# The Political Economy of Financial Innovation: Evidence from Local Governments

Christophe Pérignon * Boris Vallée †‡

First Draft: July 30, 2011
This Draft: October 27, 2015

**Abstract**

We present an empirical investigation of the role of political incentives in the use of innovative financial products. The adoption of structured loans, a high-risk type of borrowing for local governments, is more frequent when incentives for politicians to obtain immediate cash-flows are higher. We also show that using structured loans helps politicians get re-elected, mainly by allowing them to offer relatively lower taxes. Conversely, structured loan usage is hard to empirically reconcile with politicians' *ex post* claim that they do not understand the transactions. Our findings are supportive of financial innovation amplifying agency costs within the political system.

*Keywords*: Financial innovation, Political Incentives, Structured debt

*JEL codes:* P16, H74, G11, G32

*HEC Paris - Email: perignon@hec.fr. Address: Finance Department, HEC Paris, 1, rue de la Liberation, 78350 Jouy-en-Josas, France - Phone: +33 139 67 94 11

†Harvard Business School - Email: bvallee@hbs.edu. Address: Finance Department, Harvard Business School, Baker Library 245, Boston MA02163 - Phone: 617-496-4604 (corresponding author)

‡This article is based on a chapter of Boris Vallée's PhD dissertation at HEC Paris. We are grateful to Marianne Bertrand, Claire Célérier, Jonathan Dark, Francois Derrien, Dirk Jenter, Laurent Frésard, Jeffry Frieden, Thierry Foucault, Robin Greenwood, Ulrich Hege, Jose Liberti (EFA discussant), Steven Ongena, Clemens Otto, Stavros Panageas, Guillaume Plantin, Josh Rauh, Jean-Charles Rochet, Paola Sapienza, Amit Seru, Andrew Siegel, Jérôme Taillard, David Thesmar, Philip Valta, James Vickery (WFA discussant), participants at the 2012 WFA and the 2013 EFA Annual Meetings, and seminar and workshop participants at the Banque de France, HEC Paris, INSEAD, and University of Zurich, for their helpful comments and suggestions. We also thank the French Ministry of the Interior for providing some of the data. Part of this study was completed while Boris Vallée was visiting Northwestern University. All errors are ours only.

*"It's a joke that we are in markets like this. We are playing the dollar against the Swiss franc until 2042."*
Cedric Grail, CEO of City of Saint Etienne, France (Business Week, 2010)

# 1 Introduction

The political economy of financial innovation has arguably played an important role in the recent financial crisis (Rajan (2010), Zingales (2015)). The role of political incentives in the development of innovative financial products remains, however, largely debated and difficult to identify empirically. Do politicians exploit innovative financial products for implementing their own political agenda, or as often claimed by politicians afterwards, do they misunderstand these products? Anecdotal evidence provides some support for both of these hypotheses. To comply with Eurozone requirements, Greece entered into OTC cross-currency swap transactions to hide a significant amount of its debt. In the US, municipalities regularly use bond advance refunding that provide them with short-term budget relief at a high cost (Ang et al., 2014). On the other hand, the Libyan government made huge losses on derivatives transactions implemented through Goldman Sachs, which according to legal experts exploited the lack of financial sophistication of its client.[1] The research question we address in this paper is: does financial innovation amplify agency costs in the political system? More specifically, does the use by politicians of undisclosed and high-risk innovative financial instruments result from their political agenda, or from their misunderstanding of the transactions? A corollary question is: through which channel can these instruments benefit politicians' strategies?

To address these questions we exploit the recent development of an innovative form of borrowing by local governments: structured loans.[2] These loans have three defining features: a long maturity, a fixed/low interest rate for the first years of the loan, and an adjustable rate that depends on the value of a given financial index (e.g., Libor, foreign exchange rate or swap rate spreads). These loans shift a large share of the borrowers

[1] *"It was readily apparent to me that Goldman had unfairly taken advantage of the LIA's [Libyan Investment Authority] lack of financial sophistication [...] and had sold the LIA $1 billion worth of derivative products that the LIA did not properly understand."* Catherine McDougall, Allen and Overy, The New York Times, October 7, 2014.

[2] These loans embed derivatives, such as options. Although options were developed earlier, designing asset or liabilities side financial products that embed options on a range of underlying financial assets is an innovation from the early 2000s.

immediate cost of debt to certain states of nature in the future, allowing budget relief for an initial period, which typically matches the current term of office. The local government structured loan phenomenon has been observed in Europe, in Asia, and, to a lesser extent, in the US. In France alone, outstanding products represent more than EUR30 billion and bear unrealized losses exceeding EUR10 billion, or 0.5% of GDP (Cour des Comptes, 2011). During the recent financial crisis, as volatility spiked, the interest costs of structured loan users increased to historically high levels and may remain high for the remainder of their lifetimes.[3] The French Central State recently implemented a bail-out fund covering EUR3 billion of losses.

Local government structured loans represent an ideal laboratory for studying the political economy of financial innovation for three reasons: structured loans offer great flexibility to the borrowers in terms of cash-flow distribution across time and states of nature; these transactions are typically undisclosed to voters; and finally the large number of local governments and the high level of penetration of structured loans in France allow for a large sample empirical analysis.

Using proprietary data from France, we provide empirical evidence consistent with politicians strategically using risky innovative financial products for their own interest, with four main contributions. First, we document the extent to which politicians have been implementing these risky transactions: structured loans account for more than 20% of outstanding local government debt, and more than 72% of the 300 largest local governments use structured loans. Among these structured loans, 40% bear a significantly high level of risk.

Second, we show that the propensity, size, and timing of these transactions vary according to specific political incentives. A cross-section of our data illustrates how elected representatives from financially distressed local governments are significantly more likely to turn to this type of loan, evidencing a higher incentive to hide the actual cost of debt. We further establish a causal link between the level of indebtedness and the local government's propensity to use structured debt by instrumenting the level of local government debt with floods, an arguably exogenous source of expenditures. We also

[3]For instance, the City of Saint-Etienne saw the annual interest rate charged to one of its major loans increased from 4% to 24% in 2010, as the latter was indexed on the British pound/Swiss franc exchange rate (Business Week, 2010). The total unrealized losses on Saint-Etienne structured products reached EUR120 million in 2009, nearly doubling the city's nominal debt level of EUR125 million (Cour des Comptes, 2011).

find that incumbent politicians running in politically contested areas, as measured by several proxies, are more inclined to use structured loans, which is consistent with them seeking immediate savings to aid them in being re-elected. When comparing a treatment group that confronts elections during our sample period (municipalities and counties), to a control group that does not (regions, hospitals, and social housings), we find that structured loan transactions are more frequent shortly before elections than after them.

Third, we explore the real effects of structured loan usage. By instrumenting the use of structured loans with the distance to the closest branch of the leading bank, we show that issuing structured loans helps politicians getting re-elected. We also provide evidence that politicians use the cash flows obtained from structured loans to offer lower local taxes, and not to increase investments.

Finally, we establish two stylized facts that are hard to reconcile with the view that lack of financial sophistication is the main driver of this market development: politicians whose profession requires higher education are more inclined to use structured loans than politicians from a less educated background, and politicians from large cities are more likely to use structured loans than the ones from small cities. We also empirically rule out hedging as a possible motive for these transactions. Last but not least, we find evidence suggestive of coordination between politicians; they are more likely to enter into structured loans if some of their neighbors have done so recently.

Our first dataset contains the entire debt portfolio for a sample of the 300 largest French local governments as of the end of 2007. For each debt instrument, we access information pertaining to the notional amount, maturity, coupon rate, type of product, underlying financial index, and lender identity. Structured debt amounts to EUR10.4 billion for this sample, out of EUR52 billion total debt. Our second dataset includes all of the structured transactions made by Dexia, the leading bank on the French market for local government loans, between 2000 and 2009. This dataset provides loan-level information, including the mark to market and transaction date. It also contains information for more than 2,700 local governments (see Appendix A for more information on local government types), for a total of EUR23.7 billion of outstanding structured loans. We complement the second dataset with detailed accounting data, election results, list of floods, mayor demographics, and GPS coordinates.

Our methodology relies largely on probit regressions where the dependent variable

is an indicator of the use of structured loans. To gain causal identification, we complement these correlation specifications, with two distinct instrumental variable analyses: we instrument indebtedness with the occurrence of floods, the most widespread type of natural catastrophe in France, and we instrument the propensity to use structured loan with the distance to the market main player closest branch. We also implement a difference-in-differences specification when analyzing the role of election timing.

Our paper relates principally to two streams of literature. First, our work complements studies of the political economy of finance, including political agency problems (Besley and Case, 1995), political incentives and credit (Rajan, 2010), their influence on financial decisions for local governments (Butler et al. (2009), Ang et al. (2014)), or on bank bailouts (Behn et al., 2014). Aneja et al. (2015) show that politicians can use financial instruments as a way to signal their commitment. Tightly related to our findings on election timing, Dinc (2005) shows that government banks lend more in election years, while Bertrand et al. (2007) document that politicians influence CEOs to avoid layoffs prior to elections. Halling et al. (2014) document revenue transfers from government owned banks to local governments. We also complement findings on the economic effects of political uncertainty (Julio and Yook, 2012), with a public finance channel. Because structured loans allow local governments to cosmetically reduce their immediate cost of debt, our work directly relates to the off-balance sheet borrowing of local governments, mainly through pension fund liabilities (Novy-Marx and Rauh, 2011). Our study also offers a non-bank set-up to test for collective moral hazard (Farhi and Tirole, 2012).

Second, our paper contributes to the debate on the dark side of financial innovation (Simsek (2013), Shiller (2013)), its associated risks (Gennaioli et al., 2012), motives (Célérier and Vallée, 2014), and effects (Rajan, 2006). Similar to the sophisticated mortgage borrowers studied by Amromin et al. (2013), politicians may deliberately exploit certain characteristics of innovative financial products to their own advantage, regardless of the long-term risks they impose on the taxpayer.

Through the alternative explanations we consider, our work also builds on the financial literacy literature (Lusardi and Mitchell, 2011), and studies of hedging policies by corporate firms (Baker et al., 2005).

The paper proceeds as follows. In Section 2, we provide background on the local government market for structured loans, and describe our datasets in Section 3. We develop

our hypotheses in Section 4, which we subsequently test in Section 5 for structured loan usage, and in section 6 for the effects of structured loan usage. We consider alternative hypotheses in Section 7. We conclude our study in Section 8.

# 2 The Structured Loan Market

This section provides some background information on the local government market for structured loans, including an actual structured product example, and classify structured loans by their level of risk.[4] The development of the structured loan market was fostered by a combination of three factors: a blind spot in government accounting standards, the quasi-sovereign credit quality of local governments, and banks' appetite for these profitable transactions.

## 2.1 Example of a Structured Loan

In this study, a structured loan refers to a bank loan obtained by a local government, in which the coupon formula differs from either a constant fixed rate, or a floating rate such as Libor + a spread (called 'standard loans' throughout this study). Structured loans offer an initial period with a guaranteed low coupon, which typically lasts between two and seven years. In a subsequent period, the coupon follows a formula based on a given underlying financial index. The loan design embeds a sale of options on this underlying financial index by the borrower, meaning that the local government will pay a higher coupon if the underlying reaches a certain threshold.[5] In exchange, the borrower receives the option premia, which are subtracted from the interest cost. As with any short position in options, the risk of the transaction increases with its maturity, the volatility of the underlying index, the leverage in the coupon formula, and the cap level.[6]

Below is an example of a structured loan, which was subscribed by the Rhône, the French county that comprises the city of Lyon. The loan has an eight-year initial period with a low guaranteed coupon of 1.75%, which is significantly lower than the interest

[4]These institutional details rely on product term sheets, on the French Congress investigation into the structured loan market (French National Assembly, 2011), and numerous discussions with professionals from both buy and sell sides.

[5]See the appendix for a typology of the structured loans.

[6]Structured loans generally do not possess any cap feature, meaning that there is no ceiling to the coupons the borrower may face.

rate on an equivalent standard loan at the time of issuance (4.50%). In the subsequent period, the loan offers a fixed rate that is conditioned on the EURCHF exchange rate. The loan therefore generates a leveraged and uncapped exposure to CHF appreciation against EUR for the remaining 17 years. At today's levels (as of October 2015), the interest rate on this loan is about 31%. Similar products with higher leverage or strikes result in some local governments currently paying more than a 50% interest rate per year.

$$
\begin{aligned}
&\textit{Amount}: && \textit{EUR } 80 \textit{ million} \\
&\textit{Trade Year}: && 2006 \\
&\textit{Loan Maturity}: && 2031 \\
&\textit{Year } 2006-2013: && \textit{Coupon}(t) = 1.75\% \\
&\textit{Year } 2014-2031: && \textit{Coupon}(t) = 1.75\% + Max(1.40/EURCHF(t) - 1,0\%)
\end{aligned}
$$

As the equivalent fixed rate at the time of issuance was around 4.50%, the coupon formula can be rewritten as:

$$
\begin{aligned}
&\textit{Year } 2006-2013: && \textit{Coupon}(t) = 4.50\% \textbf{ - 2.75\%} \\
&\textit{Year } 2014-2031: && \textit{Coupon}(t) = 4.50\% \textbf{ - 2.75\%} + Max(1.40/EURCHF(t) - 1,0\%)
\end{aligned}
$$

This illustrates how the sale of an option on EURCHF during the years 2014-2031 provides the local government with a yearly premium of 2.75%.

## 2.2 Borrower Rationale

As evidenced by the example above, structured loans allow local governments to immediately reduce the accounting cost of their debt, and therefore provide a budget relief. This relief is certain for the period during which the coupon is guaranteed, and potentially extends to the subsequent period. Under most government accounting standards, derivatives (either stand-alone swaps or those embedded within structured loans) are not accounted for at fair value. In many countries, government accounting standards do not even require the disclosure of derivatives transactions. Only the interests that are paid during the accounting year must appear in financial statements, which makes it challenging for taxpayers to identify the true cause behind a decrease in the cost of debt of a local government.

A parallel can be drawn with the reaching for yield phenomenon, where institutional investors improve the yield of their investments by increasing their risk on unobserved dimensions (Becker and Ivashina, 2014).[7] Returning to the previous example, the product provides a 2.75% annual subsidy for seven years, which is the difference between the rate on an equivalent standard loan and the one on the structured loan. If the entire debt of the local government consists of this type of financing, the cost of debt may therefore appear less than half than what it should be. The subsidy provided by the loan appears to be guaranteed during the initial period, which often corresponds to the remaining length of the local politician's mandate. The subsidy is repaid in the future in certain states of nature, namely, when the options embedded in the derivative component of the loan end up in the money.

An important aspect of French local government accounting is that they are forbidden from borrowing to balance their operating budget.[8] However, the cost of debt is considered under government accounting as an operating expense: structured loans are therefore a possible way of balancing the budget and relaxing the financial constraint in the short term.

## 2.3 Lender Rationale

The supply side of the market is likely to be driven by the profitability of these transactions. Discussions with practitioners indicate that these transactions are significantly more profitable than standard loans (markups correspond approximately to 5% of the loan notional). Furthermore, the activity is easily scalable across countries. Indeed, the legal documentation is limited to a three or four-page contract. Structuring mechanics rely on worldwide known indices, such as the US Libor or the EURUSD exchange rate. As global players, financial institutions simultaneously market the same products in different countries.[9]

Second, lending to local governments presents characteristics that facilitate the structuring process of these transactions. Local governments are among the issuers that have

[7] As local governments are strictly regulated on the assets they can invest in, only the liability side of their balance sheet allows them to implement such strategy.

[8] Loans proceeds can only be used for investment purposes.

[9] Even if their diffusion is global, market penetration is higher in Europe than in the US, which is likely to be because cities and regional governments in Europe receive a larger share of their financing from banks, whereas those in the US primarily raise funds by issuing bonds.

the longest debt maturity, typically ranging from 15 to 30 years, which is a prerequisite for structuring products with initial periods of low interest rates. Local governments also have the credit quality that is necessary for banks to accept such long and impossible-to-hedge credit exposure. Until the recent financial crisis, counterparty risk of local governments was considered low by banks, because of the widespread view that central governments were implicitly guaranteeing these entities. This high-perceived credit quality allowed local governments to post no collateral for derivative transactions. Collateral requirements, typically in place with corporate clients, would hinder structured transactions for local governments, as the negative fair value of a derivative position would lead to margin calls that would be both costly to manage and visible to voters.

## 2.4 Risk Classification

As many local governments are currently paying double-digit coupon rates on their structured loans, the press has labeled them "toxic". Some structured loans indeed present unusually-high levels of risk, as local governments may pay significantly more in interest than the amount borrowed. In this study, we rely on the classification established by the French Government following the first litigations, the Gissler scale, to measure the risk of structured loans. Although they all rely on the same mechanism (an implicit sale of options, the premium of which is subtracted from the initial coupon rate), structured loans exhibit diverse risk profiles, which also correspond to different magnitudes of short-term budget relief: the riskier the product, the lower the coupon during the initial subsidy period, and/or the longer this period. The Gissler scale ranks structured loans according to their risk profile. For more details regarding the different types of structured loans, and the Gissler scale, see Appendix B.

We classify a structured product as high-risk if it ranks higher than 3 on the Gissler scale. Given this definition, loans that are indexed on the interest rate curve slope, foreign interest rates, or on a foreign exchange rate are classified as high-risk. Products that are linked to domestic interest rates or inflation are not considered high-risk. Our two categories also map the introduction of these products, as high-risk products are a more recent development of the market.

This classification is based on loan characteristics at inception and is independent from

the market conditions that prevail during the life of the product. A high-risk product may have offered a low coupon level to its user *ex post*; nevertheless, the borrower entered into a transaction that would have created massive losses had the market situation been reversed. Structured products that are not classified as high-risk still bear significantly more risk than standard financing, and the nonlinear payoffs of such loans are challenging to manage in practice, as they can create sudden increases in the cost of debt.

## 2.5 Post-Crisis Developments

The financial crisis led to a spike of volatility in all financial markets, which led to large unrealized losses on structured loans, and in many cases led the coupons to jump to double-digit levels. Starting in 2010, local governments have been unwilling to pay these high interest rates, and have been suing banks for mis-advice and questioning whether these transactions are legal in the first place. Local governments try to obtain the cancellation of the structured loans, especially the high-risk ones, or to negotiate an exit at better terms. Court outcomes have been mixed, but initially led to the cancellation of some structured loans for a technical reason. This decision was later repelled by the higher court of justice in France, and a new law was introduced to ensure the legality of all transactions.[10]

A partial governmental bailout was implemented in 2014, in the form of a 50% participation of the central government in unwinding costs. This government subsidy is financed for half by a new tax on banks' systemic risk contributions. The amount allocated to this purpose has been increased from EUR1.5bn to EUR3bn at the beginning of 2015, following the change in the Swiss National Bank policy that led to severe losses on products indexed to the EURCHF exchange rate. The French government faces a trade-off between having only local taxpayers pay for the structured loan losses, or sharing the cost nationwide. Moreover, the main player in the market, Dexia, has been nationalized during the financial crisis. Therefore, cancelling all local governments unrealized losses would be extremely costly for the French central government, which may have played a role in the new legislation put in place.

[10] http://www.lesechos.fr/idees-debats/cercle/cercle-107127-emprunts-toxiques-le-coup-de-jarnac-a-17-milliards-1031512.php

# 3 Data

Our analysis relies on two proprietary datasets that contain a wealth of information on local governments' structured loans, traditionally undisclosed to voters.

In most countries, the financial statements of local governments do not present the precise breakdown of debt by instrument, and in particular, they do not make a distinction between standard bank loans and structured loans. Our analysis of structured loans requires information on the composition – and not only the total amount of the debt portfolio – for a sample of local governments. We obtain this information from two separate datasets. The first dataset contains the entire debt portfolio for almost all of the 300 largest French local governments (Dataset A) as of December 31, 2007. The second set includes loan level data on all the outstanding structured transactions of Dexia, the leading bank on the market (Dataset B) as of December 31, 2009. We complement these two datasets with a set of data necessary to our analysis: local governments detailed financial statements, the list of floods in France, results of municipal elections in France since 1983, GPS data to measure distances, and demographic characteristics of mayors.

## 3.1 Local Government Level Debt Data (Dataset A)

Our first dataset, which covers precisely 293 French local governments, comes from a leading European financial consulting firm for local governments. This dataset contains the entire debt portfolio, broken down by type of debt, for nearly all the largest local governments: French regions (25 out of 27) and French Counties (96 out of 100) as well as the largest cities (96) and intercity associations (76). Collectively, these local governments have a total debt of EUR52 billion, or 38.2% of the total debt of all French local governments, which includes EUR10 billion of structured debt, or a third of the total outstanding amount in France as estimated by the French Congress. Panel A of Table 1 provides summary statistics on the debt profile of the local governments from the sample.

[Insert Table 1 here]

We observe that virtually all local governments in our sample (95.6%) have debt, and this fraction remains high for all types of local governments. Funding is achieved

through the following channels: standard bank loans, bonds, revolving facilities, and structured debt. Standard bank loans are by far the main source of financing for local governments (constituting 62.9% of outstanding debt, while bonds account for a low 3.3% of outstanding debt).[11] Structured debt represents a significant share of the total debt of local governments, accounting for 20.1% of all outstanding debt and being used by more than 72% of the local governments in our sample. These ratios are particularly high for counties and cities.[12] The fraction of structured debt varies extensively across local governments, with some local governments borrowing almost exclusively through this channel.

Within the structured debt component, we also examine the specific amount of high-risk structured loans, as defined in the previous section.[13] Overall, high-risk structured loans represent 8.4% of total debt in our sample, and are used by 43% of the local governments. Again, there is significant heterogeneity among local governments in their use, with some of the governments having up to 71.7% of their total debt consisting of high-risk structured loans.

## 3.2 Loan Level Data on Structured Transactions (Dataset B)

Our second dataset contains loan level data for all structured loan transactions implemented with Dexia, the largest lender in this market. This second dataset is almost ten times larger than the first, as Dexia has a 70% market share for public sector-structured loans (French National Assembly, 2011) and an extremely diverse customer base.[14] The French newspaper *Libération* posted this confidential risk-management data on its website following an internal leak from the bank. This dataset contains 2,741 different public sector entities: 16 regions (vs. 25 in Dataset A); 66 counties (vs. 96); 539 intercities (vs. 76); 1,588 municipalities (vs. 96); 288 hospitals (vs. zero); 115 social housing entities

[11] Bonds are used by only 7.5% of local governments, likely because of the absence of tax incentives for Muni Bonds as opposed to the US, and complex legal documentations. On the opposite, the French Central Government's debt comprises almost only bonds and bills.

[12] See Appendix C for the breakdown of Table 1 by type of local government.

[13] A detailed breakdown of structured debt by type of structured product can be found in Appendix C. The most popular products are those linked to domestic interest rates, which account for nearly half of the outstanding structured debt (47.7%). Other underlying indices (sorted by decreasing popularity) include the interest rate curve slope (26.8%), foreign exchange (14.8%), inflation (3.4%), and foreign interest rates (2.4%).

[14] There are more than 35,000 municipalities in France, the majority having less than 500 inhabitants.

(vs. zero); and 129 other borrowers, including airports, harbors, chambers of commerce, healthcare cooperatives, public-private joint ventures, schools, research institutes, nursing homes, fair organizers, and charities. The local governments in our sample vary significantly in terms of size; for instance, 37 cities have fewer than 1,000 inhabitants, and 29 cities have more than 100,000 inhabitants.

Panel B of Table 1 provides summary statistics for this dataset.[15] By construction, every local government in this sample uses at least one structured loan, for a total amount of EUR23 billion, or more than two thirds of the total amount estimated by the French National Assembly. In this sample, more than EUR13 billion of structured loans are considered high-risk under our classification. The average amount of structured loan per local government is much lower than in the previous dataset, mostly due to the larger sample that includes many entities of small size. The average number of structured transactions is approximately two, but 163 entities have more than five structured loans in their debt portfolio.[16]

The data also include information on trade inception dates, allowing us to build a panel to conduct time-series analysis.[17] The aggregated numbers of transactions per semester are plotted in Figure 1. We observe the rapid development of the market followed by a sharp contraction after 2007. The latter was exacerbated by media coverage of distressed local governments and by Dexia's own difficulties in the last quarter of 2008.[18] This figure also evidences the evolution of the composition of the transactions implemented: high-risk structured loans, as defined in the previous section, become more and more prevalent over time.

[Insert Figure 1 here]

[15]The total debt figures are from matched accounting data, as the dataset only contains structured loan information, which explains the lower number of observations.

[16]The data also contain information on the mark-to-market of transactions as of the end of 2009. The mark-to-market, which corresponds to the net present value of unwinding the derivative structure, are overwhelmingly negative for local governments in 92% of the cases. This means that local government cannot easily convert their structured debt into standard debt: 72 entities have more than EUR10 million of negative mark to market.

[17]For this purpose, we assume no loan repayments by local governments, and a linear amortization schedule for these loans. Both these assumptions come from discussions with practitioners, who informed us that loan early repayments were extremely rare, and that the majority of the structured loans followed this type of profile.

[18]Dexia's first bailout did not stem from its local government operations, which remained solvent throughout the crisis, but from losses at its US subsidiary, the monoliner FSA, and from a large loan made to troubled DEPFA bank.

### 3.3 Complementary Datasets

We complement the previous structured loan data with five types of data: detailed accounting data, election results, mayor demographics, the list of floods in France, and GPS coordinates.[19] The accounting data, provided by the French Ministry of the Interior, include the highest level of detail possible for balance sheet and income statement, at an annual frequency for the period 2002-2012. This accounting data are under French government accounting standards. The dataset on election results, provided by the Center for Socio-Political Data (CDSP), include the votes obtained by each political party during French municipal elections going back up to 1983. The sample covers all municipalities with more than 9,000 inhabitants. The third complementary dataset includes information on age, gender, political affiliation, and professional occupation for all the mayors in France since 2001. These data are collected by the French Ministry of the Interior and constitute the *Registre National des Elus*. We collect the list of floods, by municipality, from the Ministerial Decrees on natural catastrophes in France.[20] Floods are the most frequent type of natural disaster in France. These data are cleanly matched with the other datasets using municipalities unique identifier, *INSEE code*. GPS coordinates for municipalities and Dexia branches allow us to calculate distances as the crow flies for the purpose of our instrumental variable analysis.

## 4 Hypotheses

We build on the theory of incentives, more specifically principal-agent models, to structure our empirical analysis of the political economy of financial innovation.

The principal-agent model (Jensen and Meckling, 1976) is one of the most influential frameworks in both economics and political science. Because voters' (the principal) and politicians' (the agent) interests do not necessarily align, agency costs frequently emerge in the political system. As the sovereign debt crisis in Europe illustrates, politicians may focus on getting re-elected at the expense of implementing sound budget decisions.

Agency problems are amplified in specific environments, for instance when agent actions are not observable by the principal, or when the cost of current decisions can be

[19] Dataset A being anonymized, we match these data to dataset B only.

[20] The complete list of floods is available at: http://macommune.prim.net/gaspar .

shifted in the future. The agent may also cater to the principal's short-term preferences. A financial innovation may be designed to fulfill these conditions.

Structured loans fit well into this theoretical framework because: (1) their flexible payoff profile allows for easily shifting economically large cash-flows in the future and/or in certain states of nature with relatively low probability (2) these transactions are undisclosed to voters.

We derive two sets of empirically testable predictions from the principal agent framework.

The first predictions relate to which politicians are more likely to implement these innovative financial transactions. First, the incentive to shift costs in the future/in certain states of nature should be higher for politicians from highly indebted entities, as the financial constraint is more likely to be currently binding and limit the politician's actions.[21] Second, the incentives for incumbents to implement such transactions should be higher when the coming elections are expected to be highly contested. Third, incumbent politicians should have higher incentives to implement structured loans prior to the election in order to benefit from the immediate budget relief that they provide during the election campaign.[22]

The second set of predictions cover the effects of implementing structured loans. First, implementing structured loans should help politicians achieve their goal: getting re-elected. Politicians who used structured loans should be more likely to stay in office, *ceteris paribus*. Second, when using structured loans, politicians should allocate the immediate cash flow from these transactions towards budget decisions that are attractive to voters, such as cutting tax.

The following two sections test empirically these two sets of predictions.

[21] Assuming voters do not understand or observe the transactions, politicians can also communicate on immediate budget improvements, which might be a salient topic.

[22] These transactions can have such an immediate effect as the budget relief they provide are typically accounted for at the beginning of the period, when projecting the annual budget.

# 5 Structured Loan Usage

## 5.1 Indebtedness and Structured Loan Usage

Panel A in Table 2 provides an initial overview of the popularity of structured loans by quartiles of indebtedness for the local governments in Dataset A. The panel shows unconditional statistics that suggest that highly indebted local governments use structured loans more frequently and to a larger extent. The economic magnitude is particularly large: local governments from the last quartile of indebtedness are more than twice as likely to implement structured loans, than entities from the first quartile of indebtedness.

[Insert Table 2 here]

We extend the analysis in Table 3 and run several probit regressions on the use of structured loans by local governments based on Dataset A. In column 1 (respectively 2), the explained variable is an indicator variable that is equal to one if the local government has some structured (respectively high-risk) products in its debt portfolio, and zero otherwise. Column 3 (respectively 4) corresponds to an OLS regression where the dependent variable is the share of structured (respectively high-risk) loans as a percentage of the local government total debt. For both these regressions, we restrict the sample to users of structured products (respectively users of high-risk structured products). For each specification, we include a large set of control variables: debt average maturity, population, lender fixed effects, territory characteristics (unemployment rate, share of agriculture, and industry in the active population), and local government type fixed effects (regions, counties, intercities, and cities).[23] We cluster standard errors by local government types, as for instance municipality and region budget structures differ. Finally, columns 5 and 6 replicate columns 1 and 2 on dataset B, and provide consistent results.

[Insert Table 3 here]

All these specifications confirm that a higher level of debt translates into a higher propensity for, and a larger magnitude of, structured loans usage. All coefficients on the

[23]Debt average maturity provides us with an important control, as structured loans require long-maturity debt (recall that these loans rely on an implicit sale of options). However, the results are robust when not including this control.

debt over population ratio are positive and highly statistically significant. These results are consistent with the existence of greater incentives for highly indebted local governments to shift the actual cost of debt to certain future states of nature, likely due to a closer monitoring of their debt. An alternative explanation for this empirical result would be that indebted local governments turn to structured loans as last-resort financing when other means of financing are unavailable to them. However, our data are inconsistent with this alternative hypothesis, as numerous highly indebted local governments only have standard loans; thus, a high level of indebtedness does not prevent from accessing standard financing.

To better identify a causal relationship between the level of indebtedness and the propensity to use local governments, we conduct two complementary analyses: we first instrument the level of debt by the occurrence of local floods, and we then implement a placebo analysis where we test the relationship between indebtedness and other types of borrowing instruments.

*Instrumenting Indebtedness with Floods*

An abundant literature uses natural disasters as a source of exogenous variation, for instance as a shock to school placement (Imberman et al., 2013), to personal spending (Morse, 2011).[24] We rely on this literature and focus on the most frequent type of natural disaster in France: floods. These catastrophes generate significant damages to local public infrastructures, which in turn generate costs to local governments. We therefore hypothesize that floods will be positively correlated with indebtedness. Floods, by their exogenous nature, should however be orthogonal to other potential drivers of structured loans usage, which ensures the absence of exclusion restriction violations. Floods are frequent enough in France to address concerns over statistical power and external validity: around one third of French municipalities witnessed at least one flood episode during the 2000-2010 decade.

We define as *affected*, municipalities that encountered at least one flood during the period 2002-2008.[25] We then regress debt per inhabitant on the dummy *Flood*, which takes value one if the municipality has had a flood during the period 2002-2008, and zero

[24]More recent studies use natural disasters to study salient risks (Dessaint and Matray, 2015) , or supplier-client networks (Barrot and Sauvagnat, 2015).

[25]This period corresponds to our financial accounting data, which is also when structured loans developed. 2008 is the year of the municipal elections.

otherwise. We control for county fixed effects, as some zones are more likely to be affected due to their geography.[26]

Column 1 in Table 4 shows that affected municipalities have on average more debt that non-affected ones, which is likely to come from the damages floods generate.[27]

Columns 2 and 3 display the results of the instrumental variable analysis. We find that an exogenous increase in indebtedness is associated with a higher likelihood of using structured loans. Coefficients in the second stage of the instrumental variable analysis are larger than in the simple probit from table 3, which suggests that potential sources of endogeneity are biasing against the positive correlation we document.

[Insert Table 4 here]

To rule out any mechanical effects driving our results, we also conduct a placebo analysis. We replicate columns 1 and 2 of Table 3 on dataset A, using indicator variable for using revolving loans, bonds, and floating rate loans as dependent variables. Results are presented in Table A3 of the appendix. We do not find any positive correlation between the level of indebtedness and the likelihood of using these other types of funding instruments. Our result on structured loan usage is therefore unlikely to come from a specification artifact.

## 5.2 Politically Contested Areas and Structured Loan Usage

We test whether local governments with a less established party were implementing more structured loan transactions than political strongholds. For all municipalities with more than 9,000 inhabitants, for which past elections results are available since 1983, we proxy political stability with three complementary measures: the number of years for which the party of the incumbent mayor has been in power before the 2001 election, the number of political swings during the period 1983-2001, and an indicator variable equal to one if the margin of victory was below 5% in the 2001 election.[28] We find empirical evidence consistent with the hypothesis that politicians from politically contested areas are more likely to implement structured loan transactions. Panel B in Table 2 illustrates unconditionally

[26] We therefore assume that within a given county, being hit by a flood during the 2002-2008 period is a random event.

[27] Local governments insurance contracts against natural disasters, when existent, can only be partial.

[28] These measures are therefore built with data preceding the development of structured loans.

how politicians from politically contested areas make a more frequent use of structured loans than the ones from political strongholds. We then conduct probit regressions on the use of structured loans, with the three different measures of political contestation as explanatory variables. We include the usual controls.

[Insert Table 5 here]

The results in Table 5 provide further supportive evidence for a positive effect of political contestation on the use of structured loans. The longer a political party has been uninterruptedly in power when the structured loan market develops, the less likely it is that its politicians use structured loan. The more political swings there has been in a given area before the development of the market, the more likely it is that structured loans will be used. When the preceding election is won by a tight margin, politicians are also more likely to implement these transactions. These findings provide robust evidence that politicians with challenging re-elections are more likely to enter into risky transactions. The rationale may be to implement a form of risk-shifting strategy, or to create a poison pill for the next government, because losses require several years to materialize. Conversely, politicians from a stronghold might have a longer and more stable horizon, and they might also internalize more the potential impact on the national party reputation.

## 5.3 Election Timing and Toxic Loan Usage

We use a difference-in-differences approach to test whether local governments engage more frequently in structured loans prior to an election than after. We compare a treatment group that includes counties, municipalities, and intercities that held elections at the end of 2008Q1, with a control group consisting of regions, whose elections were in 2004 and 2010, and public entities with no elections (e.g., hospitals and social housing managers).[29] The governing teams of the entities from the treatment group are chosen simultaneously following the same election cycle. Those from the control group are either chosen at a different time, or have management renewals according to idiosyncratic timing. Hospitals

[29]We cannot only use regions as a control group due to a small sample issue: there are only 22 regions in France.

and social housing managers are state-owned entities in France, with processes and statuses very similar to local governments: these entities fulfill public service while having a budget independent from the central state.[30] Both groups are typically covered by the same department in banks and consulting firms. Using panel conditional logit regressions in a difference-in-differences setup, we examine the likelihood of implementing a structured transaction in a given quarter before and after the election (for periods of 12 and 18 months before and after the election) for both groups, controlling for quarter fixed effects. The exact model specification is as follows:

$$\Pr(Transaction)_{i,t} = Q_t + \alpha_i + \beta \times I_{\{Treatment\ Group\ =\ 1\ \cap\ Pre\ Treatment\ =\ 1\}} + \varepsilon_{i,t}$$

where the dependent variable is the probability that local government $i$ conducts a transaction in quarter $t$, $Q_t$ are the time fixed effects for each quarter, $\alpha_i$ are individual fixed effects, and the $I_{\{Treatment\ Group\ =\ 1\ \cap\ Pre\ Treatment\ =\ 1\}}$ variable is an interaction term between a dummy variable that is equal to one if local government $i$ is in the treatment group and a dummy variable that is equal to one if quarter $t$ is before the election. The results are shown in Table 6.

[Insert Table 6 here]

When comparing to the control group with no elections in 2008, we observe that local governments in the treatment group are significantly more likely to implement structured transactions in the period preceding the election than in the period following it. The results are robust to the time window under consideration, and cannot be explained by a downward trend in the market, due to the identification strategy. We also conduct a placebo analysis in which we randomly select a sample of the same size as our initial treatment group and use it for the interaction term. The coefficients obtained are much lower in magnitude and not significantly different from zero, which is consistent with our previous result being driven by the election cycle. To further ensure robustness, we replicate both analyses in panel B, using OLS instead of conditional logit as a regression model. Results are unchanged.

[30] For instance, these entities have to follow public procurement regulation.

# 6 The Effects of Structured Loans

We explore the effects of using structured loans on both electoral outcomes and budget decisions by instrumenting the use of structured loans with the geographic distance to the closest Dexia branch.

## 6.1 Instrumental Variable Methodology

As described in the previous sections, the decision to enter into structured loan transactions is highly endogenous to variables that are likely to affect both electoral outcomes and budget decisions, such as the level of indebtedness or how politically contested the area is. Adequately measuring the effects of using structured loans therefore calls again for an instrumental variable analysis, to control for both observed variables that are jointly determined with structured loan usage and unobserved variables. We instrument the propensity to use structured loans with the geographic distance of the local government to the closest Dexia branch, as the crow flies. Geographic distance is established as an important determinant of lending activity (Degryse and Ongena, 2005). More specifically, Bharath et al. (2011) also instrument lending relationship with distance. Exclusion restriction is unlikely to be violated as Dexia branches opened decades before the beginning of the structured loan market, with no recent change to their geographic position. The list of Dexia branches is provided in the appendix, and roughly corresponds to the list of French region capitals.[31] Geography is largely exogenous in nature, and the distance to Dexia branches is unlikely to impact political outcomes or budget decisions other than through the use of structured loans. We start by testing whether distance to Dexia branches is correlated with structured loan usage. This first stage represents a test of whether the previously documented effect of distance on lending also holds for structured loans. We regress with a probit model the propensity to use structured loans on the distance to the closest Dexia branch, controlling for the main determinants of structured loan usage, such as population and indebtedness. Controlling for population in the first stage of the IV analysis is important as Dexia branches are typically located in the largest city of the region. Since the dependent variable in the first stage is a binary variable, we

[31] Prior to 1996, Dexia was known in France as Crédit Local de France (1987-1996) and as Caisse d'Aide à l'Equipement des Collectivités Locales (1966-1987), which were government-owned banks dedicated to the financing of local governments.

follow the same methodology as in Faulkender and Petersen (2006).[32] Results are shown in columns 1 and 2 of Table 7. The negative relationship between distance to branch and propensity to implement structured loans appear both statistically significant and robust to a battery of controls.

[Insert Table 7 here]

## 6.2 Effects on Election Outcome

Using the instrument described in the previous subsection, we can now test whether using structured loans indeed helps local politicians get re-elected. We run the following regression:

$$Pr(Reelection) = \alpha + \beta * I_{StructuredLoan(Instrumented)} + \gamma * X_i + \epsilon_i \quad (1)$$

where *Reelection* is an indicator variable for having the same political party stay in power after the 2008 municipal election, $I_{StructuredLoan(Instrumented)}$ is the instrumented variable obtained in the first stage, and $X_i$ is a set of controls. Columns 3 and 4 of Table 7 present the results. We observe that an exogenous increase in the propensity of using structured loans leads to an increase in the likelihood of having the same party re-elected. The coefficient on the instrumented dummy variable for structured loan usage is positive and statistically significant. This result is robust to a battery of controls, and represents evidence consistent with structured loans helping politicians get re-elected in the short-run.[33] For comparison purpose, column 5 provides us with the standard probit specification, in which the use of structured loan is not instrumented. We observe that the coefficient is also positive but not significant. This coefficient is therefore consistent with sources of endogeneity weakening the effects of using structured loans on re-election, as their use is typically more frequent in situations more difficult for politicians, for instance when debt is high.

[32] Wooldridge (2002) shows that this approach yields consistent coefficients and correct standard errors.

[33] However, the observation of no effects would not have ruled out the ex ante motives we document in the previous sections.

## 6.3 Effects on Budget Decisions: Identifying the Channel

Another test made possible by the use of the instrumental variable analysis is to assess whether using structured loans has an impact on budget decisions, more specifically on taxes and on investment. As structured loans provide immediate savings, we specifically test two hypotheses regarding the allocation of these cash flows: whether their usage allowed politicians to decrease local taxes and/or increase investments in equipment. We restrict our sample to municipalities to maximize comparability. We run an OLS regression with the following difference specification, which implicitly controls for local government fixed effects:

$$\Delta_{2002-2007}(Y) = \alpha + \beta * I_{StructuredLoan(Instrumented)} + \gamma * X_i + \epsilon_i \quad (2)$$

where Y is the yearly local tax per inhabitant in columns 1 and 2 of Table 8, and investment in equipment per inhabitant in columns 3 and 4. $\Delta_{2002-2007}$ corresponds to the difference between the beginning to the end of the political mandate for municipalities. When using the variation in tax per inhabitant as the left hand side variable, we find that the coefficient on the indicator variable for structured loan use is negative and statistically significant. This result suggests that politicians have been using the short term savings provided by structured loans to relatively decrease the amount of tax per inhabitant.[34] This action is consistent with politicians seeking re-election by catering to taxpayers' preference for low taxes, which represents a likely channel for the previous result on effects on re-election. When regressing the variation in equipment expenditures over the course of the political mandate on the instrumented indicator variable for structured loan use, we find that the coefficient is negative and statistically significant. If anything, these results rule out the hypothesis that structured loans boost local government investments by relaxing the budget constraint.

[Insert Table 8 here]

[34] As the amount of tax per inhabitant is structurally increasing during the period, this coefficient means that local governments using structured loans have increased less their tax over the period.

# 7 Alternative Hypotheses

In this section, we consider two complementary non mutually-exclusive hypotheses for explaining politicians' implementations of structured loans: a lack of financial literacy and a hedging motive. In addition, we analyze a potential amplifier of the phenomenon: coordination between politicians.

## 7.1 Financial Literacy

In this subsection, we consider the hypothesis that the structured loan market developed due to the exploitation by banks of a lack of financial sophistication from local government politicians.[35] We have two stylized facts that are hard to reconcile with this view: politicians whose profession requires higher education are more inclined to use structured loans than politicians from less educated backgrounds, and this effect is even stronger for high-risk structured loans. Larger cities, which have access to more resources such as financial consultants, are more likely to use both structured and high-risk structured loans than smaller cities.

Local politicians have been vocal *ex post* both in the media and in French Congress about their lack of understanding of the risks embedded in the structured loan transactions they implemented. For instance, in his testimony before the French Congress' committee on structured loans, the deputy mayor of the city of Saint Etienne, who originally decided to take on some structured loans, stated that *"[he] was not able to read the information [he] received because [he was] not a financial expert"*. To assess the role of financial sophistication on the use of structured debt, we estimate probit models where the dependent variable takes a value of one if the local government made use of structured debt during our sample period on proxies for financial sophistication.[36] As politicians in larger local governments are likely to benefit from more resources and support from specialized staff and advisors, we use a series of dummy variables for several size brackets as controls. We use mayor's current or former occupation, age on election date, and education level as explanatory variables. These variables are known to be correlated with financial sophistication (Lusardi and Mitchell, 2011). We therefore compare

[35] Although some of the debt management can be delegated to a civil servant, important decisions such as loan issuances typically requires a signature from the highest ranked elected representative.

[36] For this purpose, we merge the national registry of mayors with Dataset B on Dexia's client portfolio.

municipalities of the same size, but with mayors of different background. We first report in Figure 2 the regression coefficients, along with 95% confidence intervals, for the different occupations fixed effects. The results suggest that mayors from more educated backgrounds are more likely to use structured loans than the others. The six occupations that are associated with the highest point estimates are, in decreasing order, senior civil servants (*haut-fonctionnaires*), politicians, executives, regulated profession (doctors, lawyers), engineers, and A-level civil servants.[37]

[Insert Figure 2 here]

Table 9 provides coefficients for probit regressions where the dependent variable is an indicator variable for the use of structured loans in columns 1, 3 and 5, and for the use of high-risk structured loans in columns 2, 4 and 6. We observe that the likelihood to use structured loans significantly increases with local government size, and decreases with mayor age.[38] When restricting the sample to mayors who are public servants, for whom we can precisely infer their education level, we find that more educated mayors are more likely to have implemented structured transactions. Overall, these results are hard to reconcile with the picture drawn by the local politicians themselves.

[Insert Table 9 here]

## 7.2 Hedging

One may wonder whether structured loans have been used as hedging devices. From a theoretical perspective, it appears unlikely that structured loans are used for hedging purposes. Indeed, as shown in Section 2, the payoffs of structured products are typically nonlinear and convex because of the embedded sale of out-of-the-money options. Therefore, to hedge through these instruments, a local government needs to have operational cash flows that present a strong surplus during tail events for the structured loan underlying indices, such as EURUSD or the slope of the interest rate curve, which seems unlikely. To further rule out this alternative explanation, we examine the correlation

[37] A-level civil servants are defined as roles for which a college degree is required to apply, B-level civil servants are defined as roles for which a high school diploma is required to apply, and C-level civil servants are defined as role for which no degree is required.

[38] The average mayor's age is 54 years old.

between French local government revenues and the main indices that are used in structured products: Euribor 3 months, CMS 10Y - CMS 2Y, EURCHF, and EURUSD. Our analysis is based on all French regions, French counties, and the 100 largest cities, and it covers the 1999-2010 period. Overall, we find little to no correlation between revenues and financial indices (results are available in Table A2 in the appendix). We also run a pooled regression of the change in operating revenues for all local governments on the change in the financial indices used to structure the loans while controlling for inflation. The estimated parameters that are associated with the financial indices also remain insignificant. We also perform similar regressions at the local government level and again find no significant results. This additional analysis suggests that structured debt is unlikely to serve as a hedging device for local governments. This conclusion is consistent with empirical evidence of corporations using so-called hedging policies to make directional bets (Baker et al., 2005).

## 7.3 Coordination between Politicians

Coordination between local government politicians might amplify the adoption of innovative financial instruments, all the more so as local government members and civil servants belong to strong local and political networks, and as structured transactions typically remain private. We find empirical evidence suggestive of coordination, namely geographic local correlation on the adoption of the innovative products we study, which may come from collective moral hazard, herding, or local shocks. To obtain a sense of the geographic spread of structured debt among French local governments, Figure 3 displays an activity map for the second quarters of four consecutive years (2004-2007). Structured loan usage exhibits geographic clustering.

[Insert Figure 3 here]

To cleanly identify this local correlation, we implement a panel data specification that controls for individual fixed effects. We construct an explanatory variable that is equal to the number of active local governments from the same geographical zone (county level). An active local government is defined as a local government that entered into at least one structured transaction in the previous quarter (or the previous two quarters). We again use a panel conditional logit model to estimate the effect of the number of

active neighbors of a local government on its likelihood of entering into a similar trade in the current period. We also run a panel OLS regression to explain how large the new transactions are. The model specification is as follows:

$$\Pr(Transaction)_{i,t} = Q_t + \alpha_i + \sum_{k \in J(i)} I_{k,t-1,\{Active\,=\,1\}} + \varepsilon_{i,t}$$

where the explained variable is the probability that local government $i$ conducts a transaction in quarter $t$, $Q_t$ are quarterly fixed effects, $\alpha_i$ are individual fixed effects, $J(i)$ is the set of local governments from the same county as local government $i$, and the $I_{k,t-1,\{Active\,=\,1\}}$ variable is a dummy that is equal to one if local government $k$ was active in quarter $t-1$. In the OLS specification, the left-hand-side variable is replaced by the aggregated notional amount of transactions implemented by local government $i$ in quarter $t$. Table 10 displays the conditional logit and OLS regression coefficients. The coefficients on the number of active local governments is positive and statistically significant in all specifications. The likelihood and the extent to which a local government enters into structured debt transactions appears therefore to increase with the number of active neighbors in the previous period. This result cannot be caused by a time trend, as we use quarter fixed effects. This effect shows relatively low persistence, as the estimated coefficients decrease when we consider two quarters.

[Insert Table 10 here]

There are three main possible explanations for this evidence of coordination. The first one is that politicians coordinate to decrease their reputation costs in case the transactions go wrong (Scharfstein and Stein, 1990), or to increase the likelihood of a bail-out by the central government, which would represent a form of collective moral hazard, as rationalized in Farhi and Tirole (2012). Second, the local correlation can also stem from a purely behavioral herding, where politicians are intrigued or reassured by other politicians following the same strategy. A final explanation for this correlation in borrowing choices would be the existence of regional shocks on the supply side. However, as Dexia covered the entire French territory before the inception of the structured debt market, this finding cannot be driven by new branch openings. The arrival of a highly convincing salesperson in a given region might also create such local shock, although this appears unlikely to drive our results over the whole French territory.

# 8 Conclusion

In this paper, we present an empirical investigation of the role of political incentives in the use of innovative financial products. Although politicians often argue *ex post* that they did not have sufficient information or understanding of the risks involved by innovative financial transactions, we show in this paper that local governments make a strategic use of such products through their debt management. We find that most local governments use structured loans and that these types of loans account for a surprisingly high 20% of their total outstanding debt. While the cross-section of their usage is hard to reconcile with a lack of financial sophistication from users, we find that such loans are utilized significantly more frequently within local governments that are highly indebted, which is consistent with their greater incentives to hide the actual cost of debt. Incumbent politicians from politically contested areas are more likely to use structured debts, and transactions are more frequent before elections than after elections. Using clean identification, we finally show that using structured loans helps politicians get re-elected by offering lower local tax to their voters.

During the subprime crisis, securitization facilitated a political agenda of easy access to home ownership. Similarly, we show that financial institutions have innovated to design financial securities that are aligned with the political incentives of local government elected representatives. Our results convey potential regulatory implications. Rather than banning structured loans, we suggest imposing strict public disclosure requirements on transactions by local governments to increase reputation risk and facilitate monitoring by voters, which has been proven to be efficient (Ferraz and Finan, 2008). Furthermore, changing public accounting standards to account for mark-to-market losses and gains should curb the incentives at play by increasing transparency, as observed in comparable markets (Jenter et al., 2011). Such changes would limit the use of structured loans while maintaining the autonomy of local governments in terms of financial decisions. However, the greatest risk of structured loans likely lies in outstanding transactions and the accompanying non-realized losses. The recent bailout answers only partially to this challenge.

# References


Amromin, G., J. Huang, C. Sialm, and E. Zhong (2013). Complex Mortgages. *Working Paper*.

Aneja, A., M. Moszoro, and P. T. Spiller (2015). Political Bonds: Political Hazards and the Choice of Municipal Financing Instruments. *NBER Working Paper*.

Ang, A., R. Green, and Y. Xing (2014). Advance Refundings of Municipal Bonds. *Working Paper*.

Baker, M., R. S. Ruback, and J. Wurgler (2005). Behavioral Corporate Finance: A Survey. In *Handbook in Corporate Finance: Empirical Corporate Finance* (Elsevier ed.).

Barrot, J.-N. and J. Sauvagnat (2015). Input Specificity and the Propagation of Idiosyncratic Shocks in Production Networks. *Working Paper*.

Becker, B. and V. Ivashina (2014). Reaching for Yield in the Bond Market. *Journal of Finance, Forthcoming*.

Behn, M., R. Haselmann, T. Kick, and V. Vig (2014). The Political Economy of Bank Bailouts. *Working Paper*.

Bertrand, M., F. Kramarz, A. Schoar, and D. Thesmar (2007). Politicians, Firms and the Political Business Cycle: Evidence from France. *Working Paper*.

Besley, T. and A. Case (1995). Does Electoral Accountability Affect Economic Policy Choices? Evidence from Gubernatorial Term Limits. *Quarterly Journal of Economics*, 769–798.

Bharath, S., S. Dahiya, A. Saunders, and A. Srinivasan (2011). Lending Relationships and Loan Contract Terms. *Review of Financial Studies 24*(4), 1141–1203.

Butler, A., L. Fauver, and S. Mortal (2009). Corruption, Political Connections, and Municipal Finance. *Review of Financial Studies 22*(7), 2873–2905.

Célérier, C. and B. Vallée (2014). The Motives for Financial Complexity: An Empirical Investigation. *HBS Working Paper*.

Degryse, H. and S. Ongena (2005). Distance, Lending Relationships, and Competition. *Journal of Finance LX*, 231–266.

Dessaint, O. and A. Matray (2015). Do Managers Overreact to Salient Risks? Evidence from Hurricane Strikes. *Working Paper*.

Dinc, S. (2005). Politicians and Banks: Political Influences on Government-Owned Banks in Emerging Markets. *Journal of Financial Economics 77*(2), 453–479.

Farhi, E. and J. Tirole (2012). Collective Moral Hazard, Maturity Mismatch, and Systemic Bailouts. *American Economic Review 102*(1), 60–93.

Faulkender, M. and M. Petersen (2006). Does the Source of Capital Affect Capital Structure? *Review of Financial Studies 19*(1), 45–79.

Ferraz, C. and F. Finan (2008). Exposing Corrupt Politicians: The Effects of Brazil's Publicly Released Audits on Electoral Outcomes. *Quarterly Journal of Economics 123*(2), 703–745.

Gennaioli, N., A. Shleifer, and R. Vishny (2012). Neglected Risks, Financial Innovation, and Financial Fragility. *Journal of Financial Economics 104*(3), 452–468.

Halling, M., P. Pichler, and A. Stomper (2014). The Politics of Related Lending. *Journal of Financial and Quantitative Analysis, Forthcoming*.

Imberman, S., A. Kugler, and B. Sacerdote (2013). Katrina's Children: Evidence on the Structure of Peer Effects from Hurricane Evacuees. *57*(3), 415–426.

Jensen, M. C. and W. H. Meckling (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics 3*(4), 305–360.

Jenter, D., K. Lewellen, and J. Warner (2011). Security Issue Timing: What Do Managers Know, And When Do They Know It? *Journal of Finance LXVI*(2), 413–443.

Julio, B. and Y. Yook (2012). Political Uncertainty and Corporate Investment Cycles. *Journal of Finance LXVII*(1), 45–83.

Lusardi, A. and O. S. Mitchell (2011). Financial Literacy around the World: An Overview. *Journal of Pension Economics and Finance 10*(4), 497–508.

Morse, A. (2011). Payday lenders: Heroes or villains? *Journal of Financial Economics 102*(1), 28–44.

Novy-Marx, R. and J. Rauh (2011). Public Pension Promises: How Big Are They and What Are They Worth? *Journal of Finance LXVI*(4), 1211–1249.

Rajan, R. G. (2006). Has Finance Made the World Riskier? *European Financial Management 12*(4), 499–533.

Rajan, R. G. (2010). *Fault lines: How hidden fractures still threaten the world economy*. Princeton Press.

Scharfstein, D. and J. Stein (1990). Herd Behavior and Investment. *American Economic Review* (June), 465–479.

Shiller, R. J. (2013). *Finance and the good society*. Princeton Press.

Simsek, A. (2013). Speculation and Risk Sharing with New Financial Assets. *Quarterly Journal of Economics 128*(3), 1365–1396.

Wooldridge, J. M. (2002). *Econometric analysis of cross section and panel data*. MIT Press.

Zingales, L. (2015). Does Finance Benefit Society? *Journal of Finance, Forthcoming*.

# 9 Figures

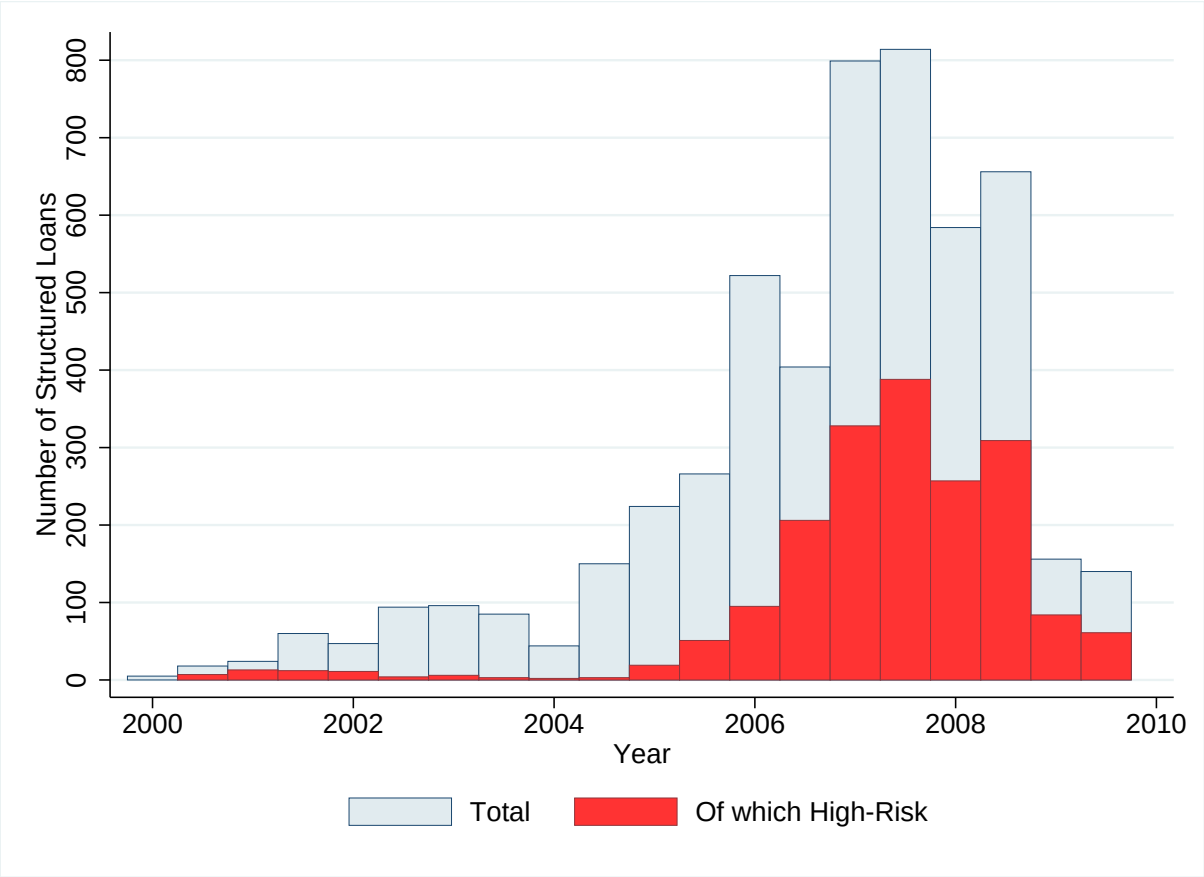


Figure 1: Number of Structured Debt Transactions per Quarter

Note: This figure displays the number of structured loans initiated during a given quarter by local governments in France for the 2000-2009 period. The data are obtained from Dexia's client portfolio (Dataset B). High-risk structured loans includes structured loans indexed to the slope of the interest curve and to foreign exchange rates.

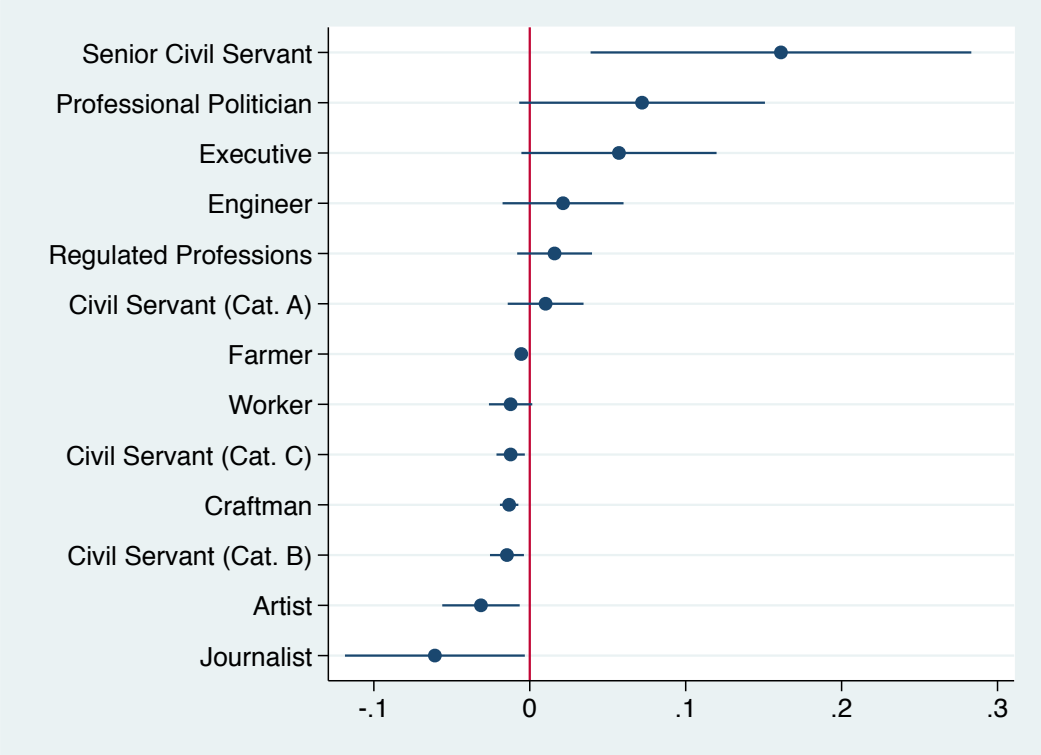


Figure 2: Occupation Fixed Effect

Note: This figure displays the estimated coefficients on mayor occupation title fixed effects from a probit regression of using structured loans on local government characteristics and elected mayor demographic variables. The data are from dataset B merged with data provided by the French Ministry of the Interior. The sample is restricted to municipalities. Dots represent the coefficients, and lines the 95% confidence interval, using standard errors clustered at the county level.

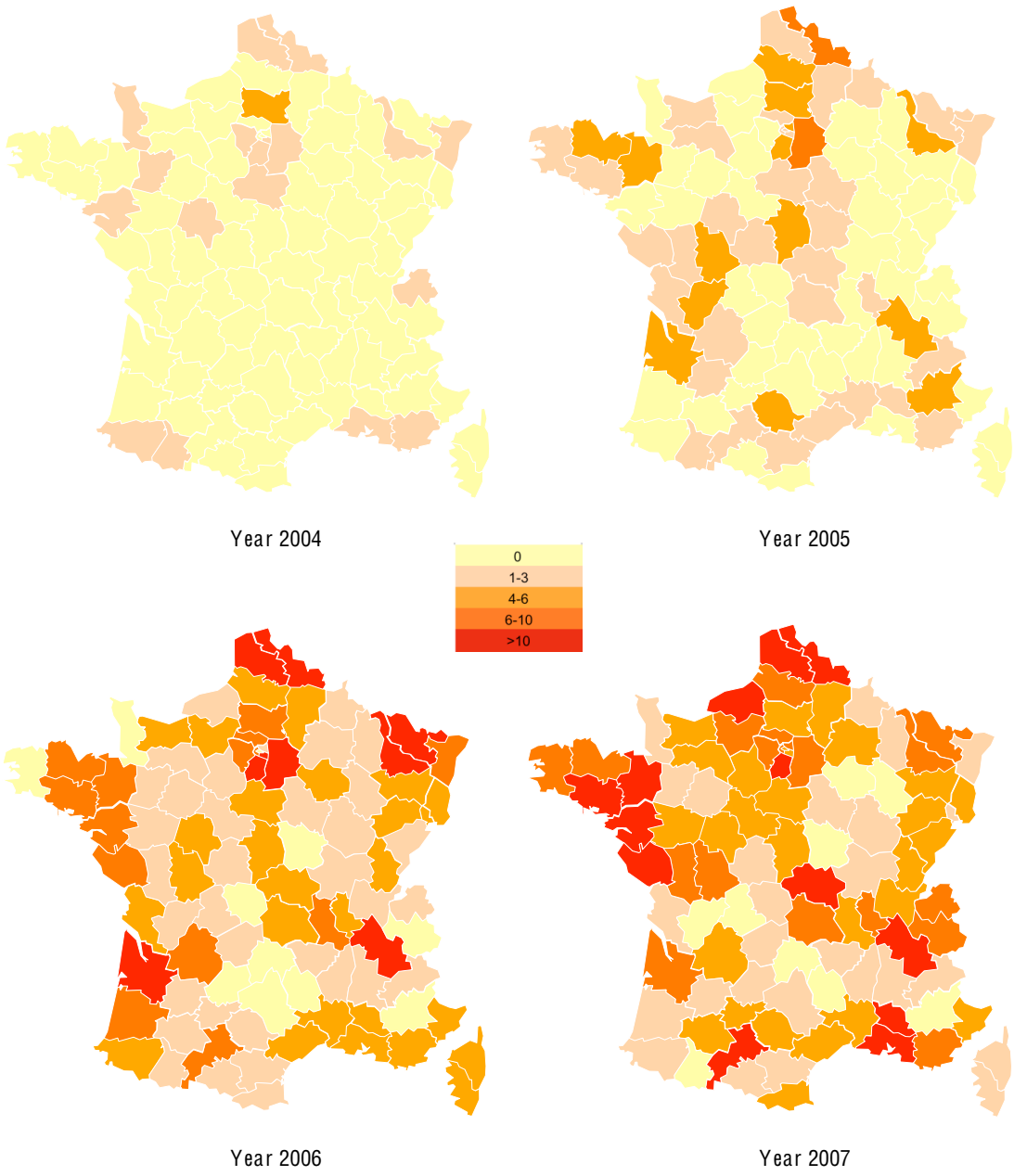


Figure 3: Geographical Evolution of Structured Debt Activity

Note: This figure displays the number of active local governments, which are defined as those that have implemented at least one structured debt transaction in the second quarter of the displayed years (from 2004 to 2007). Q2 is the period in which the recently voted budget is financed. Map division is at the French county level. The data are obtained from Dexia's client portfolio (Dataset B).

# 10 Tables

Table 1: Debt Profile of Local Governments

| | | | | Amount | | % Total Debt | |
|---|---|---|---|---|---|---|---|
| (in Million Euros) | N | Aggregate | % Use | Mean | Max | Mean | Max |
| **Dataset A: Local Government Debt Portfolios** | | | | | | | |
| Total Debt | 293 | 51,994.7 | 95.6% | 177.5 | 1,850.5 | - | - |
| Standard Loans and Bonds | 293 | 34,611.5 | 94.9% | 118.1 | 1,265.6 | 66.6% | 100% |
| Revolving Facilities | 293 | 6,953.2 | 58.4% | 23.7 | 646.2 | 13.4% | 100% |
| Structured Loans | 293 | 10,429.9 | 72.4% | 35.6 | 648.3 | 20.1% | 95.5% |
| *High-Risk Str. Loans* | 293 | 4,372.0 | 43.0% | 14.9 | 509.9 | 8.4% | 71.7% |
| **Dataset B: Loan Level Data on Structured Loans** | | | | | | | |
| Total Debt | 1,579 | 33,423.1 | 100.0% | 21.2 | 1,870.50 | - | - |
| Structured Loans | 2,742 | 23,680.0 | 100.0% | 8.6 | 459.3 | 49.7% | - |
| *High-Risk Str. Loans* | 2,742 | 13,462.0 | 42.7% | 4.9 | 459.3 | 28.3% | - |
| Negative MtM | 2,742 | 3,884.1 | 99.1% | 1.4 | 147.4 | 8.1% | - |
| # Structured Loans | 2,742 | - | - | 1.9 | 20 | - | - |

Note: This table contains summary statistics on debt profile for two samples of French local governments. All debt figures are expressed in millions of euros. Dataset A is obtained from a survey conducted by a specialized consulting firm as of December 31, 2007, and includes 25 regions, 96 counties, 76 intercities, and 96 municipalities. Dataset B is obtained from Dexia and covers the entire client portfolio of this bank as of December 31, 2009. Including overseas territories, France is divided into 27 regions, 100 departments, and 36,700 municipalities. Each of these divisions possesses a governing body that is elected by its population. Cities are defined as municipalities with a population exceeding 10,000 inhabitants. France contains a total of 950 cities. Intercities are associations of cities and surrounding municipalities that share some common expenses, such as transport or sports equipment. The mayors of the associated municipalities elect the president of the intercity. The sample aggregated total debt represents 38% of all-local-government aggregated total debt. Source: *Conseil des Communes et Regions d'Europe* (2007).

Table 2: Structured Loan Usage and Political Incentives

| | **Debt Hiding Incentives (A)** | | | | | **Political Stability (B)** | | |
|---|---|---|---|---|---|---|---|---|
| | First Quartile In-debted | Second Quartile In-debted | Third Quartile In-debted | Last Quartile In-debted | Test | Stronghold | Non-Strong. | Test |
| *% of use* | | | | | | | | |
| Structured | 41.00% | 82.19% | 81.67% | 89.60% | *** | 20.64% | 24.52% | *** |
| High-Risk Structured | 19.30% | 52.05% | 50.00% | 54.50% | *** | 9.11% | 9.64% | |
| *Share of Debt* | | | | | | | | |
| Structured | 14.50% | 18.03% | 20.84% | 26.30% | *** | 4.25% | 5.42% | *** |
| High-Risk Structured | 5.10% | 7.08% | 7.51% | 9.90% | ** | 2.28% | 2.42% | |
| Observations | 83 | 73 | 60 | 77 | | 2,678 | 3,626 | |

Note: This table contains summary statistics regarding the frequency and the extent of structured and toxic loan usage for sub-samples of the local government survey data (Panels A and B) as well as for Dexia's client portfolio (Panel C). In Panel A, the local governments are ranked into quartile of indebtedness, calculated as total debt / population. In Panel B, the stronghold sample includes municipalities that had been ruled by the same party for more than 12 years in 2001, whereas the non-stronghold sample includes municipalities that had been ruled by the same party for fewer than 12 years in 2001. % of use: Structured (% of use: High-Risk Structured) denotes the percentage of local governments in the sub-sample that have at least one structured (high-risk structured) loan in their debt. Share of Debt: Structured is the mean value of structured debt over total debt, whereas Share of Debt: High-Risk Structured is the mean value of high-risk structured debt over total debt. The Test columns display the level of statistical significance of a t-test between the mean values of the right column minus the left column. *, **, and *** represent statistical significance at the 10%, 5%, and 1% confidence levels, respectively.

Table 3: Indebtedness and Structured Loan Usage

| | **Dataset A** | | | | **Dataset B** | |
|---|---|---|---|---|---|---|
| | Probit | | Magnitude | | Probit | |
| | Structured | High-Risk | Structured | High-Risk | Structured | High-Risk |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Debt/Population | 2.081*** | 0.679*** | 4.640** | -0.011 | 0.334*** | 0.243*** |
| | 4.29 | 7.53 | 3.48 | -1.34 | 4.07 | 4.23 |
| Equipment Expenditure/Pop. | -0.004*** | -0.001* | -0.005 | -0.000 | 0.000*** | 0.000 |
| | -3.71 | -1.67 | -0.86 | -2.35 | 3.57 | 0.61 |
| Wages/Operating Expenditure | 3.809*** | 0.965 | -25.936 | -0.063** | 0.066 | 0.928 |
| | 5.51 | 0.94 | -1.05 | -4.39 | 0.11 | 0.89 |
| Log (Population) | 0.070*** | 0.085*** | 0.875** | 0.001 | 1.510*** | 1.547*** |
| | 3.56 | 8.13 | 4.76 | 1.22 | 29.09 | 20.39 |
| Debt Average Maturity | 0.075*** | 0.057*** | 1.577** | 0.011** | - | - |
| | 2.99 | 3.05 | 3.58 | 5.18 | | |
| Lender Relationship FE | Yes | Yes | Yes | Yes | - | - |
| Local Government Type FE | Yes | Yes | Yes | Yes | Yes | Yes |
| County FE | - | - | - | - | Yes | Yes |
| Pseudo R2 / R2 | 0.304 | 0.181 | 0.247 | 0.469 | 0.436 | 0.445 |
| Number of Observations | 275 | 275 | 204 | 121 | 25,023 | 22,701 |

Note: This table contains the probit and OLS regression coefficients using debt portfolio data from a sample of local governments (Dataset A) for columns 1 to 4, and data from Dexia's client portfolio (Dataset B) for columns 5 and 6. The dependent variable is a dummy variable for the use of structured products for columns 1 and 5, and a dummy variable for the use of high-risk structured loans (as defined in section 2) for columns 2 and 6. For columns 3 and 4, the dependent variable is equal to the ratio of structured debt over total debt, and high-risk structured debt over total debt. For these columns, the sample is restricted to respectively structured and high-risk structured loan users. Standard errors of the coefficients are clustered by types of local governments, and z/t-statistics are reported in brackets. *, **, and *** represent statistical significance at the 10%, 5%, and 1% confidence levels, respectively.

Table 4: Indebtedness and Structured Loan Usage: IV analysis

| | **Dataset B** | | |
|---|---|---|---|
| | Debt/Population | Probit | |
| | First Stage | Structured | High-Risk |
| | (1) | (2) | (3) |
| Affected (Floods) | 0.134** | | |
| | 2.21 | | |
| Debt/Population | | 1.791*** | 2.151** |
| | | 2.90 | 2.22 |
| Equipment Expenditure/Pop. | 0.002 | -0.003*** | -0.003** |
| | 1.52 | -2.30 | -1.78 |
| Wages/Operating Expenditure | -0.668* | 3.042*** | 3.254*** |
| | -1.96 | 5.81 | 3.61 |
| Population Category FE | Yes | Yes | Yes |
| County FE | Yes | Yes | Yes |
| Pseudo R2 / R2 | 0.026 | 0.357 | 0.350 |
| Number of Observations | 32,699 | 33,739 | 31,151 |

Note: This table contains coefficients for an instrumental variable analysis. Column 1 presents the OLS coefficients of the first stage, using floods as an instrument for indebtedness. The floods indicator variable is equal to 1 if the municipality witnessed floods between 2002 and 2008. Columns 2 and 3 display the coefficients of the second stage of the IV analysis, where the dependent variable is a indicator variable for having implemented structured loans during the 2002-2008 period in column 2, and an indicator variable for having implemented high-risk structured loans (as defined in section 2) during the 2002-2008 period in column 3. Indebtedness is instrumented as per the first stage. Sample is restricted to municipalities. Standard errors of the coefficients are clustered at the county level, and z/t-statistics are reported in brackets. *, **, and *** represent statistical significance at the 10%, 5%, and 1% confidence levels, respectively.

Table 5: Politically Contested Areas

| | **Dataset B** | | |
|---|---|---|---|
| | Structured Loan User | | |
| | (1) | (2) | (3) |
| Years in Power | -0.022* | | |
| | -1.74 | | |
| # Swings | | 0.244* | |
| | | 1.88 | |
| Close 2001 Election | | | 0.682* |
| | | | 1.96 |
| Equipment Spending / Population | 0.002 | 0.002 | 0.002 |
| | 1.18 | 1.25 | 1.27 |
| Wage / Operation Expenditure | -0.986 | -0.906 | -1.297 |
| | -0.62 | -0.57 | -0.80 |
| Log(Population) | 0.440*** | 0.439*** | 0.441*** |
| | 2.72 | 2.72 | 2.84 |
| Observations | 528 | 528 | 528 |
| Pseudo $R^2$ | 0.072 | 0.073 | 0.075 |

Note: This table contains probit regression coefficients using data from Dexia's client portfolio (Dataset B). The dependent variable is a dummy variable for the use of structured product. $Yearsinpower$ refers to the number of years during which the political party of the incumbent (as of year 2001) has been managing the local government. $\#Swings$ is the number of changes in political color during the period 1983-2001. $Close2001Election$ is an indicator variable equal to one if the margin of victory was below 5% in the 2001 election. Sample is restricted to municipalities with more than 9,000 inhabitants. Standard errors of the coefficients are clustered by types of local governments, and z/t-statistics are reported in brackets. *, **, and *** represent statistical significance at the 10%, 5%, and 1% confidence levels, respectively.

Table 6: Difference-in-Differences Estimation of Election Timing Effects

**Panel A**

| | C-logit Structured Trade | | Placebo C-logit | |
|---|---|---|---|---|
| | +\- 18 months | + \- 12 months | + \- 18 months | + \- 12 months |
| | (1) | (2) | (3) | (4) |
| Pre-Election*Treatment | 0.3522*** | 0.3350*** | 0.0262 | 0.0275 |
| | 2.88 | 3.28 | 0.10 | 0.07 |
| Quarter Fixed Effects | Yes | Yes | Yes | Yes |
| Regression Type | Panel | Panel | Panel | Panel |
| R2 / Pseudo R2 | 0.0815 | 0.0545 | 0.0534 | 0.0805 |
| Number of Periods | 12 | 8 | 12 | 8 |
| Observations | 32,892 | 21,928 | 32,892 | 21,928 |

**Panel B**

| | OLS Structured Trade | | Placebo OLS | |
|---|---|---|---|---|
| | +\- 18 months | + \- 12 months | + \- 18 months | + \- 12 months |
| | (1) | (2) | (3) | (4) |
| Pre-Election*Treatment | 0.0218* | 0.0280** | 0.0010 | 0.0001 |
| | 2.03 | 2.77 | 0.00 | 0.01 |
| Quarter Fixed Effects | Yes | Yes | Yes | Yes |
| Regression Type | Panel | Panel | Panel | Panel |
| R2 / Pseudo R2 | 0.0961 | 0.1240 | 0.096 | 0.124 |
| Number of Periods | 12 | 8 | 12 | 8 |
| Observations | 32,892 | 21,928 | 32,892 | 21,928 |

Note: Panel A of this table contains the conditional logit (C-logit) regression coefficients that are estimated using data from Dexia's client portfolio (Dataset B). The dependent variable is an indicator variable of a structured trade for a given local government in a given quarter. In columns 1 and 2, the explanatory variable is an interaction variable between a dummy for the treatment group (local governments having an election at the end of 2008Q1) and a dummy for the pre-election period. Columns 3 and 4 present a placebo analysis in which the treatment group dummy that is used in the interaction term has been replaced by a dummy on a random sample of similar size; the regressions include individual public entity fixed effects. Panel B replicates Panel A using OLS regressions. Standard errors are clustered by type of public entity. Z-statistics are reported into brackets. The time window is 18 months before and after the election (the end of March 2008) for columns 1 and 3, and the window is 12 months for columns 2 and 4. Standard errors are clustered at the local government level. *, **, and *** represent statistical significance at the 10%, 5%, and 1% confidence levels, respectively.

Table 7: Political Effects of Structured Loan Usage: IV Analysis

| | Structured Loan Usage | | Reelection | | |
|---|---|---|---|---|---|
| | First Stage | | IV | | Probit |
| | (1) | (2) | (3) | (4) | (5) |
| Distance to Dexia Branch | -0.007*** | -0.002** | | | |
| | -3.832 | -2.175 | | | |
| Use of Structured Loan Indicator | | | 3.433** | 1.634*** | 0.032 |
| | | | 2.091 | 2.965 | 0.475 |
| Debt per Inhabitant | | 0.141*** | | -0.007 | 0.012 |
| | | 4.226 | | -1.034 | 1.514 |
| Dexia Branch FE | Yes | Yes | Yes | Yes | Yes |
| Political Party FE | - | Yes | - | Yes | Yes |
| Mayor Profession FE | - | Yes | - | Yes | Yes |
| Population Category FE | - | Yes | - | Yes | Yes |
| Pseudo R2 | 0.092 | 0.363 | 0.017 | 0.108 | 0.107 |
| N | 34,231 | 25,190 | 26,319 | 24,420 | 24,728 |

Note: This table contains the coefficients for an instrumental variable analysis, using distance to the closest Dexia branch as an instrument for structured loan usage. Columns 1 and 2 present probit coefficients for the first stage, where the dependent variable is an indicator variable equal to one if the local government has borrowed with a structured loan between 2002 and 2007. Columns 3 and 4 display the coefficient of the second stage, where the dependent variable is a dummy equal to one if voters elect in 2008 a politician from the same party as the one elected in 2002, and the indicator variable for structured loan usage is instrumented as per the first stage. Column 5 shows the coefficient of a simple probit regression, with no instrumental analysis. Sample is restricted to municipalities. Standard errors are clustered at the Dexia branch level. *, **, and *** represent statistical significance at the 10%, 5%, and 1% confidence levels, respectively.

Table 8: Political Effects of Budget Decisions: IV Analysis

| | Δ Local Tax per Inhabitant | | Δ Investment per inhabitant | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Structured Loan Usage (IV) | -48.221* | | -148.895** | |
| | -1.722 | | -2.569 | |
| High-Risk Str. Loan Usage (IV) | | -134.222** | | -300.679** |
| | | -2.214 | | -2.581 |
| Debt per Inhabitant | 0.799 | 1.194* | -0.300 | 0.3737 |
| | 1.587 | 1.753 | 1.442 | 0.321 |
| Dexia Branch FE | Yes | Yes | Yes | Yes |
| Political Party FE | Yes | Yes | Yes | Yes |
| Mayor Profession FE | Yes | Yes | Yes | Yes |
| Population Category FE | Yes | Yes | Yes | Yes |
| R2 | 0.026 | 0.026 | 0.015 | 0.015 |
| N | 25,725 | 22,790 | 25,309 | 22,823 |

Note: This table contains the coefficients for an instrumental variable analysis, using distance to the closest Dexia branch as an instrument for structured loan usage. The first stage is realized using probit regressions, while the second stage is conducted with OLS regressions. The dependent variable of the second stage is the variation in local tax per inhabitant between year end 2002 and year end 2007 in columns 1 and 2, and the variation in tangible assets investments per inhabitant, between year end 2002 and year end 2007 in columns 3 and 4. Sample is restricted to municipalities. Standard errors are clustered at the Dexia branch level. *, **, and *** represent statistical significance at the 10%, 5%, and 1% confidence levels, respectively.

Table 9: Financial Sophistication

| | Probit | | | | | |
|---|---|---|---|---|---|---|
| | Structured (1) | High-Risk (2) | Structured (3) | High-Risk (4) | Structured (5) | High-Risk (6) |
| 1,000 < Pop < 5,000 | 0.558*** | 0.142* | | | | |
| | 10.365 | 1.792 | | | | |
| 5,000 < Pop < 10,000 | 1.721*** | 1.300*** | | | | |
| | 30.216 | 14.575 | | | | |
| 10,000 < Pop < 50,000 | 2.104*** | 1.774*** | | | | |
| | 22.978 | 16.012 | | | | |
| 50,000 < Pop < 100,000 | 2.537*** | 2.494*** | | | | |
| | 10.203 | 10.892 | | | | |
| 100,000 < Pop < 200,000 | 2.256*** | 2.226*** | | | | |
| | 6.211 | 5.990 | | | | |
| 200,000 < Pop | 3.027*** | 2.880*** | | | | |
| | 4.578 | 5.159 | | | | |
| Age at Election | | | -0.004* | -0.008** | | |
| | | | -1.890 | -2.166 | | |
| Senior Civil Servant | | | | | 0.945*** | 4.586*** |
| | | | | | 2.577 | 10.024 |
| College Degree | | | | | 0.455** | 4.442*** |
| | | | | | 1.973 | 15.690 |
| County FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Population Control | No | No | Yes | Yes | Yes | Yes |
| Cluster | County | County | County | County | County | County |
| Pseudo-R2 | 0.280 | 0.275 | 0.333 | 0.327 | 0.458 | 0.439 |
| N | 35,712 | 31,084 | 26,068 | 20,027 | 765 | 768 |

Note: This table presents coefficients from probit regressions, where the dependent variable is an indicator variable equal to one if the local government has borrowed with at least one structured loan in columns 1, 3 and 5, and with at least one high-risk structured loan in columns 2, 4 and 6, during the period 2002-2007. Explanatory variables X < Pop < Y represents indicators on whether the local government population is between X and Y. Sample is restricted to municipalities. Age at election represents the mayor's age when elected in the 2001 elections. Columns 5 and 6 further restricts the sample to municipalities whose mayor is a civil servant. *Senior Civil Servant* is an indicator variable for the mayor being a *Haut Fonctionnaire*, a highly selective status associated with graduating from Elite schools. *College Degree* is an indicator variable for the mayor having a civil servant status requiring a college degree (*Categorie A*). Standard errors are clustered at the county level. *, **, and *** represent statistical significance at the 10%, 5%, and 1% confidence levels, respectively.

Table 10: Local Correlation in the Borrowing Choices of Politicians

| | C-logit Structured Trade | | OLS Δ(Structured Debt Notional) | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| # of Active Neighbors (Previous Quarter) | 0.0183*** 5.53 | | 10.3991*** 3.03 | |
| # of Active Neighbors (Previous Semester) | | 0.0064** 1.91 | | 4.3144* 1.81 |
| Quarter Fixed Effects | YES | YES | YES | YES |
| Regression Type | PANEL | PANEL | PANEL | PANEL |
| R2 / Pseudo R2 | 0.155 | 0.1486 | 0.0101 | 0.0098 |
| Number of Periods | 40 | 39 | 40 | 39 |
| Number of Public Entities | 2741 | 2741 | 2741 | 2741 |

Note: This table contains the conditional logit (C-logit) and OLS panel data regression coefficients that are estimated using data from Dexia's client portfolio (Dataset B). The dependent variable is an indicator variable of a structured trade for a given local government in a given quarter (or semester) for the conditional logit regressions and the incremental exposure on structured debt entered into by a public entity in a given quarter (or semester) for the OLS regressions. The explanatory variable is the number of active public entities in the same geographical zone (county level), which is defined as the number of public entities that have implemented at least one structured transaction in the previous quarter (or semester). The regressions include individual public entity fixed effects. Standard errors are clustered by type of public entity. *, **, and *** represent statistical significance at the 10%, 5%, and 1% confidence levels, respectively.

# - For Online Publication -

# Appendix A - Types of French Local Governments

**Regions** ***(Régions)***: Metropolitan France is divided into 22 administrative regions, which are in turn divided in 2 to 8 counties *(Départements)*. Regions were created in 1982, and do not possess separate legislative authority. One of their primary responsibility is to build high schools, and regional transport infrastructures. In 2004, the median population of a region in metropolitan France was 2.3 million inhabitants. Regions are funded partly by the central government, partly by local taxes. Regions are governed by a directly elected council, the *Conseil Régional*, which in turn elects the council president.

**Counties** ***(Départements)***: Metropolitian France is divided into 96 counties. They were created in 1791 following the French Revolution, and do not possess separate legislative authority. One of their primary responsibility is to build junior high schools, and county-level transport infrastructures. In 2004, the median population of a county in metropolitan France was 520,000 inhabitants. Counties are funded partly by the central government, partly by local taxes. Counties are governed by a directly elected council, the *Conseil Général*, which in turn elects the council president.

**Municipalities** ***(Communes)***: Metropolitian France is divided into 36,681 municipalities. Municipalities were created in 1789, at the beginning of the French Revolution. Municipalities build primary schools, touristic equipment, and local transport infrastructure. Municipalities population varies widely, from 10 inhabitants to 2.2 million in Paris. Municipalities are funded partly by the central government, partly by local taxes. Municipalities are governed by a directly elected council, the *Conseil Municipal*, which in turn elects the mayor.

**Intercities** ***(Communautés d'Agglomération)***: Intercities are association of municipalities. Intercities typically cover a commuting zone. Their primary motive is to finance infrastructure that covers several municipalities, for instance swimming pools and public transport. Intercities are mainly funded by its members, which are municipalities. Intercities are governed by a council that comprises the mayors and counsellors of the participating municipalities. The council in turn elects the intercity president.

**Social Housing Entities** ***(Organismes HLM)***: Social housing entities in French own and manage more than 4 millions housing units, or 17% of primary residences in France. The board members are appointed by local governments (counties or municipalities) and the French central government. The board nominates a CEO, who has a significant autonomy.

**Hospitals** ***(Centres Hospitaliers)***: Hospitals in France are state-owned, have a general interest mission and non-profit. Hospitals are funded by health insurance organisms, local governments, and the central government. Their CEOs are appointed by the Health Ministry.

# Appendix B - Structured Loan Types

Products are presented by increasing level of risk according to the Gissler classification. For each type of products, summary statistics are provided in Table A2.

**Barriers on Domestic Rate (Gissler Scale: 1)**
These products lower cost of funding as long as the underlying index is above/under a predefined barrier. Subsidy comes from the premium of the options sold, which could be interest rate caps or floors. An example is the implicit sale of a floor:

$$coupon(t) = \begin{cases} US\ Libor(t) - x\ bps & if\ US\ Libor(t) > 3\% \\ 3\% & otherwise. \end{cases}$$

The underlying index is a very liquid interest rate. Coupon structure does not include any leverage effect. Both the subsidy offered to client and the bank margin are low ($\leq$ 0.50% of notional). Barriers were the first products to enter the market in the late 1990s. Their coupon formula can be broken down into its standard loan component and an embedded short put option:

$$\begin{array}{rcl} Standard\ loan\ coupon: & & US\ Libor(t) \\ Sale\ of\ a\ put & \begin{cases} -\ x\ bps & if\ US\ Libor(t) > 3\% \\ 3\% - US\ Libor(t) & otherwise. \end{cases} \\ with\ a\ 3\%\ strike: & \end{array}$$

**Inflation Products (Gissler Scale: 2):**
This type of products is usually based on a barrier, or on an inflation spread. They often include leverage to provide with sufficient subsidy, as inflation volatility is very low. A standard payoff is:

$$Coupon(t) = Midswap(t) - 50\ bps + 2 \times Max(French\ Inflation(t) - Euro\ Inflation(t),\ 0\%).$$

This illustrates the client's view that the French inflation rate should remain below the European inflation rate, which could be caused by entrance of new EU members from Eastern Europe with historically higher inflation.

**Steepeners (Underlying Risk Level: 3):**
In a Steepener structure, the coupon is indexed to the Constant Maturity Swap (hereafter CMS) curve slope and decreases the cost of funding when the slope of the curve is steep; but increases the cost when the curve is flat or inverted. The CMS curve is built with the equivalent fixed rates obtained when swapping Libor for all possible maturities. They are based on different measures of the slope: [20-year swap rate  two-year swap rate], [30-year swap rate  one-year swap rate], and in most cases [10-year swap rate  two-year swap rate]. An example of payoff is:

$$Coupon(t) = 7\% - 5 \times (CMS\ 10Y(t) - CMS\ 2Y(t)).$$

Entering into a Steepener transaction represents a bet against the realization of forward levels, which typically anticipate a flattening of the swap curve. The risk profile of these products is higher than the one of Barrier products. This is mainly due to the introduction of leverage in the coupon formula, usually without any cap.

**Quantos (Gissler Scale: 4):**
They represent variable interest rate products that are indexed on a foreign interest rate with an affine formula. They exploit low spot rates and higher forward levels. Risk is moderate as leverage is generally low and the underlying foreign interest rate has low volatility. They are mainly structured on indices from countries with low interest rates, such as Japan or Switzerland. A standard Quanto payoff is:

$$Coupon(t) = 2 \times JPY\ Libor(t) \quad or \quad Coupon(t) = 1.5 \times CHF\ Libor(t) + 1\%.$$

**FX Products (Gissler Scale: Out of Scale):**
FX products are also based on an implicit sale of options. However FX options premiums are much higher due to the high volatility of foreign exchange rates and remain high even when strike levels are far from spot prices. This comes from the absence of mean-reversion of foreign exchange rates in banks' pricing models. This feature allows to structure products with seemingly unreachable strikes, especially when historical levels bias the client's view. An example of payoff for an FX product is:

$$Coupon(t) = 3\% + 50\% \times Max(1.44 - EURCHF(t),\ 0\%).$$

These products offer very strong coupon subsidy, especially on long maturity loans when they bear no caps. One example is the 0% coupon loan by Depfa with Ville de Saint Etienne on a 32-year maturity loan. The coupon is set at 0% for 9 years and remains at this level afterwards as long as EURCHF is above EURUSD.

**Cumulative Structures: (Gissler Scale: Out of Scale)**
Cumulative structures can be structured on any underlying: domestic/foreign interest rates, FX rates, or inflation rates. They are based on an iterating coupon formula. Coupon degradations therefore add up to each other. The formula often includes a click feature that makes all degradations permanent; hence their nickname: snow balls. Cumulative instrument structuring is based on selling a portfolio of forward-start options. A typical coupon profile is:

$$Coupon(t) = Coupon(t-1) + 2 \times Max(USD\ Libor\ 12M(t) - 6\%,\ 0\%).$$

Due to the iterating definition of the coupon, frequency of coupon payment is key for the risk profile of the product. For a given leverage level, a quarterly cumulative structure is four times more aggressive than an annual one. These products have been dramatically impacted by the increase in volatility during the financial crisis, as they bear no cap. They are usually more sensitive to volatility than to market direction (i.e., vega dominates delta).

# Appendix C - List of Dexia Branches

NICE
MARSEILLE
CAEN
DIJON
QUIMPER
TOULOUSE
BORDEAUX
MONTPELLIER
RENNES
NANTES
ORLEANS
REIMS
NANCY
LILLE
CLERMONT FERRAND
BAYONNE
LYON
ANNECY
ROUEN
AMIENS
LIMOGES
COURBEVOIE
LEVALLOIS PERRET
PARIS LA DEFENSE

# Appendix D - Appendix Tables

## Table A1: Structured-Debt Breakdown

| | Notional | | | | | Notional / Local Gov. Total Debt | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | All | Regions | Counties | Intercities | Cities | All | Regions | Counties | Intercities | Cities |
| **Aggregate** | 10429.9 | 1128.5 | 4801.9 | 1334.7 | 3164.9 | | | | | |
| **1. Barriers** | | | | | | | | | | |
| Aggregate | 4970.7 | 532.3 | 1959.8 | 746.8 | 1731.8 | | | | | |
| Share in % | 47.70% | 47.20% | 40.80% | 56.00% | 54.70% | | | | | |
| Mean | 17 | 21.3 | 20.4 | 9.8 | 18 | 10.20% | 6.50% | 8.80% | 9.90% | 12.70% |
| Stdev | 33.3 | 29.2 | 33.3 | 24 | 39.7 | 14.10% | 8.70% | 11.90% | 17.20% | 14.60% |
| Max | 342 | 99.2 | 161.7 | 167.9 | 342 | 95.50% | 33.30% | 67.90% | 95.50% | 69.90% |
| % of use | 57.70% | 56.00% | 60.40% | 44.70% | 65.60% | | | | | |
| **2. Steepeners** | | | | | | | | | | |
| Aggregate | 2794.8 | 301.1 | 1417.5 | 329.4 | 746.7 | | | | | |
| Share in % | 26.80% | 26.70% | 29.50% | 24.70% | 23.60% | | | | | |
| Mean | 9.5 | 12 | 14.8 | 4.3 | 7.8 | 5.20% | 3.50% | 5.80% | 4.90% | 5.30% |
| Stdev | 25.4 | 33.8 | 33.5 | 10.1 | 21 | 9.70% | 11.20% | 8.80% | 9.30% | 10.50% |
| Max | 275.8 | 162.4 | 275.8 | 54.4 | 151.4 | 70.50% | 54.10% | 41.60% | 44.70% | 70.50% |
| % of use | 39.90% | 32.00% | 51.00% | 31.50% | 37.50% | | | | | |
| **3. FX** | | | | | | | | | | |
| Aggregate | 1543.9 | 87.2 | 968.3 | 152.5 | 335.8 | | | | | |
| Share in % | 14.80% | 7.70% | 20.20% | 11.40% | 10.60% | | | | | |
| Mean | 5.3 | 3.5 | 10.1 | 2 | 3.5 | 2.10% | 1.10% | 2.50% | 2.50% | 1.80% |
| Stdev | 24.1 | 11.4 | 38.4 | 7.2 | 14.2 | 7.40% | 3.80% | 7.70% | 9.40% | 6.20% |
| Max | 240.8 | 52.9 | 240.8 | 47.4 | 112.6 | 66.70% | 17.60% | 44.00% | 66.70% | 36.80% |
| % of use | 14.00% | 12.00% | 18.80% | 13.20% | 10.40% | | | | | |
| **4. Inflation** | | | | | | | | | | |
| Aggregate | 357.8 | 102.3 | 120.2 | 30.7 | 104.5 | | | | | |
| Share in % | 3.40% | 9.10% | 2.50% | 2.30% | 3.30% | | | | | |
| Mean | 1.2 | 4.1 | 1.3 | 0.4 | 1.1 | 0.60% | 1.40% | 0.40% | 0.30% | 0.70% |
| Stdev | 6.6 | 12.4 | 7 | 2.1 | 6.4 | 3.50% | 5.50% | 1.70% | 1.50% | 4.90% |
| Max | 64.4 | 49 | 64.4 | 12.9 | 60 | 46.10% | 27.00% | 11.90% | 8.70% | 46.10% |
| % of use | 7.20% | 16.00% | 8.30% | 3.90% | 6.30% | | | | | |
| **5. Quantos** | | | | | | | | | | |
| Aggregate | 249.4 | 33.5 | 89.4 | 28.6 | 98 | | | | | |
| Share in % | 2.40% | 3.00% | 1.90% | 2.10% | 3.10% | | | | | |
| Mean | 0.9 | 1.3 | 0.9 | 0.4 | 1 | 0.50% | 0.40% | 0.40% | 0.30% | 0.80% |
| Stdev | 3.5 | 4.2 | 3.4 | 2.4 | 4 | 1.90% | 1.20% | 1.30% | 1.20% | 2.70% |
| Max | 33.2 | 15.8 | 25.6 | 20.7 | 33.2 | 16.40% | 1.20% | 8.10% | 7.80% | 16.40% |
| % of use | 12.30% | 12.00% | 12.50% | 6.60% | 16.70% | | | | | |
| **6. Cumulative** | | | | | | | | | | |
| Aggregate | 33.4 | 13 | 7.4 | 0 | 13 | | | | | |
| Share in % | 0.30% | 1.20% | 0.20% | 0.00% | 0.40% | | | | | |
| Mean | 0.1 | 0.5 | 0.1 | 0 | 0.1 | 0.00% | 0.10% | 0.00% | 0.00% | 0.00% |
| Stdev | 1 | 2.6 | 0.8 | 0 | 0.8 | 0.30% | 0.40% | 0.30% | 0.00% | 0.30% |
| Max | 13 | 13 | 7.4 | 0 | 7.1 | 3.20% | 2.00% | 3.20% | 0.00% | 1.90% |
| % of use | 1.70% | 4.00% | 1.00% | 0.00% | 3.10% | | | | | |
| **7. Others** | | | | | | | | | | |
| Aggregate | 300.9 | 30 | 143.6 | 28.9 | 98.5 | | | | | |
| Share in % | 2.90% | 2.70% | 3.00% | 2.20% | 3.10% | | | | | |
| Mean | 1 | 1.2 | 1.5 | 0.4 | 1 | 0.80% | 0.30% | 1.00% | 0.50% | 1.00% |
| Stdev | 4 | 4.4 | 4.6 | 2 | 4.5 | 3.70% | 1.00% | 3.70% | 2.90% | 4.50% |
| Max | 35.8 | 20 | 23.6 | 12.9 | 35.8 | 36.10% | 3.40% | 27.90% | 22.10% | 36.10% |
| % of use | 8.50% | 8.00% | 11.50% | 3.90% | 9.40% | | | | | |

Note: This table contains summary statistics on the different types of structured debt for a sample of French local governments. The data are obtained from a survey conducted by a specialized consulting firm as of December 31, 2007 (Dataset A). The left panel of this table displays statistics on aggregated and local government-level amounts of debt. Figures are in millions of euros, except for share in % and % of use. Aggregate denotes the sum of the debt notional amount over all local governments. Share in % represents aggregated amount of a given debt instrument in the sample divided by aggregated total structured debt of the sample. The right panel displays statistics on the relative breakdown by debt instruments at the local government level. For instance, a local government whose debt consists in EUR70m of standard bank loans and EUR30m of FX linked debt will be considered as a local government with 30% of FX linked debt.

Table A2: Hedging

| | Pooled Regression | | | Individual Regressions | | | |
|---|---|---|---|---|---|---|---|
| | Coefficient | St. Err. | P-value | Mean Coeff. | St. Dev. Coeff. | % Coeff > 0 at 10% signif. | % coeff <0 at 10% signif. |
| Euribor 3m | -0.0162 | 0.0168 | 0.436 | 0.0122 | 0.047 | 3.98% | 0.00% |
| CMS 10y - CMS 2y | -0.0601 | 0.0504 | 0.355 | -0.0193 | 0.0404 | 13.72% | 1.33% |
| EURCHF | -0.112 | 0.0963 | 0.364 | 0.237 | 0.3277 | 15.49% | 3.54% |
| EURUSD | 0.1681 | 0.1577 | 0.398 | 0.0982 | 0.2713 | 3.98% | 0.00% |

Note: This table contains summary statistics on regression coefficients between the annual percentage change in revenues and the percentage change in several financial indices. The pooled regression is run on the four indices, controlling for inflation and with local authorities type fixed effects. Standard errors of coefficients are clustered by type of local authorities. Individual regressions are conducted for each local government on each individual index, also controlling for inflation. Euribor 3m is the 3-month Euro interbank offered rate and CMS stands for Constant Maturity Swap and corresponds to the fixed rate obtained by swapping a Euribor coupon. For CMS 10y - CMS 2y, we use the first difference. The sample includes all French regions, departments, as well as the 100 largest cities (226 French local authorities in total) for which we have revenue data between 1999 and 2010. Index data are from Datastream and local authorities' revenues are from the French Finance Ministry.

Table A3: Indebtedness and Type of Borrowing Instrument

| | **Dataset A** | | |
|---|---|---|---|
| | Probit | | |
| | Revolving Loans | Bonds | Floating Rate Loans |
| | (1) | (2) | (3) |
| Debt / Population | 0.000 | 0.000 | 0.002 |
| | 0.00 | 0.68 | 0.97 |
| Equipment Spending / Population | -0.001 | 0.002*** | -0.002 |
| | -1.50 | 2.80 | -0.84 |
| Wages / Operation Expenditure | 2.118 | 6.421*** | 8.421*** |
| | 1.18 | 7.07 | 18.30 |
| Debt Average Maturity | 0.027** | 0.021 | 0.198*** |
| | 2.20 | 0.60 | 7.33 |
| Log(Population) | -0.006 | 0.663 | -0.166 |
| | -0.80 | 1.12 | -1.16 |
| Lender Relationship FE | Yes | Yes | Yes |
| Local Government Type FE | Yes | Yes | Yes |
| Number of Observations | 275 | 275 | 229 |
| Pseudo $R^2$ | 0.185 | 0.526 | 0.682 |

Note: This table contains coefficents of probit regressions. The dependent variable is a dummy variable for the use of revolving loans in column 1, and a dummy for the use of bonds in column 2, and a dummy for use of floating rate loans in column 3. Sample data are as of December 31, 2007. Standard errors of the coefficients are clustered by types of local governments, and z/t-statistics are reported in brackets. *, **, and *** represent statistical significance at the 10%, 5%, and 1% confidence levels, respectively.