploiting the introduction of the Law along with the ex-ante variation in public debt ratios across states and banks, we estimate the impact of public debt ceilings using a difference-in-difference strategy where treatment is continuous and corresponds to the ratio of total public debt of a state to its free disposable income in 2016Q1. That is, the treatment status of states is fixed over time and determined by their indebtedness one quarter prior to the implementation of the Law.<sup>4</sup>

We first examine the impact of the Law on fiscal consolidation. For this, we match data on the indebtedness of local governments with information on their public expenditures and revenues. We then analyze the impact of the reform on economic activity of states, measured by their GDP growth and poverty rates. Finally, we explore if the debt restrictions imposed in the FD Law triggered a reallocation of bank lending away from local governments and into private firms. For this, we use exhaustive loan-level data along with information on bank and firm balance-sheets. Importantly, as local governments in Mexico fund themselves almost exclusively through banks, our loan-level data allows us to examine the effect of the Law on both the demand and supply of

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<sup>4</sup> The indebtedness of states through time Law varied only a little immediately after the Law, due in large part by the long maturity of states' debt (of roughly 15 years). Therefore, states with higher indebtedness at the time of the Law carried higher debt levels afterwards.

credit.<sup>5</sup> This granular data also allows us to analyze heterogeneity in credit supply across banks of varying exposure to the reform (measured by their ex-ante share of local public debt) and across firms of varying credit constraints (measured by their ex-ante length of credit history).

We find that following the FD Law, ex-ante more indebted states undertake larger fiscal consolidation, in the form of higher tax rates and larger public expenditure cuts— including in areas such as infrastructure and social protection. Regarding adjustments in public revenues, we find that a one-standard-deviation increase in state ex-ante indebtedness is associated with a 10 percent increase in tax rates but—as expected—it has no impact on federal transfers. On spending adjustments, we find that a one-standard-deviation increase in a state’s ex-ante indebtedness is associated with a 4.4 percent contraction in overall public spending, and a reduction on infrastructure and social protection expenditures of 39 percent and 5 percent, respectively.

Despite larger fiscal consolidation, we document that states with ex-ante higher indebtedness experience faster economic growth after the FD Law. In particular, a one-standard-deviation increase in the ex-ante public debt of a state leads to an increase of 0.2 percentage points in quarterly GDP growth and 0.1 percentage points in quarterly employment growth rates of the state. These results are significantly stronger in the secondary sector, which tends to be more capital intensive (Buera, Kaboski and Shin, 2011).<sup>6</sup>

The impact of the FD Law on states’ poverty rates is mixed. We find that following the Law, states with higher ex-ante public indebtedness experience a reduction in their moderate poverty rate – consistent with the overall positive output effects of expansive fiscal austerity. However, more ex-ante indebted states also experience an increase in their extreme poverty rate – consistent with the spending cuts in areas such as social protection.<sup>7</sup> More concretely, a one-standard-deviation increase in the level of state ex-ante indebtedness leads to an increase in

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<sup>5</sup> In the quarter preceding the implementation of the Law, 90 percent of the funding of state governments was obtained from private banks. This dependence on bank financing is a feature of many emerging economies, given the scarcity of alternative sources of financing (Beck, Demirgüç-Kunt and Maksimovic, 2008).

<sup>6</sup> One key identifying assumption to estimate the causal effects of the introduction of the FD law is that the outcomes of interest would have followed parallel trends across states in its absence. While we cannot explicitly test for this assumption, we can check if the trends of our outcomes of interest were parallel across states prior to the introduction of the Law. We find no differences in pre-Law trends across states, lending credibility to our identification strategy.

<sup>7</sup> According to the Mexican government, a household is in extreme (moderate) poverty if it cannot fulfill three or more (at most two) basic needs: Basic income, access to education, access to health, access to social security, basic housing services, and access to food.

extreme poverty of around 1.4 percentage points (15.6 percent higher). In line with the literature on poverty traps (Banerjee and Newman, 1993; Banerjee et al., 2019), these results provide evidence that improvements in economic activity can help households with a certain amount of wealth to raise themselves out of poverty. However, for households below that threshold of wealth, a contraction in public spending can push them into extreme poverty.

So far, our evidence suggests that despite its effect on fiscal consolidation, the FD Law had a positive impact on the overall economic activity of more ex-ante indebted states, albeit at the expense of an increase in extreme poverty. To uncover the mechanism behind these results, we examine the dynamics of bank lending across states before and after the FD Law. We find that in states with higher ex-ante public debt, local governments experience a decline in their bank liabilities after the introduction of the FD Law. A one-standard-deviation increase in ex-ante indebtedness leads to a reduction of around 6.3 percent in the outstanding bank credit of a local government. In turn, more bank lending is channeled to private firms headquartered in states with ex-ante higher public debt. That is, a one-standard-deviation increase in the ex-ante public indebtedness of a state leads on average to a 1 percent increase in lending to local private firms after the reform. We interpret these results as evidence that prior to the FD Law, local governments were crowding out private firms from the bank credit market, and that fiscal austerity alleviates this crowding out problem for firms.

We also document that there is large heterogeneity across banks in the impact of the FD Law on bank lending. We find that after the FD Law, banks with credit portfolios more exposed to indebted local governments reduce relatively more their lending to these governments and increase loans to the private sector. Using bank balance-sheet data, we find that even though there is no effect on aggregate bank lending, there is a significant change in the composition of borrowers after the Law. More concretely, a one-standard-deviation increase in a bank's pre-Law exposure to local public debt is associated with a 28 percent reduction in the total volume lent to local governments and a 31 percent increase in the total lending volume to firms. Consistent with the increased risk of lending to subnational governments after the FD Law—since loans are no longer automatically guaranteed by the federal government—we find that there is a relative increase in interest rates of loans to highly indebted local governments.

We next study in more detail the crowding-out mechanism using loan-level data. This data allows us to study changes in the loan terms of the average firm and identify adjustments in the supply (rather than in the demand) of credit, by saturating our specifications with *firm\*month* fixed effects. We find that in a state with average ex-ante public indebtedness, a one-standard-deviation increase in the ex-ante exposure of a bank to local government debt leads to an 8.8 percent increase in the loan value to firms. This effect is substantially larger in more indebted states. We then examine whether the FD Law impacts real outcomes of firms across states, and consistently with the credit results we find that it does. A one-standard-deviation increase in a state's public indebtedness is associated with an increase in local firms' liabilities, assets, and sales of around 6 percent, 7 percent, and 1.2 percent, respectively. Furthermore, the impact of the FD Law is stronger among firms headquartered in municipalities with banks more exposed to local public debt. In particular, in a state with average indebtedness, a one-standard-deviation increase in the exposure of banks in the municipality is associated with an increase in firms' liabilities of 2.5 percent, in assets of 2.2 percent, in fixed assets of 0.5 percent and in sales of 3.8 percent. As a further validation of our mechanism, we analyze whether borrowers operating in sectors less dependent on government spending (i.e., with a lower share of revenues obtained from selling inputs to the government) benefit relatively more from the unwinding of the crowding out. We find that that is indeed the case. For a firm headquartered in a state of average ex-ante public indebtedness, we find that a one-standard-deviation reduction in the exposure to government spending is associated with a 0.1 percent increase in total loan volume, and a 0.7 percent increase in loans destined to investment.

Altogether, our results suggest that imposing debt ceilings to subnational governments can reduce the crowding out of private firms in the bank credit market. Furthermore, this is especially true of firms: i) headquartered in locations—both states and municipalities—with more indebted local governments, ii) borrowing from banks more exposed to local public debt, and iii) operating in sectors less dependent on government spending.

Given our interest in uncovering potential crowding-out effects, we then evaluate whether the type of ex-ante spending of a local government has any impact on the state's subsequent economic activity. We find overall stronger positive effects on economic activity (albeit with increases in extreme poverty) in states that were spending a larger fraction of their budget on non-

infrastructure projects (e.g. on public services including social aid). For a state with average ex-ante public indebtedness, a one-standard-deviation increase in the ex-ante share of spending in non-infrastructure projects is associated with a 0.2 percentage points increase in the growth rate of GDP after the passage of the FD Law. We interpret this finding as evidence that private firms operating in states that were spending more on non-infrastructure areas, rather than on public infrastructure projects, benefit more from the unwinding of the crowding out. In other words, our results suggest that the marginal return of the reallocation of capital from public towards private firms is higher in states that were channeling more funding to non-infrastructure spending.

Finally, we check whether credit to more financially constrained firms (proxied by shorter credit histories) is disproportionately affected by the crowding out in bank lending. Our results confirm this is the case. More concretely, for firms with thin credit files (i.e., short credit history), the relation between state ex-ante indebtedness and firm credit access after the FD Law is significantly positive. For these firms, a one-standard-deviation increase in a state's ex-ante indebtedness is associated with a 2 percent increase in loan volume after the reform. This effect is stronger in states with ex-ante higher share of fiscal spending on non-infrastructure. For an average ex-ante indebted state, a one-standard-deviation increase in the ex-ante share of non-infrastructure spending is associated with a 4.7 percent increase in lending to firms with thin credit files.<sup>8</sup>

We check the validity of our estimates by relying on alternative identification strategies. First, we estimate the impact of the Law by exploiting differences in the alert system classification (i.e., sustainable vs under-watch) of states with ex-ante similar debt-to-net-income ratios. Second, to rule out that our results are driven by states with extreme values in their 2016Q1 debt-to-net-income ratios, we adopt a difference-in-difference approach where the treatment variable is discrete and equal to one for states above the median public indebtedness in the quarter prior to the FD Law and zero otherwise. Overall, we our results remain economically similar with these exercises.

Our paper contributes to the literature on local fiscal multipliers (Nakamura and Steinsson (2018); Adelino, Cunha and Ferreira (2017)) and, more generally, the literature on the impact of

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<sup>8</sup> As an oil producer, Mexico was impacted by the decline in energy prices that started in mid-2014. All our results hold if we drop from our sample the two oil producing states, Campeche, and Tabasco.



fiscal austerity.<sup>9</sup> Alesina, Favaro and Giavazzi (2019b) use cross-country panel data to analyze whether the consequences of austerity episodes depend on the type of fiscal consolidation and show that “expansionary austerity” can arise on increased business confidence and private investment. Conversely, Corbi, Papaioannou and Surico (2019), studying Brazilian federal transfers show that fiscal spending has a positive multiplier that depends negatively on the income of recipient localities (i.e. poorer municipalities have a significantly larger multiplier).<sup>10</sup> We contribute to this literature by providing granular evidence that the reduction in bank lending towards local governments can increase lending to local private firms, with positive real effects. Such positive effects are also present at the state-level GDP, though we also find that extreme poverty increases.<sup>11</sup>

Empirically, while there is evidence of a negative correlation between public debt and growth (see Reinhart and Rogoff (2010) among others), establishing causality is harder. Huang, Pagano and Panizza (2020) use firm-level data to show that local public debt in China crowded out the investment of private firms by tightening their funding, especially of more financially constrained borrowers.<sup>12</sup> Similarly, Hoffmann, Stewen and Stiefel (2021), using a German panel of firms, find that when spreads on local government debt are low, local public banks use their market power to charge higher rates to their customers, crowding out investment. Furthermore, fiscal consolidation worsened this effect by putting pressure on the budgets of municipal governments which increasingly borrowed from local public banks. We use an exogenous negative shock to the demand for credit of local public debt, along with detailed loan-level data, to show that the decrease in public spending has an overall positive effect on local bank lending of the

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<sup>9</sup> Additionally, Chodorow-Reich (2019) studies the effect of an increase in spending in one region of a monetary union, concluding that an average point estimate for a cross-sectional multiplier is 1.8. Using a panel of OECD countries, Guajardo, Leigh and Pescatori (2014) find that fiscal consolidation has contractionary effects on private demand and on GDP.

<sup>10</sup> Likewise, Braga, Guillen, and Thompson (2017) find that negative shocks to Brazilian federal transfers have a particularly negative impact on low-skill employment.

<sup>11</sup> Becker and Ivashina (2018) study the impact of financial repression and find that the lending of banks to their respective governments increased during the European sovereign debt crisis, leading to a reduction in corporate credit.

<sup>12</sup> Similarly, Broner, Erce, Martin, and Ventura (2014) along with Gennaioli, Martin and Rossi (2014) show that under credit rationing and financial frictions, government debt is especially damaging for credit constrained firms. Greenwood, Hanson, and Stein (2010), Graham, Leary, and Roberts (2015), and Demirci, Huang, and Sialm (2019) describe the relationship between the structure and level of government debt and firms’ leverage, focusing on their capital structure. Finally, Chakraborty, Goldstein, and MacKinley (2018) show that banks operating in strong housing markets increase mortgage lending at the expense of commercial lending, suggesting that monetary policy accommodation has some negative spillovers to the real economy.

private sector, particularly to the more capital-intensive secondary sector, and especially when public spending was directed towards services instead of public investment. Moreover, we show positive economic growth effects, in an austerity scenario (higher taxes and lower public expenditure) and in a setting with a privatized banking system.

This paper also contributes to the theoretical literature analyzing the impact of government borrowing on bank lending to private firms. This issue is particularly relevant in developing countries, where government borrowing has increased dramatically since the late 1990s. Moreover, the effects of government bank-borrowing on private investment are likely higher in developing countries, where credit markets are less developed and both credit constraints and credit rationing are more prevalent (Banerjee and Duflo (2004), Ghosh et. al. (2000)). Some argue that access to safe government assets allows banks to take more risk and thus increase their lending to the private sector (Kumhof and Tanner, 2005).<sup>13</sup> An alternative hypothesis is that government lending may create moral hazard discouraging (lazy) banks from lending to the risky private sector (Manove, Padilla, and Pagano, 2001). We provide empirical evidence that when restrictions to local government debt are imposed, banks reallocate their lending away from local governments and into local private firms, with important effects on private investment and real effects, though with negative consequences on extreme poverty.

The rest of this paper is organized as follows. Section 2 provides background information on the Law of Financial Discipline in Mexico. Section 3 describes the data. Section 4 discusses the identification strategy. Section 5 presents the results and section 6 concludes.

## **2. Law of Financial Discipline of States and Municipalities**

The increase in unemployment and decline in fiscal revenue that followed the 2008-09 global financial crisis induced local governments to finance fiscal deficits with debt. For example, in Mexico public debt of subnational governments increased almost threefold from 203 billion pesos (USD 15.6 billion) in 2008 to 591 billion pesos (USD 46.1 billion) in 2015, with the ratio of states' debt-to-income increasing from 13 percent to 30 percent during that period. The explosion

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<sup>13</sup> However, this mechanism may not be in play in emerging markets given their poor access to safe assets such as U.S. or German sovereign debt.

of local public indebtedness in Mexico was driven mainly by states, rather than municipalities, and was facilitated by a lax federal supervision (Smith, 2015).

To reduce the ramp-up in local debt, the Federal Government enacted the Law of Financial Discipline of States and Municipalities in April 2016.<sup>14</sup> The Law introduced three main reforms altering how local governments procure debt and report their finances. The first was the immediate creation of a registry—*Single Public Registry*—where all local public bodies were required to report their contracted obligations—regardless of the type of loan, type of creditor, maturity, or financing purpose. The second was the establishment of procurement rules with the objective of guaranteeing that subnational debt was obtained at the lowest financial cost.<sup>15</sup> The third reform, which was scheduled to come into effect a year later, introduced three indicators to monitor the financial health of all local governments and set debt ceilings to limit their indebtedness.

From April 2017 onwards, all state and municipal governments were mandated to publish three debt indicators on the website of the Ministry of Finance on a quarterly and semiannually level, respectively.<sup>16</sup> According to the alert system guidelines published by the Ministry of Finance, the first indicator was the ratio of *total public debt to freely disposable income*, where freely disposable income is the sum of federal transfers received by local governments in addition to any revenues obtained either locally or from the Budgetary Income Stabilization Fund. This first indicator was intended to measure the leverage of local governments and their overall financial sustainability. The second indicator was the ratio of *debt service and obligations to freely disposable income*. This measure reflects the capacity of local governments to meet the principal and interest of their obligations. The third indicator was the ratio of *short-term obligations to total income*. This indicator measures the ability of local governments to pay obligations with a maturity shorter than 12 months.

To ease the comparison of indebtedness across local governments, each indicator was classified into *low*, *medium*, or *high*.<sup>17</sup> The Ministry of Finance then summarized these indicators

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<sup>14</sup> Decree of Law of Financial Discipline of States and Municipalities, published in the Mexican Official Journal of the Federation on the 27<sup>th</sup> of April 2016.

<sup>15</sup> In Section 4, we present evidence that validates that our estimates are driven by the introduction of debt ceilings and are not contaminated by the establishment of procurement rules.

<sup>16</sup> Alert System Regulation, Official Journal of the Federation, March 31, 2017.

<sup>17</sup> The first indicator is *low* if its values lie below 100 percent, *medium* if its values are between 100 and 200 percent, and *high* for values above 200 percent. The second indicator is classified as *low* for values below 7.5 percent, *medium* for values between 7.5 and 15 percent, and *high* for values *greater* than 15 percent. Finally, the third indicator is

into an “alert system”, where more weight is placed on the first indicator. This alert system (described in Table IA1) ranks local public indebtedness over time as *sustainable*, *under-watch*, or *high*.<sup>18</sup> Following the FD Law, governments with a *sustainable* indebtedness were allowed to borrow annual debt of up to 15 percent of their freely disposable income; governments with an indebtedness *under-watch* were allowed to borrow at most 5 percent of their freely disposable income; governments with *high* indebtedness were banned from obtaining financing unless a strict payment plan is negotiated with the federal government.

Given the long maturity of government liabilities (averaging 15 years) and the greater weight of the first debt indicator in the methodology of the alert system, the debt classifications of local governments have remained largely stable over time. As Figure 1 shows, the first alert system classification of state governments in 2017 is highly correlated with their *total public debt to freely disposable income* ratio prior to the FD Law in April of 2016. As such, states with a higher public indebtedness ratio prior to the Law were more likely to face tighter debt ceilings in the following years as their indebtedness ratio remained closer to the debt ceilings established by the Law (Panel A of Figure IA1).<sup>19</sup>

To improve compliance, the FD Law granted greater faculties to the national congress to monitor and deny new debt as well as to sanction non-complying authorities by, for example, suspending federal transfers, not guaranteeing new loans, or explicitly determining situations in which local governments can default on their liabilities. Overall, the FD Law implicitly reduced the incentives of banks to lend to local governments. Evidence displayed in Figure 3 is consistent with this hypothesis—after the FD Law is introduced, banks reduce their share of lending to the

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classified as *low* for values below 7.5 percent, *medium* for values between 7.5 and 12.5 percent, and *high* for values above 12.5 percent.

<sup>18</sup> Indebtedness is *sustainable* when the first indicator is *low*, and the other indicators are at most *medium*. Indebtedness is *under-watch* when the first indicator is *low* and one of the other indicators is *high*, or if the first indicator is *medium* and the other indicators are at most *medium*. Finally, indebtedness of a local government is *high* when the first indicator is *high* or when the other indicators are both *high*.

<sup>19</sup> The dynamics of public debt around the time of the implementation of the FD Law grant further evidence that states with ex-ante higher indebtedness were more affected by the Law. In Figure 2, we split the sample into states with a level of public debt prior to the FD Law above and below the median. On Panel A, we plot the total deflated bank lending to local governments relative to the start of our sample. The figure shows that the two groups of states followed similar trends in their bank lending in the quarters leading up to the Law. However, in the post-reform years, the two series diverged: bank loans to low indebted states rose on average 10 percent, whereas those to high indebted states fell 20 percent on average. On Panel B, we display the average interest rate on bank loans to local governments. Again, we see parallel lines in the quarters leading up to the reform, with high indebted states paying higher interest rates of around 80 basis points. However, following the reform, the spread widened to 110 basis points on average.

government (Panel A) and the risk premium of loans to private firms vis-a-vis loans to the government drops (Panel B).

### 3. Data

The datasets used in the analysis come from seven sources. The first data set is the *Single Public Registry*, provided by the Ministry of Finance. This data set reports the debt of subnational governments (at the state and municipal levels) decomposed by credit sources on a quarterly frequency. In addition to total public liabilities, the data set also includes the lending terms contracted by local governments such as interest rates and maturity. Based on this data, we construct the ratio of public debt to freely disposable income of local governments in March 2016—one month prior to the enactment of the Law—to measure the ex-ante indebtedness of subnational governments. This ratio is highly persistent over time and strongly associated with the public-debt-to-net-income financial health indicator that local governments were required to report in the alert system from 2017 onwards (correlation of 0.88).

The second data set consists of a state-year panel containing the annual public expenditures and public revenues of each state in Mexico from 2014 to 2018. This data set is publicly available from the National Institute of Statistics (INEGI). On the expenditure side, we use information on the total expenditure of state governments as well as on certain public expenditure categories. The first category—*transfers, subsidies, and other aid*—is the largest expenditure group of state governments and represents almost 60 percent of expenditure of states. 76 percent of expenditures within this category comprise funding for health, education and social security programs and institutions. The second category corresponds to *public infrastructure* spending which represents 5 percent of state expenditures.<sup>20</sup> Public investments on construction, housing, and infrastructure projects (e.g., roads, school buildings, hospitals, sewer systems) are grouped under this category. On the revenue side, we analyze the two main components of state government income—taxes and federal transfers—representing 80 percent of their total revenue.

The third data set is the quarterly GDP of Mexico's 32 states, which started being collected in 2014 by INEGI. In addition to the total GDP, we also use information on the GDP contributed

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<sup>20</sup> The remaining 35 percent of expenditures are related with salaries and other remunerations of state employees, which tend to be very stable across time.

by each state's primary sector—mining and agriculture—secondary sector—manufacturing and construction—and tertiary sector, mainly services.

The fourth data set consists of state-level panel data at the biennial frequency on a series of poverty indicators on even years from 2010 through 2018. Data are collected and compiled by the National Evaluation Council (CONEVAL). CONEVAL created a methodology to evaluate poverty in a state according to the following indicators: income per capita, average educational attainment, access to health services, access to social security, quality and housing spaces, access to nutritious and quality food, and access to paved roads.

The fifth data set, which we refer to as the loan-level data, consists of credit registry data containing bank commercial loans in Mexico to private firms and government-backed entities from July 2014 to June 2018. Its coverage includes the universe of bank loans issued to government-backed entities and all bank loans issued to a nationally representative 10 percent sample of private firms. Loans to government-backed entities include federal, state, and municipal governments, as well as firms owned by the government (federal, state, or municipal). The data are obtained from regulatory reports monthly submitted by every commercial bank to the bank regulator (CNBV). Reports are mandatory, updated electronically, and include detailed characteristics of all new and continuing loans made to all firms. All business loans, regardless of their size, are reported. For each loan, we use information on the issuing bank, the outstanding amount, the interest rate, loan guarantees, and the type of financing (i.e., whether the loan is intended to finance working capital or investment). There is also descriptive information about each borrower, such as its location, industry, and number of employees when the loan started. In the case of private firms, we adopt a similar approach to La Porta et al. (2003) and aggregate individual loans at the *firm-bank-month* level, as some borrowers have more than one loan issued by the same bank at a given point in time. For the same reason, we aggregate all state-government loans at the *state-bank-month* level. Loan characteristics such as interest rates are then reported using an average weighted by loan volume. Doing so puts greater weight on larger loans and ensures that our results are economically meaningful.

The sixth data set consists of the monthly balance sheet information of 18 commercial banks representing more than 98 percent of commercial bank-lending in the country.<sup>21</sup> Data are provided by the Bank of Mexico (Banxico) and variables in this data set include the total credit volume of banks, both to private firms and public entities, as well as their respective interest rates.

Finally, the seventh main data set is Orbis, a *firm-year* level data set compiled by Bureau van Dijk, containing information on the balance sheets and income statements of a large set of Mexican firms. The data set reports information on assets and revenues of firms as well as their total and bank-specific liabilities by type of financing. As shown in Morais et al. (2019) this sample of firms is representative of the universe of sectors and locations in Mexico, albeit skewed towards larger firms.

The summary statistics of our data set are shown in Table 1, with the definitions of all variables listed in Table A1 in the Appendix. In Panel A, we display summary statistics of macro-level data from states and municipalities. We start by presenting the ex-ante indebtedness of state governments, measured by the main indicator  $DebtState_{s,16Q1}$ , which is the ratio of states' public debt to freely disposable income one month prior to the introduction of the FD Law.<sup>22</sup> This ratio is on average 86 percent. However, there is large variation across states (Figure 1). While states in the bottom decile have a ratio of less than 20 percent, the indebtedness ratio of states in the top decile is 225 percent.<sup>23</sup> Furthermore, the average maturity of debt to states is of 14.6 years, with bottom and top deciles having a maturity of 8.3 and 19.3 years, respectively. Still in Panel A, we also present statistics on state-level GDP and employment growth rates, as well as poverty and inequality ratios. The average quarterly growth rate is 0.8 percent, while the employment quarterly growth rate is on average 0.6 percent, with growth rates at the bottom and top deciles of -2.1 and 3.3 percent, respectively. Regarding poverty rates, 43 percent of the population of the average state is considered poor. More concretely, 34 percent of the population is considered to be in moderate poverty, while 9 percent of population is classified as living in extreme poverty. Inequality rates are measured via the Gini coefficient, which ranks the income distribution of the population within

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<sup>21</sup> To guarantee the comparability of our results across banks, and given our focus on commercial lending, we exclude from our analysis banks that specialize in consumer lending as well as niche banking.

<sup>22</sup> Of the 32 Mexican states, we only have local public debt data on 30. Both Distrito Federal (i.e. Mexico City) and Tlaxcala do not report this information.

<sup>23</sup> We also present data on the debt of municipalities, which corresponds to less than 10 percent of local debt.

a state on a scale between 0 (full equality) and 1 (full inequality). There is little variation in the inequality rates across states in Mexico, with the Gini coefficient averaging 0.47.

In Panel B, we display the main statistics of the fiscal revenue and spending indicators at the state-year level, measured as ratios over the state GDP. On the fiscal spending side, public expenditure represents on average 15.8 percent of the GDP of states. Public expenditures on infrastructure and social protection (including subsidies and other social aid) are on average 0.7 and 6.6 percent of states' GDP, with large variation across states. Regarding fiscal revenue, the vast bulk of fiscal income of states comes from federal transfers: while federal transfers represent on average 13.4 percent of states' GDP, tax revenues (not shown) only account for 0.5 percent. The last variable in Panel B,  $\text{Non-Infrastructure}_{s,2015}$ , is the share of public expenditure of a state in 2015 that was channeled to other items apart from infrastructure. We calculate this variable as the ratio of public spending of a state in 2015 in non-infrastructure projects relative to the state's total public spending. This variable allows us to proxy for the fiscal spending composition of states prior to the FD Law, as lower values reflect state governments that favored spending on public infrastructure. On average, the share of spending on public infrastructure is around 4.5 percent, with large differences across states in the bottom and top deciles (i.e., 1.7 percent vs. 8.2 percent).

In Panel C, we display the main statistics of bank loans to state governments, with observations at the state-month level. We show the levels of total loans of banks to governments, as well as their decomposition on credit lines and term loans (all measured in logs of Mexican pesos). The main takeaways from this panel are that there is an important variation across states, and that the average value of term loans is substantially larger than that of credit lines.<sup>24</sup> The last three rows of each panel present the statistics on loan margins, namely the interest rate (measured in percent), collateral (measured as a share of loan volume), and maturity (measured in logs of months).

In Panel D, we display the statistics of the firm-bank-month level data, summarizing the characteristics of bank loans given to private firms. In addition to the value of all outstanding loans,

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<sup>24</sup> Conversely, the variation in interest rates at the time of implementation of the FD Law was low. The average interest rate for the period *prior* to the FD Law is 5.6 percent while the difference between the top and bottom decile is only 1.4 percentage points. This suggests that prior to the implementation of the Law, banks considered local government debt to be as risky as sovereign debt—whose interest rate at the time was 5.4 percent—as a large share of it was implicitly secured by the federal government (Revilla, 2013). The sovereign interest rate is calculated as the implied annual yield of a 5-year government bond in local currency in March 2016.



we show the value of loans that are destined to working capital and investment (all measured in logs). The average bank loan has an interest rate of about 14.4 percent, collateral covering 32 percent of its value and maturity of around 18 months. Panel E summarizes the yearly real economic outcomes of firms. Namely, we display the value of firm liabilities, total assets, fixed assets, and sales, all measured in logs of thousands of dollars.

In Panel F, we display the summary statistics for the monthly bank-balance-sheet outcomes. The first variable corresponds to the overall volume lent to the government (including subnational governments) and private-sector firms. The next two outcomes disaggregate this measure into the lending volumes channeled by banks to the government and private-sector firms. All lending volumes are measured in logs of millions of pesos. The next two outcomes correspond to the interest rates charged on loans to the government and private sector firms, measured in percent. The next outcome,  $BankExposureGov_{b,Mar16}$ , measures the share of lending that bank  $b$  channeled to the government in March 2016. We use this variable to proxy for the ex-ante exposure that banks had to public debt. The last variable,  $BankExposureGov_{s,b,Mar16}$ , reports the share of lending of bank  $b$  to state government  $s$  in March 2016. This measure proxies for the ex-ante exposure of a given bank to a given state government prior to the Law.

Finally, Panel G displays the summary statistics of two firm-level time-invariant variables. The first one reports the share of revenue obtained from selling inputs to government entities and is measured at the 4-digit economic NAICS sector using U.S. Input-Output tables. Higher values indicate firms operating in sectors with greater dependence to government spending. The second one is an indicator that equals one for firms headquartered in states of the North of Mexico, which include the states of Baja California, Baja California Sur, Chihuahua, Coahuila, Durango, Nuevo León, Sinaloa, Sonora, and Tamaulipas.

#### **4. Methodology**

We now describe the methodology we follow to identify the impact of the FD Law on states' fiscal balance, macroeconomic activity, and bank lending to local governments. We then discuss how we map this methodology to more granular data at the bank, loan, and firm level, which allows us to investigate the impact of the debt ceilings on the unwinding of crowding out, including changes in loan conditions to private-sector borrowers and subsequent real effects.

#### 4.1. Impact of the FD Law on Fiscal Balances, Economic Activity and Bank Lending

Our identification strategy exploits the introduction of the Financial Discipline Law in April 2016, which imposed lending restrictions to state governments based on their indebtedness. While there was large variation in the indebtedness of state governments at the time of the FD Law (Figure 1), the indebtedness within a state varied little afterwards—in large part due to the long maturity of states’ debt (of roughly 15 years). Therefore, states with higher (lower) indebtedness at the time of the Law tended to carry higher (lower) debt levels in the immediately following years (see Panel A of Figure IA1). We thus adopt a difference-in-difference approach where the continuous treatment variable  $DebtState_{s,16Q1}$  corresponds to the ratio of total public debt of a state to its free disposable income in 2016Q1.<sup>25</sup> That is, the treatment status of states is fixed over time and determined by their indebtedness one quarter prior to the implementation of the Law. Our baseline specification is as follows:

$$y_{s,t} = \alpha + \beta DebtState_{s,16Q1} * Post_t + \gamma_s + \gamma_t + \varepsilon_{s,t} \quad (1)$$

In equation 1, the dependent variable  $y_{s,t}$  consists of a series of outcomes at the state and time  $t$  level.<sup>26</sup> The impact estimate is given by  $\beta$ , the coefficient of the interaction of our treatment variable,  $DebtState_{s,16Q1}$ , and  $Post_t$ , a dummy that equals one from April 2016 onwards and zero otherwise. All specifications of equation 1 include state fixed effects  $\gamma_s$ , and in most of the specifications we also include time fixed effects  $\gamma_t$ . Standard errors are double clustered at the state and time level.

Based on equation 1, we first identify the impact of public debt limits on fiscal balance dynamics of state governments. We then examine the impact of the FD Law on state-level GDP and employment growth rates, as well as on states’ poverty and income inequality rates. Finally, we identify the impact of public debt ceilings on bank lending to local governments as well as to private-sector firms. That is, we study whether the restrictions to local public debt introduced in

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<sup>25</sup> Our main analysis focuses on the impact of the FD Law across states, rather than municipalities, as state-level debt represents 90 percent of the total debt of local governments. Nevertheless, to validate our findings, we conduct a robustness check where we analyze the impact of the FD Law across municipalities of varying ex-ante indebtedness. Our findings (discussed in Section 5) remain similar to those at the state-level.

<sup>26</sup> Depending on the frequency of the data, time  $t$  can be at a monthly, quarterly, yearly, or biennial level. In some specifications, we further use data at the firm-bank-month level to analyze lending outcomes of firms headquartered in states of varying ex-ante indebtedness levels.

the FD Law altered the credit allocation of banks away from the public sector and into private-sector firms. Bank lending dynamics to private-sector firms in states below and above the median ex-ante public indebtedness suggest this is the case (Figure 4). While credit volumes to private borrowers in states below and above the median public indebtedness followed a similar trend before the FD Law, bank lending volumes to private firms in states with higher public debt begin increasing relatively more afterwards (Panel A). The increased lending volumes experienced by firms in states with ex-ante higher public debt were further met by relatively lower interest rates (Panel B), hinting that these changes in lending were the result of an expansion of credit supply to private borrowers in ex-ante more publicly indebted states.

One key identifying assumption to estimate the causal effects of the introduction of the FD Law using a difference-in-difference approach is that in the absence of the Law, the trends in outcomes between treatment and control states would have been the same.<sup>27</sup> While this assumption cannot be tested, we test for differences in the trends of our outcomes of interest across states of varying indebtedness before the introduction of the Law. To do this, we use the regression outlined in equation 2, where we restrict the sample to the pre-reform period.

$$y_{s,t} = \alpha + \beta_1 Trend_t + \beta_2 DebtState_{s,16Q1} * Trend_t + \gamma_s + \varepsilon_{b,t} \quad (2)$$

The variable  $Trend_t$  in equation 2 is a linear time trend, and as before,  $DebtState_{s,16Q1}$  captures the indebtedness measure of state  $s$  in the first quarter of 2016. The coefficient  $\beta_1$  captures the average trend over time of the outcome of interest  $y_{s,t}$  prior to the Law. The coefficient  $\beta_2$ , the main coefficient of interest, tests for differences in the trends of  $y_{s,t}$  across states of varying indebtedness levels in the pre-reform period. Included in the regression are fixed effects at the state level  $\gamma_s$  and in some specifications, we further include time-level fixed effects. The results of this test for the state-quarterly, state-yearly, state-biyearly, and state-monthly variables are displayed in Tables A2A through A2D of the Appendix. The results for the firm-bank-month level are

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<sup>27</sup> This assumption is more plausible when the outcomes in the pre-reform period are similar in levels across states of varying ex-ante public indebtedness. In Table A3A, we test for differences in mean outcomes in the pre-reform period between states below or above the median public indebtedness. We find that across a series of economic and financial measures, states with varying ex-ante indebtedness were statistically similar prior to the implementation of the Law.

summarized in Table A2E of the Appendix. Overall, we find that the outcomes of states of varying indebtedness levels indeed followed parallel trends before the FD Law was introduced.<sup>28</sup>

We additionally check the validity of our estimates by relying on alternative identification strategies. First, we estimate the impact of the Law by exploiting differences in the alert system classification (i.e., sustainable vs under-watch) of states with ex-ante similar debt-to-net-income ratios. We summarize these results in Internet Appendix Tables IA2 and IA3. Second, we adopt a difference-in-difference approach where the treatment variable is discrete and equal to one if a state's measure of public indebtedness in the quarter prior to the FD Law is above the median indebtedness and zero otherwise. This specification allows us to rule out that our results are driven by states with extreme values in their 2016Q1 ratios of total public debt over free disposable income. The results of this alternative specification are displayed in Internet Appendix Tables IA4 and IA5.

## 4.2. Bank Heterogeneity in the Impact of the FD Law

Banks provide us with yet another layer of variation to study the impact that the FD Law, and debt ceilings in particular, had on credit markets. In particular, we expect that banks that lent a larger share of their funds to ex-ante more indebted local governments, would likely experience more drastic changes to their lending once the debt ceilings were introduced. Descriptive evidence displayed in Figure 5 shows that there was a large divergence in lending across banks with varying ex-ante exposures to local government debt after the Law.<sup>29</sup> In the figure, we split banks into two

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<sup>28</sup> We further check for differences in the non-linear trends of bank lending volumes to local governments and private firms across states before and after the reform. To examine bank lending volumes to local governments, we run a series of regressions using the specification summarized in Equation 3:

$$y_{s,m} = \alpha + \sum \beta_i HighDebtState_{s,16Q1} Month_m + \gamma_s + \gamma_m + \varepsilon_{s,m} \quad (3)$$

where  $HighDebtState_{s,16Q1}$  is indicator variable that equals one for states that in the quarter prior to the FD Law had public indebtedness above the median and zero otherwise.  $Month_m$  is an indicator variable that equals one in month  $m$  and zero otherwise, while the other variables are defined as before. To analyze bank lending volumes to private-sector firms, we run a series of regressions akin to Equation 3, where observations are at the firm-bank-month level. The coefficients of interest  $\beta_m$  are plotted in Figure A1. We corroborate that prior to the Law, the dynamics of bank lending to local governments (Panel A) and private-sector firms (Panel B) were similar across states, and only begun diverging after the implementation of the Law.

<sup>29</sup> In Table A3B, we compare a series of statistics prior to the FD Law between banks with an exposure to local governments in April 2016 above vs below the median. The results show that banks with different exposures to local governments were statistically similar along several characteristics and help us rule out that banks of varying exposures to local government debt are different in other dimensions, such as their capital and liquidity ratios, or their appetite for risk. We further run a regression at the bank-month level to test whether the share of loans channeled to state governments varied across banks with varying ex-ante exposures in quarters around the implementation of the

groups depending on whether their exposure to local government debt prior to the Law is above or below the median. In Panel A, we display the dynamics of total bank lending to local governments (normalized to April 2016) for banks with high and low exposure to local public debt. Prior to the implementation of the Law, the two groups of banks followed similar trends in their lending to local governments. However, six months after the passage of the FD Law, a gap in local government lending begins opening between the two groups of banks, with the growth of subnational government lending being driven by banks ex-ante less exposed to public debt. Panel B shows that the patterns of bank lending to firms across banks are reversed, with ex-ante more exposed banks increasing relatively more their lending to private-sector firms after the Law.

To investigate heterogeneity in the lending dynamics of banks after the FD Law, we relate banks' ex-ante exposures to local government debt to adjustments in their lending to local governments and the corporate private sector after the Law. Our specification, summarized in equation 4, analyzes a series of outcomes at the bank-month level to the bank's ex-ante exposure to debt from local governments.

$$y_{b,m} = \alpha + \beta \text{BankExposureGov}_{b,Mar16} * \text{Post}_m + \gamma_b + \gamma_m + \varepsilon_{b,m} \quad (4)$$

The dependent variable  $y_{b,m}$  consists of a lending outcome of bank  $b$  in month  $m$ . The five outcomes that we examine correspond to: total volume lent (in logs), volume lent to private-sector firms (in logs), volume lent to government entities (in logs), average interest rate on loans to private-sector firms (weighted by loan size), and average interest rate on loans to government entities (weighted by loan size). The variable  $\text{BankExposureGov}_{b,Mar16}$  consists of a bank-level measure of exposure to local governments' debt and is defined as the share of lending to local governments by bank  $b$  in the month prior to the reform. To examine changes in lending outcomes across banks after the FD Law, we interact this variable by the indicator variable  $\text{Post}_m$ . Included in the specification are a series of bank and month fixed effects.

To examine more granularly whether the debt ceilings introduced in the FD Law induced an unwinding of the crowding-out in credit markets, we next apply our identification strategy to

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reform. Figure A2 plots the coefficients of this regression. Results indicate that the share of bank lending destined to local governments by banks with level of indebtedness above/below median were unchanged in the quarters leading up to the reform. However, after the reform, the share of bank lending destined to local governments declined substantially more for the banks that were more exposed to local governments at the time of the implementation of the reform.

loan-level data. More precisely, we first study changes in bank lending to local governments by using data at the state-bank-month level. We then examine variation in bank credit supply to firms using data at the firm-bank-month level. Using loan-level data allows us to test for differences in the loan conditions of firms and local governments across states of varying ex-ante public debt. Furthermore, this data helps us examine if within a state, the loan conditions obtained by firms and local governments differ across banks of varying ex-ante exposures to local public debt. The specification we use is outlined in equation 5.

$$y_{f,b,m} = \alpha + \beta_1 DebtState_{s,16Q1} * Post_m + \beta_2 BankExposureGov_{s,b,Mar16} * Post_m + \beta_3 DebtState_{s,16Q1} * BankExposureGov_{s,b,Mar16} * Post_m + \gamma_{f,b} + \gamma_{b,m} + \varepsilon_{f,m} \quad (5)$$

The dependent variable  $y_{f,b,m}$  corresponds to the total loan volume as well as the loan volume destined to working capital and to investment projects extended to firm  $f$  by bank  $b$  in month  $m$  (all in logs). Other outcomes examined include the interest rate, collateral rate, and maturity of loans obtained by firm  $f$  from bank  $b$  in month  $m$ . The regressors  $DebtState_{s,16Q1}$  and  $Post_m$  are defined as above. The variable  $BankExposureGov_{s,b,Mar16}$  is a state-bank level measure of the exposure of banks to debt from local governments and is defined as the share of lending to local governments of state  $s$  by bank  $b$  in the month prior to the reform. We include in the specification bank-month fixed effects  $\gamma_{b,m}$  to isolate variation in the data within the same bank in the same period. Doing so help us identify whether changes in the relative exposure of a bank to a given state government affects the lending conditions of borrowers in that state after the FD Law. To attribute changes in loan conditions to adjustments in the supply of credit, we need to exhaustively control for time-varying credit demand movements. We do this in two ways. First, we include in some specifications industry-month fixed effects, which help us remove from the analysis sector-driven shocks. Second, in some specifications we control comprehensively for time-varying changes in the demand for credit by including firm-month fixed effects, which allow us to compare the loan conditions that the same firm obtains from banks of varying ex-ante exposures to public debt. Standard errors are double clustered at the state and time levels.

We again test for the validity of our identification strategy by examining the trends of our loan-level outcomes across banks in the pre-reform period. The non-linear trends of the share of

bank lending to local governments are displayed graphically in Figure A2.<sup>30</sup> Prior to the Law, relative lending to local governments and firms followed a relatively similar trend across banks. However, in the quarters following the implementation of the FD Law, banks ex-ante more exposed to local public debt begin contracting relatively more their lending to local governments.

### 4.3. Impact of the FD Law on Firm-Level Outcomes

Finally, we examine the impact of public debt limits on real outcomes of firms. To do this, we apply our identification strategy on firm-year level data obtained from Orbis. With this data, we compare changes in the real activity of firms across states of varying ex-ante indebtedness before and after the FD Law. Since Orbis identifies the municipality where the firm is headquartered and given that bank lending tends to be local, we additionally examine heterogeneity in firms' real activity across municipalities of varying exposure to the FD Law. We define the exposure of a municipality to the FD Law by averaging the exposure to local government debt of the banks that operate in the municipality. Our intuition is as follows. If changes in credit supply are concentrated in banks that were ex-ante more exposed to local public debt, then firms headquartered in municipalities where these banks operate should be relatively more impacted by the FD Law. Our specification is outlined in equation 6.

$$y_{f,y} = \alpha + \beta_1 DebtState_{b,16Q1} * Post_y + \beta_2 DebtBankMuni_{m,Mar16} * Post_y + \beta_3 DebtState_{b,16Q1} * DebtBankMuni_{m,Mar16} * Post_y + \gamma_f + \gamma_y + \varepsilon_{f,y} \quad (6)$$

The outcomes of interest  $y_{f,y}$  in equation 5 correspond to the total liabilities, assets, fixed assets, and sales (all in logs) of firm  $f$  in year  $y$ . The variable  $DebtBankMuni_{m,Mar16}$  is our measure of exposure of a municipality to the FD Law and is calculated as the weighted average of  $BankExposureGov_{s,b,Mar16}$  of the banks operating in municipality  $m$  in March of 2016. All other variables are as defined above. We include year fixed effects to control for yearly shocks, as well

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<sup>30</sup> The test of non-linear trends is based on regressions akin to equation 3, where we relate the loan-level outcome to a set of interactions of the ex-ante exposure to local government debt of banks with monthly dummy variables, and further include bank and time fixed effects. Figure A1 plots the coefficients and respective confidence intervals of these interactions. In results not shown, we also confirm that our loan-level outcomes follow parallel linear trends across states of varying ex-ante indebtedness and banks of varying exposure during the pre-reform period.

as firm-level fixed effects to control for all time-unvarying characteristics of a firm. Finally, we cluster the standard errors at the firm level.<sup>31</sup>

## 5. Results

We now discuss our findings. We first summarize the effect that the FD Law had on aggregate state outcomes, including public fiscal balance, economic activity, and poverty rates. We then discuss our loan-level evidence on the unwinding of crowding out in the credit markets after the introduction of the FD Law. Next, we describe our firm-level results of the impact of the crowding-out unwinding on firms' real outcomes. Finally, we discuss the extent to which the impact of the FD Law depends on the ex-ante composition of states' fiscal spending.

### 5.1. Impact of the FD Law on Fiscal Balance, Economic Activity and Bank Lending of States

In this section, we first discuss the impact that the debt ceilings introduced in the FD Law had on states' fiscal balances. We then summarize how aggregate economic activity of states as well as their poverty rates and income inequality measures were affected by the Law.

#### 5.1.1. Fiscal Balance of States

Table 2A reports our estimates of equation 1 on the fiscal components of states. In Panel A, we show the results for the yearly fiscal expenditure indicators of states. The first indicator, *Total Expenditures<sub>s,y</sub>*, corresponds to the ratio of total public spending over a state's GDP. Consistent with the fiscal austerity that the new debt ceilings impose, we find evidence that more ex-ante indebted state governments contract their fiscal expenditures after the introduction of the FD Law (columns 1 and 2). A one-standard-deviation increase in the ex-ante public indebtedness of a state resulted in a 4.4 percent contraction in public spending after the Law (with the state's ratio of public expenditure to GDP dropping by  $-0.012 \times 0.7 = 0.7$  percentage points). The second indicator, *Infrastructure<sub>s,y</sub>*, is the ratio of public spending on infrastructure to the state's GDP. This

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<sup>31</sup> To validate our difference-in-difference strategy in the firm-year-level data, we again conduct several checks. First, we compare firm outcomes in the pre-reform period for firms located in municipalities with local public debt exposure above and below the median (Table A3C). The data confirms that both groups of firms are statistically indistinguishable on our outcomes of interest prior to the Law. Second, we check if the firm-level outcomes followed parallel trends in the pre-reform period. To conduct this test, we run regressions outlined on equation 2 on our firm-year data, restricting the sample to the period prior to the introduction of the FD Law. Results summarized in Table A2F, confirm that in the pre-reform period, the outcomes of interest follow parallel trends across states of varying indebtedness.



expenditure category mostly comprises investment in public infrastructure and construction projects. Our estimates in columns 3 and 4 indicate that as a result of the FD Law, ex-ante more indebted state governments also contracted their expenditures in infrastructure projects relative to their GDP. A one-standard-deviation increase in a state's ex-ante indebtedness leads to a contraction in public infrastructure spending over GDP of around 0.003 percentage points ( $0.004 \times 0.7$ ), corresponding to a 39 percent drop. The next indicator, *Social Services*<sub>s,y</sub>, consists of the ratio of the public spending category “transfers, subsidies and other aid” to the state's GDP. This category is the largest expenditure of local governments and is mainly directed to more vulnerable populations via funding of health, education, and social assistance programs/institutions. Results in columns 5 and 6 show that ex-ante more indebted states also cut their spending on social aid after the Law. Our estimates indicate that a one-standard-deviation increase in a state's ex-ante indebtedness is associated with a reduction in social-aid public spending of around 5 percent. Finally, the last two columns of Panel A present the results of the impact of the FD Law on the ratio of public debt servicing to states' GDP. Consistent with the increased borrowing risk from the introduction of debt ceilings, we find that more ex-ante indebted state governments had to channel more of their resources to service their outstanding debt after the FD Law.

Estimates of the effect of the FD Law on states' yearly fiscal revenue indicators are displayed in Panel B. More concretely, we focus on the two main sources of operational income of subnational governments— federal transfers and taxes. As expected, results from columns 9 and 10 show that the FD Law did not affect the ratio of federal transfers to a state's GDP. However, our estimates in columns 11 and 12 suggest that tax rates in more ex-ante indebted states increased after the FD Law (by 10 percent on average), likely in an attempt to raise fiscal revenue. Overall, these results suggest that more indebted states reduce public spending and raise taxes to increase the repayment rate of their outstanding debt.

### *5.1.2. Economic Activity of States*

Table 2B presents our estimates from equation 1 using the state-quarterly data. Our first outcome of interest corresponds to the GDP of states. The next outcomes are states' total employment, as well as employment in the primary, secondary, and tertiary sectors. All these variables are measured in quarterly growth rates. Overall, the estimates suggest that after the

introduction of the FD Law, states with ex-ante higher indebtedness experienced an increase in their aggregate production and employment. The impact of the FD Law on state GDP is positive and statistically significant: a one-standard-deviation increase in the ex-ante public indebtedness measure of a state led to an average increase in the quarterly growth rate of state GDP of around 0.2 percentage points ( $0.003 \times 0.7$ ). The impact on employment varied across sectors of production, with no aggregate change on the primary sector, and a mildly positive (albeit noisy) impact on the tertiary sector. The increase in employment appears to be stronger in the secondary sector, which tends to be more capital intensive (Buera, Kaboski and Shin, 2011) and therefore is likely to benefit relatively more from looser financing. As Internet Appendix Table A4 shows, the economic magnitudes of these results remain similar when we adopt a difference-in-difference approach with discrete treatment.

Table 2C displays the impact estimates of the FD Law on poverty and inequality measures, reported at the state-level at a biennial frequency (i.e. even years). Our outcomes of interest include the share of the state's population living in total, moderate and extreme poverty, as well as the Gini coefficient. Estimates in columns 1 through 4 indicate that states with higher ex-ante indebtedness—which increased substantially their GDP and employment following the FD Law—also saw declines in their total and moderate poverty rates after the FD Law. More concretely, a one-standard-deviation increase in ex-ante state indebtedness led to a reduction in the share of poverty of around 1.4 percentage points (3.3 percent) and a reduction in share of moderate poverty of around 2.8 percentage points (8.3 percent). However, compared to states with ex-ante lower public debt, the share of population living under extreme poverty increased in states that had higher indebtedness prior to the FD Law (columns 5 and 6). A one-standard-deviation increase in the level of state ex-ante public indebtedness leads to an increase in extreme poverty of around 1.4 percentage points (15.6 percent). This result is consistent with our previous finding that the FD Law induced states with ex-ante higher public debt to carry out spending cuts in areas such as social protection.<sup>32</sup> Nevertheless, despite the increase in extreme poverty, we do not find evidence of rising income inequality after the FD Law in ex-ante more indebted states (columns 7 and 8).

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<sup>32</sup> In other results not shown, we find that extreme poverty of a state is highly sensitive to changes in the state's spending on social programs, suggesting that spending cuts in this area presumably hurt the most vulnerable population.

### *5.1.3. Bank Lending to State Governments and Private-Sector Firms*

Our findings so far suggest that after the FD Law, ex-ante more indebted states grow faster—despite adopting fiscal austerity measures. One potential mechanism explaining these results has to do with credit reallocation (away from the public sector and possibly into private-sector firms seeking financing). Our intuition being that the restrictions to local government debt introduced by the FD Law likely pushed banks previously lending to the public sector to channel their credit elsewhere possibly within the same state. To establish if the FD Law indeed induced banks to reallocate their credit, we examine the evolution of banking lending to local governments and private-sector firms after the Law. We further investigate bank heterogeneity in credit reallocation, exploiting variation across banks given their exposure to debt from local governments prior at the time of the implementation of the Law.

Table 3A displays the estimates of equation 1 on the bank loans to local governments at the state-month level. The three outcomes of interest are the evolution of total bank lending, total bank lending in term loans—which tends to be used to finance investment projects—and total bank lending in credit lines—which is credit primarily used to finance working capital. All variables are in logs. Overall, the results suggest that ex-ante more indebted state governments experienced a decline in their bank borrowing once the FD Law was introduced. Columns 1 and 2 show that, after the implementation of the Law, state governments with higher ex-ante debt significantly contracted their total loan volume. More concretely, a one-standard-deviation increase in the ex-ante indebtedness of a state government led to a reduction of around  $0.09 \times 0.7 = 6.3$  percent in its bank credit volume. As columns 3 to 6 show, the reduction in lending to state governments was driven by a reduction in term loans, with the impact on credit lines being statistically indistinguishable from zero.

Table 3B further displays the estimates of equation 1 on the terms obtained by local governments on their bank loans. We find that after the FD Law, more ex-ante indebted states experience an increase in the cost of credit relative to other state governments, in the form of higher interest rates, and higher collateral requirements. Albeit with no adjustment in the maturity of their loans. For example, a one-standard-deviation increase in the ex-ante indebtedness of a state government, leads to a 60 basis points increase in their interest rate. We interpret these findings as

evidence that the FD Law had a larger impact on the relative tightening of bank lending to state governments with higher ex-ante levels of debt.

While more indebted state governments contracted their bank borrowing after the FD Law, the *a priori* direction of the impact of government borrowing restrictions on lending to private firms is unclear. On the one hand, governments might have crowded-out private firms and banks may redirect lending towards the private sector. On the other hand, banks may contract their lending in highly indebted states due to the predicted lower government spending and consequential lower economic activity.<sup>33</sup>

We now discuss our loan-level evidence of the impact of government borrowing restrictions on bank credit to private firms. To do so, we use a specification akin to equation 3, where observations are at the firm-bank-month level. We include in this specification fixed effects at the bank-month level, which help us isolate variation in the credit supply of a given bank in a given month across states of different ex-ante public indebtedness. We also introduce firm-bank fixed effects to control for time-invariant demand factors within a firm-bank pair. Thus, we compare changes in lending outcomes of the same firm-bank pair before and after the introduction of the FD Law. Finally, we saturate some specifications with sector-month fixed effects to control for monthly changes in the credit demand of firms from different sectors.

Table 4A displays our estimates for three outcomes of interest, all in logs:  $Value_{f,b,m}$ , which corresponds to the total credit volume extended to firm  $f$  by bank  $b$  in month  $m$ , as well as credit volume issued to finance investment projects ( $Investment_{f,b,m}$ ) and working capital ( $Working\ Capital_{f,b,m}$ ). Results in columns 1 and 2 show that an increase in ex-ante state public indebtedness is associated with increases in bank lending to private firms after the implementation of the FD Law. More concretely, a one-standard-deviation increase in the indebtedness of a state leads to a  $0.015 \times 0.7 = 1$  percent increase in lending to private firms. Results in columns 3 through 6 show that the increased lending is mainly in the form of credit towards investment projects. More concretely, a one-standard-deviation increase in the indebtedness of a state leads to a 3.6 percent rise in credit

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<sup>33</sup> These predictions assume that capital markets in Mexico are not perfectly integrated. If they were, any potential crowding-out would happen at the national level, not the state level, since a local increase in demand for credit would not result in higher interest rates at the local level, instead capital would flow across locations, equalizing interest rates across states. Huang, Pagano and Panizza (2020) also show that Chinese capital markets are not perfectly integrated.

to finance investment of firms, and a 1.2 percent increase in credit destined to working capital. In Table 4B, we further examine the evolution of the credit terms of bank loans to firms following the FD Law. We find that a one-standard-deviation increase in the public indebtedness of a state leads to an increase of 1 percent in the collateral rate on loans to private-sector firms in the state, with no change in other margins.

#### *Unwinding of Crowding Out: Robustness Checks*

We conduct a series of robustness checks to confirm the validity of our crowding-out mechanism. First, given our results suggesting that state-level employment in the secondary sector is positively impacted by the FD Law, we explore whether bank lending is disproportionately reaching firms operating in the secondary sector which tend to be more capital intensive (Buera, Kaboski, and Shin, 2011). Table A4 summarizes our findings, which overall confirm that firms operating in the secondary level experience a relatively larger increase in their bank credit volumes, especially on loans destined to investment. For these firms, a one-standard deviation increase in ex-ante indebtedness of states leads to a 6.7 percent increase in loan value.

Second, to ensure that our results are not driven by variations in external conditions—mainly from the United States—we split the sample into northern and non-northern states, and check whether the effects we obtain are concentrated geographically. Northern states in Mexico are more exposed to external shocks as they have substantially more economic relations with the United States (INEGI, 2014) as well as a larger share of exports to GDP (39 percent compared to 12 percent). We rule out that our results are concentrated in the Northern states and thus driven by external conditions as opposed to the FD Law (Table A5).<sup>34</sup>

Third, as we discussed earlier, the Law of Financial Discipline affects state as well as municipal governments. While the overall bank debt of states is 12 times larger than that of municipalities, we also check if after the Law, bank lending to private firms expands more in more indebted municipalities. Our results, summarized in Table A6, confirm that conditional on the public indebtedness of a state, bank lending to the private sector increases more in municipalities with ex-ante higher per capita public debt following the FD Law. In a state of average public indebtedness, a one-standard-deviation increase in the ex-ante per capita public debt of a

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<sup>34</sup> We also find that these results go through if we split the sample into tradable and non-tradable sectors (results available upon request).

municipality where a firm is headquartered, leads to the firm experiencing an increase in its loan volume of 0.4 percent, and an increase in its loan volume to finance investment and working capital of 3.2 and 0.4 percent, respectively. These results provide further evidence that lending to local public governments in the pre-reform period was crowding out lending to private firms.

Fourth, we further test whether private-sector borrowers operating in sectors less dependent on public spending (i.e., less affected by the contraction in government spending) benefit relatively more from the reform. Following Belo, Gala, and Li (2013), we use the Mexican Input-Output table at the 4-digit NAICS level to calculate the share of revenues that comes from sales to the government for each sector. The results of this exercise are displayed in Table A7. They suggest that private borrowers operating in sectors less dependent on government spending benefit relatively more from the reform curtailing local public debt. More concretely, a one-standard-deviation decrease in the level of government exposure is associated with a 0.1 percent increase in total loan volume, and a 0.7 percent increase in loans destined to investment.

Fifth, along with the debt ceilings, the Law also introduced procurement rules requiring state-owned entities to carry out a competitive procurement process with multiple lenders and select the offer with the lowest cost. One potential threat to our identification is that by potentially reducing the cost of credit of local governments, the new procurement rules might have induced local governments with ex-ante lower debt (i.e., the states that belong to our control group) to increase their indebtedness. In such case, the gap in public debt that widened across states of varying indebtedness after the Law would be driven not exclusively by the debt contraction of ex-ante more indebted governments (due to the new debt ceilings), but also by the rise in debt of ex-ante less indebted governments (due to the procurement rules). We rule out this concern in two ways. First, we examine changes in bank lending of ex-ante less indebted local governments before and after the Law. As Figure 2 shows, while local governments with ex-ante higher public debt contracted considerably their bank liabilities ex-post, bank lending of ex-ante less-indebted local governments did not increase. If anything, the liabilities of local governments with ex-ante lower debt decreased after the Law, albeit at a slower pace than their more indebted peers. Similarly, as Panel B of Figure IA1 shows, even state governments of ex-ante lower indebtedness saw an increase in the cost of credit in the years following the FD Law. Second, we rely on an alternative identification strategy to estimate the impact of the debt ceilings. Under this strategy, we exploit

differences in the alert system classification (i.e., *sustainable* vs *under-watch*) of 10 states with ex-ante similar debt-to-net-income ratios around the threshold splitting five *sustainable* and five *under-watch* states. We confirm that our results under this alternative methodology remain similar in magnitude (see Internet Appendix Tables IA2 and IA3). Further evidence that mitigates this concern comes from Agarwal et al. (2021), who examine states in Mexico with low public debt levels to investigate whether the introduction of procurement rules in the FD Law altered the credit terms of state-owned entities (SOEs) seeking financing. They find that in low-debt states, while the interest rates on bank loans of SOEs declined after the Law (as intended by the procurement rules), the volume of credit they obtained remained unchanged.

## **5.2. Bank Heterogeneity in the Impact of the FD Law**

So far, our results indicate that in states with ex-ante more public indebtedness, local governments contracted their bank borrowing after the FD Law, and in turn, bank lending to private firms headquartered in the states increased. However, we would expect the adjustment in credit to vary across banks. Banks with no lending relationship with local governments prior to the Law would likely see little change in their lending patterns. In contrast, the FD Law likely induced more adjustments among ex-ante more aggressive lenders of local governments. Following the lending contraction to local governments due to the debt ceilings, lenders ex-ante more exposed to local governments would have to reallocate their funds.

We now discuss our evidence on bank heterogeneity in the lending adjustments to local governments observed after the FD Law. To capture the exposure of a bank to local governments prior to the FD Law, we calculate the share of lending the bank channeled to subnational governments relative to its total lending in March 2016. We then relate the ex-ante exposure of banks to local governments to lending outcomes before and after the introduction of the Law.

Table 5 presents the estimates of equation 4 on a series of monthly balance-sheet outcomes of banks. As column 1 shows, differences in ex-ante exposures of banks to local government lending are not associated with variations on their ex-post aggregate lending. However, estimates in columns 2 and 3 show that there is large variation in the composition of bank lending after the FD Law. More concretely, a one-standard-deviation increase in ex-ante bank exposure to public local debt is associated with a 28 percent reduction in volume lent to local governments, and a 31 percent increase in volume lent to private-sector firms. Results in columns 4 and 5 also indicate

that a one-standard-deviation increase in ex-ante bank exposure to local public debt is associated with a 0.30 percentage points increase in interest rates on loans to local governments, with no effect on the interest rate charged to private-sector borrowers. Overall, these results suggest that, while the FD Law did not impact aggregate lending of banks, it did change the composition of lending of more-exposed banks, with more lending being channeled to private-sector firms as opposed to local governments.

Further evidence of the heterogeneity across banks in the crowding-out channel comes from analyzing changes in bank lending more granularly. Doing so allows us to relate lending adjustments within a state by banks with varying ex-ante exposures to the state's public indebtedness. Our exercise is based on regressions summarized in equation 5, with observations at the bank-state-month and firm-bank-month levels. Table 6 summarizes our results for the state-bank-month (Panel A) and firm-bank-month (Panel B) data. In Panel A, the outcome of interest corresponds to the total volume lent to state-government  $s$  by bank  $b$  at month  $m$ . Our estimates from columns 1 to 3 indicate that the contraction in lending to ex-ante more indebted local governments after the Law is mainly driven by banks with higher ex-ante exposures to local public debt. That is, in a state with an average ex-ante public indebtedness ratio of around 0.86, a one-standard-deviation increase in bank exposure leads to a 23 percent decline in lending to the government. This effect remains significant and larger in magnitude when bank-month and state-month fixed effects are further introduced in the regression (columns 2 and 3). In Panel B, the outcome of interest corresponds to the value of loans extended by bank  $b$  to firm  $f$  in month  $m$ . Our results show that after the Law, banks ex-ante more exposed to the public debt of a state increase their lending to private firms headquartered in the state (Columns 4 to 6). More concretely, a one-standard-deviation increase in bank exposure is associated with a 2.3 percent increase in lending to firms (Column 4).<sup>35</sup> Estimates from Column 5 further indicate that this adjustment in credit supply remains (and becomes economically larger) once we saturate our specification with bank-month and state-month fixed effects. In Column 6, we further include firm-month fixed effects to exhaustively control for unobserved time-varying firm fundamentals (e.g., firm risk, investment opportunities, and balance sheet movements). One drawback of the inclusion of firm-month fixed

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<sup>35</sup> While the magnitude of the impact on bank lending to states (around 30 percent) is higher than the impact to private firms (2 percent) this regression is only analyzing the impact at the intensive margin, not the bank lending to new firm-bank relations. As noted in Table 5, where we analyze results at the aggregate bank-month level, the magnitudes of the impact of the FD Law on bank lending to states and firms are relatively similar (albeit with opposing signs).



effects is that we restrict the sample to firms that at a given month have loans with more than one bank. Thus, this exercise could bias our results downwards since firms with multiple lenders tend to have lengthier credit histories and greater access to financing. While we drop more than half of the observations, the results overall corroborate that after the FD Law, firms in more indebted states experience an expansion in the supply of credit by banks previously more exposed to local public debt. In a state with an average public indebtedness ratio, a one-standard-deviation increase in the ex-ante exposure of a bank to local debt leads to an increase in loan volume to private firms of the state of 8.8 percent.

### **5.3. Impact of the FD Law on Firm-Level Outcomes**

We now analyze the impact of the unwinding of crowding-out in the credit markets on the real outcomes of firms. For that, we run equation 6 to relate yearly outcomes of firms to the public indebtedness of their states as well as to the public debt exposure of banks operating in their municipalities. All specifications include firm fixed effects, while some include year fixed effects or state-year fixed effects. Our results are displayed on Table 7. As noted from columns 1, 3 and 7, after the FD Law, firms in more ex-ante indebted states experience an increase in their liabilities, assets, and sales. More concretely, a one-standard-deviation increase in the ex-ante indebtedness of a state results in an increase in liabilities, assets, and sales of around 6 percent, 7 percent, and 1.2 percent, respectively. In columns 2, 4, 6 and 8, we further examine if changes in the real effects of firms vary with the average ex-ante exposure to local public debt of banks in their municipalities.<sup>36</sup> Our findings suggest that within a state, real outcomes of firms tend to grow relatively more after the Law the higher exposition of banks in their municipalities. More concretely, a one-standard-deviation increase in the measure of municipality exposure, in a state with average public indebtedness, is associated with an increase in liabilities of 2.5 percent, in assets of 2.2 percent, in fixed assets of 0.5 percent, and in sales of 3.8 percent. We again interpret these results as evidence that the implementation of debt ceilings in the FD Law helped reduce the crowding out in lending of private firms, especially of those operating in locations where banks used to finance more heavily local governments.

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<sup>36</sup> The intuition for this exercise is that given that bank lending is local (Degryse and Ongena, 2005), we expect firms in the same state, but located in municipalities with a large fraction of banks exposed to lending to local governments, to be relatively more impacted by the FD law relative to other firms in the same state but in municipalities with banks less exposed to bank lending to local governments.

#### 5.4. Heterogeneity in the Impact of the FD Law given Composition of Fiscal Spending

Given that public spending on infrastructure projects tends to be more productive (Cohen and Paul, 2004), we now investigate whether the impact of the FD Law differed depending on the type of spending carried out by state governments. To do so, we define the variable *Non-Infrastructure<sub>s,2015</sub>* as the share of fiscal spending of a state in non-infrastructure projects (out of total fiscal spending) in 2015.<sup>37</sup> We then introduce this variable in equation 1, both in levels and in interactions with the *Post<sub>t</sub>* and *DebtState<sub>s,16Q1</sub>* variables, to examine differences in state-level outcomes of economic activity.

Results displayed in Table 8A indicate that the ex-ante composition of fiscal spending indeed affects the subsequent behavior of macro outcomes of states. More concretely, in a state with average ex-ante public indebtedness after the passage of the FD Law ( $\sim 0.86$ ), a one-standard-deviation increase in the share of public spending in non-infrastructure projects is associated with an increase of around  $0.062 \times 0.028 \times 0.86 = 0.15$  percentage points of GDP growth and an increase in employment growth of 0.09 percentage points. These findings suggest that the crowding-out effect was greater in states where governments were spending a larger fraction of their budget on projects unrelated with public investment. Thus, the marginal return of capital reallocation from public towards private firms is higher in states channeling relatively more resources on expenditures different from public infrastructure projects.

Similarly, we analyze the impact of the FD Law on poverty rates and income inequality of states of varying ex-ante indebtedness and composition of public spending. Our results are summarized in Table 8B. The estimated coefficients of the triple interaction in Columns 2 and 3 indicate that at similar ex-ante indebtedness levels, states that ex-ante channeled more public spending in non-infrastructure projects experience higher reductions (increases) in their moderate (extreme) poverty rates. For a state of average ex-ante public indebtedness, a one-standard-deviation increase in the ex-ante share of public spending in non-infrastructure is associated with a reduction in moderate poverty of 3.6 percent and an increase in extreme poverty of 5.5 percent.

We further investigate the differential impact of the FD Law on lending outcomes to private firms by states' type of public spending. The results, displayed in Table 8C, suggest that the

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<sup>37</sup> Results are qualitatively similar if we average a state's investment rate over the previous three or five years.

unwinding of crowding out experienced after the Law was stronger in states spending more on non-infrastructure projects. More concretely, in a state with average ex-ante public indebtedness, a one-standard-deviation increase in the share of spending on non-infrastructure is associated with an additional 1.7 percent increase in bank loans to firms.

Finally, we investigate whether the crowding out in credit markets was more severe among firms with shorter credit histories with their banks, which tend to be more credit constrained.<sup>38</sup> To do so, we proxy for the credit history of a borrower using the length of time that has passed since the creation of the firm-bank relationship. With this variable, we then rerun the previous exercise splitting the sample of firms across borrowers with a credit history above/below the median (three years). Our results are shown in Table A8 in the Appendix. The outcomes we examine are the bank loan values (total, to investment and to working capital) to firms with short and long credit histories. Our results show that while both types of firms benefit from larger bank lending volumes after the FD Law, the unwinding of the crowding out was concentrated on borrowers with short credit history. That is, a one-standard-deviation increase in a state's indebtedness is associated with a 1 (Column 1) and 2 (Column 7) percent increase in loan volume for borrowers with long and short credit histories respectively.<sup>39</sup> Moreover, while there is no relation between the rate of fiscal public infrastructure spending of more ex-ante indebted states and lending to borrowers with long credit history, this relation is strong and economically large for borrowers with short credit history. More concretely, for an average indebted state, a one-standard-deviation increase in the share of non-infrastructure spending is associated with an additional 4.7 percent increase in the value of loans. Overall, these results suggest that the crowding out of government borrowing prior to the FD Law was having an outsized negative impact on bank lending by more credit constrained firms.

## 6. Conclusions

In this paper, we study the potential crowding out in credit markets of private firms by the government. To do this, we study a Mexican reform imposing restrictions on subnational bank

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<sup>38</sup> In the presence of credit rationing and financial frictions, government debt is especially damaging for firms with restricted credit access (Broner, Erce, Martin, and Ventura, 2014).

<sup>39</sup> This effect is even stronger when analyzing the impact of loans destined to investment projects. In this case a one-standard-deviation increase in a state's indebtedness is associated with a 3 percent and 9 percent increase in loan volume for borrowers with long and short credit histories respectively.

debt—the Financial Discipline Law to States and Municipalities—establishing ceilings on public debt for local governments.

Exploiting variation over time and across states, we find that state-level economic activity (i.e., GDP and employment) increased in ex-ante more indebted states after the enactment of the Law. While moderate poverty rates in ex-ante more indebted states dropped following the FD Law, extreme poverty rose. Consistent with these results, we find that ex-ante more indebted states carried out more severe fiscal austerity measures in the form of spending cuts in areas such as infrastructure and social protection.

To uncover the mechanism behind the economic growth among ex-ante more indebted states despite them carrying out tighter fiscal austerity measures, we analyze the impact of the FD Law on bank lending allocation. We find that in states with ex-ante higher public indebtedness, banks reallocated lending away from the government and into private-sector firms after the FD Law. The unwinding of this crowding out has greater benefits for more credit constrained firms and firms that were borrowing from banks more exposed to local public debt. Finally, we find that the impact of the Law on economic growth, poverty, and the unwinding of crowding out in the credit markets is stronger among states that prior to the Law channeled a larger share of their public spending to non-infrastructure projects.

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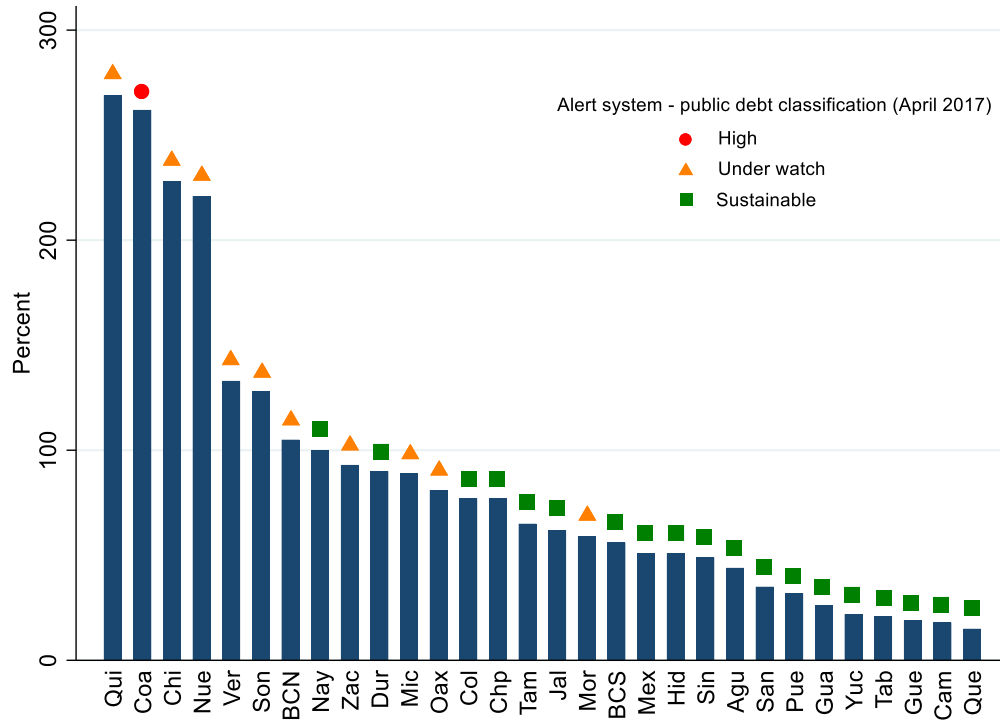
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**Figure 1 – Public Debt of States in 2016Q1**

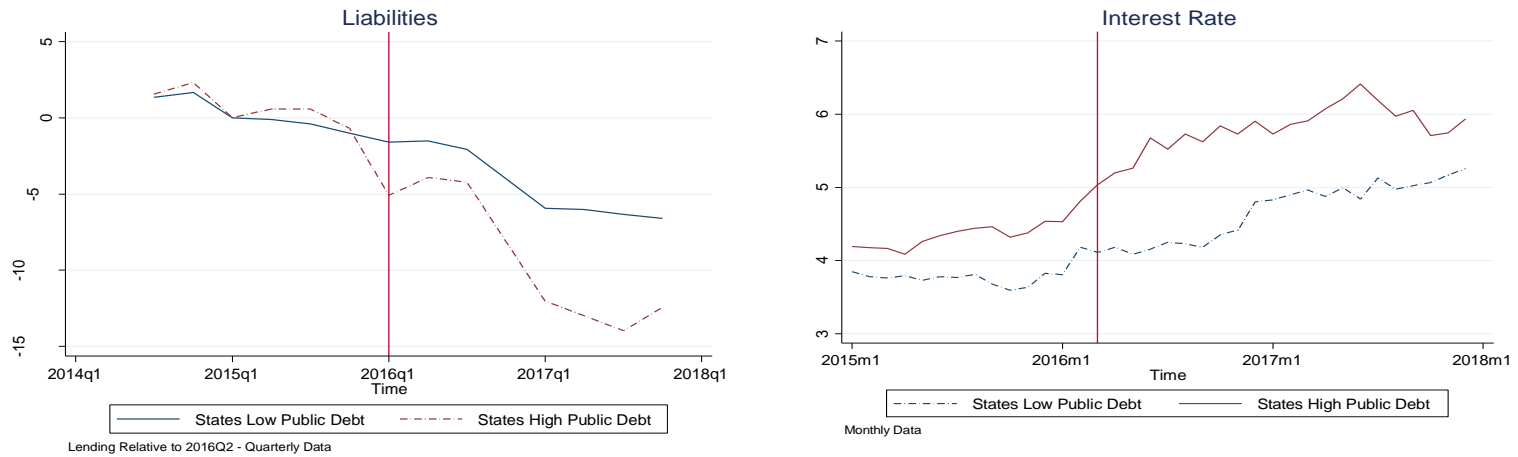
This figure plots the ratio of public debt to freely disposable income of Mexican states in 2016Q1 – one month prior to the implementation of the FD Law – along with the first public debt classification of states under the alert system in April 2017.





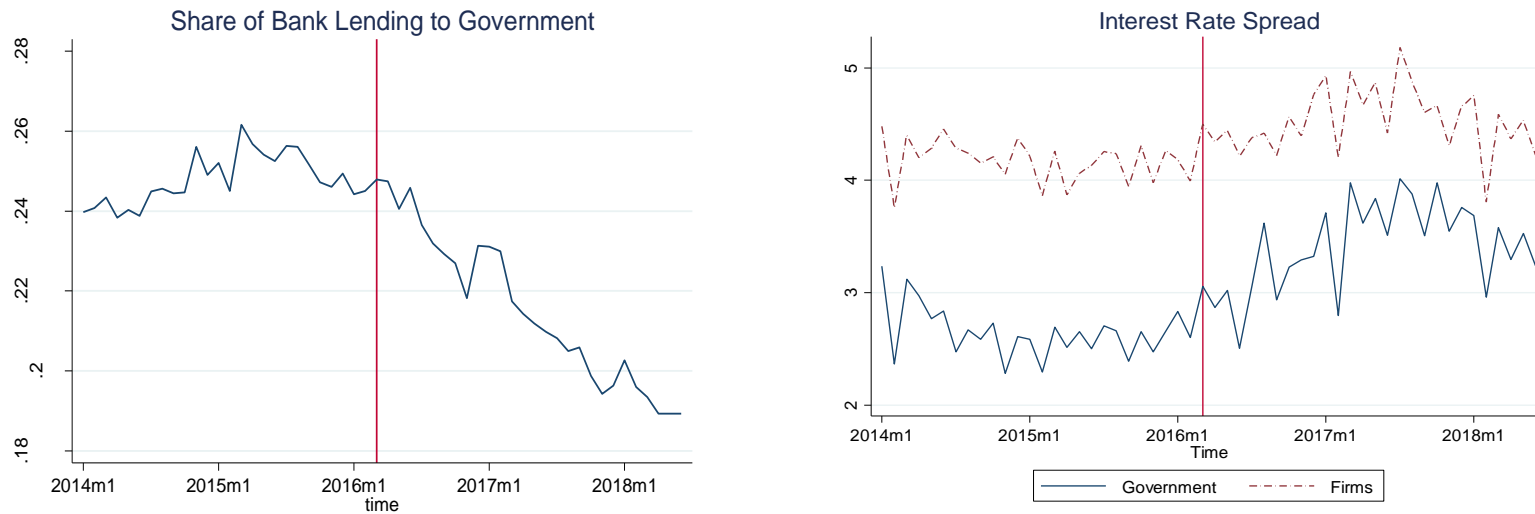
### Figure 2 – Bank Lending and Interest Rates to Local Governments with Low vs High Public Debt

Panel A plots bank quarterly lending to state governments, relative to 2016Q2, for states with high and low public debt. A state is defined with high (low) public debt if its debt as a share of income in the quarter prior to the reform is above or below the median. Panel B plots the monthly interest rate on bank loans paid by state governments with high and low public debt. The vertical lines in both panels mark the introduction of the FD Law.



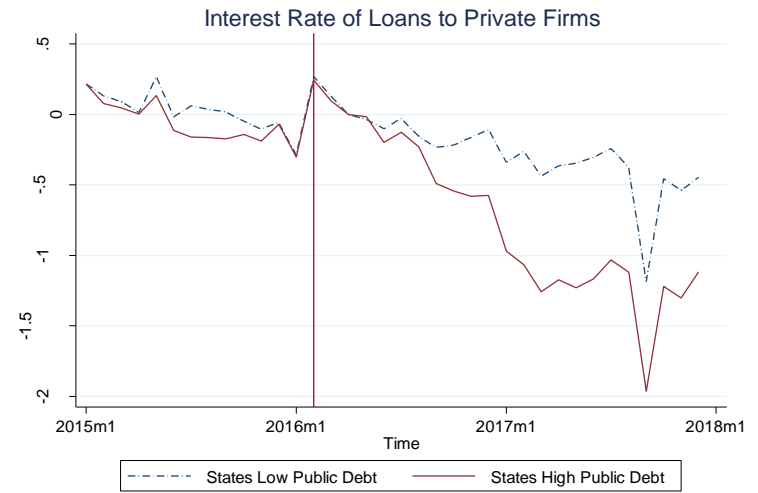
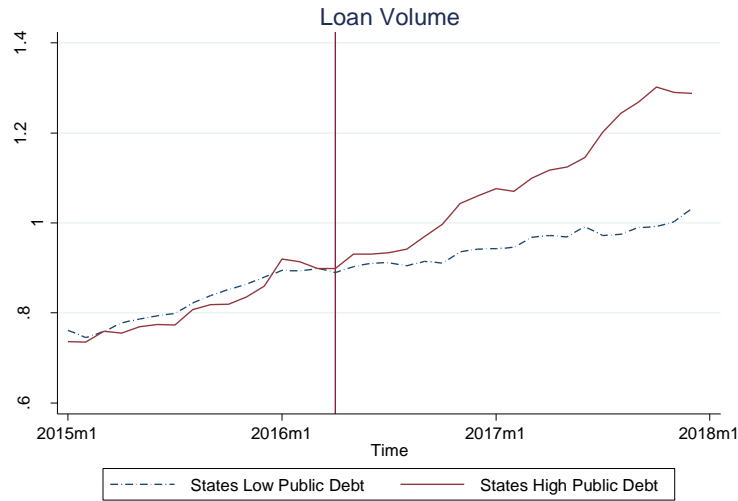
### Figure 3 – Bank Lending and Interest Rates to Local Governments and Firms

Panel A plots the share of bank lending channeled to the government (out of total bank lending to all government entities and private firms) relative to March 2016, the month prior to the implementation of the Law. Panel B plots the average interest rates on bank loans—net of cost of funds—charged to state governments and private firms. The vertical lines in both panels mark the introduction of the FD Law.



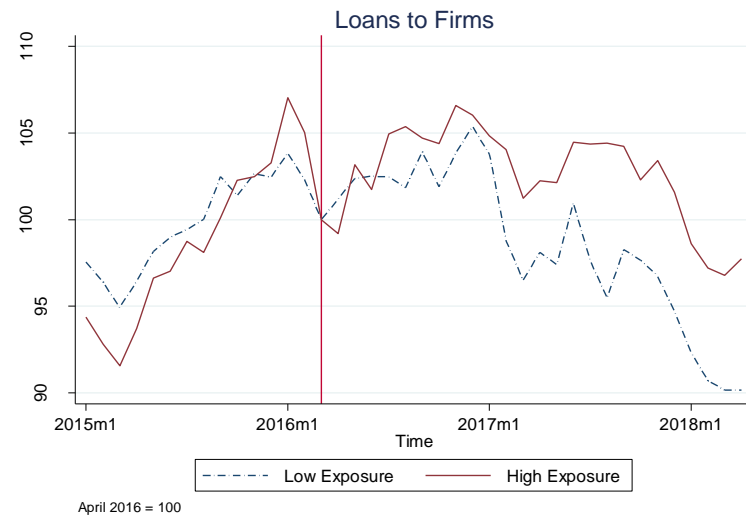
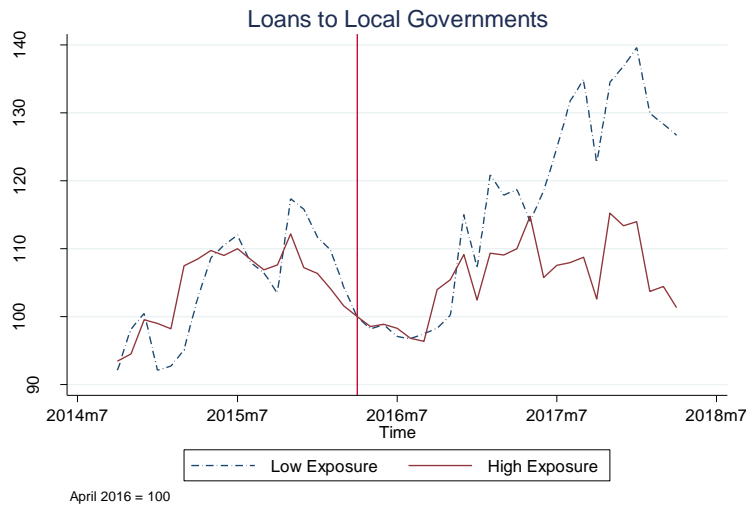
### Figure 4– Bank Lending and Interest Rates to Firms Given State Public Debt

The figures plot the evolution of bank lending (Panel A) and interest rates on bank loans (Panel B) to state governments and private firms relative to January 2014. In both panels, states are divided into two groups depending on whether their indebtedness in 2016Q1 was above or below the median indebtedness. The vertical lines in both panels mark the introduction of the FD Law.



### Figure 5 –Bank Lending to Local Governments and Firms given Bank Exposure to Local Public Debt

The figures plot the evolution of lending to state governments (Panel A) and private firms (Panel B) relative to March 2016 by banks with low and high ex-ante public debt exposure. Banks are considered to have high (low) ex-ante exposure to public debt if their share of lending to public entities in 2016Q1 was above (below) the median. The vertical lines in both panels mark the introduction of the FD Law.



**Table 1 - Summary Statistics**

Panel A exhibits macro level data of states and municipalities. Panel B presents statistics on the fiscal balance components of local governments. Panel C presents a series of statistics of bank lending to local governments. See Table A1 in the Appendix for variable definitions.

	Obs.	Mean	p10	Median	p90	Std. Dev.
<b>Panel A. Economic Indicators of States/Municipalities</b>						
DebtState <sub>s,16Q1</sub>	30	0.86	0.20	0.64	2.25	0.70
Maturity <sub>s,16Q1</sub>	30	14.6	8.3	14.2	19.3	3.9
DebtBankMuni <sub>m,Mar16</sub>	984	0.24	0.02	0.34	0.37	0.15
DebtMunicipality <sub>m,16Q1</sub>	1,083	0.03	0.00	0.00	0.08	0.05
Employment	434	0.006	-0.021	0.006	0.033	0.022
- Primary	434	0.004	-0.13	0.003	0.141	0.109
- Secondary	434	0.011	-0.049	0.009	0.074	0.05
- Tertiary	434	0.006	-0.028	0.006	0.039	0.028
GDP <sub>s,q</sub>	496	0.008	-0.05	0.009	0.062	0.039
Poverty <sub>s,y</sub>	155	0.43	0.28	0.42	0.64	0.14
Poverty – Moderate <sub>s,y</sub>	155	0.34	0.25	0.34	0.44	0.08
Poverty – Extreme <sub>s,y</sub>	155	0.09	0.02	0.06	0.19	0.08
Gini <sub>s,y</sub>	155	0.47	0.42	0.47	0.51	0.04
<b>Panel B. Fiscal Balance Components of State Governments</b>						
Total Expenditure <sub>s,y</sub>	174	0.158	0.090	0.149	0.258	0.060
Infrastructure <sub>s,y</sub>	174	0.007	0.002	0.006	0.016	0.005
Social Services <sub>s,y</sub>	180	0.066	0.029	0.057	0.125	0.038
Debt Servicing <sub>s,y</sub>	174	0.007	0.001	0.004	0.018	0.008
Transfers <sub>s,y</sub>	174	0.135	0.074	0.127	0.214	0.058
Tax Rate <sub>s,y</sub>	150	0.490	0.289	0.465	0.670	0.168
Non-Infrastructure <sub>s,2015</sub>	180	0.045	0.017	0.044	0.082	0.028
<b>Panel C. Bank Lending to State Governments</b>						
Loans – Govt <sub>s,m</sub>	1,080	22.66	21.28	22.51	24.24	1.07
Credit Line – Govt <sub>s,m</sub>	891	19.40	16.61	19.88	21.65	2.40
Term Loan – Govt <sub>s,m</sub>	1,080	22.57	21.17	22.48	24.09	1.10
Interest Rate <sub>s,m</sub>	1,080	6.81	5.51	6.38	8.74	1.31
Collateral <sub>s,m</sub>	1,080	0.01	0.00	0.01	0.01	0.00
Maturity <sub>s,m</sub>	1,080	5.00	4.59	5.07	5.32	0.34

**Table 1 - Summary Statistics (Cont'd)**

Panel D presents the summary statistics of outcomes at the loan (firm-bank-month) level. Panel E shows the summary statistics of outcomes at the firm-year level. Panel F displays the summary statistics of bank-month-level outcomes. Panel G presents statistics of firm and state characteristics. See Table A1 in the Appendix for variable definitions.

	Obs.	Mean	p10	Median	p90	Std. Dev.
<b>Panel D. Bank Lending to Private Firms</b>						
Value <sub>f,b,m</sub>	1,216,258	13.27	10.64	13.46	15.77	2.41
Investment <sub>f,b,m</sub>	200,318	12.85	9.55	12.93	16.14	2.64
Working Capital <sub>f,b,m</sub>	1,100,190	13.27	10.77	13.46	15.66	2.35
Interest Rate <sub>f,b,m</sub>	1,216,258	14.42	8.65	13.43	20.72	5.32
Collateral <sub>f,b,m</sub>	1,216,258	0.32	0.00	0.00	1.00	0.41
Maturity <sub>f,b,m</sub>	845,642	2.89	1.36	3.09	4.22	1.13
<b>Panel E. Firm Real Outcomes</b>						
Liabilities <sub>f,y</sub>	1,755	10.06	8.09	9.68	12.96	1.93
Assets <sub>f,y</sub>	1,818	11.12	9.09	10.54	14.52	2.09
Fixed Assets <sub>f,y</sub>	1,747	9.44	6.40	8.94	13.89	2.73
Sales <sub>f,y</sub>	1,911	10.68	9.62	10.46	11.99	1.16
<b>Panel F. Bank-Level Indicators</b>						
Loans <sub>b,m</sub>	468	11.92	9.91	12.34	13.33	1.35
Loans – Govt <sub>b,m</sub>	468	8.34	3.85	9.44	10.93	2.94
Loans – Non-Govt <sub>b,m</sub>	468	11.23	9.40	11.57	12.65	1.28
IntRate – Govt <sub>b,m</sub>	468	6.51	4.20	6.23	9.08	2.13
IntRate – Non-Govt <sub>b,m</sub>	468	8.32	5.55	7.78	11.78	2.73
BankExposureGov <sub>b,Mar16</sub>	468	0.32	0.06	0.3	0.75	0.25
BankExposureGov <sub>s,b,Mar16</sub>	468	0.10	0.00	0.05	0.29	0.14
<b>Panel G. Other Variables</b>						
Tradable Sector <sub>i</sub>	83	0.26	0.00	0.00	1.00	0.44
GovernmentExposure <sub>i</sub>	83	0.09	0.01	0.08	0.19	0.08
North <sub>s</sub>	30	0.46	0.00	0.00	1.00	0.51

**Table 2A – Impact of FD Law on States’ Fiscal Balance Components Given Their Public Debt**

This table reports OLS estimates of the impact of the FD Law on fiscal balance components of states of varying ex-ante public indebtedness. On the public expenditure side, the variables  $TotalExpenditures_{s,y}$ ,  $Infrastructure_{s,y}$ ,  $SocialServices_{s,y}$  and  $DebtServicing_{s,y}$  correspond to the ratios of total public expenditures and expenditures on infrastructure projects, social aid, and debt servicing over the GDP of state  $s$  in year  $y$ . On the public revenue side, the variables  $Transfers_{s,y}$  and  $TaxRate_{s,y}$  correspond to the amount of federal government transfers and tax income obtained by state  $s$  in year  $y$  and are calculated as ratios over the state yearly GDP.  $DebtState_{s,16Q1}$  is a measure of public indebtedness of state  $s$  in the quarter prior to the FD Law and is calculated as the ratio of public debt of a state over its net income.  $Post_y$  is an indicator variable that equals one from 2016 onwards. Observations at the state-year level. Standard errors are reported in parentheses and are doubled clustered at the state and year levels. \*, \*\*, \*\*\* denote significance at the 10, 5 and 1 percent levels. Detailed variable definitions are provided in Table A1 in the Appendix.

	Panel A. Public Expenditures								Panel B. Public Revenues			
	$TotalExpenditures_{s,y}$		$Infrastructure_{s,y}$		$SocialServices_{s,y}$		$DebtServicing_{s,y}$		$Transfers_{s,y}$		$TaxRate_{s,y}$	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
$Post_y$	-0.002		-0.001		0.001		0.002		-0.003**		-0.024	
	(0.002)		(0.001)		(0.001)		(0.001)		(0.001)		(0.016)	
$Post_y * DebtState_{s,16Q1}$	-0.011**	-0.012**	-0.003*	-0.004*	-0.003*	-0.005*	0.003*	0.002	-0.002	-0.002	0.070*	0.068*
	(0.005)	(0.005)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)	(0.039)	(0.038)
Observations	174	174	174	174	180	180	174	174	174	174	150	150
R-squared	0.990	0.990	0.682	0.703	0.981	0.982	0.471	0.506	0.991	0.992	0.886	0.890
Macro Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

**Table 2B – Impact of FD Law on States’ Employment and GDP Given Their Public Debt**

This table reports OLS estimates of the impact of the FD Law on employment and GDP of states of varying ex-ante public indebtedness. *Employment Total<sub>s,q</sub>* is the growth rate of employment in state *s* in quarter *q*. *Employment Primary<sub>s,q</sub>*, *Employment Secondary<sub>s,q</sub>* and *Employment Tertiary<sub>s,q</sub>* are the growth rates of employment in the primary, secondary and tertiary sectors of state *s* in quarter *q*. *GDP<sub>s,q</sub>* is the GDP growth rate of state *s* in quarter *q*. *DebtState<sub>s,16Q1</sub>* is a measure of public indebtedness of state *s* in the quarter prior to the FD Law and is calculated as the ratio of public debt of a state over its net income. *Post<sub>q</sub>* is an indicator variable that equals one from 2016Q2 onwards. Observations at the state-quarter level. Standard errors are reported in parentheses and are doubled clustered at the state and quarter levels. \*, \*\*, \*\*\* denote significance at the 10, 5 and 1 percent levels. Detailed variable definitions are provided in Table A1 in the Appendix.

	GDP <sub>s,q</sub>		Employment Total <sub>s,q</sub>		Employment Primary <sub>s,q</sub>		Employment Secondary <sub>s,q</sub>		Employment Tertiary <sub>s,q</sub>	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Post <sub>q</sub>	0.002 (0.013)		0.002 (0.004)		0.012 (0.009)		-0.010*** (0.000)		-0.002 (0.005)	
Post <sub>q</sub> *DebtState <sub>s,16Q1</sub>	0.003*** (0.001)	0.003*** (0.001)	0.001 (0.001)	0.001*** (0.000)	0.002 (0.007)	0.002 (0.009)	0.007*** (0.002)	0.007*** (0.001)	0.003* (0.002)	0.003 (0.002)
Observations	480	480	420	420	420	420	420	420	420	420
R-squared	0.044	0.473	0.015	0.180	0.017	0.092	0.027	0.042	0.019	0.146
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes



**Table 2C - Impact of FD Law on States' Poverty and Inequality Given Their Public Debt**

This table reports OLS estimates of the impact of the FD Law on poverty and inequality of states of varying ex-ante public indebtedness. The variable  $Poverty_{s,y}$  is the share of the population in state  $s$  and year  $y$  that is considered poor (i.e., individuals that cannot fulfill one of six basic needs: education, access to health, access to social security, basic housing services, access to food, and basic income). *Moderate (Extreme) Poverty* $_{s,y}$  is the share of the population in state  $s$  and year  $y$  that cannot fulfill at most (more than) two basic needs. The variable  $Gini_{s,y}$  is the Gini coefficient of state  $s$  in year  $y$ .  $DebtState_{s,16Q1}$  is a measure of public indebtedness of state  $s$  in the quarter prior to the FD Law and is calculated as the ratio of public debt of a state over its net income.  $Post_y$  is an indicator variable that equals one from 2016 onwards. Observations at the state-year level. Standard errors are reported in parentheses and are doubled clustered at the state and year levels. \*, \*\*, \*\*\* denote significance at the 10, 5 and 1 percent levels. Detailed variable definitions are provided in Table A1 in the Appendix.

	Poverty $_{s,y}$		Moderate Poverty $_{s,y}$		Extreme Poverty $_{s,y}$		Gini $_{s,y}$	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Post_y$	-0.04*** (0.01)		-0.00 (0.01)		-0.04*** (0.00)		-0.04*** (0.01)	
$Post_y * DebtState_{s,16Q1}$	-0.02* (0.01)	-0.02* (0.01)	-0.04*** (0.01)	-0.04*** (0.01)	0.02** (0.01)	0.02** (0.01)	0.00 (0.02)	0.00 (0.02)
Observations	150	150	150	150	150	150	150	150
R-squared	0.96	0.96	0.91	0.91	0.96	0.97	0.54	0.58
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes	No	Yes	No	Yes

**Table 3A – Impact of FD Law on Bank Lending to Local Governments Given State Public Debt**

This table reports OLS estimates of the impact of the FD Law on bank lending to local governments of varying ex-ante public indebtedness. The variable  $Loans-Govt_{s,m}$  is the total bank lending (in logs) of state government  $s$  in month  $m$ .  $Term\ Loan-Govt_{s,m}$  is the bank lending (in logs) in term loans of state government  $s$  in month  $m$ .  $Credit\ Line-Govt_{s,m}$  is the bank lending (in logs) from credit lines of state government  $s$  in month  $m$ .  $DebtState_{s,16Q1}$  is a measure of public indebtedness of state  $s$  in the quarter prior to the FD Law and is calculated as the ratio of public debt of a state over its net income.  $Post_m$  is an indicator variable that equals one from April 2016 onwards. Observations at the state-month level. Standard errors are reported in parentheses and are doubled clustered at the state and month levels. \*, \*\*, \*\*\* denote significance at the 10, 5 and 1 percent levels. Detailed variable definitions are provided in Table A1 in the Appendix.

	Loans-Govt <sub>s,m</sub>		Term Loan-Govt <sub>s,m</sub>		Credit Line-Govt <sub>s,m</sub>	
	(1)	(2)	(3)	(4)	(5)	(6)
Post <sub>m</sub>	0.04*		0.10***		-3.19***	
	(0.02)		(0.02)		(0.55)	
Post <sub>m</sub> *DebtState <sub>s,16Q1</sub>	-0.09**	-0.09**	-0.14***	-0.14***	-1.19	-1.19
	(0.04)	(0.04)	(0.04)	(0.04)	(1.20)	(1.19)
Observations	1,080	1,080	1,080	1,080	1,080	1,080
R-squared	0.96	0.96	0.96	0.96	0.52	0.54
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	No	Yes	No	Yes	No	Yes

**Table 3B –Impact of FD Law on Bank Loan Margins to Local Governments Given State Public Debt**

This table reports OLS estimates of the impact of the FD Law on credit margins of bank loans to local governments of varying ex-ante public indebtedness. The variable  $Interest\ Rate_{s,m}$  is the annualized average interest rate (in percent) of the outstanding loans of state government  $s$  in month  $m$ . The variable  $Collateral_{s,m}$  is the average share of bank loans of state government  $s$  in month  $m$  that are guaranteed.  $Maturity_{s,m}$  is the average maturity (in logs) of the outstanding loans of state government  $s$  in month  $m$ .  $DebtState_{s,16Q1}$  is a measure of public indebtedness of state  $s$  in the quarter prior to the FD Law and is calculated as the ratio of public debt of a state over its net income.  $Post_m$  is an indicator variable that equals one from April 2016 onwards. Observations at the state-month level. Standard errors are reported in parentheses and are doubled clustered at the state and month levels. \*, \*\*, \*\*\* denote significance at the 10, 5 and 1 percent levels. Detailed variable definitions are provided in Table A1 in the Appendix.

	Interest Rate <sub>s,m</sub>		Collateral <sub>s,m</sub>		Maturity <sub>s,m</sub>	
	(1)	(2)	(3)	(4)	(5)	(6)
Post <sub>m</sub>	1.49*** (0.07)		0.00*** (0.00)		-0.00 (0.02)	
Post <sub>m</sub> *DebtState <sub>s,16Q1</sub>	0.86*** (0.18)	0.86*** (0.09)	0.00** (0.00)	0.00*** (0.00)	0.01 (0.04)	0.01 (0.04)
Observations	1,080	1,080	1,080	1,080	1,080	1,080
R-squared	0.59	0.91	0.46	0.70	0.60	0.60
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	No	Yes	No	Yes	No	Yes

**Table 4A – Impact of FD Law on Bank Lending to Firms Given State Public Debt**

This table reports OLS estimates of the impact of the FD Law on bank lending to private firms in states of varying ex-ante public indebtedness. The variable  $Value_{f,b,m}$  is the loan value (in logs) issued to firm  $f$ , by bank  $b$  in month  $m$ .  $Investment_{f,b,m}$  is the loan value (in logs) for investment projects issued to firm  $f$ , by bank  $b$  in month  $m$ .  $Working\ Capital_{f,b,m}$  is the loan value (in logs) for working capital issued to firm  $f$ , by bank  $b$  in month  $m$ .  $DebtState_{s,16Q1}$  is a measure of public indebtedness of state  $s$  in the quarter prior to the FD Law and is calculated as the ratio of public debt of a state over its net income.  $Post_m$  is an indicator variable that equals one from April 2016 onwards. Observations are at the firm-bank-month level. Standard errors are reported in parentheses and are doubled clustered at the state and month levels. \*, \*\*, \*\*\* denote significance at the 10, 5 and 1 percent levels. Detailed variable definitions are provided in Table A1 in the Appendix.

	Value <sub>f,b,m</sub>		Investment <sub>f,b,m</sub>		Working Capital <sub>f,b,m</sub>	
	(1)	(2)	(3)	(4)	(5)	(6)
Post <sub>m</sub> *DebtState <sub>s,16Q1</sub>	0.013** (0.006)	0.015** (0.006)	0.046*** (0.013)	0.051*** (0.013)	0.016** (0.007)	0.017** (0.007)
Observations	1,252,105	1,252,105	206,666	206,655	1,131,483	1,131,483
R-squared	0.803	0.803	0.870	0.870	0.799	0.800
Firm-Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Sector-Month FE	No	Yes	No	Yes	No	Yes

**Table 4B - Impact of FD Law on Bank Loan Margins to Firms Given State Public Debt**

This table reports OLS estimates of the impact of the FD Law on bank credit margins to private firms in states of varying ex-ante public indebtedness. The variable  $InterestRate_{f,b,m}$  is the annualized average interest rate of the outstanding loan given to firm  $f$ , by bank  $b$  in month  $m$ .  $Collateral_{f,b,m}$  is the average share of loans received by firm  $f$  from bank  $b$  in month  $m$  that are guaranteed.  $Maturity_{f,b,m}$  is the average monthly maturity (in logs) of the outstanding loans received by firm  $f$  from bank  $b$  in month  $m$ .  $DebtState_{s,16Q1}$  is a measure of public indebtedness of state  $s$  in the quarter prior to the FD Law and is calculated as the ratio of public debt of a state over its net income.  $Post_m$  is an indicator variable that equals one from April 2016 onwards. Observations are at the firm-bank-month level. Standard errors are reported in parentheses and are doubled clustered at the state and month levels. \*, \*\*, \*\*\* denote significance at the 10, 5 and 1 percent levels. Detailed variable definitions are provided in Table A1 in the Appendix.

	Interest Rate $_{f,b,m}$		Collateral $_{f,b,m}$		Maturity $_{f,b,m}$	
	(1)	(2)	(3)	(4)	(5)	(6)
$Post_m * DebtState_{s,16Q1}$	0.004 (0.014)	0.005 (0.014)	0.016*** (0.002)	0.015*** (0.002)	-0.001 (0.007)	0.003 (0.007)
Observations	1,252,105	1,252,105	1,252,105	1,252,105	870,454	870,454
R-squared	0.859	0.859	0.747	0.749	0.678	0.679
Firm-Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Sector-Month FE	No	Yes	No	Yes	No	Yes

**Table 5 – Impact of FD Law on Balance Sheets of Banks Given Their Exposure to Local Public Debt**

This table reports OLS estimates of the impact of the FD Law on the balance sheet of banks of varying ex-ante exposure to local public indebtedness. The variable  $Loans_{b,m}$  is the total value of outstanding loans (in logs) extended by bank  $b$  in month  $m$ .  $Loans-Govt_{b,m}$  is the total value of outstanding loans (in logs) extended to the government by bank  $b$  in month  $m$ .  $Loans-Non-Govt_{b,m}$  is the total value of outstanding loans (in logs) extended by bank  $b$  in month  $m$  to all borrowers excepting the government.  $IntRate-Govt_{b,m}$  is the average interest rate (percent) charged by bank  $b$  in month  $m$  to the government.  $IntRate-NonGovt_{b,m}$  is the average interest rate (percent) charged by bank  $b$  in month  $m$  to all borrowers except government.  $BankExposureGov_{b,Mar16}$  is a measure of the exposure of a bank to local public entities in the month prior to the FD Law and is calculated as the ratio of bank lending to local public entities over total lending.  $Post_m$  is an indicator variable that equals one from April 2016 onwards. Observations at the bank-month level. Standard errors are reported in parentheses and are doubled clustered at the bank and month levels. \*, \*\*, \*\*\* denote significance at the 10, 5 and 1 percent levels. Detailed variable definitions are provided in Table A1 in the Appendix.

	Loans <sub>b,m</sub> (1)	Loans-Non-Govt <sub>b,m</sub> (2)	Loans-Govt <sub>b,m</sub> (3)	IntRate-Non-Govt <sub>b,m</sub> (4)	IntRate-Govt <sub>b,m</sub> (5)
$Post_m * BankExposureGov_{b,Mar16}$	0.01 (0.03)	1.26* (0.71)	-1.18*** (0.37)	-0.02 (0.31)	1.23** (0.60)
Observations	468	417	456	468	468
R-squared	1.00	0.96	0.94	0.95	0.76
Bank FE	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes

**Table 6 – Impact of FD Law on Bank Lending to Local Governments Given Bank Exposure and State Public Debt**

This table reports OLS estimates of the impact of the FD Law on the lending volumes issued to local governments (Panel A) and private firms (Panel B) in states of varying ex-ante public indebtedness by banks of varying ex-ante exposure to local public debt. The variable  $Loans-Govt_{s,b,m}$  is the total bank lending (in logs) of state government  $s$  with bank  $b$  in month  $m$ .  $Loans-Firms_{f,b,m}$  is the bank lending (in logs) of firm  $f$  extended by bank  $b$  in month  $m$ .  $DebtState_{s,16Q1}$  is a measure of public indebtedness of state  $s$  in the quarter prior to the FD Law and is calculated as the ratio of public debt of a state over its net income.  $BankExposureGov_{s,b,Mar16}$  is a measure of the exposure of a bank to local public entities of a state in the month prior to the reform. It is calculated as the ratio of loans extended by bank  $b$  to state government  $s$  over bank  $b$ 's total lending.  $Post_m$  is an indicator variable that equals one from April 2016 onwards. In Panel A, observations are at the state-bank-month level. Borrower fixed effects correspond to fixed effects at the state-level. In Panel B, observations are at the firm-bank-month level. Borrower fixed effects correspond to fixed effects at the firm-level. Standard errors are reported in parentheses and are doubled clustered at the state and month levels. \*, \*\*, \*\*\* denote significance at the 10, 5 and 1 percent levels. Detailed variable definitions are provided in Table A1 in the Appendix.

	Panel A. Loans-Govt <sub>s,b,m</sub>			Panel B. Loans-Firms <sub>f,b,m</sub>		
	(1)	(2)	(3)	(4)	(5)	(6)
$Post_m * DebtState_{s,16Q1} * BankExposureGov_{s,b,Mar16}$	-1.87*** (0.56)	-2.89*** (0.64)	-4.61*** (1.09)	0.189* (0.113)	0.279* (0.142)	0.734* (0.391)
$Post_m * DebtState_{s,16Q1}$	-0.08 (0.12)	0.15 (0.11)		0.016*** (0.006)	0.022*** (0.006)	
$Post_m * BankExposureGov_{s,b,Mar16}$	1.33*** (0.29)	1.65*** (0.35)	2.81*** (0.44)	-0.224 (0.200)	-0.363* (0.199)	-1.263** (0.539)
Observations	7,568	7,512	7,499	1,136,616	1,136,616	469,977
R-squared	0.78	0.80	0.85	0.798	0.798	0.897
Bank-Borrower FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	-	-	-	-	-
Bank-Month FE	No	Yes	Yes	Yes	Yes	Yes
Sector-Month FE	-	-	-	No	Yes	-
Borrower-Month FE	No	No	Yes	No	No	Yes

**Table 7 – Impact of FD Law on Firm Outcomes Given State Public Debt and Municipality Bank Exposure**

This table reports OLS estimates of the impact of the FD Law on real outcomes of private firms in states of varying ex-ante public indebtedness and across municipalities of varying ex-ante bank exposure to local public debt. The variable  $Liabilities_{f,y}$  is the value (in logs) of liabilities of firm  $f$  in year  $y$ .  $Assets_{f,y}$  and  $Fixed Assets_{f,y}$  are the value (in logs) of total and fixed assets of firm  $f$  in year  $y$ .  $Sales_{f,y}$  is the value (in logs) of sales of firm  $f$  in year  $y$ .  $Employment_{f,y}$  is the number of employees (in logs) of firm  $f$  in year  $y$ .  $DebtState_{s,16Q1}$  is a measure of public indebtedness of state  $s$  in the quarter prior to the FD Law and is calculated as the ratio of public debt of a state over its net income.  $DebtBankMuni_{m,Mar16}$  measures the average exposure to local public debt of banks operating in municipality  $m$  in the month prior to the reform. It is calculated as the municipality's weighted average of  $BankExposureGov_{s,b,Mar16}$  which is a measure of the exposure of a bank to local public entities of a state in March 2016. The standard deviation of this variable for our sample of firms is equal to 0.02.  $Post_y$  is an indicator variable that equals one from 2016 onwards. Observations at the firm-year level. Standard errors are reported in parentheses and are doubled clustered at the state and year levels. \*, \*\*, \*\*\* denote significance at the 10, 5 and 1 percent levels. Detailed variable definitions are provided in Table A1 in the Appendix.

	Liabilities <sub>f,y</sub>		Assets <sub>f,y</sub>		Fixed Assets <sub>f,y</sub>		Sales <sub>f,y</sub>	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post <sub>y</sub> *DebtState <sub>s,16Q1</sub>	0.024**		0.019*		0.037		0.023*	
	(0.009)		(0.012)		(0.029)		(0.014)	
Post <sub>y</sub> *DebtBankMuni <sub>m,Mar16</sub>		0.743		0.339		-0.176		0.022
		(0.762)		(0.463)		(0.989)		(0.914)
Post <sub>y</sub> *DebtState <sub>s,16Q1</sub>		1.452***		1.280***		0.329		2.224*
*DebtBankMuni <sub>m,Mar16</sub>		(0.358)		(0.285)		(0.842)		(0.938)
Observations	4,452	4,292	4,460	4,318	4,387	4,139	4,443	4,206
R-squared	0.967	0.979	0.983	0.991	0.976	0.988	0.941	0.963
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	-	Yes	-	Yes	-	Yes	-
State-Year FE	No	Yes	No	Yes	No	Yes	No	Yes



**Table 8A - Impact of FD Law on States' Employment and GDP Given Their Public Debt and Fiscal Spending Composition**

This table reports OLS estimates of the impact of the FD Law on employment and GDP of states of varying ex-ante public indebtedness and spending composition.  $Employment\ Total_{s,q}$  is the growth rate of employment in state  $s$  in quarter  $q$ .  $Employment\ Primary_{s,q}$ ,  $Employment\ Secondary_{s,q}$  and  $Employment\ Tertiary_{s,q}$  are the growth rates of employment in the primary, secondary and tertiary sectors of state  $s$  in quarter  $q$ .  $GDP_{s,q}$  is the GDP growth rate of state  $s$  in quarter  $q$ .  $DebtState_{s,16Q1}$  is a measure of public indebtedness of state  $s$  in the quarter prior to the FD Law and is calculated as the ratio of public debt of a state over its net income.  $NonInfrastructure_{s,2015}$  is the ratio of public spending in all categories except for infrastructure over the total public spending of state  $s$  in 2015.  $Post_q$  is an indicator variable that equals one from 2016Q2 onwards. Observations at the state-quarter level. Standard errors are reported in parentheses and are doubled clustered at the state and quarter levels. \*, \*\*, \*\*\* denote significance at the 10, 5 and 1 percent levels. Detailed variable definitions are provided in Table A1 in the Appendix.

	GDP <sub>s,q</sub>	Employment Total <sub>s,q</sub>	Employment Primary <sub>s,q</sub>	Employment Secondary <sub>s,q</sub>	Employment Tertiary <sub>s,q</sub>
	(1)	(2)	(3)	(4)	(5)
Post <sub>q</sub> *DebtState <sub>s,16Q1</sub> *Non-Infrastructure <sub>s,2015</sub>	0.062* (0.036)	0.039* (0.021)	0.315 (0.224)	-0.183*** (0.030)	0.154* (0.086)
Post <sub>q</sub> *DebtState <sub>s,16Q1</sub>	0.004* (0.003)	0.001*** (0.000)	0.004 (0.011)	0.006 (0.015)	0.004 (0.002)
Post <sub>q</sub> *Non-Infrastructure <sub>s,2015</sub>	-0.061 (0.062)	0.084*** (0.001)	-0.055 (0.269)	-0.037 (0.090)	0.095** (0.043)
Observations	480	420	420	420	420
R-squared	0.473	0.184	0.093	0.045	0.153
State FE	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes

**Table 8B - Impact of FD Law on States' Poverty and Inequality Given Their Public Debt and Fiscal Spending Composition**

This table reports OLS estimates of the impact of the FD Law on poverty and inequality of states of varying ex-ante public indebtedness and spending composition. The variable  $Poverty_{s,y}$  is the share of the population in state  $s$  and year  $y$  that is considered poor (i.e., individuals that cannot fulfill one of six basic needs: education, access to health, access to social security, basic housing services, access to food, and basic income). *Moderate (Extreme) Poverty* $_{s,y}$  is the share of the population in state  $s$  and year  $y$  that cannot fulfill at most (more than) two basic needs. The variable  $Gini_{s,y}$  is the Gini coefficient of state  $s$  in year  $y$ .  $DebtState_{s,16Q1}$  is a measure of public indebtedness of state  $s$  in the quarter prior to the FD Law and is calculated as the ratio of public debt of a state over its net income.  $NonInfrastructure_{s,2015}$  is the ratio of public spending in all categories except for infrastructure over the total public spending of state  $s$  in 2015.  $Post_q$  is an indicator variable that equals one from 2016Q2 onwards.  $Post_y$  is an indicator variable that equals one from 2016 onwards. Observations at the state-year level. Standard errors are reported in parentheses and are doubled clustered at the state and year levels. \*, \*\*, \*\*\* denote significance at the 10, 5 and 1 percent levels. Detailed variable definitions are provided in Table A1 in the Appendix.

	Poverty $_{s,y}$ (1)	Moderate Poverty $_{s,y}$ (2)	Extreme Poverty $_{s,y}$ (3)	Gini $_{s,y}$ (4)
$Post_y * DebtState_{s,16Q1} * Non-Infrastructure_{s,2015}$	-0.176 (0.150)	-0.396*** (0.122)	0.219*** (0.080)	0.386 (0.246)
$Post_y * DebtState_{s,16Q1}$	-0.009* (0.005)	-0.017*** (0.004)	0.007** (0.003)	0.002 (0.008)
$Post_y * Non-Infrastructure_{s,2015}$	0.434*** (0.151)	0.465*** (0.130)	-0.025 (0.075)	0.275* (0.162)
Observations	150	150	150	150
R-squared	0.964	0.920	0.969	0.608
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

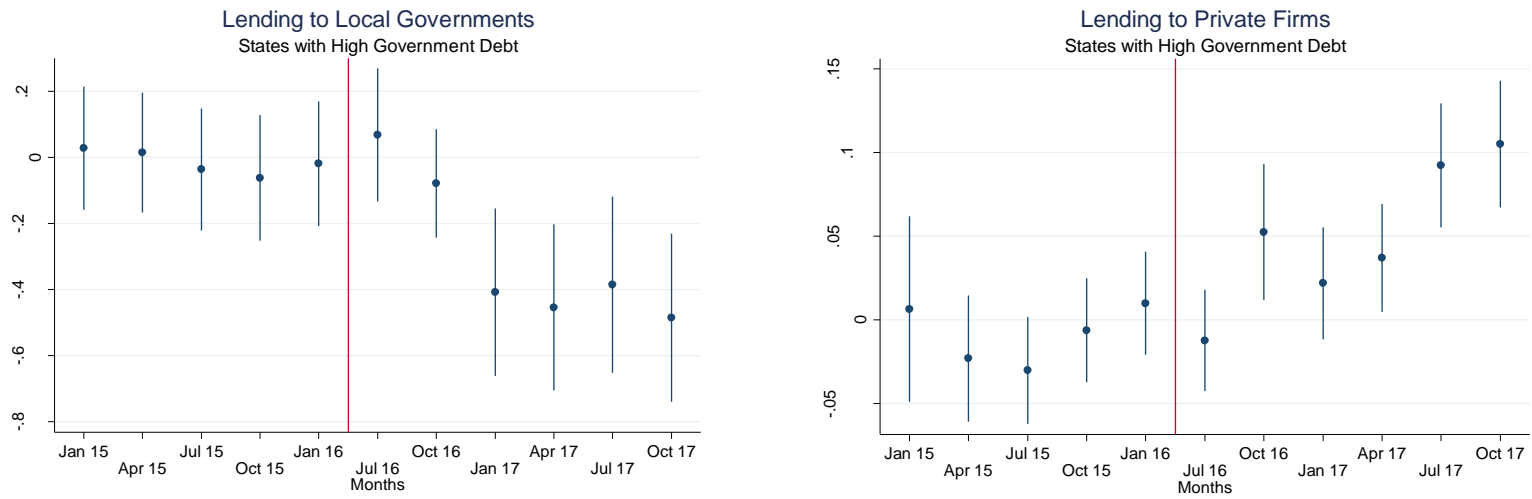
**Table 8C - Impact of FD Law on Bank Lending to Firms Given State Public Debt and Fiscal Spending Composition**

This table reports OLS estimates of the impact of the FD Law on bank lending to private firms in states of varying ex-ante public indebtedness and spending composition. The variable  $Value_{f,b,m}$  is the loan value (in logs) issued to firm  $f$ , by bank  $b$  in month  $m$ .  $Investment_{f,b,m}$  is the loan value (in logs) for investment projects issued to firm  $f$ , by bank  $b$  in month  $m$ .  $Working\ Capital_{f,b,m}$  is the loan value (in logs) for working capital issued to firm  $f$ , by bank  $b$  in month  $m$ .  $DebtState_{s,16Q1}$  is a measure of public indebtedness of state  $s$  in the quarter prior to the FD Law and is calculated as the ratio of public debt of a state over its net income.  $NonInfrastructure_{s,2015}$  is the ratio of public spending in all categories except for infrastructure over the total public spending of state  $s$  in 2015.  $Post_m$  is an indicator variable that equals one from April 2016 onwards. Observations at the firm-bank-month level. Standard errors are reported in parentheses and are doubled clustered at the state and month levels. \*, \*\*, \*\*\* denote significance at the 10, 5 and 1 percent levels. Detailed variable definitions are provided in Table A1 in the Appendix.

	Value <sub>f,b,m</sub>		Investment <sub>f,b,m</sub>		Working Capital <sub>f,b,m</sub>	
	(1)	(2)	(3)	(4)	(5)	(6)
Post <sub>m</sub> *DebtState <sub>s,16Q1</sub> *Non-Infrastructure <sub>s,2015</sub>	0.727*** (0.199)	0.637*** (0.198)	0.446 (0.422)	0.661 (0.427)	0.783*** (0.218)	0.655*** (0.215)
Post <sub>m</sub> *DebtState <sub>s,16Q1</sub>	0.017*** (0.006)	0.019*** (0.006)	0.057*** (0.014)	0.056*** (0.014)	0.018*** (0.006)	0.020*** (0.006)
Post <sub>m</sub> *Non-Infrastructure <sub>s,2015</sub>	-0.479*** (0.180)	-0.503*** (0.178)	-0.859** (0.369)	-0.637* (0.367)	-0.360* (0.198)	-0.382* (0.196)
Observations	1,252,105	1,252,105	206,666	206,655	1,131,483	1,131,483
R-squared	0.803	0.803	0.870	0.870	0.799	0.800
Firm-Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Sector-Month FE	No	Yes	No	Yes	No	Yes

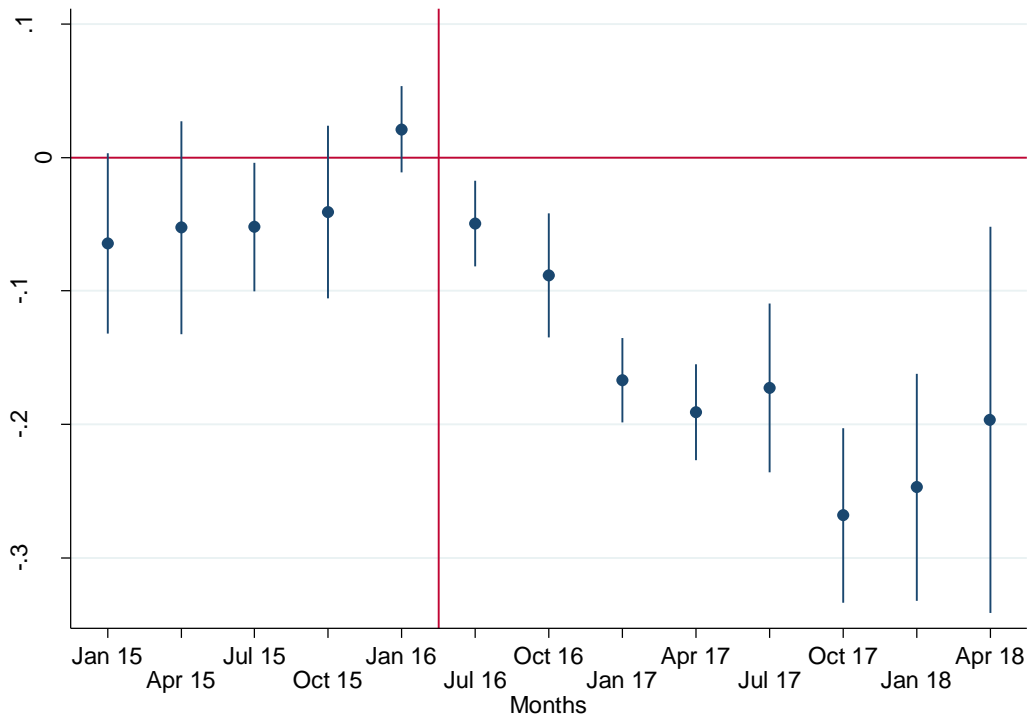
**Figure A1 – Dynamic Impact of FD Law on Bank Lending to Local Governments and Firms given State Public Debt**

These figures display quarterly coefficients of state-month level regressions where the dependent variables are: the value (in logs) of bank loans to local governments (Panel A) and the value (in logs) of bank loans to private firms (Panel B). The coefficients in the figures correspond to interactions of quarterly dummy variables with an indicator variable that equals one for states that in the quarter prior to the FD Law had public indebtedness above the median and zero otherwise. The regressions further include bank and month fixed effects. Standard errors are doubled clustered at the state and month level. The blue vertical bars represent confidence intervals of the coefficients at the 90 percent significance level. The red vertical lines in both panels mark the introduction of the FD Law.



**Figure A2 – Dynamic Impact of FD Law on Share of Bank Lending to Local Governments  
Given Bank Exposure to Local Public Debt**

This figure displays quarterly coefficients of bank-month level regressions where the dependent variable is the share of bank loans channeled to state governments. The coefficients in the figure correspond to interactions of quarterly dummy variables with an indicator variable that equals one for banks that had an exposure to local public debt above the median in March 2016 and zero otherwise. The regressions further include month fixed effects. Standard errors are doubled clustered at the bank and month level. The blue vertical bars represent confidence intervals of the coefficients at the 90 percent significance level. The red vertical line marks the introduction of the FD Law.



**Table A1 - Variable Definitions**


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<u>State/Municipalities</u>	
DebtState <sub>s,16Q1</sub>	Ratio of total liabilities of local governments of state <i>s</i> over net income of state <i>s</i> in the first quarter of 2016.
Maturity <sub>s,16Q1</sub>	Outstanding maturity of state government <i>s</i> ' bank debt in the first quarter of 2016 (in logs).
DebtBankMuni <sub>m,Mar16</sub>	Average <i>BankExposureGov<sub>s,b,Mar16</sub></i> of banks operating in municipality <i>m</i> in March 2016, weighted by the share of total lending in the municipality of each bank.
DebtMunicipality <sub>m,16Q1</sub>	Total public debt per capita of the municipality <i>m</i> in 2016Q1.
Employment <sub>s,q</sub>	Quarterly growth of employment in state <i>s</i> in quarter <i>q</i> .
Employment Primary <sub>s,q</sub>	Quarterly growth of employment of primary sectors in state <i>s</i> in quarter <i>q</i> .
Employment Secondary <sub>s,q</sub>	Quarterly growth of employment of secondary sectors in state <i>s</i> in quarter <i>q</i> .
Employment Tertiary <sub>s,q</sub>	Quarterly growth of employment of tertiary sectors in state <i>s</i> in quarter <i>q</i> .
GDP <sub>s,q</sub>	Real GDP index (relative to 2014) of state <i>s</i> in quarter <i>q</i> (in logs).
Poverty <sub>s,y</sub>	Share of population in state <i>s</i> that is poor in year <i>y</i> . The government defines poverty when a person cannot fulfill one of these six basic needs: Education, access to health, access to social security, basic housing services, access to food, and basic income.
Poverty – Moderate <sub>s,y</sub>	Share of population in state <i>s</i> that in year <i>y</i> that cannot fulfill at most two basic needs.
Poverty – Extreme <sub>s,y</sub>	Share of population in state <i>s</i> that in year <i>y</i> that cannot fulfill three or more basic needs.
Gini <sub>s,y</sub>	Gini coefficient of state <i>s</i> in year <i>y</i> that takes values between zero (lowest concentration) and one (highest concentration).
<u>Fiscal Balance Components</u>	
Total Expenditure <sub>s,y</sub>	Ratio of total public spending over GDP in state <i>s</i> in year <i>y</i> .
Infrastructure <sub>s,y</sub>	Ratio of spending on public projects towards infrastructure over GDP in state <i>s</i> in year <i>y</i> .
Social Services <sub>s,y</sub>	Ratio of spending on social services ( <i>ayudas sociales</i> ) over GDP in state <i>s</i> in year <i>y</i> .
Debt Servicing <sub>s,y</sub>	Ratio of spending on debt costs over GDP in state <i>s</i> in year <i>y</i> .
Transfers <sub>s,y</sub>	Ratio of federal transfers over GDP in state <i>s</i> in year <i>y</i> .
Tax Rate <sub>s,y</sub>	Ratio of tax revenue in state <i>s</i> in year <i>y</i> over GDP.
Non-Infrastructure <sub>s,2015</sub>	Share of public spending in all categories except for infrastructure over the total public spending of state <i>s</i> in 2015.
<u>Lending to Local Governments</u>	
Loans – Govt <sub>s,m</sub>	Value of total loans extended to state <i>s</i> in month <i>m</i> (in logs).
Credit Line – Govt <sub>s,m</sub>	Value of loans from credit lines extended to state <i>s</i> in month <i>m</i> (in logs).
Term Loan – Govt <sub>s,m</sub>	Value of term loans extended to state <i>s</i> in month <i>m</i> (in logs).
Interest Rate <sub>s,m</sub>	Average interest rate of loans extended to state <i>s</i> in month <i>m</i> (percent).
Collateral <sub>s,m</sub>	Share of loan that state <i>s</i> has in a month <i>m</i> that is guaranteed.
Maturity <sub>s,m</sub>	Outstanding maturity of the loan that state <i>s</i> has in a month <i>m</i> (in logs).

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**Table A1 - Variable Definitions (Cont'd)**

Lending to Private Firms

Value <sub>f,b,m</sub>	Value of loans firm <i>f</i> has from bank <i>b</i> in a month <i>m</i> (in logs).
Investment <sub>f,b,m</sub>	Value of loans destined to investment projects that a firm <i>f</i> has from bank <i>b</i> in a month <i>m</i> (in logs).
Working Capital <sub>f,b,m</sub>	Value of loans destined to working capital that a firm <i>f</i> has from bank <i>b</i> in a month <i>m</i> (in logs).
Interest Rate <sub>f,b,m</sub>	Annualized interest rate of the loan that firm <i>f</i> has from bank <i>b</i> in a month <i>m</i> (percent).
Collateral <sub>f,b,m</sub>	Fraction of loan that firm <i>f</i> has from bank <i>b</i> in a month <i>m</i> that is guaranteed by firm's assets.
Maturity <sub>f,b,m</sub>	Outstanding maturity of the loan that firm <i>f</i> has from bank <i>b</i> in month <i>m</i> (in logs).

Firm Outcomes

Liabilities <sub>f,y</sub>	Total liabilities of firm <i>f</i> in year <i>y</i> (in logs).
Assets <sub>f,y</sub>	Total assets of firm <i>f</i> in year <i>y</i> (in logs).
Fixed Assets <sub>f,y</sub>	Total fixed assets of firm <i>f</i> in year <i>y</i> (in logs).
Sales <sub>f,y</sub>	Operational revenue of firm <i>f</i> in year <i>y</i> (in logs).

Bank Variables

Loans <sub>b,m</sub>	Value of commercial loans extended by bank <i>b</i> in month <i>m</i> (in logs).
Loans – Govt <sub>b,m</sub>	Value of loans to local governments extended by bank <i>b</i> in month <i>m</i> (in logs).
Loans – Non-Govt <sub>b,m</sub>	Value of loans to private firms extended by bank <i>b</i> in month <i>m</i> (in logs).
IntRate – Govt <sub>b,m</sub>	Average interest rate of loans extended to local governments by bank <i>b</i> in month <i>m</i> (percent).
IntRate – Non-Govt <sub>b,m</sub>	Average interest rate of loans extended to private firms by bank <i>b</i> in month <i>m</i> (percent).
BankExposureGov <sub>b,Mar16</sub>	Ratio of lending value by bank <i>b</i> to all local governments over total bank lending in March 2016.
BankExposureGov <sub>s,b,Mar16</sub>	Ratio of lending value by bank <i>b</i> to local governments in state <i>s</i> over total bank lending in March 2016.

Other Variables

Post <sub>m</sub>	Indicator that takes value 1 if month <i>m</i> is after April 2016.
Tradable Sector <sub>i</sub>	Indicator that sector <i>i</i> produces tradables following Mian and Sufi (2014).
Government Exposure <sub>i</sub>	Measure of the dependence of firms in industry <i>i</i> on government spending following Belo, Gala, and Li (2013).
North <sub>s</sub>	Indicator of northern states according to the National Statistics Agency (INEGI).
Primary, Secondary and Tertiary Sectors	Companies classified in the <i>primary</i> sector mainly extract and harvest resources, like agriculture, mining, or forestry. The <i>secondary</i> sector comprises businesses that are involved in processing, manufacturing, and construction. Businesses in the <i>tertiary</i> sector provide services, such as retailers or financial companies.

**Table A2A – Parallel Trend Test of Fiscal Balance Components Across States of Varying Public Debt Before FD Law**

This table reports OLS estimates of the trends of fiscal balance components across states of varying public indebtedness prior to the introduction of the FD Law. On the public expenditure side, the variables  $TotalExpenditures_{s,y}$ ,  $Infrastructure_{s,y}$ ,  $SocialServices_{s,y}$  and  $DebtServicing_{s,y}$  correspond to the ratios of total public expenditures and expenditures on infrastructure projects, social aid, and debt servicing over the GDP of state  $s$  in year  $y$ . On the public revenue side, the variables  $Transfers_{s,y}$  and  $TaxRate_{s,y}$  correspond to the amount of federal government transfers and tax income obtained by state  $s$  in year  $y$  and are calculated as ratios over the state yearly GDP.  $DebtState_{s,16Q1}$  is a measure of public indebtedness of state  $s$  in the quarter prior to the FD Law and is calculated as the ratio of public debt of a state over its net income.  $Trend_y$  is a linear trend over time from the start of our sample in 2014 up to 2015. Observations at the state-year level. Standard errors are reported in parentheses and are doubled clustered at the state and year levels. \*, \*\*, \*\*\* denote significance at the 10, 5 and 1 percent levels. Detailed variable definitions are provided in Table A1 in the Appendix.

	Panel A. Public Expenditures						Panel B. Public Revenues					
	Total Expenditures <sub>s,y</sub>		Infrastructure <sub>s,y</sub>		Social Services <sub>s,y</sub>		Debt Servicing <sub>s,y</sub>		Transfers <sub>s,y</sub>		Tax Rate <sub>s,y</sub>	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Trend <sub>y</sub>	0.000		-0.001***		0.002*		0.000		0.001		0.002	
	(0.001)		(0.001)		(0.001)		(0.001)		(0.001)		(0.017)	
Trend <sub>y</sub> *DebtState <sub>s,16Q1</sub>	-0.003	-0.003	-0.000	-0.000	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	0.018	0.018
	(0.002)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.014)	(0.014)
Observations	90	90	90	90	90	90	90	90	90	90	90	90
R-squared	0.989	0.989	0.776	0.776	0.981	0.981	0.640	0.641	0.994	0.994	0.899	0.900
Macro Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes



**Table A2B – Parallel Trend Test of Employment and GDP Across States of Varying Public Debt Before FD Law**

This table reports OLS estimates of the trends of employment and GDP across states of varying public indebtedness prior to the introduction of the FD Law.  $Employment\ Total_{s,q}$  is the growth rate of employment in state  $s$  in quarter  $q$ .  $Employment\ Primary_{s,q}$ ,  $Employment\ Secondary_{s,q}$  and  $Employment\ Tertiary_{s,q}$  are the growth rates of employment in the primary, secondary and tertiary sectors of state  $s$  in quarter  $q$ .  $GDP_{s,q}$  is the GDP growth rate of state  $s$  in quarter  $q$ .  $DebtState_{s,16Q1}$  is a measure of public indebtedness of state  $s$  in the quarter prior to the FD Law and is calculated as the ratio of public debt of a state over its net income.  $Trend_q$  is a linear trend over time from the start of our sample in 2014Q1 up to 2016Q1, the quarter prior to the implementation of the FD Law. Observations at the state-quarter level. Standard errors are reported in parentheses and are doubled clustered at the state and quarter levels. \*, \*\*, \*\*\* denote significance at the 10, 5 and 1 percent levels. Detailed variable definitions are provided in Table A1 in the Appendix.

	GDP <sub>s,q</sub>		Employment Total <sub>s,q</sub>		Employment Primary <sub>s,q</sub>		Employment Secondary <sub>s,q</sub>		Employment Tertiary <sub>s,q</sub>	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Trend <sub>q</sub>	-0.00*		-0.00		-0.00		0.00		-0.00	
	(0.00)		(0.00)		(0.01)		(0.01)		(0.00)	
Trend <sub>q</sub> *DebtState <sub>s,16Q1</sub>	0.00	0.00	-0.00	-0.00	-0.00	-0.00	-0.02	-0.02	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.03)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
Observations	210	210	150	150	150	150	150	150	150	150
R-squared	0.04	0.52	0.06	0.28	0.10	0.20	0.08	0.09	0.10	0.30
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

**Table A2C – Parallel Trend Test of Bank Lending to Local Governments Across States of Varying Public Debt Before FD Law**

This table reports OLS estimates of the trends of bank lending to local governments across states of varying public indebtedness prior to the introduction of the FD Law. The variable *Loans-Govt<sub>s,m</sub>* is the total bank lending (in logs) of state government *s* in month *m*. *Term Loan-Govt<sub>s,m</sub>* is the bank lending (in logs) in term loans of state government *s* in month *m*. *Credit Line-Govt<sub>s,m</sub>* is the bank lending (in logs) from credit lines of state government *s* in month *m*. *DebtState<sub>s,16Q1</sub>* is a measure of public indebtedness of state *s* in the quarter prior to the FD Law and is calculated as the ratio of public debt of a state over its net income. *Trend<sub>m</sub>* is a linear trend over time from the start of our sample in January 2014 up to March 2016, the month prior to the implementation of the FD Law. Observations at the state-month level. Standard errors are reported in parentheses and are doubled clustered at the state and month levels. \*, \*\*, \*\*\* denote significance at the 10, 5 and 1 percent levels. Detailed variable definitions are provided in Table A1 in the Appendix.

	Poverty		Moderate Poverty		Extreme Poverty		Gini	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Trend <sub>y</sub> *DebtStates,16Q1	-0.01*		0.00		-0.01***		0.00	
	(0.01)		(0.00)		(0.00)		(0.00)	
Trend <sub>y</sub> *DebtState <sub>s,16Q1</sub>	0.01	0.01	-0.01	-0.01	0.02	0.02	-0.01	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)
Observations	90	90	90	90	90	90	90	90
R-squared	0.97	0.97	0.94	0.94	0.98	0.98	0.63	0.64
Bank-State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Month FE	No	Yes	No	Yes	No	Yes	No	Yes

**Table A2D – Parallel Trend Test of Bank Lending to Local Governments Across States of Varying Public Debt Before FD Law**

This table reports OLS estimates of the trends of bank lending to local governments across states of varying public indebtedness prior to the introduction of the FD Law. The variable *Loans-Govt<sub>s,m</sub>* is the total bank lending (in logs) of state government *s* in month *m*. *Term Loan-Govt<sub>s,m</sub>* is the bank lending (in logs) in term loans of state government *s* in month *m*. *Credit Line-Govt<sub>s,m</sub>* is the bank lending (in logs) from credit lines of state government *s* in month *m*. *DebtState<sub>s,16Q1</sub>* is a measure of public indebtedness of state *s* in the quarter prior to the FD Law and is calculated as the ratio of public debt of a state over its net income. *Trend<sub>m</sub>* is a linear trend over time from the start of our sample in January 2014 up to March 2016, the month prior to the implementation of the FD Law. Observations at the state-month level. Standard errors are reported in parentheses and are doubled clustered at the state and month levels. \*, \*\*, \*\*\* denote significance at the 10, 5 and 1 percent levels. Detailed variable definitions are provided in Table A1 in the Appendix.

	Loans - Govt <sub>s,m</sub>		Term Loan - Govt <sub>s,m</sub>		Credit Line- Govt <sub>s,m</sub>	
	(1)	(2)	(3)	(4)	(5)	(6)
Trend <sub>m</sub>	0.00 (0.01)		0.00 (0.01)		0.00 (0.01)	
Trend <sub>m</sub> *DebtState <sub>s,16Q1</sub>	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)
Observations	450	450	450	450	450	450
R-squared	0.98	0.98	0.98	0.98	0.98	0.98
Bank-State FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Month FE	No	Yes	No	Yes	No	Yes
State-Month FE	No	No	No	No	No	No

**Table A2E – Parallel Trend Test of Bank Lending to Local Governments Across States of Varying Public Debt Before FD Law**

This table reports OLS estimates of the trends of bank lending to local governments across states of varying public indebtedness prior to the introduction of the FD Law. The variable  $Loans-Govt_{s,m}$  is the total bank lending (in logs) of state government  $s$  in month  $m$ .  $Term\ Loan-Govt_{s,m}$  is the bank lending (in logs) in term loans of state government  $s$  in month  $m$ .  $Credit\ Line-Govt_{s,m}$  is the bank lending (in logs) from credit lines of state government  $s$  in month  $m$ .  $DebtState_{s,16Q1}$  is a measure of public indebtedness of state  $s$  in the quarter prior to the FD Law and is calculated as the ratio of public debt of a state over its net income.  $Trend_m$  is a linear trend over time from the start of our sample in January 2014 up to March 2016, the month prior to the implementation of the FD Law. Observations at the state-month level. Standard errors are reported in parentheses and are doubled clustered at the state and month levels. \*, \*\*, \*\*\* denote significance at the 10, 5 and 1 percent levels. Detailed variable definitions are provided in Table A1 in the Appendix.

	Value <sub>f,b,m</sub>		Investment <sub>f,b,m</sub>		Working Capital <sub>f,b,m</sub>	
	(1)	(2)	(3)	(4)	(5)	(6)
Trend <sub>m</sub> *DebtState <sub>s,16Q1</sub>	-0.000 (0.001)	-0.000 (0.001)	-0.002 (0.001)	-0.001 (0.001)	-0.000 (0.001)	-0.000 (0.001)
Observations	524,710	524,710	29,383	29,383	502,403	502,403
R-squared	0.840	0.840	0.895	0.897	0.834	0.834
Firm-Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Month	Yes	Yes	Yes	Yes	Yes	Yes
Sector-Month	No	Yes	No	Yes	No	Yes

**Table A2F – Parallel Trend Test of Bank Lending to Local Governments Across States of Varying Public Debt Before FD Law**

This table reports OLS estimates of the trends of bank lending to local governments across states of varying public indebtedness prior to the introduction of the FD Law. The variable  $Loans-Govt_{s,m}$  is the total bank lending (in logs) of state government  $s$  in month  $m$ .  $Term Loan-Govt_{s,m}$  is the bank lending (in logs) in term loans of state government  $s$  in month  $m$ .  $Credit Line-Govt_{s,m}$  is the bank lending (in logs) from credit lines of state government  $s$  in month  $m$ .  $DebtState_{s,16Q1}$  is a measure of public indebtedness of state  $s$  in the quarter prior to the FD Law and is calculated as the ratio of public debt of a state over its net income.  $Trend_m$  is a linear trend over time from the start of our sample in January 2014 up to March 2016, the month prior to the implementation of the FD Law. Observations at the state-month level. Standard errors are reported in parentheses and are doubled clustered at the state and month levels. \*, \*\*, \*\*\* denote significance at the 10, 5 and 1 percent levels. Detailed variable definitions are provided in Table A1 in the Appendix.

	Liabilities <sub>f,y</sub>		Assets <sub>f,y</sub>		Fixed Assets <sub>f,y</sub>		Sales <sub>f,y</sub>	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Trend <sub>y</sub>	-0.07		-0.03		-0.19**		-0.05	
	(0.06)		(0.05)		(0.09)		(0.06)	
Trend <sub>y</sub> *DebtState <sub>s,16Q1</sub>	0.01	0.01	0.06	0.06	0.06	0.06	-0.01	-0.01
	(0.10)	(0.10)	(0.09)	(0.09)	(0.15)	(0.15)	(0.11)	(0.11)
Observations	654	654	654	654	652	652	654	654
R-squared	0.93	0.93	0.93	0.93	0.95	0.95	0.90	0.90
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes	No	Yes	No	Yes

**Table A3A – Comparison of Means Between States with Low and High Public Debt Before FD Law**

This table displays the summary statistics of states given their public indebtedness in March of 2016, one month prior to the implementation of the FD Law. A state is defined as with low (high) debt if its public indebtedness in March 2016 is below (above) the median. *Lending to states* is the share of liabilities to net income. *Population* is the total population of the state in millions. *Employment* is the quarterly growth rate of employment. *GDP* is the quarterly GDP growth. *Investment* is the ratio of spending on public investment projects relative to the state’s GDP. *Services* is the ratio of spending on public services relative to the state’s GDP. *Social Services* is the ratio of spending on social services relative to the state’s GDP. *Debt Servicing* is the ratio of spending on debt outlays relative to the state’s GDP. *Transfers* is the ratio of federal transfers relative to the state’s GDP. *Tax Rate* is the ratio of tax revenues of a state relative to the state’s GDP. *Poverty* is the share of households in a state living in poverty. *Gini* is the Gini coefficient in a state. *Northern State* is an indicator of whether the state is classified as a northern state by the national statistics agency. The first two columns in each panel show the mean and standard deviation of each variable. The last column—*Standardized Difference*— shows the normalized differences of variables between states with high and low debt (based on Imbens and Wooldridge, 2009). All differences are insignificant, except for *Liabilities/Net Income*, which is higher in states with high debt (by definition).

	States with Low Debt		States with High Debt		Standardized Difference
	Mean	Standard Deviation	Mean	Standard Deviation	
Lending to states (share)	0.391	0.12	1.128	0.423	-1.68
Population (millions)	3.64	3.848	3.227	1.77	0.1
GDP	-0.031	0.022	-0.035	0.043	0.09
Employment	-0.013	0.022	-0.011	0.021	-0.05
- Primary	-0.044	0.114	-0.061	0.116	0.11
- Secondary	0.009	0.064	0.025	0.067	-0.17
- Tertiary	-0.007	0.023	-0.005	0.03	-0.05
Investment	0.006	0.004	0.006	0.005	-0.04
Services	0.005	0.003	0.007	0.004	-0.46
Social Services	0	0	0	0	-0.02
Debt Servicing	0.002	0.002	0.008	0.007	-0.84
Transfers	0.129	0.053	0.146	0.075	-0.18
Tax Rate	0.485	0.197	0.483	0.169	0.01
Poverty Total	0.416	0.12	0.415	0.179	0
- Moderate	0.351	0.076	0.337	0.106	0.1
- Extreme	0.065	0.055	0.078	0.089	-0.13
Gini	0.451	0.039	0.469	0.043	-0.3
Northern State	0.4	0.507	0.533	0.516	-0.18

**Table A3B – Comparison of Means Between Banks with Low and High Exposure to Local Public Debt Before FD Law**

This table displays the summary statistics of banks given their lending to state governments in March of 2016, one month prior to the implementation of the FD Law. A bank is defined as with low (high) local public lending if its share of lending to local governments in March of 2016 is below (above) the median. *Lending to States* is the share of bank loans channeled to local governments. *Assets* is the value (in logs) of bank assets. *Capital* is the tier1 capital ratio (percent). *Liquidity* is the ratio of liquid assets to total assets (percent). *Delinquency* is the share of loans that are more than 90 days in arrears (percent). The first two columns in each panel show the mean and standard deviation of each variable. The last column—*Standardized Difference*— shows the normalized differences of variables between banks with high and low local public debt (based on Imbens and Wooldridge, 2009).

	Banks with Low Local Public Debt		Banks with High Local Public Debt		Standardized Difference
	Mean	Standard Deviation	Mean	Standard Deviation	
Lending to states (share)	0.0	0.0	0.2	0.2	-1.22
Assets (logs)	12	1.8	12.4	1.5	-0.22
Capital (%)	11	3.8	9.6	6.8	0.18
Liquidity (%)	6.9	2.3	6.4	3	0.04
Delinquency (%)	2.3	1.8	2.2	1.4	0

**Table A3C – Comparison of Means Between Firms in Municipalities with Low and High Bank Exposure to Public Local Debt Before FD Law**

This table displays the summary statistics of firms given the exposure to local public lending of the banks they borrow from. All statistics recorded in March of 2016, one month prior to the implementation of the FD law. A bank is defined as with low (high) public debt if its share of lending to local governments in March of 2016 is below (above) the median. *Liabilities*, *Assets*, *Fixed Assets* and *Sales* are the value (in logs) of firms’ total liabilities, total assets, fixed assets, and total sales. *Employment* is the average number of employees (in logs). The first two columns in each panel show the mean and standard deviation of each variable. The last column—*Standardized Difference*—shows the normalized differences of variables between banks with high and low public debt (based on Imbens and Wooldridge, 2009).

	Banks with Low Debt		Banks with High Debt		Standardized Difference
	Mean	Standard Deviation	Mean	Standard Deviation	
Liabilities (logs)	19.13	1.8	19.19	1.87	-0.02
Assets (logs)	19.85	1.79	19.93	1.8	-0.03
Fixed Assets (logs)	17.93	2.48	18.34	2.38	-0.12
Sales (logs)	20.17	1.39	20.2	1.47	-0.01



**Table A4 – Impact of FD Law on Bank Lending to Firms (Across Sectors) Given State Public Debt**

This table reports OLS estimates of the impact of the FD Law on bank lending to private firms operating in the primary, secondary and tertiary sectors, in states of varying ex-ante public indebtedness. Primary sector includes the sectors of agriculture and mining, secondary sector includes sectors such as construction and manufacturing, and tertiary sector includes sectors such as retail, finance, education, and health. The variable  $Value_{f,b,m}$  is the loan value (in logs) issued to firm  $f$ , by bank  $b$  in month  $m$ .  $Investment_{f,b,m}$  is the loan value (in logs) for investment projects issued to firm  $f$ , by bank  $b$  in month  $m$ .  $Working\ Capital_{f,b,m}$  is the loan value (in logs) for working capital issued to firm  $f$ , by bank  $b$  in month  $m$ .  $DebtState_{s,16Q1}$  is a measure of public indebtedness of state  $s$  in the quarter prior to the FD Law and is calculated as the ratio of public debt of a state over its net income.  $Post_m$  is an indicator variable that equals one from April 2016 onwards. Observations at the firm-bank-month level. Standard errors are reported in parentheses and are doubled clustered at the state and month levels. \*, \*\*, \*\*\* denote significance at the 10, 5 and 1 percent levels. Detailed variable definitions are provided in Table A1 in the Appendix.

	Value <sub>f,b,m</sub>			Investment <sub>f,b,m</sub>			Working Capital <sub>f,b,m</sub>		
	Primary (1)	Secondary (2)	Tertiary (3)	Primary (4)	Secondary (5)	Tertiary (6)	Primary (7)	Secondary (8)	Tertiary (9)
Post <sub>m</sub> *DebtState <sub>s,16Q1</sub>	-0.003 (0.015)	0.042*** (0.008)	0.006 (0.007)	-0.063* (0.036)	0.095*** (0.020)	0.040** (0.017)	-0.002 (0.016)	0.042*** (0.008)	0.010 (0.007)
Observations	54,027	348,390	849,588	10,355	65,068	131,104	47,983	311,905	771,476
R-squared	0.869	0.809	0.790	0.905	0.877	0.858	0.871	0.805	0.788
Firm-Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector-Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

**Table A5 – Impact of FD Law on Bank Lending to Firms (North vs non-North States) Given State Public Debt**

This table reports OLS estimates of the impact of the FD Law on bank lending to private firms headquartered in Northern vs non-Northern states of varying ex-ante public indebtedness. North states are defined following the definition of the Mexican National Statistics Agency. The variable  $Value_{f,b,m}$  is the loan value (in logs) issued to firm  $f$ , by bank  $b$  in month  $m$ .  $Investment_{f,b,m}$  is the loan value (in logs) for investment projects issued to firm  $f$ , by bank  $b$  in month  $m$ .  $Working\ Capital_{f,b,m}$  is the loan value (in logs) for working capital issued to firm  $f$ , by bank  $b$  in month  $m$ .  $DebtState_{s,16Q1}$  is a measure of public indebtedness of state  $s$  in the quarter prior to the FD Law and is calculated as the ratio of public debt of a state over its net income.  $Post_m$  is an indicator variable that equals one from April 2016 onwards. Observations at the firm-bank-month level. Standard errors are reported in parentheses and are doubled clustered at the state and month levels. \*, \*\*, \*\*\* denote significance at the 10, 5 and 1 percent levels. Detailed variable definitions are provided in Table A1 in the Appendix.

	Value <sub>f,b,m</sub>		Investment <sub>f,b,m</sub>		Working Capital <sub>f,b,m</sub>	
	North (1)	Non-North (2)	North (3)	Non-North (4)	North (5)	Non-North (6)
Post <sub>m</sub> *DebtState <sub>s,16Q1</sub>	0.015** (0.008)	0.017* (0.010)	0.042*** (0.015)	0.092** (0.036)	0.017** (0.008)	0.009 (0.011)
Observations	631,424	620,646	113,370	93,220	566,800	564,604
R-squared	0.811	0.795	0.876	0.865	0.806	0.793
Firm-Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Month FE	Yes	Yes	Yes	Yes	Yes	Yes

**Table A6 – Impact of FD Law on Bank Lending to Firms Given Public Debt of Their Municipalities**

This table reports OLS estimates of the impact of the FD Law on bank lending to private firms in states and municipalities of varying ex-ante public indebtedness. The variable  $Value_{f,b,m}$  is the loan value (in logs) issued to firm  $f$ , by bank  $b$  in month  $m$ .  $Investment_{f,b,m}$  is the loan value (in logs) for investment projects issued to firm  $f$ , by bank  $b$  in month  $m$ .  $Working\ Capital_{f,b,m}$  is the loan value (in logs) for working capital issued to firm  $f$ , by bank  $b$  in month  $m$ .  $DebtState_{s,16Q1}$  is a measure of public indebtedness of state  $s$  in the quarter prior to the FD Law and is calculated as the ratio of public debt of a state over its net income.  $DebtMunicipality_{m,16Q1}$  measures the public indebtedness of municipality  $m$  and is calculated as the municipal public debt per capita in 2016Q1.  $Post_m$  is an indicator variable that equals one from April 2016 onwards. Observations at the firm-bank-month level. Standard errors are reported in parentheses and are doubled clustered at the state and month levels. \*, \*\*, \*\*\* denote significance at the 10, 5 and 1 percent levels. Detailed variable definitions are provided in Table A1 in the Appendix.

	(1)	Value <sub>f,b,m</sub> (2)	(3)	(4)	Investment <sub>f,b,m</sub> (5)	(6)	(7)	Working Capital <sub>f,b,m</sub> (8)	(9)
Post <sub>m</sub> *DebtState <sub>s,16Q1</sub>	0.018*** (0.006)	0.019*** (0.006)		0.049*** (0.012)	0.054*** (0.013)		0.019*** (0.007)	0.019*** (0.007)	
Post <sub>m</sub> *DebtMunicipality <sub>m,16Q1</sub>	-0.126*** (0.024)	-0.118*** (0.023)	-0.103*** (0.023)	-0.340*** (0.065)	-0.339*** (0.067)	-0.510*** (0.100)	-0.094*** (0.024)	-0.083*** (0.023)	-0.047** (0.023)
Post <sub>m</sub> *DebtState <sub>s,16Q1</sub> * DebtMunicipality <sub>m,16Q1</sub>	0.073*** (0.022)	0.079*** (0.022)	0.103*** (0.029)	0.450*** (0.063)	0.446*** (0.064)	0.733*** (0.099)	0.081*** (0.023)	0.090*** (0.023)	0.103*** (0.030)
Observations	1,252,105	1,252,105	1,252,105	206,666	206,655	206,666	1,131,483	1,131,483	1,131,483
R-squared	0.803	0.803	0.803	0.870	0.870	0.871	0.799	0.800	0.800
Firm-Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector-Month FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
State-Month FE	No	No	Yes	No	No	Yes	No	No	Yes

**Table A7 – Impact of FD Law on Bank Lending to Firms (by Their Dependence to Government Spending) Given State Public Debt**

This table reports OLS estimates of the impact of the FD Law on bank lending to private firms from sectors with different dependence on government spending and across states of varying ex-ante public indebtedness. The variable  $Value_{f,b,m}$  is the loan value (in logs) issued to firm  $f$ , by bank  $b$  in month  $m$ .  $Investment_{f,b,m}$  is the loan value (in logs) for investment projects issued to firm  $f$ , by bank  $b$  in month  $m$ .  $Working\ Capital_{f,b,m}$  is the loan value (in logs) for working capital issued to firm  $f$ , by bank  $b$  in month  $m$ .  $DebtState_{s,16Q1}$  is a measure of public indebtedness of state  $s$  in the quarter prior to the FD Law and is calculated as the ratio of public debt of a state over its net income.  $GovernmentExposure_i$  measures the dependence of firms from industry  $i$  to government spending (following Belo, Gala, and Li, 2013), and is calculated as the share of revenues in industry  $i$  derived from sales to the government (or to its providers).  $Post_m$  is an indicator variable that equals one from April 2016 onwards. Observations at the firm-bank-month level. Standard errors are reported in parentheses and are doubled clustered at the state and month levels. \*, \*\*, \*\*\* denote significance at the 10, 5 and 1 percent levels. Detailed variable definitions are provided in Table A1 in the Appendix.

	Value <sub>f,b,m</sub>		Investment <sub>f,b,m</sub>		Working Capital <sub>f,b,m</sub>	
	(1)	(2)	(3)	(4)	(5)	(6)
Post <sub>m</sub> *DebtState <sub>s,16Q1</sub>	0.028*** (0.006)		0.092*** (0.016)		0.028*** (0.007)	
Post <sub>m</sub> *GovernmentExposure <sub>i</sub>	0.049*** (0.013)	-0.025*** (0.006)	0.081* (0.042)	0.106*** (0.023)	0.018 (0.014)	-0.047*** (0.007)
Post <sub>m</sub> *DebtState <sub>s,16Q1</sub> *GovernmentExposure <sub>i</sub>	-0.020*** (0.007)	-0.018** (0.008)	-0.145*** (0.024)	-0.135*** (0.024)	-0.013* (0.007)	-0.009 (0.007)
Observations	824,687	824,687	130,532	130,574	747,875	747,875
R-squared	0.80	0.80	0.870	0.871	0.800	0.800
Firm-Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Month FE	Yes	Yes	Yes	Yes	Yes	Yes
State-Month FE	No	Yes	No	Yes	No	Yes

**Table A8 - Impact of FD Law on Bank Lending to Firms (with Short vs Long Credit History) Given State Public Debt and Fiscal Spending Composition**

This table reports OLS estimates of the impact of the FD Law on bank lending to private firms of different credit history length in states of varying ex-ante public indebtedness and spending composition. A firm is defined to have a long (short) credit history if the relationship duration with its bank is above (below) the median at the time of the FD Law. The variable  $Value_{f,b,m}$  is the loan value (in logs) issued to firm  $f$ , by bank  $b$  in month  $m$ .  $Investment_{f,b,m}$  is the loan value (in logs) for investment projects issued to firm  $f$ , by bank  $b$  in month  $m$ .  $Working\ Capital_{f,b,m}$  is the loan value (in logs) for working capital issued to firm  $f$ , by bank  $b$  in month  $m$ .  $DebtState_{s,16Q1}$  is a measure of public indebtedness of state  $s$  in the quarter prior to the FD Law and is calculated as the ratio of public debt of a state over its net income.  $NonInfrastructure_{s,2015}$  is the ratio of public spending on all items except for infrastructure over the total public spending of state  $s$  in 2015.  $Post_m$  is an indicator variable that equals one from April 2016 onwards. Observations at the firm-bank-month level. Standard errors are reported in parentheses and are doubled clustered at the state and month levels. \*, \*\*, \*\*\* denote significance at the 10, 5 and 1 percent levels. Detailed variable definitions are provided in Table A1 in the Appendix.

	Firms with Long Credit History						Firms with Short Credit History					
	Value <sub>f,b,m</sub>		Investment <sub>f,b,m</sub>		Working Capital <sub>f,b,m</sub>		Value <sub>f,b,m</sub>		Investment <sub>f,b,m</sub>		Working Capital <sub>f,b,m</sub>	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Post <sub>m</sub> *DebtState <sub>s,16Q1</sub>	0.01*	0.02***	0.03**	0.05***	0.02***	0.02***	0.02*	0.01	0.09***	0.09***	0.02*	0.02
	(0.01)	(0.01)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.01)	(0.01)
Post <sub>m</sub> *NonInfrastructure <sub>s,2015</sub>		-0.84***		-0.80**		-0.65***		0.09		-0.40		0.08
		(0.17)		(0.40)		(0.18)		(0.30)		(0.77)		(0.32)
Post <sub>m</sub> *DebtState <sub>s,16Q1</sub>		-0.12		0.19		0.08		1.94***		1.52**		1.65***
*NonInfrastructure <sub>s,2015</sub>		(0.20)		(0.51)		(0.21)		(0.30)		(0.73)		(0.33)
Observations	721,946	721,946	112,551	112,551	661,194	661,194	530,145	530,145	94,024	94,024	470,261	470,261
R-squared	0.80	0.80	0.86	0.86	0.79	0.79	0.81	0.81	0.87	0.87	0.81	0.81
Firm-Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector-Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

**Table IA1. Classification of Local Public Indebtedness in the Alert System**

This table displays the classification of indebtedness of states given their financial health indicators as defined by the Mexican Ministry of Finance.

	<b>Indicator 1</b>	<b>Indicator 2</b>	<b>Indicator 3</b>
	<i>Total public debt to net income</i>	<i>Interest payments to net income</i>	<i>Short-term obligations to total income</i>
<b>Classification of Indebtedness</b>			
Sustainable	Low	Low	Low
	Low	Low	Medium
Under-Watch	Low	Medium	Low
	Low	Medium	Medium
	Low	High	Low
	Low	High	Medium
	Low	Low	High
	Low	Medium	High
	Medium	Medium	Medium
High	Medium	High	Low
	Medium	High	Medium
	Medium	Low	High
	Medium	Medium	High
	High	-	-
	Low	High	High
	Medium	High	High

**Table IA2 – Impact of Debt Ceilings on States’ Employment and GDP (Sample of States with *Sustainable* and *Under-Watch* Debt)**

This table reports OLS estimates of the impact of the FD Law on employment and GDP for the sample of ten states classified in 2016Q1 as with “Sustainable” and “Under-Watch” public indebtedness.  $Employment\ Total_{s,q}$  is the growth rate of employment in state  $s$  in quarter  $q$ .  $Employment\ Primary_{s,q}$ ,  $Employment\ Secondary_{s,q}$  and  $Employment\ Tertiary_{s,q}$  are the growth rates of employment in the primary, secondary and tertiary sectors of state  $s$  in quarter  $q$ .  $GDP_{s,q}$  is the GDP growth rate of state  $s$  in quarter  $q$ .  $UnderWatch_{s,16Q1}$  is an indicator variable that equals one for the five states that had an indebtedness classification of “Under-Watch” in 2016Q1 and equals zero for the remaining five states with an indebtedness classification of “Sustainable”.  $Post_q$  is an indicator variable that equals one from 2016Q2 onwards. Observations at the state-quarter level. Standard errors are reported in parentheses and are doubled clustered at the state and quarter levels. \*, \*\*, \*\*\* denote significance at the 10, 5 and 1 percent levels. Detailed variable definitions are provided in Table A1 in the Appendix.

	Employment Total <sub>s,q</sub>		Employment Primary <sub>s,q</sub>		Employment Secondary <sub>s,q</sub>		Employment Tertiary <sub>s,q</sub>		GDP <sub>s,q</sub>	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Post <sub>q</sub>	-0.011*		-0.047***		-0.018*		-0.007		-0.006	
	-0.006		-0.014		-0.008		-0.012		-0.008	
Post <sub>q</sub> *UnderWatch <sub>s,16Q1</sub>	0.016***	0.016***	0.078**	0.072***	0.020*	0.02	0.014*	0.015*	0.007*	0.007*
	-0.003	-0.004	-0.029	-0.023	-0.02	-0.021	-0.007	-0.009	-0.004	-0.004
Observations	144	144	144	144	144	144	144	144	192	192
R-squared	0.281	0.411	0.153	0.259	0.128	0.216	0.251	0.366	0.316	0.608
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

**Table IA3 – Impact of Debt Ceilings on Bank Lending to Firms (Sample of States with *Sustainable* and *Under-Watch* Debt)**

This table reports OLS estimates of the impact of the FD Law on bank lending to private firms for the sample of ten states classified in 2016Q1 as with “Sustainable” and “Under-Watch” public indebtedness. The variable  $Value_{f,b,m}$  is the loan value (in logs) issued to firm  $f$ , by bank  $b$  in month  $m$ .  $Investment_{f,b,m}$  is the loan value (in logs) for investment projects issued to firm  $f$ , by bank  $b$  in month  $m$ .  $Working\ Capital_{f,b,m}$  is the loan value (in logs) for working capital issued to firm  $f$ , by bank  $b$  in month  $m$ .  $UnderWatch_{s,16Q1}$  is an indicator variable that equals one for the five states that had an indebtedness classification of “Under-Watch” in 2016Q1, and equals zero for the remaining five states with an indebtedness classification of “Sustainable”.  $Post_m$  is an indicator variable that equals one from April 2016 onwards. Observations at the firm-bank-month level. Standard errors are reported in parentheses and are doubled clustered at the state and month levels. \*, \*\*, \*\*\* denote significance at the 10, 5 and 1 percent levels. Detailed variable definitions are provided in Table A1 in the Appendix.

	Value <sub>f,b,m</sub>		Investment <sub>f,b,m</sub>		Working Capital <sub>f,b,m</sub>	
	(1)	(2)	(3)	(4)	(5)	(6)
Post <sub>m</sub> *UnderWatch <sub>s,16Q1</sub>	0.05***	0.04***	0.05	0.05	0.05***	0.04***
	-0.01	-0.01	-0.04	-0.04	-0.01	-0.01
Observations	275,534	275,534	43,980	43,980	248,858	248,858
R-squared	0.83	0.83	0.89	0.89	0.82	0.82
Firm-Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Sector-Month FE	No	Yes	No	Yes	No	Yes



**Table IA4 – Impact of FD Law on States’ Employment and GDP for States Below and Above Ex-Ante Public Debt**

This table reports OLS estimates of the impact of the FD Law on employment and GDP of states above the ex-ante public indebtedness. *Employment Total<sub>s,q</sub>* is the growth rate of employment in state *s* in quarter *q*. *Employment Primary<sub>s,q</sub>*, *Employment Secondary<sub>s,q</sub>* and *Employment Tertiary<sub>s,q</sub>* are the growth rates of employment in the primary, secondary and tertiary sectors of state *s* in quarter *q*. *GDP<sub>s,q</sub>* is the GDP growth rate of state *s* in quarter *q*. *I(DebtState)<sub>s,16Q1</sub>* is an indicator variable that equals one if a state's measure of public indebtedness in the quarter prior to the FD Law (calculated as the ratio of public debt of a state over its net income) is above the median state and zero otherwise. *Post<sub>q</sub>* is an indicator variable that equals one from 2016Q2 onwards. Observations at the state-quarter level. Standard errors are reported in parentheses and are doubled clustered at the state and quarter levels. \*, \*\*, \*\*\* denote significance at the 10, 5 and 1 percent levels. Detailed variable definitions are provided in Table A1 in the Appendix.

	GDP <sub>s,q</sub>		Employment Total <sub>s,q</sub>		Employment Primary <sub>s,q</sub>		Employment Secondary <sub>s,q</sub>		Employment Tertiary <sub>s,q</sub>	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Post <sub>q</sub>	0.003 (0.012)		0.001 (0.004)		0.017 (0.013)		-0.009*** (0.001)		-0.002 (0.006)	
Post <sub>q</sub> *I(DebtState) <sub>s,16Q1</sub>	0.005** (0.002)	0.006* (0.004)	0.004* (0.002)	0.004* (0.002)	-0.009 (0.015)	-0.009 (0.017)	0.008** (0.003)	0.008** (0.003)	0.007* (0.003)	0.007 (0.004)
Observations	480	480	420	420	420	420	420	420	420	420
R-squared	0.044	0.473	0.016	0.176	0.014	0.092	0.027	0.037	0.017	0.140
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

**Table IA5 – Impact of FD Law on Bank Lending to Firms Given State Public Debt**

This table reports OLS estimates of the impact of the FD Law on employment and GDP of states above the ex-ante public indebtedness. The variable  $Value_{f,b,m}$  is the loan value (in logs) issued to firm  $f$ , by bank  $b$  in month  $m$ .  $Investment_{f,b,m}$  is the loan value (in logs) for investment projects issued to firm  $f$ , by bank  $b$  in month  $m$ .  $Working\ Capital_{f,b,m}$  is the loan value (in logs) for working capital issued to firm  $f$ , by bank  $b$  in month  $m$ .  $I(DebtState_{s,16Q1})$  is an indicator variable that equals one if a state's measure of public indebtedness in the quarter prior to the FD Law (calculated as the ratio of public debt of a state over its net income) is above the median state and zero otherwise.  $Post_m$  is an indicator variable that equals one from April 2016 onwards. Observations at the firm-bank-month level. Standard errors are reported in parentheses and are doubled clustered at the state and month levels. \*, \*\*, \*\*\* denote significance at the 10, 5 and 1 percent levels. Detailed variable definitions are provided in Table A1 in the Appendix.

	Value <sub>f,b,m</sub>		Investment <sub>f,b,m</sub>		Working Capital <sub>f,b,m</sub>	
	(1)	(2)	(3)	(4)	(5)	(6)
Post <sub>m</sub> *I(DebtState <sub>s,16Q1</sub> )	0.011* (0.006)	0.013* (0.007)	0.054*** (0.021)	0.058*** (0.021)	0.008 (0.011)	0.012 (0.011)
Observations	1,252,105	1,252,105	206,666	206,655	1,131,483	1,131,483
R-squared	0.802	0.803	0.870	0.871	0.799	0.800
Firm-Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank-Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Sector-Month FE	No	Yes	No	Yes	No	Yes

**Figure IA1 – Public Debt of States and Interest Rates to Local Governments Over Time**

Panel A displays the evolution of state public indebtedness in 2016Q1 (one quarter prior to the FD Law) and 2018Q1 (7 quarters after the FD Law) along a 45-degree line. Panel B displays the average interest rate on bank loans paid by state governments in 2016Q1 and 2018Q1.

