Public Debt and Investment Under Political Competition: Evidence from Toxic Loans

Julien Sauvagnat and Boris Vallée[†]

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ABSTRACT

We examine the response from local governments and their voters to a large and exogenous increase in municipal indebtedness. We first show that municipalities with loans that become "toxic" exhibit a reduction in municipal investments as large as the associated increase in indebtedness. Local taxes remain unaffected. The reduction in investments is particularly pronounced for politically contested municipalities, and a debt shock reduces the incumbent vote share at the next election. These empirical findings are consistent with a model of public investment in which electoral competition disciplines local politician budget choices, and highlight the political nature of public indebtedness.

Keywords: Public debt, public investments, political competition, toxic loans.

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1 Introduction

Local governments have been accumulating large amounts of debt over the past decades, which now represents around 30% of GDP on average for developed countries.[1] As balanced-budget requirements typically prevents local governments from running a deficit, this rise in debt mostly results from local governments financing an increasing amount of public investments. In 2021, more than half of public investment spending came from local governments.[2] The Covid-19 outbreak and the recent rise in interest rates has put further pressure on local government balance sheets. Despite these developments, surprisingly little is known about how increases in debt affects local governments' subsequent budget decisions, and what role political competition plays in these relationships. While Reinhart and Rogoff (2010); Reinhart et al. (2012) suggests the existence of a form of debt overhang in public finance, so far empirical evidence causally linking government debt to public investment is scarce. Moreover, the mechanisms, whether economic or political, through which public indebtedness affects politician decisions are not yet well understood. Pinning down the central mechanism at play is crucial to assessing whether the restriction on public investment that debt may create should be primarily interpreted as the expression of taxpayers' preferences or the detrimental effect of a friction.

Empirically measuring the effects of an increase in indebtedness on local government investments, operating expenses, revenue policies, and constituents' behaviors is difficult due to both unobserved variable bias and reverse causality concerns. Existing evidence on the role of political parties in determining economic and fiscal policies makes it all the more crucial to identify variations in indebtedness that are independent from local government characteristics and context.[3]

In this study, we address these empirical challenges by exploiting a large and plausibly exogenous variation in indebtedness for a large number of French local governments, and interpret the empirical regularities we document through a simple political agency model. We have two main sets of findings. First, a significant increase in local indebtedness results

[1] Source: https://stats.oecd.org/.

[2] Source: https://stats.oecd.org/.

[3] For evidence on the role of political ideology, see for instance Beland (2015); Pettersson-Lidbom (2008); Folke (2014); Ferreira and Gyourko (2009).

in a reduction in local public investment of comparable magnitude, while it has no effect on local taxes and a minor effect on operating expenses. Second, the reduction in public investment is distinctively more pronounced in municipalities where political competition is high. Moreover, for these municipalities, the reduction in investment is significantly larger than their increase in debt. The debt shock also predicts incumbent electoral under-performance, which can be rationalized in a model where a debt shock prompts contested incumbents to cut local investment in order to better align with the preferences of fiscally conservative voters. Our central contribution is therefore to provide causal evidence linking public debt increase to public investment reduction, as well as fleshing out a novel political constraint on public debt underlying such a relationship when voters are fiscally conservative.

Our empirical analysis exploits a large shock in local indebtedness for a broad set of municipalities that results from the ex post outcomes of structured loans, a widespread type of loans embedding long-dated derivative instruments, which were sold prior to the Great Financial Crisis (GFC). Our empirical setting also allows us to interact this debt shock with heterogeneity in political competition across our sample to explore the role of elections in the public finance and investment nexus. The riskiest segment of structured loans was made of loans implicitly selling options on foreign-exchange rates, mostly on EURCHF or USDCHF (CHF-linked loans), or on the slope of the interest-rate curve ("steepener" loans). The market conditions brought by the GFC and its aftermath led to the significant deterioration of the derivative positions of this segment of loans, which the press dubbed "toxic loans". Indeed, the Swiss Franc significantly strengthened following the GFC, particularly so after the Swiss National Bank unpegged it from the Euro, and the interest rate forward curve flattened dramatically. Both these market evolutions led local governments with CHF-linked loans and steepener loans to face a surge in their interest expense, with some annual interest rates reported to be above 50%, and vastly negative mark-to-market on their loans. Overall, for the majority of toxic loan users, the episode led to a rise in interest expenses, followed by a long-term increase in the level of debt as the toxic loans are restructured into vanilla loans of a larger amount to absorb the unwind costs.[4]

[4]For the most affected local governments, the central government covered around half of the unwind costs ex post. When interpreting relative magnitudes of the debt increase and investment reduction, we focus on the "gross" debt change, i.e. not taking into account the partial bail-out, as it was unclear ex ante whether

For identification, we rely on a matched difference-in-differences approach, with either binary or continuous treatment, which builds on a unique dataset that allows us to precisely identify affected municipalities and the extent of their exposure. We exploit detailed information on toxic loan usage by local governments in France combined with detailed panel data of government financial statements, election, and population outcomes obtained from the French statistical office and covering the period 2000 to 2020. We first identify from our data the local governments that held toxic loans prior to the Great Financial Crisis. We then match these municipalities with counterparts that belong to the same decile of population and ratio of debt over population. This matching is key to establishing an adequate control group given the important selection effects associated with toxic loan usage documented in Perignon and Vallee (2017).[5] Our main identifying assumption is a parallel trend between the treated and matched control groups in the absence of the shock. Our data confirms the absence of pre-trends on the observable characteristics we study and the clear discontinuity associated with the increase in indebtedness triggered by having structured loans in the aftermath of the Great Financial Crisis.

Our empirical results are as follows. We first document that toxic loan deterioration leads to a large increase in indebtedness for the affected municipalities, with both debt amount and interest expense being impacted. Local newspaper coverage of the topic of municipal debt is also significantly higher for municipalities from the affected group. Second, treated municipalities significantly reduce their investments. The magnitude of these effects is large: for a municipality to have all its debt consisting of toxic loans would translate into an increase in indebtedness of 980 euros per inhabitant from the end of 2007 to the end of 2020, almost as much as the average initial amount of debt in our sample. The effect on investment is of comparable magnitude, as cumulative investments would be reduced by 1,120 euros per inhabitant over the 2008 to 2020 period. However, local taxes, which could be used to finance investments or interest expenses, are not impacted by the increase in indebtedness.

Turning to the political economy of local government debt, we leverage local elections

and to what extent it would happen.

[5]Although our results are consistent when conducting the difference-in-differences on the whole sample of municipalities with more than 2,000 inhabitants, we view the matching procedure as the one allowing the most precise quantification of the effects we are studying.

in which we observe different degrees of electoral competition, and find that the reduction in investments is significantly more pronounced for politically contested municipalities. For politically contested municipalities, the reduction in investments is twice as large as the increase in gross debt. The heterogeneity in the effects on investments is particularly pronounced along political competition and is robust to controlling for an interaction of the shock with a battery of proxies for differences in initial indebtedness, local government characteristics, economic conditions, or population characteristics. We also establish robustness of this heterogeneity to the measure of political competition we use by considering four different proxies commonly used in the literature. We interpret this heterogeneity as suggesting an imperfect alignment between the objectives of the agent (the "mayor") and the principal ("the voters"), and a disciplining role of contested elections over the agent. Indeed, the debt shock seems to also play a role in subsequent election outcomes. Incumbent candidates obtain a lower vote share when running for re-election, despite the fact that in most cases the incumbent is *not* the one that took on the loans that became toxic in the first place.

Last, we develop a simple theoretical framework to flesh out the economic mechanism plausibly underlying the large effect of an increase in indebtedness on local government investments, and its heterogeneous magnitude depending on how politically contested the local government is. In our setting, voters prefer to finance investment with debt rather than taxes, and trade-off the user value of public goods with the dis-utility from higher taxes or public debt. Because elected local politicians derive private benefits from local government investments, they are less fiscally conservative than voters. They prioritize using debt over taxes as they partly internalize voter preferences, but set investments to a level higher than voters' optimal one. When faced with a shock to indebtedness, and the associated reputation cost it imposes on them, incumbents reduce investments to get closer to voter preferences and improve their standing in the race. This reduction is particularly pronounced if the election is competitive, as in this case incumbents need to better align with voters to stand a chance for re-election. Grounded in the documented local voters' attention to debt level, this framework provides a unified yet parsimonious rationalization of our empirical findings and highlights the disciplining effect of elections on local politicians' budget decisions. The model also highlights the existence of a direct political cost for the elected official in charge

at the time of an exogenous debt shock, confirming the dual nature –financial and political– of such a shock.[6]

Our findings shed light on a novel political channel, which is complementary to the traditional economic channel through which higher debt increases governments' borrowing costs, and in turn depresses public investment (Laubach, 2009; Reinhart et al., 2012). This channel supports a more positive interpretation of this relationship, which results from a disciplining effect of elections in our setting. The results of our empirical setting are likely to be relevant in other contexts. First, this study should bear external validity to local governments facing large debt accumulation in countries with similar economic development and democratic institutions to France, such as the United States. To the extent that national voters are also fiscally conservative (Peltzman, 1992; Brender and Drazen, 2008), our results should be informative for central governments as well, where it is inherently more difficult to observe cross-sectional differences in the political context and identify variations in indebtedness that are independent from government actions.[7,8]

Our results contribute to the longstanding literature on the role and effects of public debt, starting with Ricardo (1951) and Barro (1979). There is a long standing literature studying the consequences of public debt accumulation, both in developed and developing countries. While there is evidence of a positive correlation between public debt and spending cuts (Reinhart and Rogoff, 2010; Reinhart et al., 2012) in cross-country analysis, establishing causality has been more difficult, as international comparisons are plagued by problems of reverse causality and omitted variables (Panizza and Presbitero, 2014). Using quasi-experimental settings at the local level Adelino et al. (2017), Cornaggia et al. (2018), and Dagostino (2022) study the impact of relaxing municipalities' financial constraints on

[6] In the absence of a reputational cost from the debt shock to the incumbent in our model, there is no heterogeneity in the investment response to a debt shock along the level of political competition.

[7] Peltzman (1992) documents that national voters in the U.S. are less likely to support politicians who has increased overall spending before the election. While there is evidence that targeted spending before an election can be a tool to gain votes in some contexts (see e.g. Drazen and Eslava, 2010), at the national level, Brender and Drazen (2005) show that earlier evidence of a political deficit cycle that is, an increase in spending or deficits in election years - are driven by the first few elections in countries that have made the transition to democracy. Instead, among developed countries and established democracies, Brender and Drazen (2008) find that deficits either in the election year or over the term actually reduce an incumbent's re-election chances.

[8] At the national level, other non-mutually exclusive channels linking public debt and investment are likely at play, e.g. the ones related to monetary policy, which are outside the scope of this study.

their bond issuance and price, government spending and local employment. Clemens and Miran (2012) and Grembi et al. (2016) estimate the size of fiscal multipliers and the effects of fiscal rules at the local level, while Huang et al. (2020) and Pinardon-Touati (2023) document the crowding-out effects of local government debt on corporate credit. Public liabilities are growing in part due to large pension liabilities, as documented by Novy-Marx and Rauh (2011), which jointly affects spending, tax, and borrowing decisions of local governments (Myers, 2020). Our setting, which uses a large and exogenous shock on local public indebtedness and encompasses multiple elections, allows us to disentangle the effects of debt from local economic conditions, and isolate the importance of electoral competition in the sensitivity of public investment to indebtedness. Our results thus shed light on the existence of a constraint that is not financial in nature.

Our analysis also connects with recent studies estimating the real effects of a high level of indebtedness on investment and spending for different economic agents. Agarwal et al. (2016), Di Maggio et al. (2017) and Ganong and Noel (2019) find that households who experience debt payment reductions have a lower probability of default and increase spending on durable goods. Closer to our empirical setting, Verner and Gyongyosi (2020) exploit variation in exposure to household foreign currency debt during Hungary's late-2008 currency crisis and document a rise in default and a collapse in spending, which amplify the recession locally. In the corporate sector, Gilje (2016) finds a reduction in investments as firms exogenously approach financial distress. We expand the validity of this relationship to local governments and flesh out a new mechanism specific to elected bodies.

Our work adds to a growing body of work on the disciplining effect of electoral competition on policy choices (Besley and Case, 1995; Besley and Preston, 2007; Besley et al., 2010; Ferraz and Finan, 2011). Our contribution to this strand of literature is to characterize a new channel through which electoral competition disciplines public debt and government spending. By exploring how local government expenditures relate to local voter preferences, our work thus relates to the seminal work by Tiebout (1956), and more recent work empirically testing for such mechanism (Ferreira and Gyourko, 2009).

Last, this study also speaks to the consequences of financial innovation gone wrong, in a public finance context. When the innovation reaches sufficient scale to become systemic,

it can have acute financial consequences, as documented in Mian and Sufi (2010), and lead to a broad range of real effects, including political (Gyöngyösi and Verner (2022), Sartre and Daniele (2022)). This study looks at the consequences of a nefarious innovation on government economic policy and speaks to comparable episodes implemented at different levels of government (e.g. Gromb and Peress (2018)).

The rest of the paper is organized as follows. Section II provides some background on the toxic loan episode. Section III presents the empirical setting, including the data. Section IV documents the effects on local government budget decisions. Section V connects the political context to the previous results. Section VI provides a theoretical framework to articulate both sets of empirical results. Section VI concludes.

2 Background

To study the real effects of local government indebtedness, we exploit a plausibly exogenous variation in the indebtedness of French local governments over the 2000-2020 period, resulting from the combination of a large set of local governments entering into high-risk derivative transactions through structured loans, and the adverse market conditions that the Great Financial Crisis created ex post for these financial instruments.

2.1 French Municipal Elections, Municipalities' Governance and Budget

French municipalities are governed by a mayor and a municipal council that are elected together every six years. These French municipal governments overlook local services such as public transpiration, police, nurseries, primary schools, and road maintenance. In France, 11% of public spending is on the municipal level (Broberg et al., 2022).

Like municipal governments in the United States, these activities are funded primarily through local taxes and transfers from the central government. Local taxes, which make up roughly 2/3 of municipal revenue, are predominantly collected from property taxes, real estate transactions, and a value-added tax on local firms. Local tax rates are set by the

municipal council. Funding from government transfers is determined by objective criteria legislated from the central government. In addition, all municipalities legally must maintain a balanced budget and consequently cannot run an operating deficit.

Since 1983, mayoral elections are organized around candidate lists for municipalities with over 3,500 inhabitants.[9] A list is headed by a candidate for the mayoral position, and also includes joint candidates for the municipal council. A list is usually affiliated with a political party, or a coalition of parties. The list that obtains a majority of the vote receives first half the seats on the town council; the remaining seats are then distributed proportionally across all the lists (including the winning one) that received more than 5% of the votes.[10] The council then chooses the mayor, who almost always is the candidate that was leading the list that got the most votes.

2.2 Structured Loans

Structured loans, later dubbed "Toxic Loans" by the media for the high-risk ones, are a type of loans used by local governments in Europe during the 2000s, which embed sales of options with various underlying assets: interest rates, inflation, interest rate spreads, or foreign-exchange rates. The use of these instruments was widespread in Europe, particularly in France during the 2000s where thousands of French local governments using structured loans. The sale of options allowed local governments to borrow at a lower interest rate than with vanilla loans, as borrowers implicitly received the option premiums, as long as the options stayed out of the money.[11]

The most widespread high-risk structured loans, which we will now refer to as toxic loans, are CHF-linked loans, and steepeners. CHF-linked loans are designed with a short exposure to CHF exchange rates: the interest rate follows a formula such as *x% + c*Max(K- Exchange Rate, 0)*. If the foreign exchange rate, typically EURCHF or USDCHF, drops below the level

[9] Our main sample consists of all municipalities above 2,000 inhabitants, the administrative cutoff for a town in France. In Section V, where we focus on the political context, we restrict our focus to municipalities above the 3,500 population threshold for ensuring homogeneity in the electoral system.

[10] If no candidate receives a majority of the votes, then a second round of voting is conducted where any list with more than 10% of the votes are eligible to participate. The winner is the one that attracts the larger number of votes in this runoff.

[11] For more details on local government structured loans, see Perignon and Vallee (2017).

K, the interest rate paid annually on the loan increases by *c*(Exchange Rate - K)*, where c is typically 0.5 or 1. Once in the money, an appreciation of the CHF vs the other currency of 0.01, therefore, raises the interest rate by 0.5 or 1%. Steepener loans are indexed on the slope of the interest rate curve, the most common exposure being the spread between the EUR 10-year Constant Maturity Swap rate and the EUR 2-year Constant Maturity Swap rate. The interest rate follows a formula such as *x% + L*Max(K - (CMS 10y - CMS 2y),0)*, with x being lower than the usual interest rate, L being the leverage, and K being the strike of the option on the rate spread. Such transactions create a large and long-lasting exposure to a CHF appreciation or a flattening of the interest curve, as the loan maturity can go up to 30 years.

2.3 The Impact of the Great Financial Crisis on Toxic Loans

With the Great Financial Crisis, the underlying indices for both the CHF-linked loans and steepener loans moved strongly against the loan issuers. With the Swiss Franc being a safe haven currency, the GFC led to a drop of the EURCHF and USDCHF parity. To limit this appreciation of the Swiss Franc, on September 6, 2011, the Swiss National Bank (SNB) announced a floor on the EURCHF exchange rate of 1.20, which brought a stable EURCHF exchange rate through 2014. However, at the end of 2014, foreign developments, including market participants' anticipation of a large-scale quantitative easing program in the euro area, led to a large flight to safety phenomenon into CHF-denominated securities, in turn prompting the SNB governing board to unexpectedly abandon the minimum exchange rate on January 15, 2015. This policy change led to a particularly large CHF appreciation when compared to typical short-term exchange-rate fluctuations in advanced economies (see for instance Auer et al. (2021)). In parallel, the drop in the long-term interest rate resulting from the recession expectations at the onset of the GFC led to a sharp flattening of the interest rate curve as soon as 2008. Figure 1 displays the evolution of the EURCHF parity and the CMS 10y - CMS 2y spread over the period 2004-2022.

INSERT FIG 1

There are several key aspects of this episode to consider for our study. First, the adverse

market movements translated into a significant rise in interest rates on the exposed structured loans, some of them reaching annual interest rates over 50%. Relatedly, the unwind cost for exiting the derivative instrument embedded in the structured loans surged, amplified by the high duration of the loans. Second, the amount of debt of a municipality increases as a result of the deterioration of a toxic loan only if this loan is refinanced into a vanilla loan. This vanilla loan will indeed need to be larger to finance the unwind cost of the derivative component of the initial loan. Although costly to the municipalities, the unwind allows them to de-risk the position. Overall, for the majority of toxic loan users, the episode should lead to a rise in interest expenses, followed by a long-term increase in the level of debt as the toxic loans are restructured into vanilla loans of a larger amount to absorb the unwind costs. Third, a partial bail-out program was put in place by the central government to assist local governments to unwind the derivative instruments and finance around half of the unwind cost for the most affected municipalities. This program made payments starting in 2016 and covered around 400 municipalities, including virtually all CHF-linked issuers and most of the steepener loan issuers. The cumulative transfer from the central government to local governments under this program reaches EUR 5 billion, with an even larger amount of unwind costs being borne by the affected local governments. The bail out was implemented without "strings attached" beyond the use of the proceeds being applied towards the unwind cost, i.e. it did not include constraints towards increased austerity or reduced investment. In our baseline specifications, we consider the change of debt resulting from the toxic loan deterioration before taking into account the partial bail-out, as it better corresponds to the expected increase in debt prior to the bail-out.[12]

[12]While the ideal quantity to track would be the mark-to-market of the derivative instrument embedded in the loans, as it represents a dynamic estimate of the unwind costs and is typically disclosed to the local government by the bank, such a quantity is particularly challenging to estimate for long-dated exotic derivative positions, and would also require information on the option strikes, which we do not possess.

3 Empirical Setting

3.1 Data

We first obtain detailed municipalities' financial statements for the period 2000 to 2020 from the data-sharing website of the French Interior Ministry.[13] We restrict our attention to municipalities above 2,000 inhabitants in 2007.[14]

We then rely on two proprietary datasets, the same as in Perignon and Vallee (2017), to identify toxic loan users, namely CHF-linked and steepener loan users. The first dataset contains details of all of the structured loans taken by municipalities between 2000 and 2009 with the bank Dexia, which has a 70% market share for such transactions in France. This dataset was leaked at the end of 2011 to the French newspaper *Liberation*. The second dataset contains detailed information on the entire debt portfolio for the 100 largest French municipalities as of the end of 2007 and stems from a survey conducted by a specialized consulting firm. Both these datasets contain information that is typically undisclosed to the public. We also obtain the election data and incumbent outcomes for the municipal elections of 2001, 2008, 2014, and 2020 used in Broberg et al. (2022).[15] We merge these datasets using the INSEE code, a unique municipality identifier from the French statistical office, and build a balanced panel data set.

Last, we exploit data from Aday, a media monitoring firm that focuses on French local newspapers.[16] The Aday database allows us to run queries that quantify the number of articles using a given set of keywords for a given period. By including the name of a municipality in each query, we build a panel dataset at the municipality level on local media coverage of specific topics. We merge this data with our main dataset by municipality name.

[13] Source: https://www.data.gouv.fr/en/datasets/comptes-individuels-des-communes-fichier-global-a-compter-de-2000/

[14] In 2007, there was around 4,700 municipalities (out of 36,000 in total) above 2,000 inhabitants (the administrative cutoff for a town in France), and around 2,700 municipalities above 3,500 inhabitants (the threshold over which electoral rules described above are the same across municipalities)

[15] We thank the authors for sharing their data with us.

[16] The Aday platform is comparable to Factiva, but offers significantly better coverage of French local newspapers, and allows to run richer queries.

3.2 Empirical Strategy

We aim at estimating the effects of exogenous indebtedness shocks driven by toxic loan deterioration on municipalities' budget decisions and voters' behavior. Given the selection on size and indebtedness for toxic loan usage documented in Perignon and Vallee (2017), it is crucial to use an adequate control group for ensuring that we are isolating the effects of toxic loan deterioration, as opposed to other municipal characteristics that could drive the outcome variables of interest. Our empirical strategy, therefore, relies on a matched sample of control municipalities for each treated municipality, defined as those having CHF-linked or steepener loans on their balance sheet as of 2007. Control municipalities are drawn from the universe of municipalities without toxic loans in 2007. We then combine the treated and control samples and estimate the effect of toxic loan deterioration in an otherwise standard difference-in-differences framework. The same approach has been used in several recent studies to estimate treatment effects when treated and control units differ significantly on a small set of characteristics (see e.g. Balsmeier et al., 2017; Jaravel et al., 2018; Azoulay et al., 2019).

Specifically, we implement a "coarsened exact matching" procedure (Blackwell et al., 2009; Iacus et al., 2012). In our baseline sample, we draw control municipalities based on population and municipal debt per capita in 2007. For each treated municipality (those with toxic loans in 2007), we keep all control municipalities (without toxic loans in 2007) that belong to the same deciles of population and debt per capita. When there is no exact match, the treated municipality is removed from the estimation. This procedure yields a treated group that contains 572 municipalities (100% of treated municipalities), and a matched control group of 2,127 municipalities (around half of municipalities above 2,000 inhabitants without toxic debt).[17] In robustness checks presented later, we re-run our specifications on more stringent matching procedures.

Table 1 provides summary statistics of treatment variables (Panel A) for the resulting

[17] The "coarsened exact matching" procedure produces weights. Unmatched units receive a weight of zero. Matched units receive a weight equal to one if they belong to the treatment group, and $\frac{n_C}{n_T}\frac{n_T^s}{n_C^s}$ if they belong to the control group, where n_C is the total number of control units, n_T is the total number of treatment units, and n_C^s and n_T^s are their counterparts in stratum s. The weights make the treatment and control groups balanced with respect to the variables used in the match procedure. All regressions presented in the paper are weighted with the "coarsened exact matching" weights.

sample, and of budget categories, either absolute (Panel B) or scaled by population (Panel C). We also present our outcome variables in Panel D, and variables related to election outcomes in Panel E. Treated governments have on average a share equal to 0.0733/0.212=35% of toxic debt on their balance sheet as of 2007. Around one third of toxic debt consists of CHF-linked debt, and two thirds of steepener debt. Municipalities in our sample have 13,400 inhabitants on average, and represent around 60% of the French population.

INSERT TABLE 1

We plot in Figure 2 the location of CHF-linked and steepener loan users in France, as well as municipalities from the matched control group. This figure illustrates the broad geographic range of toxic loan users, as well as the geographic comparability of our control group. This geographic dispersion mitigates concerns over local shocks potentially confounding our measurement exercise.

INSERT FIG 2

We then check whether our treated group and our control group are observationally similar. To do so, we calculate the coefficients for the univariate regressions that regress 2007 municipal characteristics on an a treatment variable that is equal to one if the municipality has either CHF or steepener loans. We perform this exercise first for the whole universe of municipalities and second for a sample consisting of the treated group combined with the matched sample. Figure 3 displays the result of this exercise, which validates the comparability of our matched control group on a broad set of characteristics. While municipalities with toxic loans are on average significantly larger and more indebted compared to the universe of other French municipalities (see Panel A), treated and control municipalities are very well-balanced in our matched sample in terms of population and debt per capita, the two covariates that formed the basis of the "Coarsened Exact Matching" procedure. Reassuringly, in our matched sample, treated and control municipalities are also well balanced on a series of other characteristics that were not used as inputs for matching, such as the level of municipal taxes, investments, and expenses in 2007.

INSERT FIG 3

Our main identifying assumption is therefore a parallel trend between the treated and control groups in the absence of the shock, as motivated by our matching methodology. Our empirical analysis relies on both panel analysis and cross-sectional analysis of cumulative outcomes, which allow absorbing time-invariant unobserved characteristics of local governments. While we view this methodological choice as the most precise one, we also ensure that our results are robust to using the full sample of municipalities above 2,000 inhabitants by conducting a robustness. Such analysis is provided in Table A.1 in the online appendix.

3.3 Internal Validity

As a test of internal validity for our setting and sample, we compare the local press coverage about toxic loans for municipalities from the treated group with the ones from the control group. Figure 4 plots the average number of local articles covering toxic loans per quarter for municipalities with CHF-linked or steepeners on their balance sheet prior to the Great Financial Crisis.[18] We observe that the topic is significantly more covered for treated municipalities than for control ones. Coverage is particularly high at the time of the Dexia leak (2011 Q4), and at the time of the unpeg of the Swiss Franc from the euro (2015 Q1). This higher local media coverage is consistent with the higher treatment for these municipalities we identify from the structured loan data.

INSERT FIG 4

4 Effects on Local Government Budget Decisions

4.1 Effects on Indebtedness

We start by measuring the impact of toxic loan deterioration on municipality indebtedness, taking into account the partial bail-out implemented by the central government.

We run the following panel regressions:

$$log(Y_{m,t}) = \alpha + \beta_t \mu_t + \beta_{Treat,t} \mathbb{1}_{Treated} \times \mu_t + \gamma_m + \varepsilon_{m,t} \tag{4.1}$$

[18] Online appendix C details the exact query run on the Aday platform.

where $Y_{m,t}$ is either the gross amount of debt of the municipality, the amount of debt net of the cumulated bail-out transfer, or the interest expense of municipality m in year t. $\mathbb{1}_{Treated}$ is an indicator variable for having CHF-linked or steepener loans in 2007, μ_t are year fixed effects, and γ_m are municipality fixed effects. We cluster the error term, $\varepsilon_{m,t}$, at the department level. Figure 5 displays the treatment coefficients (left-hand side panels), as well as the coefficients β_t and $(\beta_t + \beta_{Treat,t})$, thus comparing the trajectories of the treated group vs. the control group (right-hand side panels). Consistent with our identification assumption, we observe similar trends for the two groups prior to 2008. Afterward, however, the treated group exhibits a significantly larger debt amount, particularly so when looking at the amount of debt gross of the partial bailout transfer, and significantly higher interest expenses.

INSERT FIG 5

We further confirm this result by running cross-sectional regressions that include a comprehensive set of controls to address concerns over potential confounding factors. We use the share of debt that consists of toxic debt as of 2007 as a continuous measure of treatment and therefore identify from both the extensive and intensive margin of treatment. We first run the following specification:

$$Y_m = \alpha + \beta ToxicDebtShare + \lambda' x_m + \mu_d + \mu_p + \varepsilon_m \tag{4.2}$$

where Y_m is either the change in gross debt per inhabitant from 2007 to 2020, or the cumulative amount of interest expense from 2008 to 2020 per inhabitant. x_m are a set of controls including debt per inhabitant, investments per inhabitant, operating expenses per inhabitant, local taxes per inhabitant, and central government transfers per inhabitant, all measured as of 2007. μ_d are department fixed effects, and μ_p are population quintiles fixed effects. We cluster the error term, ε_m, at the department level.

The regression coefficients are reported in columns 1 and 2 of panel A of Table 2. This exercise confirms the significant increase in indebtedness associated with toxic loans after

2008, and also brings light to its particularly large magnitude, which is a key strength of our empirical setting. If 100% of the debt of a local government is made of toxic loans, the gross debt increases by 986 euros per inhabitant between 2007 and 2020. This compares to an average baseline of 1,047 euros of debt per inhabitant in 2007 in our sample.

We also run a similar regression breaking down the toxic debt share into its CHF-linked and steepener components. Namely, we use the following specification:

$$Y_m = \alpha + \beta_{chf} CHFDebtShare + \beta_{steep} SteepenerDebtShare + \lambda' x_m + \mu_d + \mu_p + \varepsilon_m \quad (4.3)$$

We report the results in panel B of Table 2. This exercise evidences the particularly large effects of CHF-linked loans on indebtedness, as a local government using only such loans would have seen its debt almost double over the period as a result of their deterioration.

INSERT TABLE 2

To test whether this increase in debt translates into a higher local media coverage of municipal debt, we run a similar specification as equation 4.1, using the number of articles covering municipal debt for a given municipality as the dependent variable. Results are displayed in Figure 6. Municipal debt is significantly more discussed for the treated group than for the control group, particularly at the time of the Dexia leak and the Swiss Franc unpeg, but also around the 2014 municipal elections. Voters from the treated groups are therefore likely to be aware of the recent increase in municipal debt they are facing.

INSERT FIG 6

4.2 Effects on Investments

Having established the significance of the increase in indebtedness triggered by the toxic loan deterioration in the wake of the Great Financial Crisis, and documented its associated local media coverage, we now study the effects of this shock on local governments' investment decisions.

We thus perform a similar exercise as in equation 4.1 and Figure 5, this time focusing on the log of municipal investments as the dependent variable. Results are displayed in Panel

A of Figure 7. We observe that the increase in debt for the treated group translates into a significant and persistent reduction in municipal investments relative to the control group.

INSERT FIG 7

To get a sense of the absolute and relative magnitude of the effect, we turn to the previous cross-sectional specification of equation 4.1, and use the cumulative amount of investments per inhabitant over the period 2008 to 2020 as the dependent variable. Results are displayed in columns 3 of Table 2.

The coefficients indicate a particularly pronounced reduction in municipal investments. When comparing with the baseline annual investment per capita in our sample, we observe that a municipality with only toxic debt on its balance sheet would reduce its investment by an amount equivalent to two full years of investments over the 2008 to 2020 period. The reduction in investment is on average of the same magnitude as the increase in gross debt triggered by the toxic loan deterioration, which supports a direct link between these two quantities.

When zooming in on the type of toxic loans in Panel B, we find more pronounced effects for the CHF loans in absolute terms, as a municipality with only this type of debt would cut the equivalent of three years of investments over the 2008-2020 period. In relative terms, the effect on investments when compared to the magnitude of the increase of the debt is however somewhat lower than for steepener loans, which is consistent with the partial bailout particularly targeting CHF-linked loans.

4.3 Effects on Operating Expenses, Local Taxes, and Government Transferd

For completeness, we also study the effects on operating expenses, local taxes and central government transfers in Panel B and C of Figure 7, and columns 4, 5 and 6 of Table 2. We observe a modest and insignificant reduction in municipality operating expenses, and virtually no effect on local taxes and central government transfers.

Because of the balanced-budget constraint, an increase in interest expenses cannot be financed with debt or a reduction in investments. The reduction in municipality operating

expenses, though not statistically significantly, broadly mirrors the increase in interest expenses. An alternative to reducing investments when faced with a shock on indebtedness is to increase tax revenues. While voters could be indifferent between the municipality raising debt or taxes (Ricardo, 1951; Barro, 1979), we find no effects on local taxes, which indicates that elected politicians are reluctant to raise taxes, and are likely internalizing local voters' aversion for increases in local taxes. Finally, we do not find evidence that the central government increases its transfers to municipalities experiencing indebtedness shocks.

4.4 Pre-trends and Robustness

We first test that our treatment variable is not correlated with existing pre-trends in municipal budget outcomes, as such a correlation could introduce a bias in our point estimates. To do so, we run the same specifications as in Table 2, replacing the dependent variables defined over the 2008-2020 period by their counterparts over the 2000-2007 period. Results are displayed in Table 3. Reassuringly, when replacing outcomes from the treatment period with the ones of the pre-treatment period, the coefficients on the treatment variable all turn insignificant, and correspond to relatively precisely estimated zeroes.

INSERT TABLE 3

We then ensure that our results are robust to the matching criteria and process we adopt in our baseline analysis. In Table 4, we repeat the specifications run in Table 2 (Panel A) on alternative matched samples of municipalities and present the coefficient on the share of toxic debt. We match treated municipalities with control municipalities based on deciles of population and municipal debt per capita in 2007 as in our baseline matched sample, as well as on an additional municipal characteristic as of 2007: being located in the same region (row 1), deciles of interest expenses per capita (row 2), deciles of investment per capita (row 3), deciles of operating expenses per capita (row 4), deciles of local taxes per capita (row 5), deciles of government transfers per capita (row 6). We also present the results when matching only on deciles of population and municipal debt per capita in 2007 as in our baseline matched sample, but using alternatively a one-to-one exact matching procedure as in Jaravel et al. (2018) in which ties are broken at random when there is more than one exact match (row

7). The point estimates are directionally and quantitatively similar across all these matched samples. We also replicate our main specification on long-term effects using the whole sample of municipalities with more than 2,000 inhabitants. Results are displayed in Panel A of Table A.1 in the online appendix, while Panel B studies the pre-trends. The results in Panel A are consistent with the ones obtained when applying our preferred matching procedure. In the pre-trend analysis, we observe that treated municipalities are on a different trend in investments than the overall sample, which further motivates our matching procedure and provides an explanation for the difference in the coefficient magnitudes for that outcome between the two approaches.

Last, to further mitigate concerns over potential unobserved heterogeneity between the treated and control groups, we implement a panel regression setting, with the logarithm of debt, the logarithm of interest expense, the average interest rate on debt, the logarithm of municipal investments, the logarithm of operating expenses, , the logarithm of local taxes, the logarithm of government transfers, and the logarithm of population, as the dependent variables. We include municipality and year fixed effects, and cluster standard errors at the department level. We use *Toxic Debt Share* $\times$ *Post* as an explanatory variable in Panel A, and *CHF-linked Share* $\times$ *Post* and *Steepener Share* $\times$ *Post* in Panel B, where *Post* is equal to 1 if the year is larger or equal to 2008. This specification allows absorbing unobserved characteristics of municipalities. We report these results in Table A.2 and observe consistent results with the previous cross-sectional analysis.

5 A Political Discipline on Public Debt?

5.1 Toxic Debt, Political Competition and Investments

We now explore the role political competition plays in the causal relationship between increase in public debt and reduction in public investments we previously establish. To do so, we assess the heterogeneity of our central result - that higher local government debt results in lower investments - across levels of political competition. Such analysis is motivated by the likely existence of a political cost for an increase in public indebtedness, which would

result in heterogeneous response from the elected officials depending on the political context they face.[19] This analysis is run on the subset of municipalities above 3,500 inhabitants, for which the electoral rules are the same.[20]

In Table 5, we thus reproduce our cross-sectional specification while splitting our sample between local governments whose mayor was elected without a runoff in 2008 (Panel A), which suggests low political contestation, and the ones elected following a runoff (Panel B). Importantly, the municipal elections of 2008 precede the shocks on the Swiss Franc and the rate spread that we use for identification.

We observe that the negative effect of debt on investments that we previously document is significantly more pronounced for local governments with a high level of political competition. This heterogeneity suggests a disciplining role of elections: the reduction in investment triggered by an increase in debt is strengthened when political competition is high. In addition to the well-known financial constraint imposed by lenders, which may be relaxed by central government potential bail-outs, these results suggest that municipalities also face a constraint originating from voters.

INSERT TABLE 5

5.2 Heterogeneity on other municipal characteristics

To ensure that the pronounced heterogeneity in the reduction in investments we observe is uniquely predicted by political competition, we conduct a battery of heterogeneity analysis on a comprehensive set of local characteristics in Table 6. We cover political characteristics in Panel A, municipality characteristics in Panel B, local economic characteristics in Panel C, and local workforce characteristics in Panel D. We run the following augmented specification:

$$\begin{aligned} Y_m = \alpha + \beta ToxicDebtShare + \beta_c ToxicDebtShare \times \mathbb{1}_{Contested} \\ + \sum_i \beta_i X_i + \sum_i \beta_{i,c} ToxicDebtShare \times X_i + \mu_d + \mu_p + \varepsilon_m \end{aligned} \tag{5.1}$$

[19] Table A.6 in the online appendix highlights how local public debt is a major concern for local voters.

[20] We show in Table A.3 in the online appendix that the previously documented effects on municipal budget outcomes are virtually the same in this smaller sample of municipalities.

where $\mathbb{1}_{Contested}$ is an indicator for having been elected in a run-off in columns 1 and 2, and an indicator for being below the median in terms of vote difference between the elected candidate and the second candidate in columns 3 and 4. X_i represents a comprehensive set of characteristics we cover in this analysis: mayor with above median age, female mayor, mayor affiliated with a left-wing ideology party, college-educated mayor, council size in Panel A; municipal debt per capita, municipal investment per capita, operating expenses per capita, local taxes per capita, goverment transfers per capital, the log of population in Panel B; working age population, unemployment rate, local firm value added per worker, average wages per worker, firm debt, and local firm investments in Panel C; the share of inhabitants between 15 and 24 years old, the share of workers in the agriculture sector, in industry, in construction, in retail/services/transportation, and in the public sector in Panel D.[21]

There are two main take-aways from this empirical exercise. First, the heterogeneity along political competition we previously stress is robust to the inclusion of the interaction of any of these characteristics with our treatment variable. When introducing the interacted characteristics, the coefficient on the interaction between the toxic debt share and the proxy for political competition remains significantly negative and exhibits a stable magnitude, strengthening the findings of Table 5, and mitigating concerns over other characteristics, e.g. different economic conditions or governance contexts, driving the heterogenous effects we document.

Second, only a few other characteristics are predictive of an heterogeneous effects of the toxic loan shock on investments. We observe that having a younger mayor, having initially a higher municipal debt, and having initially a higher level of municipal investments, are also predictive of a more pronounced reduction in investments when interacted with our treatment variable. Younger mayors may be more likely to care about their re-election prospects given their longer remaining political career. Voter's disutility resulting from municipal indebtedness is likely to be convex. Reducing investments is likely less costly when the baseline is high.[22]

[21] Table A.4 in the online appendix present summary statistics for these characteristics separately for municipalities whose mayor was elected without a runoff in 2008 (low political competition), and municipalities whose mayor was elected in a runoff in 2008 (high political competition).

[22] As we use investments per capita as the dependent variable, such an heterogeneity in absolute terms can also be somewhat mechanic if the reduction is targeted in relative terms.

INSERT TABLE 6

For completeness, we reproduce the same specification as column 1 of Table 6 using three alternative proxies for (low) political competition, i.e. the vote margin for the between the winner and the runner-up in the local elections of 2008, an indicator variable for this margin being above the median, and an indicator variable for the incumbent winning in the first round. We report the results in Table 7. Finally, we check whether our results hold beyond the baseline matched sample of municipalities. For this, we replicate the analysis using the whole sample of municipalities with more than 3,500 inhabitants and present the results in Table A.5 in the online appendix. We find consistent results for these three alternative proxies of (low) political competition, and in the full sample of municipalities above 3,500 inhabitants, which confirms the robustness of this heterogeneity analysis.

INSERT TABLE 7

5.3 Effects on Election Outcomes

Last, we investigate whether the increase in indebtedness we study affects the likelihood of re-election of the incumbent, i.e. the current mayor.

In Table 8, we run the following difference-in-differences specification at the municipality-election level:

$$Y_{m,t} = \alpha + \beta ToxicDebtShare \times Post + \#Candidates + \mu_m + \mu_t + \varepsilon_m \tag{5.2}$$

where Y_m, t is an indicator variable for the incumbent running for re-election in column 1, the share of votes obtained by the incumbent in column 2, and an indicator variable for the incumbent winning re-election in column 3. *Post* is an indicator variable for the elections happening in 2008 or later, i.e. after the onset of the GFC. $\#Candidates$ is the number of candidates in the first round of the election. μ_m are municipality fixed effects to absorb any time-invariant heterogeneity in incumbent advantage, and μ_t are election year fixed effects. The error term, ε_m, is clustered at the department level.

We observe in Panel A that being hit by the toxic loan shock modestly affects negatively the incumbent election outcomes post 2008. All three outcome variables present a negative

relationship with the shock, with the incumbent vote share in the first round presenting statistical significance. The magnitude is significant for this estimate: having all its debt made of toxic loans corresponds to a 5 percentage point decrease in vote share for the incumbent. The lack of significance when predicting victory is likely to result from the non-linear relationship between vote share and victory.

In Panel B, we reproduce the same analysis, excluding the 2008 election. There are two reasons for doing so: first, in 2008, incumbent candidates are likely responsible for the implementation of the toxic loans, and therefore the shock is clearly endogenous for such candidates. Second, the existence of toxic loans was mostly revealed after the Dexia leak, which occurs at the end of 2011. In the absence of voter awareness around the problem, it is less likely that there would be effects on electoral outcomes. Reassuringly, the results are consistent if not strengthened when excluding 2008, which highlights the electoral consequences despite the shock being largely exogenous to the candidate, and mitigates concerns over the plausibility of the channel at play.

INSERT TABLE 8

5.4 Voting with their feet?

A voter that is dissatisfied with the level of debt of their local government may also "vote with their feet" (Tiebout, 1956), by deciding to move to a different location.[23] We thus close our empirical analysis by exploring this hypothesis by studying whether the increase in indebtedness results in a decrease in population. Column 7 of Table 2 performs such an analysis. While the coefficients are not always statistically significant when using our whole sample, the point estimates suggest that an increase in indebtedness indeed leads on average to a small reduction in the municipal population. As shown in Panel A of Table 5, this effect is more pronounced when restricting the sample to municipalities that are not politically contested. This fact would suggest that when voters are less likely to have an impact on the election outcome, they might be more inclined to move somewhere else when facing an

[23] While moving costs are large and it is therefore unlikely for a household to decide to move solely based on the level of municipal debt, such a dimension is more likely to play a role conditional on moving, e.g. for households that have decided to move to a given area, but need to decide on the exact municipality.

increase in local indebtedness.

6 Theoretical Framework

To help interpret our empirical results and pin-down the channel through which – and the context in which – shocks to public indebtedness affect politician budget decisions, we propose a model of public investment under electoral competition that generates the key empirical facts previously documented: the toxic debt shock translates into a significantly higher indebtedness, lower investments, and the reduction in investments is more pronounced when the municipality is politically contested. For simplicity, we rely on a static model where politicians first announce their policies and can commit to them, and then the election occurs. While this model does not capture the dynamic nature of our data, it provides a unified framework to interpret the cumulative effects of toxic shocks on taxes, debt, and investment presented above, and allows comparative statics in the cross section of political competition.

In the model, two candidates running for local elections announce and commit to a level of local public investment and whether to finance it through tax or debt. Because elected politicians derive private benefits from public investment, their preferred level of investment is higher than the one of voters, who trade off the user value of local public goods with their dis-utility of higher taxes or public debt. Voters are therefore structurally more fiscally conservative than politicians, consistent with empirical evidence (Peltzman, 1992; Brender, 2003; Brender and Drazen, 2008; Arvate et al., 2009). This assumption is also consistent with survey evidence during the French 2020 municipal elections, presented in Table A.6 in the online appendix, where a majority of voters agreed with the statements that "Financial and debt management", and "local taxes" are crucial elements in their vote. Given the balanced budget requirement for local governments in France (as well as in most countries), we do not model operating expenses, as they can only be financed with tax. We also match the pecking order of public investment financing: as politicians internalize voter preferences, they prioritize using debt over taxes to finance investment.

We model the shock resulting from toxic loans as both a sudden increase in local public indebtedness and a decrease in the perceived quality of the incumbent mayor prior to the

upcoming campaign. We view this specification as externally valid to other exogenous increases in indebtedness, consistent with voters struggling to distinguish skill from luck. This dual nature of the shock generates the two main empirical regularities we observe in the data: a general reduction in investment, and a heterogenous effect according to how contested the next election is.[24] Electoral competition therefore acts as a disciplinary device on candidates: they internalize the fact that they will lose the election if they choose their own preferred level of local investments. As a result, following an identical toxic debt shock, local investment is significantly lower – and closer to voters' preferences – in politically contested municipalities, defined as those in which the incumbent mayor has only a small electoral advantage.

6.1 Setup

Formally, we consider a local election (e.g. a mayoral election) with two candidates in a given location: the incumbent and their main challenger (denoted respectively M and C below). The two candidates occupy fixed positions in the ideology profile: $X_M = 1$ and $X_C = -1$.[25] Each candidate j ($j = M$ or $j = C$) has a personal quality, θ_j, that captures a combination of their reputation, skills, and political ability.

Voters and electoral competition. In each location, there is a continuum of voters that care about the ideology, the quality, and the budget choices of the candidates M and C. Specifically, voter i - with personal ideology X_i - gets the following utility from voting for candidate j, who has announced (s)he will implement the level of local public investment I_j over the next mandate, and finance it with new debt D_j and taxes T_j:

$$U_{i,j} = -|X_i - X_j| + \theta_j + \lambda.I_j - (D_O + D_j + \mu.T_j)^\gamma \tag{6.1}$$

[24] We do not take a stand on the exact channel through which a toxic debt shock is associated with a decrease in the reputation of the incumbent mayor. For instance, there is a staining effect for being in charge when an exogenous negative shock is realized, as documented for instance in Bagues and Esteve-Volart (2016); Cunha et al. (2022). In our empirical setting, only a small fraction of the mayors that put in place the toxic loans are still in office when the shock is realized.

[25] This ideology should be interpreted as orthogonal to budget choices.

under the budget constraint:

$$I_j = T_j + D_j$$

where D_O denotes the initial stock of debt, $\lambda > 0$ is a parameter capturing the value of local investment for voters, $\mu > 1$ is a parameter capturing voters' preference to finance investment with debt rather than taxes,[26] and $\gamma > 1$ models an increasing marginal private cost for contributing to the financing of local investment.[27,28]

The ideology of voters – observed by parties – is assumed to be uniformly distributed around the ideology of the median voter m: $X_i \sim \mathcal{U}[-1 + X_m, 1 + X_m]$. It follows that the mayor M wins the election if the median voter gets a higher utility when voting for M than for C, that is $U_{m,M} > U_{m,C}$.

Candidates. Both candidates, M and C, derive a fixed private benefit $\underline{\beta} \geq 0$ for being elected and a variable private benefit $\beta > 0$ proportional to the level of investment they implement when elected,[29] which add up to the utility they get as a voter as per equation (6.1). The utility of being elected for the candidate j can therefore be written as:

$$U_j^{\text{Elected}} = \underline{\beta} + \beta.I + U_{i=j,j} \tag{6.2}$$

If candidate j loses the election, their utility simply equals $U_{i=j,-j}$.

Toxic Debt Shock. We model structured debt gone wrong, i.e. becoming toxic as described in section 2, as both an increase in local indebtedness (by D_{Tox}), and a decrease in the perceived quality of the incumbent mayor (by θ_{Tox}), consistent with the "staining effect" of negative shocks on people in charge at the time of their occurrence. Formally, if a toxic

[26] Voters might be impatient or present-biased, or prefer debt over taxes because they can avoid repaying the debt when moving to other municipalities.

[27] Such convex cost naturally arises in case of private consumption commitment, for instance.

[28] In what follows, we assume D_O is not too large to ensure interior equilibrium levels of local investment. This boils down to assuming formally that $D_O < \left(\frac{\lambda}{\gamma}\right)^{\frac{1}{\gamma-1}}$.

[29] This is consistent with prior empirical work documenting large private returns to holding public office in both developing and developed countries (see e.g. Fisman et al., 2014; Cingano and Pinotti, 2013), and showing that higher investment levels increase rent-seeking opportunities to politicians (Keefer and Knack, 2007; Lehne et al., 2018; Bandiera et al., 2009).

debt shock occurs, voter i gets the following utility when voting for the mayor:

$$U_{i,M}^{\text{Tox}} = -|X_i - X_M| + \theta_M - \theta_{\text{Tox}} + \lambda.I_M - (D_O + D_{\text{Tox}} + D_M + \mu.T_M)^\gamma \tag{6.3}$$

whereas (s)he gets the following utility when voting instead for the challenger:

$$U_{i,C}^{\text{Tox}} = -|X_i - X_C| + \theta_C + \lambda.I_C - (D_O + D_{\text{Tox}} + D_C + \mu.T_C)^\gamma \tag{6.4}$$

Equilibrium. We solve for a Nash equilibrium, which consists of choices of investment I, new debt D, and taxes T for both the Mayor M and Challenger C. We assume that the ideology of the median voter and the quality θ_M and θ_C of both candidates are public knowledge, as well as the occurrence of a toxic debt shock, if any. The timing of the game is then as follows: the Mayor M and Challenger C announce and commit simultaneously to their level of investment I, new debt D, and taxes T; Voters observe the policy choices of both candidates, vote, and one candidate is elected. The formal proof of the Proposition presented below is provided in online appendix B.

6.2 Effects of the Toxic Loan Shock on Local Public Investment

The first intuition of our framework is that voters' preferences will push candidates to campaign for financing public investment with debt rather than taxes. To see this formally, let us solve for the preferred policy levels, I^V, D^V, and T^V for voters, which maximizes expression (6.1). Given that taxes are perceived as more costly than debt ($\mu > 1$), voters have a preference for debt-financed investment, that is $T^V = 0$ and $D^V = I^V$. It follows that I^V equals $\left(\frac{\lambda}{\gamma}\right)^{\frac{1}{\gamma-1}} - D_O$.[30] The second intuition is that the preferred level of local investment for politicians, denoted I^P, is higher than the one of voters, because politicians derive private benefits from higher level of investment.[31]

[30] I^V maximizes expression (6.1) with $T^V = 0$ and $D^V = I^V$, that is $\lambda.I - (D_O + I)^\gamma$, and thus equals $\left(\frac{\lambda}{\gamma}\right)^{\frac{1}{\gamma-1}} - D_O$. Note that I^V is strictly positive as we assume $D_O < \left(\frac{\lambda}{\gamma}\right)^{\frac{1}{\gamma-1}}$.

[31] Formally, I^P maximizes expression (6.2) with $T^P = 0$ and $D^P = I^P$, that is $(\lambda + \beta).I - (D_O + I)^\gamma$, and thus equals $\left(\frac{\beta+\lambda}{\gamma}\right)^{\frac{1}{\gamma-1}} - D_O$.

We derive below two key results on how local investment changes when a toxic shock occurs, summarized in the following Proposition. Proof is provided in the online appendix.

Proposition 6.1. *After the occurrence of a toxic debt shock:*

(i) local investment decreases, while taxes stay unchanged;

(ii) The decline in investment is larger in politically contested municipalities.

Following a toxic debt shock, incumbent mayors adjust their choices of investment downwards for two reasons: first, because more indebtedness shifts the preferences of both voters and politicians towards less investment; and second, because the negative reputation shock on the perceived quality of the mayor reduces her political advantage, and leads her to strategically reduce the level of investment towards the preferences of voters in order to preserve her chances of reelection.[32] Importantly, this second force binds only in politically contested municipalities. In non-contested municipalities, the initial political advantage of the mayor is so large that even after experiencing a negative reputation shock, the incumbent mayor is still certain to win the election even if she sticks to her preferred level of high investment – in this case, $I^P - D_{\text{Tox}}$. Instead, in contested municipalities, the reputation shock leads the incumbent mayor to strategically reduce the level of investment by more than the increase in indebtedness D_{Tox}. Figure 8 provides a graphical illustration of the equilibrium investment level after a toxic debt shock in both politically non-contested municipalities (upper panel) and politically contested municipalities (lower panel). Indeed, in order to compensate for the electoral cost associated to the loss in reputation, the incumbent mayor needs to decrease further local investment, closer to the preferences of voters, in order to maintain her chances of reelection.

INSERT FIGURE 8

7 Conclusion

In this study, we exploit the deterioration of notorious financial instruments, dubbed "toxic loans" by the press, to provide causal evidence that an increase in local government indebt-

[32] This outcome is consistent with the evidence in Table 8 where we find that toxic loans are associated with lower vote shares for incumbent mayors in the 2014 municipal election.

edness results in a reduction in local government investments of comparable size. Operating expenses are also reduced to offset increased interest expenses, which cannot be financed by debt due to the balanced budget requirements that local governments face. However, local taxes are unaffected by this shock to local public finances.

In the cross-section of municipalities, the effects of indebtedness on investments are particularly pronounced for municipalities that are politically contested, and incumbent candidates are less likely to be re-elected when their municipality faces this significant increase in debt. These empirical findings are consistent with a model where public investment choices are disciplined by electoral competition, which highlights the existence of a political constraint on public indebtedness.

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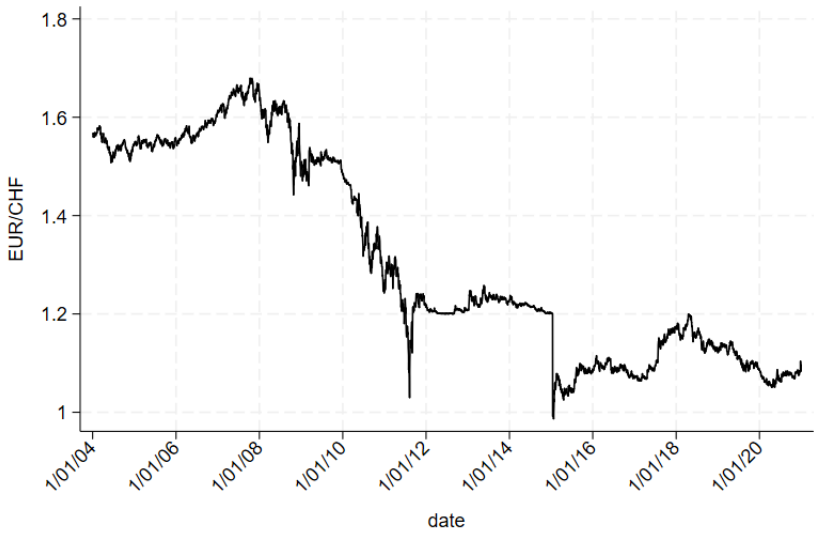
8 Figures

Panel A: Euro-Swiss Franc (EURCHF) exchange rate



Panel B: Spread between Euro CMS 10 Year Swap Rate and 2 Year Swap Rate

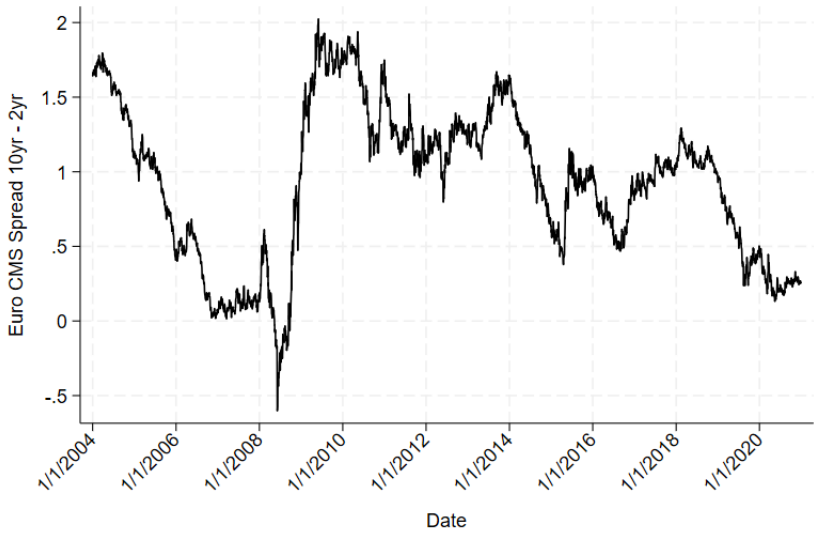


Figure 1
Structured Loan Underlying Indices

Note: This figure presents the evolution of the EURCHF exchange rate (Panel A), and the spread between the EUR CMS 10 year rate and the EUR CMS 2 year rate.

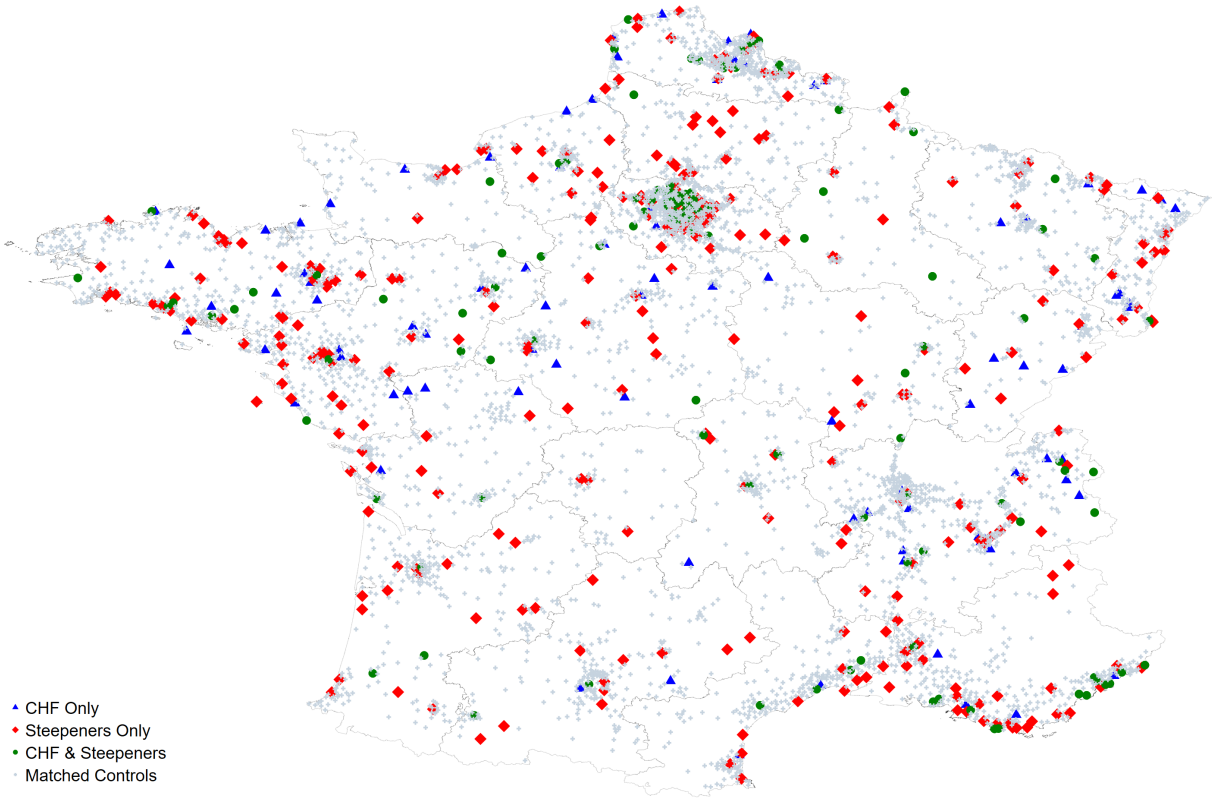
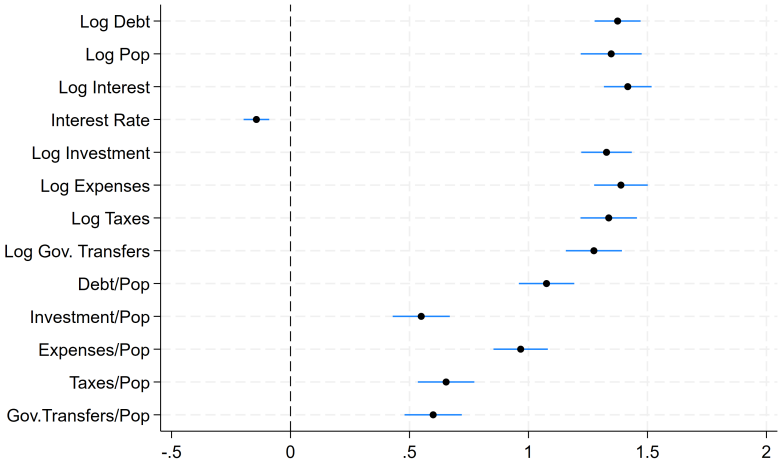


Figure 2
Geographic Location of Treated and Control Municipalities

Note: This map displays the location of municipalities with CHF debt, steepener debt, or both, on their balance sheet as of 2007, the treated group in our analysis, as well as the municipalities included in the matched control group. The control group consists of exact matches on deciles of population and debt-to-population.

Panel A: All Municipalities



Panel B: Treatment Group + Matched Control Group

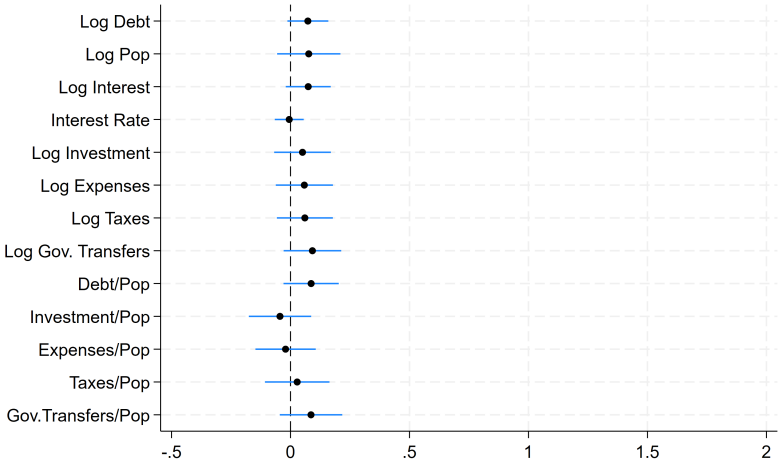


Figure 3
Regression Coefficients between Municipal Characteristics and Treatment in 2007

Note: This figure displays the OLS coefficients for the univariate regressions of a set of municipal characteristics on a dummy variable equal to one if the municipality has either CHF or steepener loans on its balance-sheet in 2007. The exercise is performed for the universe of French municipalities with more than 2,000 inhabitants in Panel A, and for our baseline matched sample (treated group + matched control group) in Panel B. The control group consists of exact matches on deciles of population and debt-to-population. For the sake of comparison, all municipal characteristics have been standardized to obtain empirical distributions with a mean of zero and a standard deviation of one. Standard errors are clustered at the department level.

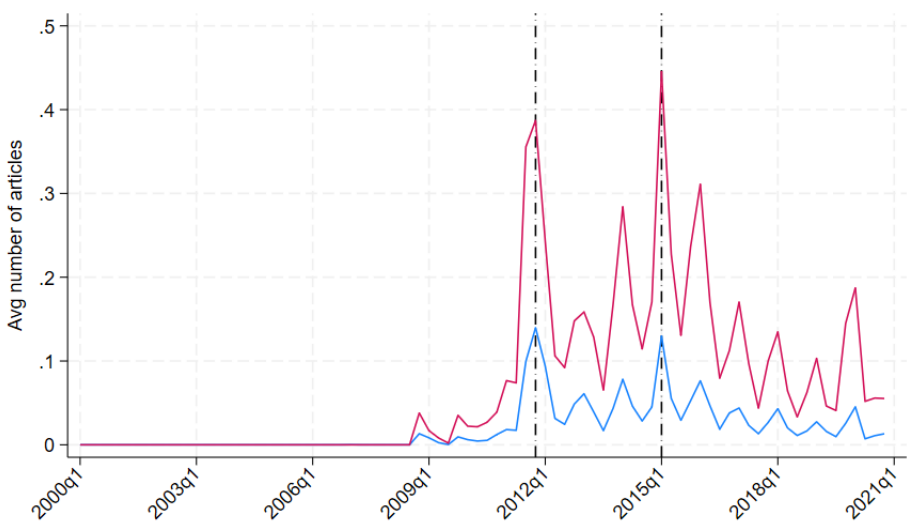
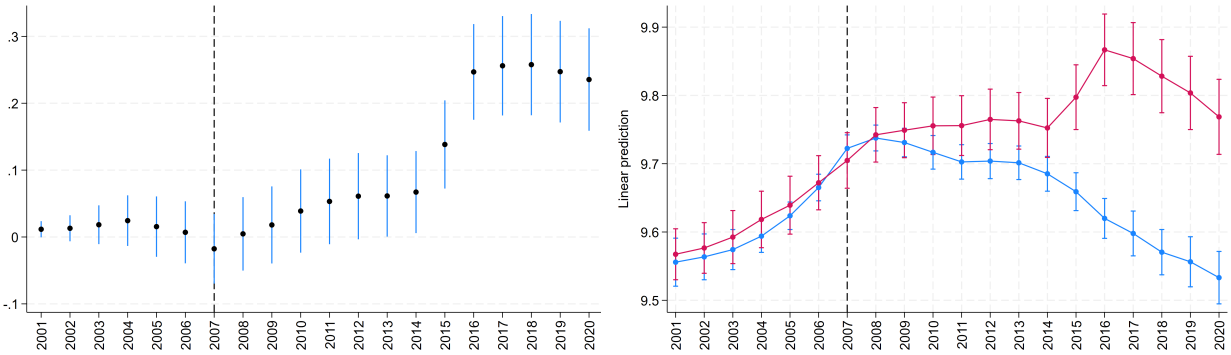


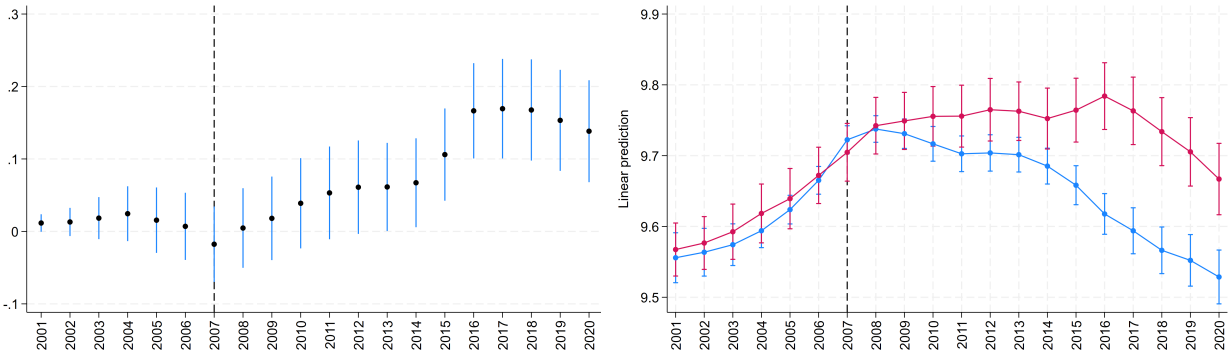
Figure 4
Newspaper Articles on Toxic Loans

Note: This figure presents the average number of articles covering the topic of toxic loans, for the municipalities from the treated group (red line) and the matched control group (blue line). Data is from Aday, and the exact query run is provided in online appendix C. The first vertical dash line corresponds to the publication by the *Liberation* newspaper of the Dexia dataset on toxic loan users. The second vertical dash line corresponds to when the Swiss central bank unpegs the CHF from the euro.

Panel A. Municipal Debt (Log)



Panel B. Municipal Debt Net of Bailout (Log)



Panel C. Interest Expense (Log)

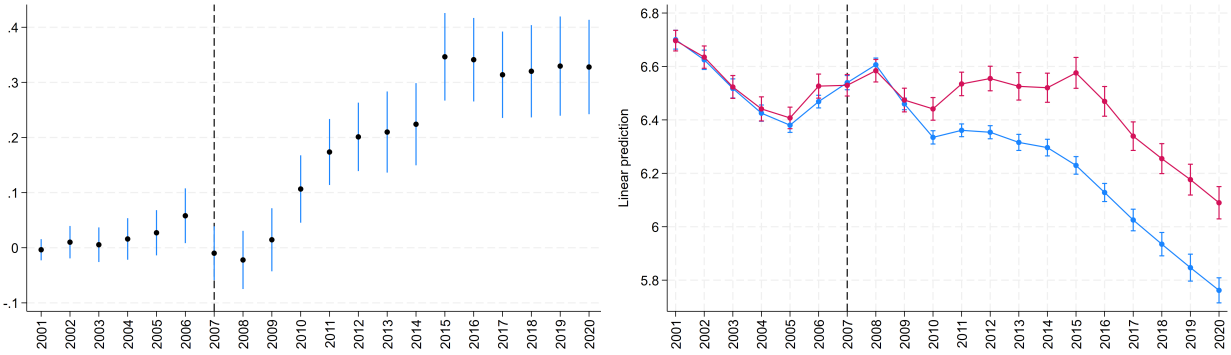


Figure 5
Toxic Debt and Municipal Indebtedness Outcomes - Dynamic Specifications

Note: This figure presents estimates for dynamic specifications of a set of municipal outcomes (in logs) regressed on a full set of year dummies (using 2000 as the reference year) interacted with a dummy for treated municipalities in the matched sample (those with toxic debt on their balance-sheet in 2007). The regressions include municipality and year fixed effects and standard errors are clustered at the department level. The panels on the right-hand side reports the predicted values of each outcome variables for the treated municipalities (in red) and control municipalities (in blue) over the years 2001-2020. The figures also display 95% confidence intervals.

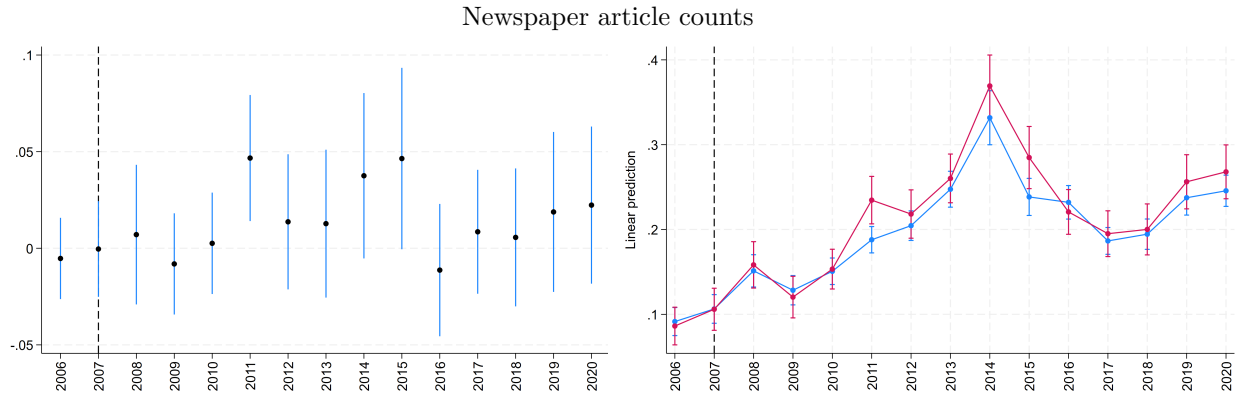


Figure 6
Local Media Coverage of Municipal Debt

Note: This figure presents estimates for a dynamic specification of newspaper article counts covering the topic of municipal debt regressed on a full set of year dummies (using 2000 as the reference year) interacted with a dummy for treated municipalities in the matched sample (those with toxic debt on their balance-sheet in 2007). The regressions include municipality and year fixed effects and standard errors are clustered at the department level. The panel on the right-hand side reports the predicted values for the treated municipalities (in red) and control municipalities (in blue) over the years 2001-2020. Data on newspaper articles is from Aday and the exact query run to identify such articles is provided in online appendix C. The figures also display 95% confidence intervals.

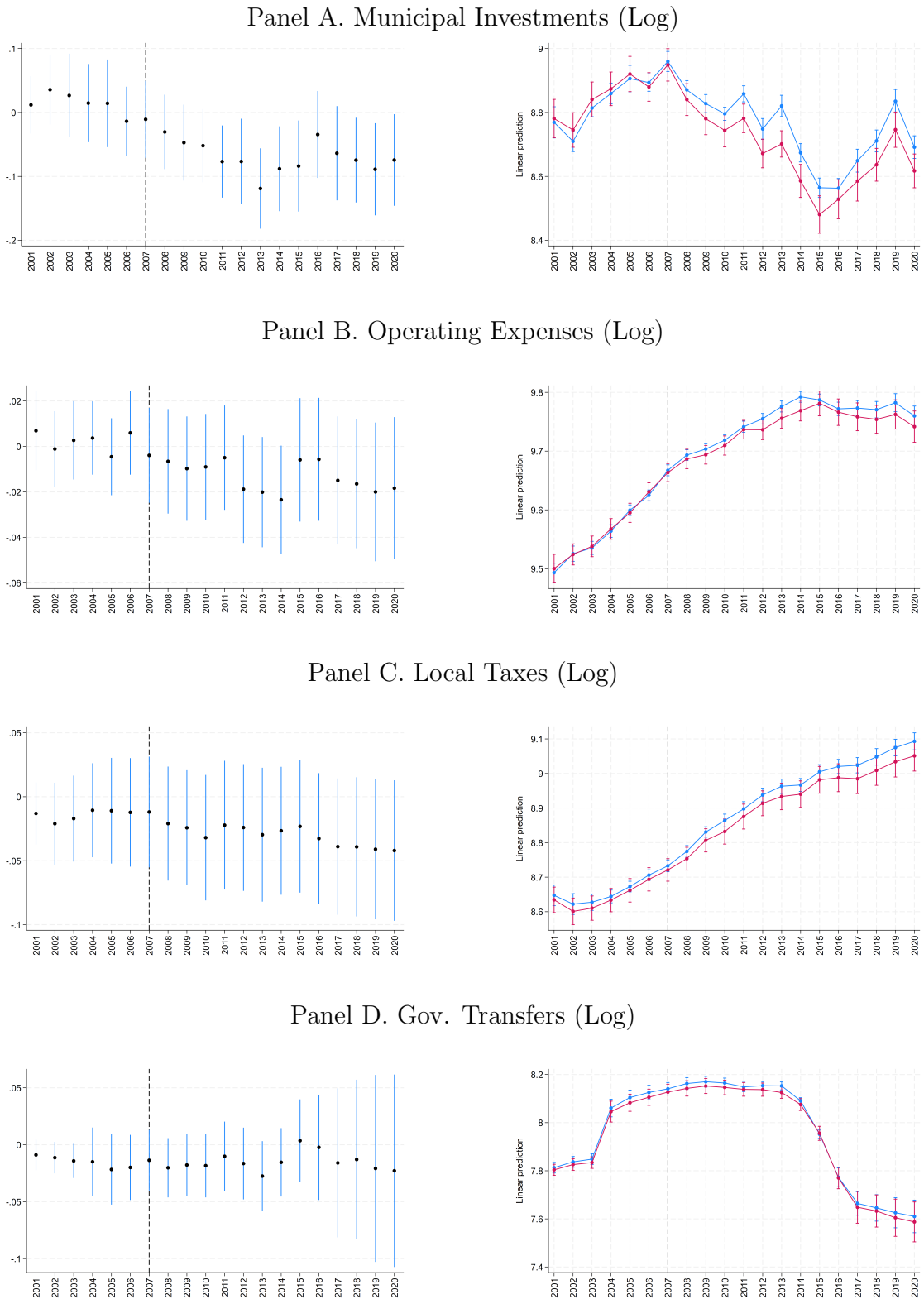


Figure 7
Toxic Debt and Municipal Outcomes - Dynamic Specifications

Note: This figure presents estimates for dynamic specifications of a set of municipal outcomes (in logs) regressed on a full set of year dummies (using 2000 as the reference year) interacted with a dummy for treated municipalities in the matched sample (those with toxic debt on their balance-sheet in 2007). The regressions include municipality and year fixed effects and standard errors are clustered at the department level. The panels on the right-hand side reports the predicted values of each outcome variables for the treated municipalities (in red) and control municipalities (in blue) over the years 2001-2020. The figures also display 95% confidence intervals.

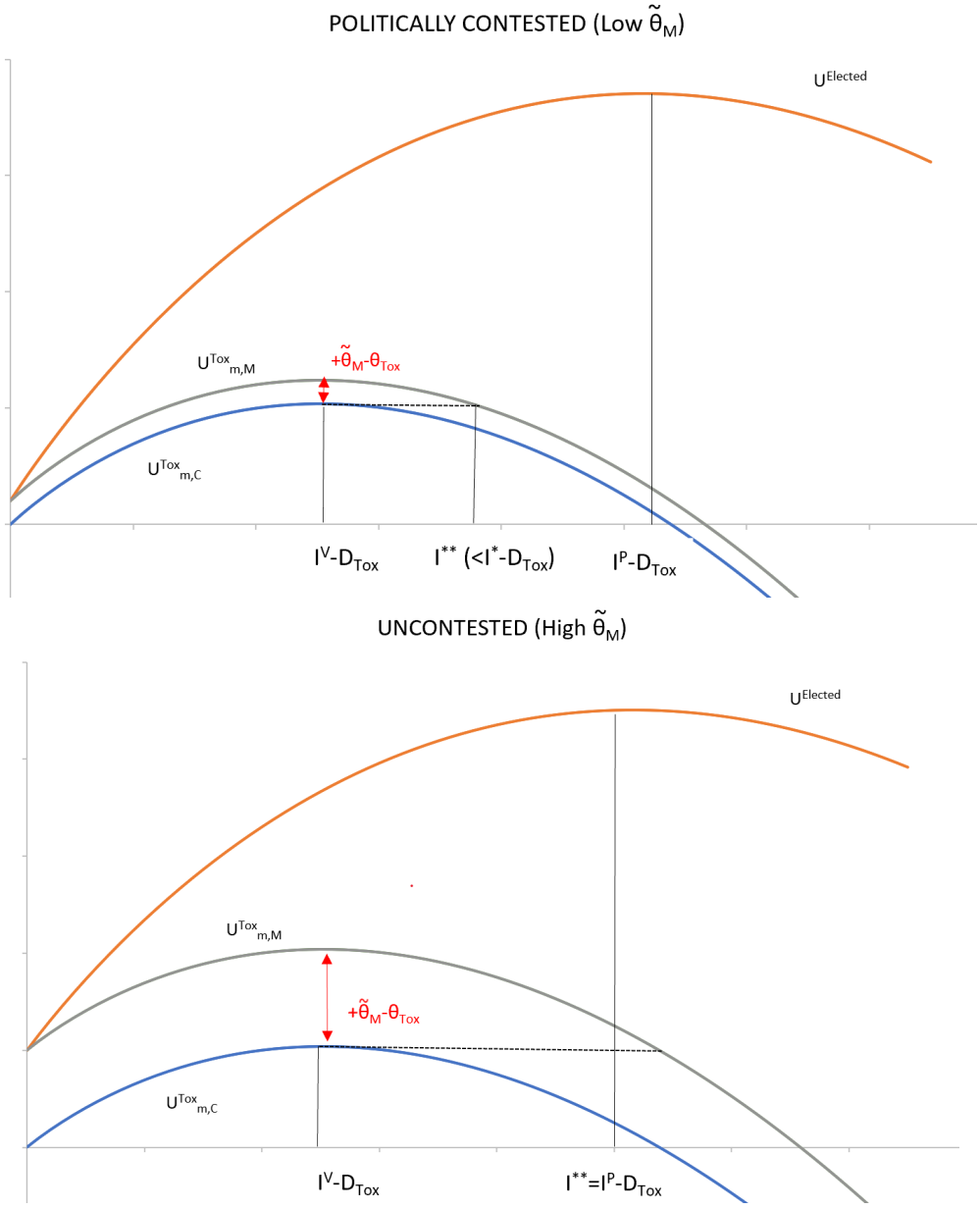


Figure 8
Investment Choice in Politically Contested Versus Non-politically Contested Municipalities After a Toxic Shock

Note: This figure provides a graphical illustration of the equilibrium level of investment after a toxic shock in both politically contested (upper panel) and non-contested municipalities (lower panel). The blue, grey and orange lines plot respectively $U^{\text{Tox}}_{m,C}(I, D = I, T = 0)$, $U^{\text{Tox}}_{m,M}(I, D = I, T = 0)$, and $U^{\text{Elected}}_{M}(I, D = I, T = 0)$ as a function of I.

9 Tables

Table 1
Summary Statistics

	(1) N	(2) Mean	(3) St. Dev.	(4) p1	(5) p50	(6) p99
Panel A: Treatment Variables						
Treated (0/1)	2,699	0.212	0.409	0	0	1
Toxic Debt Share (07)	2,699	0.0733	0.173	0	0	0.799
CHF Debt Share (07)	2,699	0.0239	0.0934	0	0	0.503
Steepener Debt Share (07)	2,699	0.0497	0.136	0	0	0.635
Panel B: Municipal Budget Categories						
Population (07)	2,699	13,395	28,469	2,137	6,248	113,234
Debt (07)	2,699	14,843	45,566	1,004	5,865	136,756
Interest Expenses (07)	2,699	623.1	1,933	38	254	5,781
Municipal Investments (07)	2,699	7,740	20,168	458	3,275	76,518
Operating Expenses (07)	2,699	15,601	36,958	1,014	5,987	148,601
Taxes (07)	2,699	6,347	14,219	445	2,493	63,030
Central Gov. Transfers (07)	2,699	3,583	8,316	237	1,353	37,076
Panel C: Municipal Budget Categories Per Capita						
Toxic Debt / Pop (07)	2,699	0.100	0.278	0	0	1.183
CHF Debt / Pop (07)	2,699	0.0328	0.134	0	0	0.683
Steepener Debt / Pop (07)	2,699	0.0675	0.208	0	0	0.951
Debt / Pop (07)	2,699	1.047	0.572	0.249	0.956	3.138
Interests Expenses / Pop (07)	2,699	0.0443	0.0249	0.00954	0.0396	0.134
Municipal Investments / Pop (07)	2,699	0.549	0.310	0.127	0.469	1.551
Operating Expenses / Pop (07)	2,699	0.993	0.389	0.406	0.929	2.537
Local Taxes / Pop (07)	2,699	0.426	0.208	0.137	0.378	1.323
Central Gov. Transfers / Pop (07)	2,699	0.238	0.116	0.0844	0.218	0.634
Panel D: Municipal Budget Categories - Outcome Variables						
Δ_{07-20} Gross Debt / Pop (07)	2,699	-0.00181	0.553	-1.101	-0.0552	2.044
Σ_{16-20} Bail-out / Pop (07)	2,699	0.0500	0.260	0	0	1.373
Δ_{07-20} Net Debt / Pop (07)	2,699	-0.0453	0.495	-1.110	-0.0704	1.481
Σ_{08-20} Interest Expenses / Pop (07)	2,699	0.499	0.314	0.0759	0.426	1.680
Σ_{08-20} Municipal Investments / Pop (07)	2,699	5.916	2.483	2.186	5.451	15.89
Σ_{08-20} Operating Expenses / Pop (07)	2,699	14.30	5.104	6.598	13.38	34.65
Σ_{08-20} Local Taxes / Pop (07)	2,699	6.882	2.707	2.752	6.413	17.53
Σ_{08-20} Central Gov. Transfers / Pop (07)	2,699	3.044	1.362	0.832	2.833	6.700
Δ_{07-20} Log Pop	2,699	0.0642	0.120	-0.169	0.0471	0.445
Panel E: Local Election 2008 (Only for Municipalities with Population $\geq$ 3,500)						
Wins First Round	1,994	0.651	0.477	0	1.000	1
Vote Margin (in %)	1,994	22.027	25.920	0.000	16.685	100.000
Incumbent Wins First Round	1,378	0.630	0.483	0.000	1	1
Number of Candidates in First Round	1,994	3.209	1.476	1	3	8

Note: This table provides summary statistics for the municipalities in our sample (treated group + matched control group). Variables are expressed in thousand euros in Panel B, and thousand euros per inhabitant in Panel C and Panel D. Municipalities' financial statements are obtained from the French Interior Ministry. Measures for the degree of political competition, presented in Panel E, are based on the local elections held in 2008 and available only for municipalities above 3,500 inhabitants. Vote Margin is the the gap in vote percentages between the winner and the runner-up.

Table 2
Toxic Debt and Municipal Budget Outcomes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Baseline	Δ_{07-20} Debt	Σ_{08-20}Interests	Σ_{08-20}Investments	Σ_{08-20}Op. Expenses	Σ_{08-20}Local Taxes	Σ_{08-20}Gov. Transfers	Δ_{07-20}Log Pop
Toxic Debt Share (07)	0.986***	0.355***	-1.119***	-0.250	-0.054	-0.034	-0.016
	(0.080)	(0.029)	(0.257)	(0.229)	(0.138)	(0.083)	(0.013)
Debt / Pop (07)	-0.331***	0.400***	0.232*	0.510**	0.627***	0.058	0.012
	(0.044)	(0.018)	(0.128)	(0.228)	(0.168)	(0.057)	(0.010)
Investments / Pop (07)	0.052	0.027	2.688***	0.397*	-0.116	-0.047	0.028**
	(0.052)	(0.025)	(0.290)	(0.222)	(0.149)	(0.109)	(0.011)
Op. Expenses / Pop (07)	0.097	0.017	1.851***	10.801***	0.559**	-0.101	-0.035**
	(0.076)	(0.025)	(0.338)	(0.537)	(0.216)	(0.104)	(0.016)
Local Taxes / Pop (07)	0.063	0.051	2.301***	2.112***	10.199***	-1.848***	0.019
	(0.101)	(0.046)	(0.437)	(0.596)	(0.469)	(0.290)	(0.036)
Central Gov. Transfers / Pop (07)	0.649***	0.043	0.781	0.896	-2.011***	10.519***	-0.137***
	(0.195)	(0.083)	(0.732)	(0.769)	(0.737)	(0.701)	(0.035)
Department FE	Y	Y	Y	Y	Y	Y	Y
Pop Quintiles FE	Y	Y	Y	Y	Y	Y	Y
Observations	2,699	2,699	2,699	2,699	2,699	2,699	2,699
R^2	0.273	0.725	0.634	0.913	0.860	0.793	0.381
Panel B: CHF/Steepener	Δ_{07-20} Debt	Σ_{08-20}Interests	Σ_{08-20}Investments	Σ_{08-20}Op. Expenses	Σ_{08-20}Local Taxes	Σ_{08-20}Gov. Transfers	Δ_{07-20}Log Pop
CHF Debt Share (07)	2.223***	0.654***	-1.615***	-0.037	0.013	-0.059	-0.010
	(0.167)	(0.063)	(0.384)	(0.374)	(0.215)	(0.129)	(0.020)
Steepener Debt Share (07)	0.328***	0.195***	-0.861***	-0.359	-0.091	-0.017	-0.020
	(0.072)	(0.029)	(0.288)	(0.257)	(0.164)	(0.101)	(0.015)
Debt / Pop (07)	-0.342***	0.397***	0.236*	0.508**	0.627***	0.059	0.012
	(0.043)	(0.018)	(0.128)	(0.228)	(0.168)	(0.058)	(0.010)
Investments / Pop (07)	0.064	0.030	2.684***	0.399*	-0.115	-0.047	0.028**
	(0.050)	(0.025)	(0.290)	(0.222)	(0.149)	(0.110)	(0.011)
Op. Expenses / Pop (07)	0.100	0.018	1.849***	10.801***	0.559**	-0.101	-0.035**
	(0.077)	(0.026)	(0.338)	(0.536)	(0.216)	(0.104)	(0.016)
Local Taxes / Pop (07)	0.096	0.059	2.289***	2.118***	10.201***	-1.849***	0.019
	(0.103)	(0.047)	(0.437)	(0.595)	(0.469)	(0.291)	(0.036)
Central Gov. Transfers / Pop (07)	0.612***	0.035	0.793	0.889	-2.013***	10.519***	-0.138***
	(0.193)	(0.083)	(0.737)	(0.769)	(0.737)	(0.701)	(0.035)
Department FE	Y	Y	Y	Y	Y	Y	Y
Pop Quintiles FE	Y	Y	Y	Y	Y	Y	Y
Observations	2,699	2,699	2,699	2,699	2,699	2,699	2,699
R^2	0.323	0.735	0.635	0.913	0.860	0.793	0.381

Note: This table presents the OLS coefficients from regressing long-tern changes of cumulative municipal outcomes on the share of toxic debt (Panel A), or the share of CHF debt and the share of Steepener debt (Panel B) on the balance-sheet of municipalities in the matched sample in 2007. The dependent variable is the long-term change in municipal debt between 2007 and 2020 in column 1, the cumulative amount over the period 2008-2020 of interest expenses in columns 2, municipal investments in column 3, operating expenses in column 4, local taxes in column 5, and central government in column 6, all scaled by municipal population in 2007. The dependent variable is the long-term change in the logarithm of population between 2007 and 2020 In the last column. The regressions include controls for the amount of debt, municipal investments, operating expenses, local taxes, and central government transfers as per 2007 (all scaled by population), as well department and population quintile fixed effects. Standard errors are clustered at the department level, and are reported into parenthesis under the regression coefficients. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Table 3
Toxic Debt and Municipal Budget Outcomes
Falsification Tests using Pre-2007 Changes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Δ_{00-07} Debt	Σ_{00-07}Interests	Σ_{00-07}Investments	Σ_{00-07}Op. Expenses	Σ_{00-07}Local Taxes	Σ_{00-07}Gov. Transfers	Δ_{99-07}Log Pop
Toxic Debt Share (07)	0.041	0.020	0.188	0.030	-0.023	-0.039	-0.007
	(0.406)	(0.270)	(0.240)	(0.768)	(0.748)	(0.287)	(0.523)
Debt / Pop (07)	0.467***	0.246***	0.601***	0.103	-0.120	0.005	0.034
	(0.000)	(0.000)	(0.000)	(0.249)	(0.100)	(0.892)	(0.167)
Local Taxes / Pop (07)	-0.130	0.057**	-0.082	-0.106	5.366***	-0.279***	0.047
	(0.219)	(0.046)	(0.772)	(0.576)	(0.000)	(0.002)	(0.111)
Op. Expenses / Pop (07)	-0.294***	0.094***	1.818***	6.492***	1.073***	0.147	-0.062***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.136)	(0.001)
Investments / Pop (07)	0.096*	-0.094***	2.426***	-0.287***	0.260***	0.024	0.007
	(0.097)	(0.000)	(0.000)	(0.002)	(0.003)	(0.540)	(0.603)
Central Gov. Transfers / Pop (07)	-0.135	0.021	-0.571*	0.605***	-1.120***	4.721***	-0.102**
	(0.258)	(0.616)	(0.090)	(0.009)	(0.000)	(0.000)	(0.023)
Department FE	Y	Y	Y	Y	Y	Y	Y
Pop Quintiles FE	Y	Y	Y	Y	Y	Y	Y
Observations	2,699	2,699	2,699	2,699	2,699	2,699	2,699
R^2	0.429	0.701	0.719	0.942	0.897	0.850	0.379

Note: This table presents the OLS coefficients from regressing pre-sample changes or cumulative municipal outcomes on the share of toxic debt on the balance-sheet of municipalities in the matched sample in 2007. The dependent variable is the long-term change in municipal debt between 2000 and 2007 in column 1, the cumulative amount over the period 2000-2007 of interest expenses in columns 2, municipal investments in column 3, operating expenses in column 4, local taxes in column 5, and central government in column 6, all scaled by municipal population in 2007. The dependent variable is the long-term change in the logarithm of population between 1999 and 2007 In the last column. The regressions include controls for the amount of debt, municipal investments, operating expenses, local taxes, and central government transfers as per 2007 (all scaled by population), as well department and population quintile fixed effects. Standard errors are clustered at the department level, and are reported into parenthesis under the regression coefficients. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Table 4
Toxic Debt and Municipal Budget Outcomes
Alternative Matched Samples

Matching on Pop + Debt	Δ_{07-20} Debt	Σ_{08-20}Interests	Σ_{08-20}Investments	Σ_{08-20}Op. Expenses	Σ_{08-20}Local Taxes	Σ_{08-20}Gov. Transfers	Δ_{07-20}Log Pop
+ Region	0.986***	0.356***	-1.026***	-0.387*	-0.022	0.001	-0.018
	(0.093)	(0.034)	(0.262)	(0.212)	(0.142)	(0.090)	(0.015)
+ Interest Expenses	0.982***	0.354***	-0.996***	-0.228	-0.094	-0.031	-0.020*
	(0.093)	(0.030)	(0.263)	(0.246)	(0.133)	(0.108)	(0.012)
+ Investments	0.950***	0.351***	-1.192***	-0.273	-0.175	-0.104	-0.018
	(0.086)	(0.034)	(0.244)	(0.229)	(0.161)	(0.102)	(0.016)
+ Operating Expenses	0.955***	0.336***	-1.252***	-0.291	-0.131	-0.063	-0.014
	(0.084)	(0.031)	(0.252)	(0.241)	(0.143)	(0.088)	(0.014)
+ Local Taxes	0.981***	0.360***	-1.093***	-0.373*	-0.081	-0.098	-0.014
	(0.078)	(0.028)	(0.256)	(0.224)	(0.136)	(0.094)	(0.014)
+ Gov. Transfers	0.942***	0.369***	-1.144***	-0.150	-0.026	-0.103	-0.012
	(0.081)	(0.028)	(0.243)	(0.205)	(0.117)	(0.064)	(0.013)
	Δ_{07-20} Debt	Σ_{08-20}Interests	Σ_{08-20}Investments	Σ_{08-20}Op. Expenses	Σ_{08-20}Local Taxes	Σ_{08-20}Gov. Transfers	Δ_{07-20}Log Pop
One-to-one Matching	0.972***	0.341***	-1.058***	-0.088	0.044	-0.115	0.002
	(0.086)	(0.028)	(0.278)	(0.234)	(0.166)	(0.092)	(0.014)

Note: This table re-runs the same specifications presented in the upper panel of Table 2 on alternative matched samples of municipalities, and presents the coefficient on the share of toxic debt in 2017. We match treated municipalities with control municipalities based on deciles of population and municipal debt per capita in 2007, and another characteristic: being located in the same region in the first row, being in the same decile of interest per capita in the second row, being in the same decile of investment per capita in the third row, being in the same decile of expenses per capita in the fourth row, being in the same decile of taxes per capita in the fifth row, and being in the same decile of government transfers per capita in the sixth row. In the last row, we follow Jaravel et al. (2018) and use a one-to-one exact matching procedure based on deciles of population and municipal debt per capita in 2007. When there is no exact match, the treated municipality is removed from the estimation. When there is more than one exact match, the ties are broken at random. Standard errors are clustered at the department level, and are reported into parenthesis under the regression coefficients. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Table 5
Toxic Debt, Political Competition, and Municipal Investments

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel A: Low Political Competition - 2008 Mayor Elected in First Round						
	Δ_{07-20} Debt	Σ_{08-20}Interests	Σ_{08-20}Investments	Σ_{08-20}Op. Expenses	Σ_{08-20}Local Taxes	Σ_{08-20}Gov. Transfers	Δ_{07-20}Log Pop
Toxic Debt Share (07)	1.082***	0.336***	-0.782**	-0.293	-0.001	-0.036	-0.033**
	(0.103)	(0.040)	(0.310)	(0.256)	(0.194)	(0.114)	(0.016)
Debt, Invest., Expenses, Taxes, Transfers (07)	Y	Y	Y	Y	Y	Y	Y
Department FE	Y	Y	Y	Y	Y	Y	Y
Pop Quintiles FE	Y	Y	Y	Y	Y	Y	Y
Observations	1,299	1,299	1,299	1,299	1,299	1,299	1,299
R^2	0.317	0.733	0.678	0.923	0.844	0.823	0.425
	Panel B: High Political Competition - 2008 Mayor Elected in Runoff						
	Δ_{07-20} Debt	Σ_{08-20}Interests	Σ_{08-20}Investments	Σ_{08-20}Op. Expenses	Σ_{08-20}Local Taxes	Σ_{08-20}Gov. Transfers	Δ_{07-20}Log Pop
Toxic Debt Share (07)	0.806***	0.406***	-2.127***	-0.654	-0.353	0.134	0.001
	(0.190)	(0.058)	(0.581)	(0.450)	(0.255)	(0.091)	(0.037)
Debt, Invest., Expenses, Taxes, Transfers (07)	Y	Y	Y	Y	Y	Y	Y
Department FE	Y	Y	Y	Y	Y	Y	Y
Pop Quintiles FE	Y	Y	Y	Y	Y	Y	Y
Observations	695	695	695	695	695	695	695
R^2	0.312	0.758	0.657	0.928	0.897	0.892	0.475
Toxic Debt Share (07)	0.276	-0.070	1.345**	0.361	0.352	-0.170	-0.034
(High-Low)	(0.213)	(0.069)	(0.606)	(0.486)	(0.335)	(0.163)	(0.040)

Note: This table re-runs the same specifications presented in the upper panel of Table 2, separately for the sample of municipalities where the mayor was elected in first round in the 2008 elections (Panel A), or in the run-off (Panel B). The sample is restricted to municipalities with more than 3,500 inhabitants in 2007. Standard errors are clustered at the department level, and are reported into parenthesis under the regression coefficients. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Table 6
Toxic Debt, Political Competition, and Municipal Investments
Robustness Analysis

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Political Characteristics	Σ_{08-20}Investments						
Toxic Debt Share (07) × Elected in Runoff	-1.384***	-1.601***	-1.443**	-1.397**	-1.374**	-1.337**	-1.584***
	(0.505)	(0.572)	(0.602)	(0.576)	(0.586)	(0.527)	(0.563)
Toxic Debt Share (07)	-0.706**	-1.318***	-0.647**	-0.754**	-0.511	9.113**	8.958*
	(0.298)	(0.330)	(0.313)	(0.360)	(0.354)	(4.491)	(5.158)
Elected in Runoff	0.280	0.349*	0.333*	0.274	0.334*	0.285	0.295
	(0.180)	(0.193)	(0.192)	(0.195)	(0.193)	(0.184)	(0.196)
Toxic Debt Share (07) × Old Mayor		1.360***					1.488***
		(0.448)					(0.467)
Toxic Debt Share (07) × Female Mayor			0.127				0.529
			(0.899)				(0.873)
Toxic Debt Share (07) × Left-wing Mayor				0.326			0.365
				(0.507)			(0.544)
Toxic Debt Share (07) × High-skill Mayor					-0.465		0.407
					(0.549)		(0.565)
Toxic Debt Share (07) × Council Size						-2.847**	-3.086**
						(1.279)	(1.451)
Non-interacted Political Characteristic	Y	Y	Y	Y	Y	Y	Y
Debt, Invest., Expenses, Taxes, Transfers (07)	Y	Y	Y	Y	Y	Y	Y
Department FE	Y	Y	Y	Y	Y	Y	Y
Pop Quintiles FE	Y	Y	Y	Y	Y	Y	Y
Observations	1,994	1,994	1,994	1,994	1,994	1,994	1,994
R^2	0.629	0.642	0.640	0.650	0.640	0.631	0.655
Panel B: Municipality Budget and Size	Σ_{08-20}Investments						
Toxic Debt Share (07) × Elected in Runoff	-1.350***	-1.354***	-1.480***	-1.385***	-1.384***	-1.252**	-1.307***
	(0.478)	(0.501)	(0.479)	(0.507)	(0.508)	(0.508)	(0.458)
Toxic Debt Share (07)	0.522	0.050	1.401	-0.724	-0.706	3.914	6.612**
	(0.750)	(0.476)	(1.206)	(0.906)	(0.871)	(2.850)	(2.643)
Elected in Runoff	0.276	0.283	0.276	0.280	0.280	0.274	0.270
	(0.179)	(0.180)	(0.180)	(0.180)	(0.180)	(0.182)	(0.181)
Toxic Debt Share (07) × Debt / Pop (07)	-1.059*						-0.610
	(0.596)						(0.753)
Toxic Debt Share (07) × Investments / Pop (07)		-1.263*					-1.149
		(0.701)					(0.774)
Toxic Debt Share (07) × Expenses / Pop (07)			-1.902*				-2.004
			(1.036)				(1.408)
Toxic Debt Share (07) × Local Taxes / Pop (07)				0.040			3.074
				(1.870)			(2.040)
Toxic Debt Share (07) × Gov. Transfers / Pop (07)					-0.001		1.714
					(2.964)		(2.927)
Toxic Debt Share (07) × Log Pop (07)						-0.505*	-0.604**
						(0.297)	(0.290)
Debt, Invest., Expenses, Taxes, Transfers (07)	Y	Y	Y	Y	Y	Y	Y
Department FE	Y	Y	Y	Y	Y	Y	Y
Pop Quintiles FE	Y	Y	Y	Y	Y	Y	Y
Observations	1,994	1,994	1,994	1,994	1,994	1,994	1,994
R^2	0.630	0.630	0.631	0.629	0.629	0.630	0.633

Table 6 (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel C: Economic Characteristics	Σ_{08-20}Investments						
Toxic Debt Share (07) × Elected in Runoff	-1.373***	-1.409***	-1.389***	-1.374***	-1.400***	-1.379***	-1.395***
	(0.508)	(0.519)	(0.504)	(0.505)	(0.505)	(0.510)	(0.515)
Toxic Debt Share (07)	-5.732	-0.781	0.695	0.569	-1.047*	-1.054*	-7.386
	(3.813)	(0.799)	(1.114)	(1.929)	(0.565)	(0.630)	(4.876)
Elected in Runoff	0.284	0.285	0.268	0.270	0.284	0.284	0.283
	(0.179)	(0.180)	(0.181)	(0.179)	(0.182)	(0.178)	(0.179)
Toxic Debt Share (07) × Working Age Population	7.840						11.723**
	(5.819)						(5.652)
Toxic Debt Share (07) × Unemployment Rate		0.562					0.586
		(6.252)					(6.707)
Toxic Debt Share (07) × Value Added per Worker			-0.027				-0.039
			(0.020)				(0.032)
Toxic Debt Share (07) × Wages				-0.047			0.017
				(0.069)			(0.109)
Toxic Debt Share (07) × Firm Debt					1.342		1.286
					(1.547)		(1.437)
Toxic Debt Share (07) × Private Investment						2.647	2.742
						(3.773)	(4.425)
Non-interacted Economic Characteristic	Y	Y	Y	Y	Y	Y	Y
Debt, Invest., Expenses, Taxes, Transfers (07)	Y	Y	Y	Y	Y	Y	Y
Department FE	Y	Y	Y	Y	Y	Y	Y
Pop Quintiles FE	Y	Y	Y	Y	Y	Y	Y
Observations	1,994	1,994	1,994	1,994	1,994	1,994	1,994
R^2	0.630	0.630	0.631	0.631	0.629	0.630	0.637
Panel B: Workforce Characteristics	Σ_{08-20}Investments						
Toxic Debt Share (07) × Elected in Runoff	-1.396***	-1.444***	-1.389***	-1.395***	-1.376***	-1.377**	-1.451***
	(0.512)	(0.507)	(0.520)	(0.520)	(0.507)	(0.524)	(0.545)
Toxic Debt Share (07)	-1.049	-0.862***	-0.664	-0.847	0.623	-1.136	6.620
	(1.330)	(0.283)	(0.550)	(0.660)	(1.075)	(0.867)	(26.607)
Elected in Runoff	0.281	0.272	0.281	0.287	0.279	0.295	0.287
	(0.182)	(0.182)	(0.181)	(0.183)	(0.182)	(0.180)	(0.189)
Toxic Debt Share (07) × Share Young	1.059						2.890
	(3.845)						(3.696)
Toxic Debt Share (07) × Workers in Agriculture		17.890					8.244
		(15.209)					(45.889)
Toxic Debt Share (07) × Workers in Industry			-0.273				-7.784
			(2.225)				(26.689)
Toxic Debt Share (07) × Workers in Construction				1.918			-4.691
				(8.703)			(28.574)
Toxic Debt Share (07) × Workers in Retail/Services/Transportation					-3.093		-10.155
					(2.552)		(25.891)
Toxic Debt Share (07) × Workers in Public Sector						1.376	-7.413
						(2.566)	(27.509)
Non-interacted Workforce Characteristic	Y	Y	Y	Y	Y	Y	Y
Debt, Invest., Expenses, Taxes, Transfers (07)	Y	Y	Y	Y	Y	Y	Y
Department FE	Y	Y	Y	Y	Y	Y	Y
Pop Quintiles FE	Y	Y	Y	Y	Y	Y	Y
Observations	1,994	1,994	1,994	1,994	1,994	1,994	1,994
R^2	0.630	0.631	0.629	0.630	0.632	0.635	0.638

Note: This table presents the OLS coefficients of regressing cumulative municipal investments from 2008-2020, scaled by population in 2007, on the share of toxic debt, its interaction with a dummy indicating whether the mayor was elected in the runoff of the election in 2008, as well controls for the amount of debt, municipal investments, operating expenses, local taxes, and central government transfers as per 2007, all scaled by population, department and population quintile fixed effects. In Panel A, we further include dummies for old mayors, for the gender of the mayor, for the political ideology of the mayor, for high-skill mayors, the logarithm of the number of members serving on the council, and their interaction with the share of toxic debt. The old mayor dummy is 1 for mayor above the sample median age of 60. The dummy for left-wing mayor is 1 when mayors are labeled as either "left" or "far left". The dummy for high-skill mayors is 1 for mayors who worked as manager, engineer, physician, lawyer, or university professor. All these characteristics are obtained from the *Registre National des Elus*. In Panel B, we further include municipal debt, municipal investments, operating expenses, local taxes, central government transfers, all scaled by municipal population in 2007, and the logarithm of municipal population, and their interaction with the share of toxic debt. In Panel C, we further include working age population, the unemployment rate, value added per worker, wages per worker, firms' leverage, firms' investment, and their interaction with the share of toxic debt. Micro data on firms are obtained from tax files. In Panel D, we further include the share of the population with age between 15 and 24 years old, the share of workers employed in agriculture, in industry, in construction, in retail/Services/transportation, in the public sector, and their interaction with the share of toxic debt. The Data is from INSEE, the French Statistical Institute. Standard errors are clustered at the department level and are reported into parenthesis under the regression coefficients. The sample is restricted to municipalities with more than 3,500 inhabitants in 2007. ***, ** , and * indicate statistical significance at the 10%, 5%, and 1%, respectively.

Table 7
Toxic Debt, Political Competition, and Municipal Investments
Alternative Measures of Political Competition

	(1)	(2)	(3)
	Σ_{08-20}Investments		
Toxic Debt Share (07) × Vote Margin	0.027**		
	(0.012)		
Toxic Debt Share (07) × Vote Margin ≥ Median		1.190**	
		(0.531)	
Toxic Debt Share (07) × Incumbent Wins First Round			1.309**
			(0.579)
Toxic Debt Share (07)	-1.842***	-1.838***	-2.269***
	(0.400)	(0.434)	(0.476)
Vote Margin	-0.001		
	(0.004)		
Vote Margin ≥ Median		-0.180	
		(0.149)	
Incumbent Wins First Round			-0.211
			(0.170)
Debt, Invest., Expenses, Taxes, Transfers (07)	Y	Y	Y
Department FE	Y	Y	Y
Pop Quintiles FE	Y	Y	Y
Observations	1,994	1,994	1,375
R^2	0.628	0.628	0.657

Note: This table presents the OLS coefficients of regressing cumulative municipal investments from 2008-2020, scaled by population in 2007, on the share of toxic debt, and its interaction with different measures for the degree of political competition in each municipality. All specifications include as control variables the amount of debt, municipal investments, operating expenses, local taxes, and central government transfers as per 2007, all scaled by population, department and population quintile fixed effects. In column 1, we include the vote margin between the winner and the runner-up in the local elections of 2008. In column 2, we include a dummy equal to 1 for vote margins between the winner and the runner-up in the local elections of 2008 above the median. In column 3, we include a dummy equal to 1 when the incumbent mayor won in the first round of the local elections in 2008. Standard errors are clustered at the department level and are reported into parenthesis under the regression coefficients. The sample is restricted to municipalities with more than 3,500 inhabitants in 2007. ***, ** , and * indicate statistical significance at the 10%, 5%, and 1%, respectively.

Table 8
Toxic Debt and Election Outcomes

	(1)	(2)	(3)
Panel B: All Elections (2001, 2008, 2014, 2020)	Incumbent Runs	Incumbent Vote Share - 1st Round	Incumbent Wins
Toxic Debt Share (07) × Post	-0.027	-0.054*	-0.043
	(0.074)	(0.028)	(0.086)
# Candidates, Round 1		-0.067***	-0.041***
		(0.005)	(0.014)
Municipality FE	Y	Y	Y
Election FE	Y	Y	Y
Observations	7,804	3,751	3,751
R^2	0.235	0.735	0.466
Panel B: Excluding 2008 Election	Incumbent Runs	Incumbent Vote Share - 1st Round	Incumbent Wins
Toxic Debt Share (07) × Post	-0.002	-0.066**	-0.097
	(0.079)	(0.032)	(0.113)
# Candidates, Round 1		-0.077***	-0.072***
		(0.006)	(0.026)
Municipality FE	Y	Y	Y
Election FE	Y	Y	Y
Observations	5,748	1,814	1,814
R^2	0.341	0.741	0.490

Note: This table presents the OLS coefficients of regressing election outcomes for the incumbent candidate (i.e. a dummy variable for running for re-election in column 1, the share of votes obtained by the incumbent in column 2, and a dummy variable for winning re-election in column 3) on the interaction between the share of toxic debt in 2007, and a dummy variable equal to 1 for the election taking place in 2008, 2014, and 2020. Columns 2 and 3 include only observations for which the incumbent runs for re-election. In panel B, we exclude the 2008 election from the analysis. All specifications include municipality and election fixed effects. Standard errors are clustered at the department level and are reported into parenthesis under the regression coefficients. The sample is restricted to municipalities with more than 3,500 inhabitants. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

ONLINE APPENDIX

Public Financing and Investment Under Political Competition

Julien Sauvagnat and Boris Vallée

A Appendix Tables

Table A.1
Toxic Debt and Municipal Budget Outcomes
Full Sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Post-2007	Δ_{07-20} Debt	Σ_{08-20}Interests	Σ_{08-20}Investments	Σ_{08-20}Op. Expenses	Σ_{08-20}Local Taxes	Σ_{08-20}Gov. Transfers	Δ_{07-20}Log Pop
Toxic Debt Share (07)	0.752***	0.276***	-0.689***	-0.148	-0.044	-0.093	-0.018*
	(0.083)	(0.024)	(0.213)	(0.179)	(0.101)	(0.087)	(0.009)
Debt / Pop (07)	-0.377***	0.401***	0.071	0.512***	0.342***	0.113***	0.009***
	(0.025)	(0.008)	(0.086)	(0.108)	(0.067)	(0.033)	(0.003)
Investments / Pop (07)	0.007	0.010	2.626***	0.466***	0.009	-0.012	0.029***
	(0.033)	(0.012)	(0.137)	(0.123)	(0.069)	(0.034)	(0.008)
Op. Expenses / Pop (07)	0.113**	0.023	1.207***	9.875***	0.865***	-0.206***	-0.047***
	(0.052)	(0.015)	(0.194)	(0.353)	(0.120)	(0.062)	(0.011)
Local Taxes / Pop (07)	0.008	0.041**	3.696***	3.701***	10.158***	-1.475***	-0.011
	(0.056)	(0.020)	(0.315)	(0.407)	(0.297)	(0.148)	(0.017)
Central Gov. Transfers / Pop (07)	0.480***	0.050	0.630*	0.260	-1.771***	10.295***	-0.182***
	(0.130)	(0.042)	(0.363)	(0.525)	(0.343)	(0.520)	(0.028)
Department FE	Y	Y	Y	Y	Y	Y	Y
Pop Quintiles FE	Y	Y	Y	Y	Y	Y	Y
Observations	4,681	4,681	4,681	4,681	4,681	4,681	4,681
R^2	0.193	0.739	0.565	0.909	0.853	0.799	0.347
Panel B: Pre-2007	Δ_{00-07} Debt	Σ_{00-07}Interests	Σ_{00-07}Investments	Σ_{00-07}Op. Expenses	Σ_{00-07}Local Taxes	Σ_{00-07}Gov. Transfers	Δ_{99-07} Log Pop
Toxic Debt Share (07)	0.051	0.009	0.357**	0.255*	0.060	-0.041	-0.013
	(0.037)	(0.013)	(0.142)	(0.151)	(0.063)	(0.047)	(0.008)
Debt / Pop (07)	0.490***	0.251***	0.558***	0.129**	-0.042	0.009	0.017***
	(0.016)	(0.006)	(0.056)	(0.057)	(0.026)	(0.017)	(0.004)
Investments / Pop (07)	0.102***	-0.076***	2.279***	-0.236***	0.171***	-0.003	0.018***
	(0.023)	(0.007)	(0.082)	(0.055)	(0.045)	(0.015)	(0.005)
Op. Expenses / Pop (07)	-0.226***	0.076***	1.689***	6.126***	0.918***	0.150***	-0.060***
	(0.032)	(0.011)	(0.102)	(0.152)	(0.082)	(0.039)	(0.009)
Local Taxes / Pop (07)	-0.272***	0.095***	0.349**	0.597***	5.663***	-0.375***	0.014
	(0.041)	(0.013)	(0.169)	(0.178)	(0.103)	(0.050)	(0.011)
Central Gov. Transfers / Pop (07)	-0.220**	0.027	-0.075	0.545***	-1.175***	5.031***	-0.114***
	(0.089)	(0.024)	(0.224)	(0.207)	(0.135)	(0.295)	(0.028)
Department FE	Y	Y	Y	Y	Y	Y	Y
Pop Quintiles FE	Y	Y	Y	Y	Y	Y	Y
Observations	4,681	4,681	4,681	4,681	4,681	4,681	4,681
R^2	0.415	0.737	0.680	0.936	0.914	0.869	0.350

Note: This table re-runs the same specifications presented Table 2, for the full sample of municipalities above 2,000 inhabitants. Standard errors are clustered at the department level, and are reported into parenthesis under the regression coefficients. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Table A.2
Toxic Debt and Municipal Budget Outcomes
Panel Setting

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Outcome Variables in Logs							
Panel A: Baseline	Debt	Interests	Interest Rate	Investments	Op. Expenses	Local Taxes	Gov. Transfers	Pop
Toxic Debt Share (07) × Post	0.364***	0.571***	1.076***	-0.198***	0.006	0.007	0.018	-0.015
	(0.053)	(0.063)	(0.125)	(0.046)	(0.022)	(0.037)	(0.041)	(0.012)
Municipality FE	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	56,679	56,679	56,679	56673	56,679	56,679	56,679	37,786
R^2	0.913	0.884	0.561	0.886	0.989	0.968	0.947	0.998
Panel B: CHF/Steepener	Debt	Interests	Interest Rate	Investments	Op. Expenses	Local Taxes	Gov. Transfers	Pop
CHF Debt Share (07) × Post	0.615***	0.826***	1.896***	-0.232***	0.008	0.013	0.076	-0.027*
	(0.090)	(0.098)	(0.247)	(0.077)	(0.034)	(0.054)	(0.068)	(0.016)
Steepener Debt Share (07) × Post	0.221***	0.423***	0.641***	-0.183***	0.003	-0.001	-0.014	-0.009
	(0.061)	(0.076)	(0.164)	(0.054)	(0.022)	(0.036)	(0.040)	(0.014)
Municipality FE	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	56,679	56,679	56,679	56673	56,679	56,679	56,679	37,786
R^2	0.913	0.884	0.562	0.886	0.989	0.968	0.947	0.998

Note: This table presents the OLS coefficients from regressing municipal outcomes in a given year (in Log) on the share of toxic debt (Panel A), or the share of CHF debt and the share of Steepener debt (Panel B), interacted with a dummy variable for the year being larger or equal to 2008. The regressions include municipality and year fixed effects. Data on municipal population is not available for the years 2000-2006. The sample period is 2000-2020. Standard errors are clustered at the department level, and are reported into parenthesis under the regression coefficients. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Table A.3
Toxic Debt and Municipal Budget Outcomes
Municipalities above 3,500 inhabitants

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Post-2007	Δ_{07-20} Debt	Σ_{08-20}Interests	Σ_{08-20}Investments	Σ_{08-20}Op. Expenses	Σ_{08-20}Local Taxes	Σ_{08-20}Gov. Transfers	Δ_{07-20}Log Pop
Toxic Debt Share (07)	0.984***	0.349***	-1.166***	-0.293	-0.093	0.048	-0.018
	(0.091)	(0.032)	(0.282)	(0.258)	(0.161)	(0.073)	(0.015)
Debt / Pop (07)	-0.313***	0.402***	0.238*	0.579**	0.707***	0.085	0.018*
	(0.048)	(0.021)	(0.140)	(0.262)	(0.185)	(0.062)	(0.011)
Investments / Pop (07)	0.044	0.021	2.646***	0.307	-0.189	-0.074	0.023*
	(0.063)	(0.028)	(0.344)	(0.261)	(0.176)	(0.128)	(0.012)
Op. Expenses / Pop (07)	0.100	0.006	1.956***	10.973***	0.464*	-0.073	-0.032*
	(0.087)	(0.027)	(0.387)	(0.584)	(0.240)	(0.108)	(0.019)
Local Taxes / Pop (07)	0.020	0.062	2.124***	1.735**	10.283***	-2.167***	0.026
	(0.108)	(0.057)	(0.499)	(0.683)	(0.543)	(0.309)	(0.042)
Central Gov. Transfers / Pop (07)	0.581**	0.011	0.832	1.074	-2.373***	11.652***	-0.150***
	(0.230)	(0.099)	(0.903)	(0.877)	(0.886)	(0.533)	(0.034)
Department FE	Y	Y	Y	Y	Y	Y	Y
Pop Quintiles FE	Y	Y	Y	Y	Y	Y	Y
Observations	1,994	1,994	1,994	1,994	1,994	1,994	1,994
R^2	0.259	0.718	0.626	0.915	0.853	0.829	0.382
Panel B: Pre-2007	Δ_{07-20} Debt	Σ_{08-20}Interests	Σ_{08-20}Investments	Σ_{08-20}Op. Expenses	Σ_{08-20}Local Taxes	Σ_{08-20}Gov. Transfers	Δ_{07-20}Log Pop
Toxic Debt Share (07)	0.034	0.023	0.105	0.027	-0.025	-0.015	-0.002
	(0.559)	(0.262)	(0.521)	(0.812)	(0.757)	(0.622)	(0.894)
Debt / Pop (07)	0.476***	0.242***	0.538***	0.064	-0.126	0.005	0.038
	(0.000)	(0.000)	(0.000)	(0.515)	(0.134)	(0.893)	(0.168)
Investments / Pop (07)	0.053	-0.089***	2.445***	-0.285***	0.302***	0.022	0.004
	(0.436)	(0.000)	(0.000)	(0.005)	(0.005)	(0.663)	(0.799)
Op. Expenses / Pop (07)	-0.275***	0.093***	1.898***	6.531***	1.103***	0.135	-0.057***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.171)	(0.006)
Local Taxes / Pop (07)	-0.123	0.056*	-0.178	-0.128	5.264***	-0.324***	0.053
	(0.293)	(0.090)	(0.580)	(0.538)	(0.000)	(0.003)	(0.118)
Central Gov. Transfers / Pop (07)	-0.054	0.032	-0.703*	0.651**	-1.050***	5.200***	-0.126***
	(0.652)	(0.508)	(0.085)	(0.023)	(0.003)	(0.000)	(0.008)
Department FE	Y	Y	Y	Y	Y	Y	Y
Pop Quintiles FE	Y	Y	Y	Y	Y	Y	Y
Observations	1,994	1,994	1,994	1,994	1,994	1,994	1,994
R^2	0.408	0.685	0.713	0.941	0.885	0.877	0.381

Note: This table re-runs the same specifications presented Table 2, for the restricted set of municipalities in the matched sample with population above 3,500 inhabitants in 2007. Standard errors are clustered at the department level, and are reported into parenthesis under the regression coefficients. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Table A.4
Summary Statistics by Degree of Local Political Competition

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Low Political Competition			High Political Competition			Equality Test
	Obs.	Mean	SD	Obs.	Mean	SD	P-value
Treated (0/1)	1,299	0.222	0.416	695	0.283	0.451	0.003
Toxic Debt Share (07)	1,299	0.079	0.180	695	0.090	0.182	0.175
CHF Debt Share (07)	1,299	0.026	0.101	695	0.031	0.100	0.287
Steepener Debt Share (07)	1,299	0.053	0.139	695	0.059	0.139	0.330
Population (07)	1,299	12,619	18,185	695	19,267	28,836	0.000
Toxic Debt / Pop (07)	1,299	0.101	0.244	695	0.117	0.257	0.167
CHF Debt / Pop (07)	1,299	0.034	0.131	695	0.041	0.130	0.230
Steepener Debt / Pop (07)	1,299	0.067	0.181	695	0.076	0.189	0.301
Debt / Pop (07)	1,299	0.999	0.548	695	1.050	0.534	0.044
Interest Expenses / Pop (07)	1,299	0.042	0.024	695	0.045	0.023	0.058
Municipal Investments / Pop (07)	1,299	0.539	0.299	695	0.530	0.278	0.508
Operating Expenses / Pop (07)	1,299	1.012	0.379	695	1.055	0.358	0.014
Local Taxes / Pop (07)	1,299	0.429	0.201	695	0.456	0.193	0.003
Central Gov. Transfers / Pop (07)	1,299	0.239	0.111	695	0.246	0.101	0.141
Old Mayor	1,299	0.490	0.500	695	0.590	0.490	0.000
Female Mayor	1245	0.070	0.255	609	0.108	0.311	0.008
Left-wing Mayor	1222	0.499	0.500	594	0.397	0.490	0.000
High-skill Mayor	1245	0.312	0.464	609	0.361	0.481	0.038
Council Size	1296	3.430	0.167	694	3.484	0.207	0.000
Working Age Population	1,299	0.641	0.043	695	0.643	0.041	0.285
Unemployment Rate	1,299	0.112	0.044	695	0.116	0.043	0.017
Value Added	1,299	51.74	14.31	695	51.57	14.14	0.794
Wages	1,299	26.77	4.062	695	26.75	4.191	0.932
Firm Leverage	1,299	0.252	0.146	695	0.264	0.158	0.112
Private Investment	1,299	0.140	0.075	695	0.137	0.066	0.311
Share Young	1,299	0.311	0.062	695	0.320	0.071	0.004
Workers in Agriculture	1,299	0.011	0.019	695	0.010	0.016	0.372
Workers in Industry	1,299	0.174	0.118	695	0.150	0.101	0.000
Workers in Construction	1,299	0.082	0.046	695	0.077	0.040	0.006
Workers in Retail/Services/Transport	1,299	0.423	0.112	695	0.429	0.101	0.228
Workers in Public Sector	1,299	0.302	0.110	695	0.325	0.104	0.000

Note: This Table presents summary statistics separately for municipalities (in the treated group + matched control group) for which the mayor was elected in first round in the 2008 elections ("Low Political Competition"), or in the run-off ("High Political Competition"). Old Mayor, Female Mayor, Left-wing Mayor, High-skill Mayor, Council Size, are measured in the local election of 2008. Old Mayor is defined as being above 60 years old. The dummy for left-wing mayor is 1 when mayors are labeled as either "left" or "far left". High-skill Mayor is a dummy indicating whether the mayor was either a manager, engineer, physician, lawyer, or university professor. Council Size is the logarithm of the number of members who serve on the municipal council. Working Age Population, Unemployment Rate, Value Added, Wages, Firm Leverage, Private Investment, Share Young, the share of Workers in Agriculture, in Industry, in Construction, in Retail/Services/Transportation, in the Public Sector, are computed in 2007. Value Added and Wages are expressed in thousand euros per worker, and computed using the universe of private firms located in each municipality. Firm Leverage (respectively Private Investment) is the value-weighted ratio of debt over assets (respectively ratio of capital expenditures over firm capital) computed across all firms located in a given municipality. Working Age Population (respectively Share Young) is the share of the population with age between 25 and 54 years old (respectively with age between 15 and 24 years old). The sample is restricted to municipalities with population above 3,500 inhabitants.

Table A.5
Toxic Debt, Political Competition, and Municipal Investments
All municipalities above 3,500 inhabitants

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel A: Low Political Competition - 2008 Mayor Elected in First Round						
	Δ_{07-20} Debt	Σ_{08-20}Interests	Σ_{08-20}Investments	Σ_{08-20}Op. Expenses	Σ_{08-20}Local Taxes	Σ_{08-20}Gov. Transfers	Δ_{07-20}Log Pop
Toxic Debt Share (07)	0.783***	0.260***	-0.593**	-0.364	-0.033	-0.005	-0.040***
	(0.091)	(0.029)	(0.282)	(0.225)	(0.179)	(0.084)	(0.011)
Debt, Invest., Expenses, Taxes, Transfers (07)	Y	Y	Y	Y	Y	Y	Y
Department FE	Y	Y	Y	Y	Y	Y	Y
Pop Quintiles FE	Y	Y	Y	Y	Y	Y	Y
Observations	1,623	1,623	1,623	1,623	1,623	1,623	1,623
R^2	0.219	0.762	0.604	0.911	0.842	0.839	0.402
	Panel B: Low Political Competition - 2008 Mayor Elected in Runoff						
:	Δ_{07-20} Debt	Σ_{08-20}Interests	Σ_{08-20}Investments	Σ_{08-20}Op. Expenses	Σ_{08-20}Local Taxes	Σ_{08-20}Gov. Transfers	Δ_{07-20}Log Pop
Toxic Debt Share (07)	0.722***	0.342***	-1.574***	-0.512*	-0.068	-0.211	0.011
	(0.171)	(0.050)	(0.353)	(0.265)	(0.239)	(0.245)	(0.020)
Debt, Invest., Expenses, Taxes, Transfers (07)	Y	Y	Y	Y	Y	Y	Y
Department FE	Y	Y	Y	Y	Y	Y	Y
Pop Quintiles FE	Y	Y	Y	Y	Y	Y	Y
Observations	787	787	787	787	787	787	787
R^2	0.237	0.783	0.592	0.908	0.860	0.817	0.409
Toxic Debt Share (07)	0.162	-0.037	-0.030	0.877**	0.190	0.357	-0.036
(High-Low)	(0.136)	(0.027)	(0.061)	(0.392)	(0.319)	(0.409)	(0.026)

Note: This table re-runs the same specifications presented Table 5, for the full sample of municipalities with population above 3,500 inhabitants. Standard errors are clustered at the department level, and are reported into parenthesis under the regression coefficients. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Table A.6
Municipal Voter Priorities - IFOP Poll (2020)

What role did each of these municipal policies play in your vote?	Crucial	Important but not crucial	Secondary	Total
Financial and debt management	64	30	6	100
Healthcare services	62	33	5	100
Security and safety	62	32	6	100
Local taxes	60	34	6	100
Cleanliness and landscaping	60	36	4	100
Employment and economic development	54	39	7	100
Urbanism	54	40	6	100
Education and schools	50	40	10	100
Pollution	48	42	10	100
Environment	46	40	14	100
Local stores	46	44	10	100
Social services	44	43	13	100
Public transportation	41	43	16	100
Traffic	40	44	16	100
Housing	32	50	18	100
Early childhood education	32	52	16	100
Parking	30	46	24	100
Culture	29	52	19	100

Note: This table displayed the results from a poll run by IFOP for CNEWS and Sud Radio after the 2020 Municipal elections. Complete results and methodology are available at https://www.ifop.com/wp-content/uploads/2020/03/117215-Rapport-JDV-MUNI20-DET-18h30.pdf (in French).

B Proof of Proposition 6.1

We start the proof by noting that in all politicians' strategies, it is always optimal to finance investment entirely with debt (that is, set $I = D$ and $T = 0$). Without loss of generality, we assume that voters vote for the mayor when indifferent between voting for the mayor and the challenger. We characterize below the equilibrium level of investment first without, and then with, a toxic debt shock. We then show that the decline in investment following a toxic debt shock is larger in politically contested municipalities, defined as those such that the mayor political advantage $\tilde{\theta}_M$ is below the threshold $\overline{\theta} + \theta_{Tox}$.

Investment choices without a toxic debt shock.

To simplify the exposition, let us define $\overline{\theta} \equiv \lambda(I^V - I^P) - (D_O + I^V)^\gamma + (D_O + I^P)^\gamma = \lambda(\left(\frac{\lambda}{\gamma}\right)^{\frac{1}{\gamma-1}} - \left(\frac{\beta+\lambda}{\gamma}\right)^{\frac{1}{\gamma-1}}) + \left(\frac{\beta+\lambda}{\gamma}\right)^{\frac{\gamma}{\gamma-1}} - \left(\frac{\lambda}{\gamma}\right)^{\frac{\gamma}{\gamma-1}}$. We show below that when the net political advantage of the mayor, that we can define $\tilde{\theta}_M \equiv |X_m - X_C| - |X_m - X_M| + \theta_M - \theta_C$ (where X_m denotes the ideology of the median voter), is higher than $\overline{\theta}$, choosing $I^* = I^P$ for the mayor is a dominant strategy.

To see this, note that $\tilde{\theta}_M \geq \overline{\theta}$ implies $-|X_m - X_M| + \theta_M + \lambda.I^P - (D_O + I^P)^\gamma > -|X_m - X_C| + \theta_C + \lambda.I^V - (D_O + I^V)^\gamma$, and therefore $U_{m,M}(I^P) > U_{m,C}(I^V)$. As $U_{m,C}(.)$ is maximized in I^V, it follows that the mayor is elected if she chooses her preferred investment level I^P irrespective of the investment choice of the challenger.

Suppose now that $0 < \tilde{\theta}_M < \overline{\theta}$. We conjecture and check below that the Nash equilibrium has the following form: Challenger strategy: I^V; Mayor strategy: $I^* < I^P$ such as $U_{m,M}(I^*) = U_{m,C}(I^V)$.

To check whether these strategies form a Nash equilibrium, we show below that there is no profitable deviation for neither the challenger nor the mayor. In the candidate equilibrium above, note that the mayor wins the election with probability 1.

If challenger chooses investment below I^V or above I^V, in both cases, this reduces the utility of the median when voting for the challenger, and the challenger still loses the election with probability 1.

Turning to the mayor, first note that because $\tilde{\theta}_M > 0$, $U_{m,M}(I^*) = U_{m,C}(I^V)$ implies that $I^* > I^V$. If the mayor chooses investment below I^*, she still wins with probability 1 (as this increases even further the utility of the median voter when voting for the mayor), but this decreases the mayor utility (because $(\beta + \lambda).I - (D_O + I)^\gamma$ is increasing in I for $I < I^P$). If the mayor instead chooses investment above I^*, she loses the election (as then $U_{m,M}(I > I^*) < U_{m,C}(I^V)$), and the mayor utility drops. This concludes the first part of the proof.

Investment choices with a toxic debt shock.

Following the same steps as for the investment choices without a toxic debt shock, it is straightforward to show that: (i) when $\tilde{\theta}_M - \theta_{Tox} > \overline{\theta}$, the mayor chooses her preferred investment level $I^P - D_{Tox}$, and is elected with probability 1; (ii) when $0 < \tilde{\theta}_M - \theta_{Tox} < \overline{\theta}$, the mayor chooses I^{**} such that $U^{Tox}_{m,M}(I^{**}) = U^{Tox}_{m,C}(I^V - D_{Tox})$ (with $I^{**} < I^P - D_{Tox}$), and is elected with probability 1.

We are left to verify that the decline in investment following a toxic debt shock is larger in

politically contested municipalities, defined as those such that the mayor political advantage $\tilde{\theta}_M$ is below the threshold $\overline{\theta} + \theta_{Tox}$.

In the region in which the mayor advantage is larger, that is $\tilde{\theta}_M > \overline{\theta} + \theta_{Tox}$, investment declines from I^P to $I^P - D_{Tox}$.

To complete the proof, let us now show that the decline in investment following a toxic debt shock is strictly larger than D_{Tox} when $\tilde{\theta}_M < \overline{\theta} + \theta_{Tox}$.

First note that when $\overline{\theta} < \tilde{\theta}_M < \overline{\theta} + \theta_{Tox}$, investment declines from I^P to I^{**}, which is strictly larger than D_{Tox} as $I^{**} < I^P - D_{Tox}$. When $\theta_{Tox} < \tilde{\theta}_M < \overline{\theta}$, investment declines from I^* to I^{**}. Remember that I^* and I^{**} are respectively such that $U_{m,M}(I^*) = U_{m,C}(I^V)$ and $U^{Tox}_{m,M}(I^{**}) = U^{Tox}_{m,C}(I^V - D_{Tox})$. Now, using equations (6.1), (6.3) and (6.4), observe that $U^{Tox}_{m,C}(I^V - D_{Tox}) = U_{m,C}(I^V) - \lambda D_{Tox}$ and $U_{m,M}(I^*) = U^{Tox}_{m,M}(I^* - D_{Tox}) + \lambda D_{Tox} + \theta_{Tox}$. It follows that $U^{Tox}_{m,M}(I^{**}) = U^{Tox}_{m,M}(I^* - D_{Tox}) - \theta_{Tox}$. Given that both $I^* - D_{Tox}$ and I^{**} are larger than $I^V - D_{Tox}$ and $U^{Tox}_{m,M}$ is decreasing in I for $I > I^V - D_{Tox}$, it follows that $I^{**} < I^* - D_{Tox}$, and therefore the decline in investment is following a toxic debt shock is strictly larger than D_{Tox} in that case.

C Queries on Aday

Keywords:

- For toxic loans:

  (“emprunt toxique” or “emprunts toxiques”) and “[Name of the municipality]”

- For municipal Debt:

  ((“dette de la ville” or “dette municipale” or “dette communale” or “dette par habitant” or “dette locale”) and “[Name of the municipality]”) or “dette de [Name of the municipality]” ou “endettement de [Name of the municipality]”