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How heterogeneous are they?

Gilles DUFRÉNOT[1], Philippe FROUTÉ[2], Christophe SCHALCK[3]

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[1] Banque de France, CEPII and DEFI, Université de la Méditerranée, Centre de Recherche en Développement Économique et Finance Internationale, 14 Avenue Jules Ferry, 13621, Aix-en-Provence, Cedex, Tel : +33 4 42 91 48 34, Email : gilles.dufrenot@univmed.fr

[2] Banque de France and EconomiX, Banque de France, Direction de la Conjoncture et de la Prévision Macroéconomique, Service des Finances Publiques, 39 rue Croix des Petits Champs, 75001, Paris, Tel : +33 1 42 92 56 78, Email: philippe.froute@banque-france.fr

[3] ESG Paris and EconomiX, ESG Management School, Groupe Paris Graduate School of Managment, 25, rue Saint Ambroise, 75011 Paris, Tel : +33 1 53 36 44 32, Email : cschalck@esg.fr

Abstract

This paper provides empirical evidence of the heterogeneous borrowing behaviours of French regions, despite a common accountability constraint that forces them to balance their budget and to borrow only to finance investment expenditure (golden rule). To this end, we use a quantile regression analysis covering the period from 1999 to 2007. The heterogeneity is very pronounced when the regions face a negative shock on debt, for instance a tightening of financial conditions. We explain our findings as a consequence of the fact that the Golden rule can be thought of as a "soft" rule if some local administrations believe that a financial rescue from the central government is automatic (as the regions receive transfers from the later). In this case, some regions find it advantageous to consider borrowing as an adjustment variable when taking their budgetary decisions.

Keywords: Regional Borrowing, Quantile Regressions, Golden rule.
JEL Classification: H74, E62, K34, R5

Résumé

Cette étude apporte des preuves empiriques de l'adoption de comportements d'emprunt hétérogènes de la part des régions françaises. Cette hétérogénéité apparaît en dépit de l'existence d'une règle comptable contraignante qui les oblige à voter un budget en équilibre et à ne pouvoir emprunter que dans le but de financer des dépenses d'investissement (la règle d'or). A cette fin, nous mettons en œuvre une analyse par régression quantile sur la période 1999-2007. L'hétérogénéité des comportements est particulièrement prononcée lorsque les régions font face à un choc d'endettement négatif, par exemple à la suite d'un durcissement des conditions financières. Nous interprétons nos résultats comme la conséquence du fait que la règle d'or peut être considérée comme une règle souple si certaines collectivités territoriales pensent qu'un sauvetage financier interviendra de manière automatique (à travers une augmentation des transferts par exemple). Dans cette hypothèse, ces régions pourraient tirer avantage à considérer l'emprunt comme une variable d'ajustement lors de la prise de décisions budgétaires.

Mots clefs : Emprunt régional, régression quantile, règle d'or.
Classification JEL : H74, E62, K34, R5

1. Introduction

The 2008 financial crisis has revived debates, in France, on the fiscal problems facing local governments. Up until then, many theoretical and empirical papers on local finance widely focused on local governments' financial autonomy in the context of political decentralization. For instance, questions related to the fiscal room for manoeuvre have given rise to articles examining the problem of tax autonomy (Blöchlinger and King (2006), Gilbert and Guengant (2001), Meloche *et al.* (2004)) or tax competition (Buettner (2003), Devereux *et al.* (2007), Maties and Rocaboy (2005), Mintz and Smart (2004), Wilson (1999)). Very few studies were devoted to the question of local investment (one exception is Hoorens (2001, 2006)). However, given the crisis juncture, the question of the capacity of local governments to boost public investment in order to support demand has become crucial. In France, the main measures of the stimulus package adopted at the end of 2008 concerned a boost to local investment (transport infrastructures, roads, railways, investment in hospitals, etc). Since local governments account for three quarter of public investment, one can legitimately wonder whether the current crisis will hinder the capacity of regions to implement recovery plans.

Contrary to the central State, the French local governments have an obligation by the law to vote their budget in balance according to a so-called Golden rule. The latter stipulates that each section of the local budget (current and investment spending) must be balanced and that borrowing can exclusively be used to finance investment expenditure. Amongst revenues devoted to financing investment (allocations granted by the State budget, local tax, receipts in excess of current expenditures) borrowing appears then to be used as an adjustment variable.

Hence, at least intuitively, the Golden rule should normalize borrowing behaviours. Nevertheless, this paper provides empirical evidence of the heterogeneous borrowing behaviours of the French regions, despite the Golden rule. To this end, we use a quantile regression analysis covering the period from 1999 to 2007. The heterogeneity is very pronounced when the regions face a negative shock on debt, for instance a tightening of financial conditions. We explain our findings as a consequence of the fact that the Golden rule can be thought of as a "soft" rule if some local administrations believe that a fiscal rescue from the central government is automatic (as the regions receive transfers from the later). In

this case, some regions find it advantageous to consider borrowing as an adjustment variable when taking their budgetary decisions.

The rest of the paper is structured as follows. Section 2 describes the accountability framework in which the regions' budgetary decisions are undertaken. Section 3 contains our empirical analysis and Section 4 briefly discusses our main findings. Finally Section 5 concludes.

2. Local public expenditure and borrowing accountability framework

In France, local administrations account for almost three quarter of the total of public investment (approximately 2.4% GDP out of 3.2% of GDP in 2009). The regional administrative level has been created in March 1982, and reinforced in 2003/2004, within the context of political decentralization. The main competences that were transferred to Regions concerned economic, urban and county planning (for instance, public transportation regional schemes) education and professional training (high and secondary school, investment).

Decentralization has entailed a major issue regarding the fiscal autonomy of local government. The rules governing local governments differ from those of the central government. When voted, local budgets have to be balanced and they must satisfy a Golden Rule. Local governments' accountability in France distinguishes between current expenditure and investment expenditure. Contrary to the central State budget, the Golden Rule imposes that each "section" (current and investment) of the budget has to be balanced and that borrowing has to be used for balancing the investment section. Thus, for a given level of investment and a given level of grants from the State budget, the need to balance the investment section forces local administrations to use their self-financing (e.g. current receipts in excess of current expenditure) or to borrow.

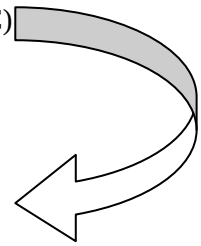
Table 1 shows the accountability framework for regional governments. Borrowing is exclusively aimed at financing investment[4] (equipment expenditure and purchase of durable goods). Financial costs, including interest payments, are considered as current expenditure

[4] Borrowing needs not be explicitly assigned to one or more investment transactions specifically designated in the contract. They can be aggregated and correspond to the overall need for financing the investment section.

(this assignment is a requirement from the Golden Rule which aims at achieving a good intertemporal management: the burden of the loan which defers the cost of funding on future generations must be covered by current resources). Another function of borrowing is to act as an adjustment variable depending upon the rooms for manoeuvre of local governments. The latter depend upon two factors: the amount of transfers from the State budget and local tax revenues. The amount of indebtedness depends on the existing stock of debt and its related mortgage.

Table1. Accountability framework of French regional governments

Operating Section	Current expenditure (CE)	Local revenue (LR	⇨Self-financing capacity (SFC)
		Transfers from central government (GTO)	
Investment section	Investment expenditure (INV)	Self-financing capacity (SFC)	
		Transfers from central government (GTI)	
		Borrowing (BOR)	



Investment expenditure (INV)[5] depends on the investment grants received from the central government (GTI)[6], borrowing (BOR) and self-financing capacity (SFC). The latter is defined as the difference between the grants for current expenditure received from the central government (GTO)[7] plus local revenue (LR) and local current expenditure (CE). Local

[5] Investment expenditure includes direct capital expenditure, equipment subsidies and capital repayments

[6] These consist of two kinds of grant. The first grant is the compensation fund of VAT which corresponds to reimbursement by the State of the VAT paid by local administrations on their own investments. The second grant aims at covering specific investment such as those for school equipment.

[7] These grants include compensation for wage part of the local tax, compensation for the regional part of the residence tax, compensation for capital taxes, 95% of the decentralization allocation and a perequation allocation.

revenues come from direct taxes such as housing tax, built and non-built property taxes, local business tax and from tax sharing with the State like for instance oil tax (TIPP).

We accordingly have the following identities

$$BOR_t \equiv INV_t - SFC_t - GTI_t \quad (1)$$

$$SFC_t \equiv LR_t + GTO_t - CE_t \quad (2)$$

Historically, the average investment expenditure per capita over the period are 36€, with a maximum of 52€ per capita in 2007 and a minimum of 24€ per capita in 2001. In 2007, investment by French regions accounted for approximately 25% out of the 2.4% of GDP recorded for local administrations as a whole (see Figure 1). The grants for current expenditure increased from 78.4€ per capita in 2004 to 83.6€ per capita in 2007. The average local tax revenue between 2000 and 2007 amounted 65.7€ per capita, with a maximum level of 77.9€ in 2001 and a minimum of 51.4€ in 2003 (see Figure 2). This reflects a stagnation of the regional financing capacity which is explained by different measures of local tax relief adopted at the national level in the recent years. The average self-financing capacity amounted 18.5 € per capita over the period, with a maximum of 20.8€ per capita in 2007 and 17.3€ per capita in 2002 (see Figure 3).

Figure 1. Regional investment expenditure (€ per-capita)

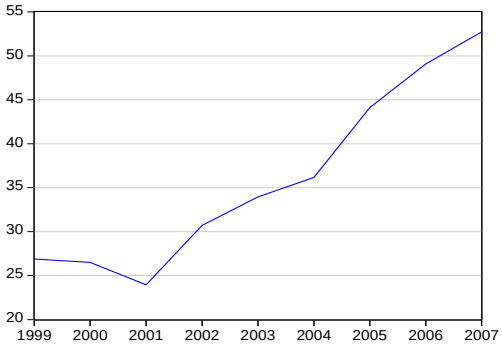


Figure 2. Regional revenues from direct taxation

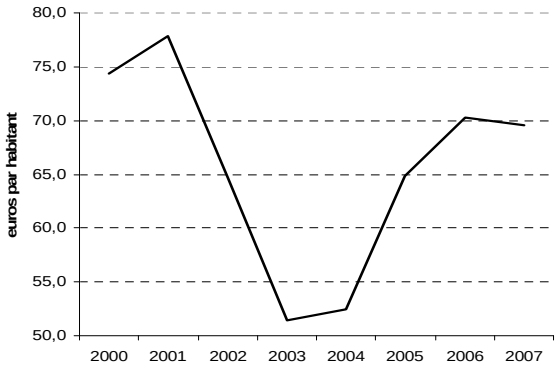
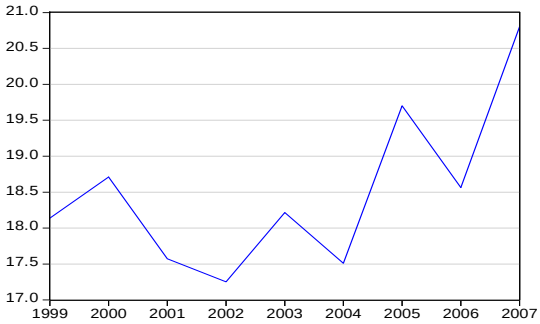


Figure 3. Regional SFC (€ per-capita)



In addition to the accountability constraints, borrowing behaviours are also influenced by the financial conditions prevailing in capital loan markets. These conditions work through the stock of debt and the interest rates. Regional debt has strongly increased since 2001, from 25€ per capita to 51 € per capita in 2007 (see Figure 4), as the results of changes in the interest rates. Figure 5 shows the evolution of several rates:

- the OAT constant rate at 10 years (denoted TEC10) which corresponds to the usual estimate of long-term debt conditions;
- the 12 month Euribor which is an average rate charged by a set of credit institutions in the euro area and which corresponds to an assessment of the usual conditions for short term debt;
- the 3 month Euribor which corresponds to the usual estimate of short-term debt conditions;
- the EONIA, which corresponds to short-term debt conditions too.

All those rates are expressed in real terms and follow very similar patterns. For instance, the 12 month Euribor reaches its peak in 2000, then decreases until 2003 and then goes back to its 2000 level in 2007. However, changes in TEC10 differ slightly from the other rates, especially at the beginning of the period. TEC10 reach its maximum in 1999 with 2.72%, then decreases almost continuously until 2005 when it reached its minimum level at 1.52% before a rebound to 2.35% in 2007.

Figure 4. Regional debt (€ per-capita)

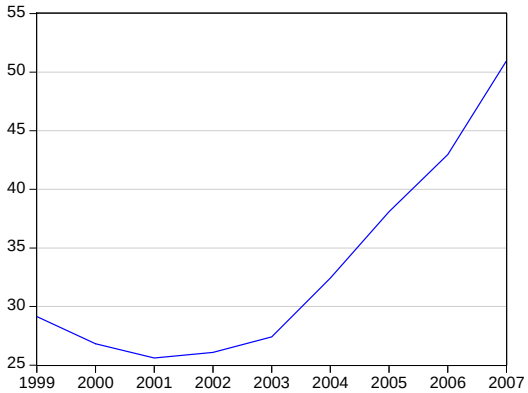
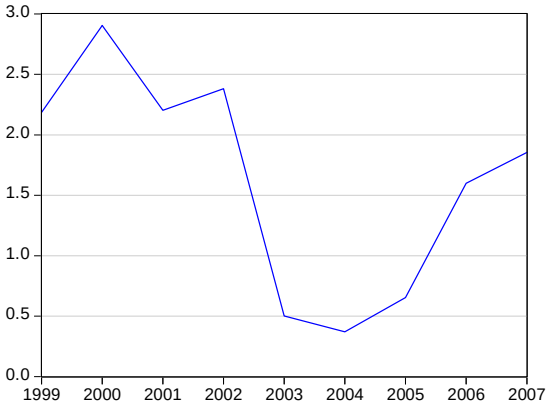
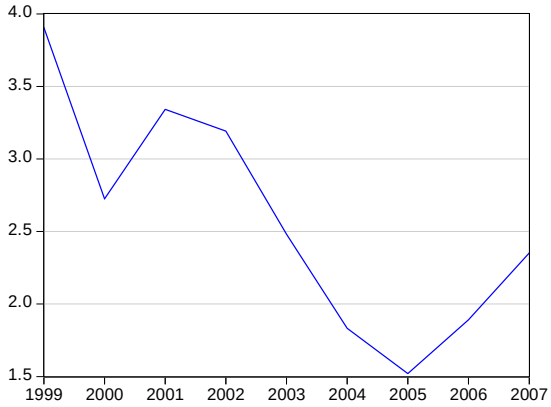


Figure 5. Real interest rates (in%)

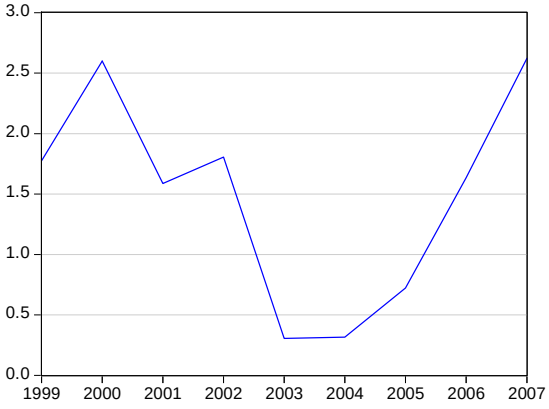
Eonia



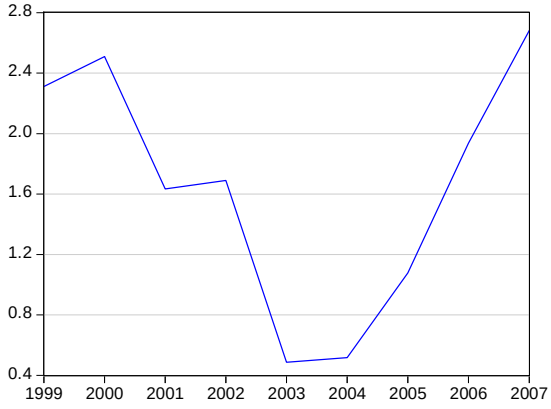
OAT 10 years



3-months Euribor



12-months Euribor



3. Evidence of heterogeneous borrowing behaviours

In this section, we focus on the borrowing decisions and show that they are heterogeneous across regions. To this end, we do a quantile regression analysis over the period 1999-2007. We use a pooled panel data of 176 observations (eight years and 22 regions). The application of quantile regression techniques enables to introduce parameter heterogeneity across the conditional distribution of borrowing and see whether the influence of the explanatory variables on borrowing differ across regions.

We consider a specification in which the explanatory variable is the first-difference of the logarithm of borrowing ($DLBOR_t$) and the explanatory variables are the following: first-differences of the logarithm of investment expenditure ($DLINV_t$) and self-financing capacity ($DLSFC_t$), the logarithm of past debt level ($LDEBT_{t-1}$), the interest rate ($RATE_t$) and the first lag of the endogenous variable ($DLBOR_{t-1}$). Transfers from the central government are not included in the regression in order to avoid colinearity biases. Indeed, investment allocations from central government are strongly linked with regional investment expenditure.

The estimated equation is as follows:

$$DLBOR_{it} = \mu_t + \alpha\, DLBOR_{it-1} + \phi\ DLINV_{it} + \lambda\, DLSFC_{it} + \delta\, LDEBT_{it-1} + \rho RATE_{it} + \varepsilon_{it},\ i=1,...,8 \text{ and } k=1,...,22 \quad (3)$$

It is derived from an error correction mechanism in which the long-run relationship is the constraint imposed by the accounting framework. Specifically, the ECM equation is written as

$$DLBOR_{it} = \mu_t + \alpha\, DLBOR_{it-1} + \phi\ DLINV_{it} + \lambda\, DLSFC_{it} + \delta\, LDEBT_{it-1} + \omega\, DTRANSF_{it} + \rho RATE_{it} - b\,[LBOR_{it-1} - \alpha 1\, LINV_{it-1} - \alpha 2\, LSFC_{it-1} - \alpha 3\, TRANSF_{it-1}] + \varepsilon_{it} \quad (4)$$

where *TRANSF* are the transfer from central government. The accountability framework implies that $\alpha_1 = 1$, $\alpha_2 = \alpha_3 = -1$ and the term between brackets reduces to zero. In the equation, we also assume that $\omega=0$ in order to avoid the colinearity problems mentioned above.

We are thus interested in estimating Equation (3) to see whether there are differences in the response of borrowing behaviours to changes in the explanatory variables. The application of quantile regression techniques allows possible parameter heterogeneity across the conditional distribution of borrowing.

3.1. Quantile regression principle

For purpose of clarity, we briefly explain some key features of quantile regression analysis. For technical presentations, we refer the reader to Koenker and Basset (1978), Buchinsky (1998), Koenker and Hallock (2001), and Koenker (2005).

The use of quantile regressions improves upon the usual Ordinary Least Squares techniques by uncovering patterns in which the influence of a given variable, given the other determinants of borrowing, varies across regions.

Let us consider the linear model:

$$Y_{it} = X_{it}^{'}\beta + v_{it} \tag{5}$$

where *Y* is the dependent variable and *X* is a vector of explanatory variables. The essential feature of a regression analysis is to study the manner in which a set of explanatory variables affects the conditional distribution of a dependent variable. With the classical econometric techniques (OLS, IV, GMM, and GLS)[8], the component around which the dependent variable randomly fluctuates is the conditional mean $E[Y / X, \beta]$. Unlike the classical approaches which amount to estimating the conditional mean of the conditional distribution of *Y*, the quantile estimator is employed on different quantiles of the conditional distribution.

Let $F(y)$ be the cumulated distribution function of *Y*. The θ^{th} quantile of *Y* is defined as the smallest *y* satisfying $F(y) \geq \theta$. In a regression context, it can be shown that finding θ amounts to obtaining the following estimator of β:

$$\hat{\beta}_{\theta} = \arg\min_{\beta_{\theta}} \left\{ \sum_{i=1}^{T} H_{\theta}(v_{it}) \right\}, \quad H_{\theta}(v_{it}) = \theta\, v_{it}^{+} + (1-\theta)\, v_{it}^{-} \tag{6}$$

[8] GMM is the Generalized Method of Moments estimation; GLS refers to the Generalized Least Squares estimation and IV means instrumental variables.

where v_{it}^{+} is the vector of residuals with positive values and 0 otherwise, v_{it}^{-} is the vector of negative residuals and 0 otherwise. Therefore, we have as many estimators of β (and quantile regression estimates β) as values of $\theta \in (0,1)$ by changing the "representative" individual. The latter can be the mean (as in OLS), the median ($\theta = 0.5$) or any other quantile. As θ can vary while considering all the individuals of the sample, we have a better picture of the entire distribution conditional on the endogeneous variable. This approach has several advantages. Firstly, it enables to consider the heterogeneity of the sample instead of focusing exclusively on the average of the variable. Secondly, it is useful to deal with small samples without having to split them further into smaller groups.

While the estimation of β is quite simple and requires the use of simplex algorithms (see D'Orey and Koenker (1987)), the estimate of the residual variance and the standard error of the estimated parameters is more complicated, since it requires the estimation of the unknown probability distribution function of *Y* and its derivative. The latter is necessary to estimate the quantile density function $s(\theta)$, also called the sparsity function. Computation of the coefficient covariance matrices is an important part of quantile regression analysis and various approaches are available: bootstrap re-sampling methods, direct methods based on Siddiqui difference coefficients and kernel density (see Koenker and Bassett (1982), and Koenker (1994)). It can be shown that the quantile estimator is distributed asymptotically as a Gaussian variable :

$$\sqrt{T}\left(\hat{\beta}_{\theta} - \beta_{\theta}\right) \approx N\left(0, \theta(1-\theta)s(\theta)^2 J^{-1}\right) \tag{7}$$

$$J = \lim_{T \to \infty}\left(X' X / T\right) \tag{8}$$

$$s(\theta) = 1/ f(F^{-1}(\theta)) \tag{9}$$

To deal with the endogeneity of some of the explanatory variables, we adopt a two-step approach, by first using instruments to forecast the investment variable (using its lagged values and those of the regional GDP) and then by substituting the resulting forecasted investment variable for the original one in Equation(3). Further, due to the small sample data, the standard errors of the estimated coefficient are bootstrapped. For purpose of robustness,

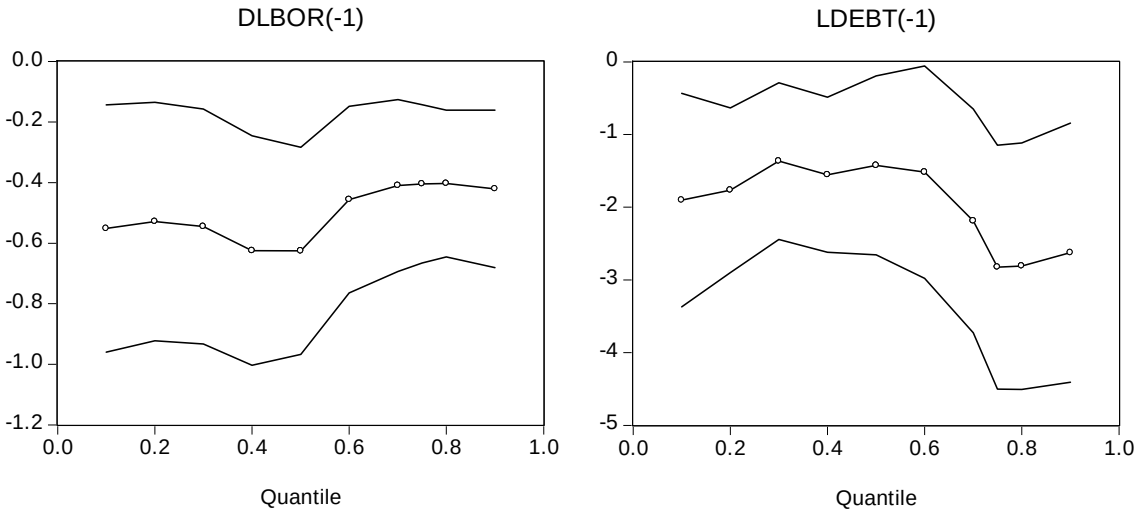
we use three bootstrap methods (residual bootstrap, Markov chain Marginal bootstrap and XY-pair bootstrap)[9]. For each method, we do 100 replications.

3.2 Empirical results

Table 2 reports the estimates for the 25th quantile of borrowing distribution representing regions with low conditional borrowing levels, the 75th quantile describing those with high conditional borrowing levels and the 50^{th} quantile (median). The results are shown for the case in which the interest rate series is TEC10 (the other interest rates yield similar results). Borrowing behaviour is sensitive to the financial situation facing the regions. We see that it is negatively and significantly related to debt level and past borrowings. However, interest rates, investment expenditure, GDP and self-financing capacity do not seem to be determinant explanatory factors. The impacts of indebtedness and past debt level on borrowing are significantly different between low-borrowing and high-borrowing regions, as shown in Figure 6 which reports the estimated coefficients at different quantiles from 0.1 to 0.9. The figure shows a slight decrease of the impact of previous year debt on the current borrowing for high borrowers. Interestingly, we see that the impact of indebtedness on borrowing is steeper for the highest quantiles. This means that the level of debt plays an important role for regional investment.

[9] For a technical description of the different approaches we refer the reader to Buchinsky (1995), He and Hu (2002), Kocherginsky, He and Mu (2005).

Figure 6.- Quantile process estimates (with 95% confidence interval



We further find that the position in the distribution of a specific region varies importantly in the panel (see figure 7), thereby suggesting that in addition to being heterogeneous borrowing behaviours also vary across time.

To study the consequences of the heterogeneous response of borrowing to the debt level, we examine how the borrowing distribution changes when all regions in the sample are hit by the same shock. We compare the probability density function for borrowing using the original data and the distribution of the forecasted level of borrowing that emerges when the debt variable is increased or decreased by its standard error. We consider an exogenous shock that

Table 2. quantile regressions –Two-step: investment instrument in the first step

Standard errors computed using bootstrap methods – 100 replications

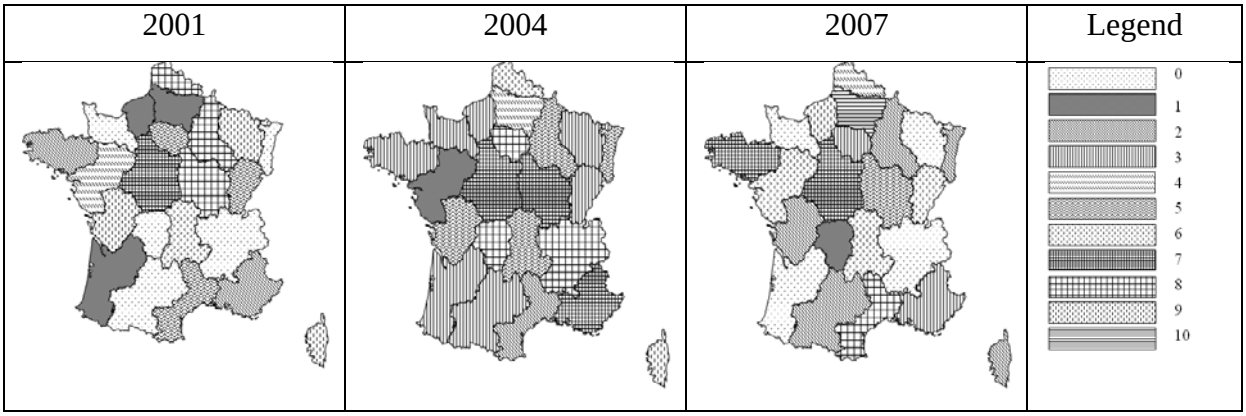
Dependent variable: *DLBOR*

	Bootstrap (method : residuals)			Bootstrap (method: MCMB)			Bootstrap (method XY pairs)		
	$\theta = 0.25$	$\theta = 0.5$	$\theta = 0.75$	$\theta = 0.25$	$\theta = 0.5$	$\theta = 0.75$	$\theta = 0.25$	$\theta = 0.5$	$\theta = 0.75$
μ	10.84*	8.84*	18.66*	9.68*	9.39*	18.35*	9.68*	9.39*	18.35*
	(6.52)	(6.72)	(11.54)	(2.53)	(3.75)	(4.45)	(2.11)	(2.11)	(3.33)
DLINV	-0.65	-0.29	-0.38	-0.02	-0.32	-0.35	-0.02	-0.32	-0.35
	(-1.27)	(-0.74)	(-0.79)	(-0.02)	(-0.91)	(-0.42)	(-0.02)	(-0.54)	(-0.56)
DLBOR(-1)	-0.55*	-0.61*	-0.41*	-0.54*	-0.63*	-0.404*	-0.54*	-0.63*	-0.40*
	(-28.55)	(-28.19)	(-13.21)	(-3.26)	(-4.06)	(-3.59)	(-2.64)	(-3.59)	(-3.05)
DLSFC	-0.49	-0.29	0.04	-0.49	-0.25	0.05	-0.49	-0.25	0.05
	(-1.15)	(-0.89)	(0.12)	(-0.64)	(-0.66)	(0.09)	(-0.68)	(-0.43)	(0.06)
LDEBT(-1)	-1.65*	-1.39*	-2.86*	-1.48*	-1.42*	-2.82*	-1.48*	-1.42*	-2.82*
	(-7.08)	(-7.74)	(-12.75)	(-2.49)	(-4.09)	(-4.95)	(-2.69)	(-2.28)	(-3.32)
RATE	-0.09	0.07	0.32*	-0.09	-0.02	0.35	-0.09	-0.02	0.35
	(-0.86)	(0.66)	(2.24)	(-0.47)	(-0.105)	(1.54)	(-0.39)	(-0.07)	(1.05)
R^2	0.19	0.18	0.33	0.19	0.18	0.32	0.20	0.18	0.33

Note : t-ratios in parentheses. All regressions include time fixed effects. * means that a coefficient is statistically significant at the 5% level of significance.

can be either positive or negative. We proceed as follows. We first compute the conditional probability density function for borrowing, using the estimated coefficients of (3) for different quantiles from the 10th up to the 90th. Then, the obtained distribution is "shocked" by one standard error of the debt variable. We consider both positive and negative shocks.

Figure 7. Conditional quantile distribution of borrowing

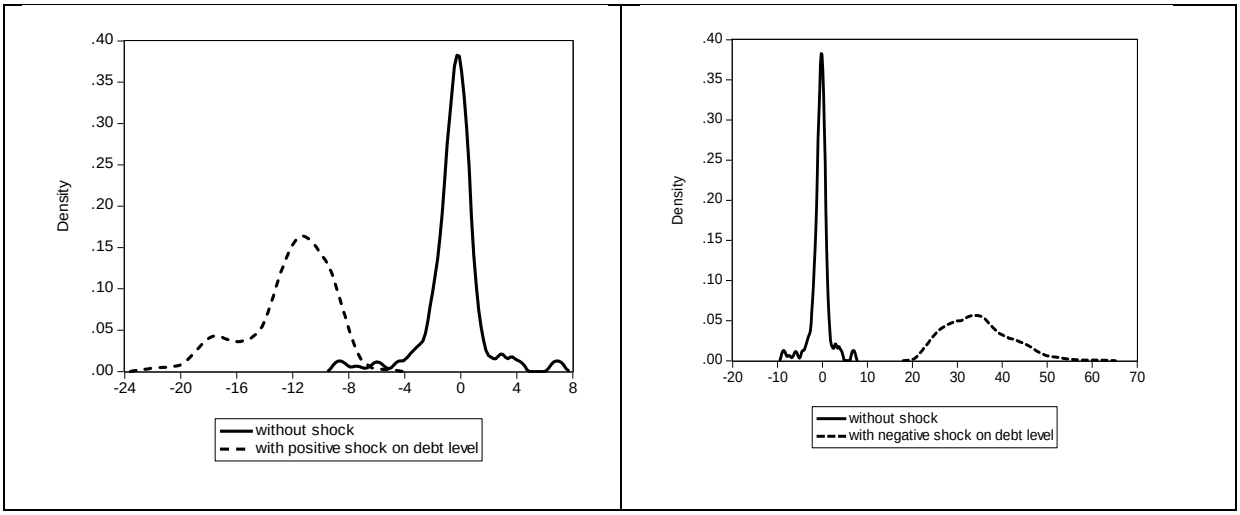


Figures 8 and 9 show the borrowing conditional distribution corresponding to a situation without shock (solid lines) and the corresponding conditional distributions when the economies are "perturbed" with an exogenous shock to debt (dotted lines). We see that reveals that a positive debt shock is associated with a reduction in the average behaviour and a more pronounced dispersion of the borrowing distribution. Indeed, the dotted lines are slightly less leptokurtic than the solid lines. In contrast, a negative shock induces an increase in the average behaviour and a stronger dispersion of the distribution. An interesting point is that the reaction to a same shock is not symmetric. The rise of borrowing consecutive to a reduction of the debt level is more pronounced compared to the diminution of borrowing consecutive to a positive shock on debt.

The response to a negative shock is quite intuitive. When financial conditions are loosening, regions can implement different investment programs which can explain the observed rise in heterogeneity symbolized by the more platikurtic dotted lines. However, the fact that a positive shock on debt levels leads to a rise in the conditional distribution heterogeneity is much more puzzling. Indeed, at least intuitively, such a shock should make the constraint become more binding and hence should lead to uniform borrowing behaviors in order to meet the Golden Rule. But, it seems that the opposite is at play. In the next section, we propose an

explanation to this puzzle by considering different ways in which regions deal with the Golden rule.

Figure 8. Borrowing conditional distribution (positive and negative debt shock)



4. How do regions deal with the Golden rule?

To answer this question one must have in mind that there are several interpretations of "a rule".

Some rules do not have binding effects (the so-called "soft laws" in the literature[10]), while other are very stringent ("hard laws"). The opposition between soft and hard law refers to the debates on the benefits of flexibility against certainty. This opposition is at the heart of a lot of works in the field of law and economics. The main benefits of legal certainty are traditionally justified by arguments that are in line with the findings of the neo-institutionalist school and developments of the theory of incomplete contracts. The implementation of secure and easily predictable systems encourages economic performance and long-term investments (Acemoglu et al. (2001, 2002), North and Weingast (1989), Rodrik and Subramian (2003)). Other works emphasize the benefits of flexibility since it enables economic agents to adapt themselves more quickly to a rapidly changing world (Berglof and Rosenthal (2003), Deffains and Guigou (2002), Lamoreaux and Rosenthal (2005), La Porta et al. (1997), Roe (2003)).

[10] See Greif, Milgrom and Weingast (1994), Greif (1998), Senden (2004),

In public finance, several factors leading the local authorities to interpret a rule as a soft rule have been identified.

The first factor is the size of local government. Wildasin (1997) uses a model in which the production of local public goods creates positive externalities, a positive correlation between the size of local government and the amount of the bail-out. A possible interpretation of this relationship involves the "too big to fail" argument. Local governments implement policies that bind the central government. This result is however challenged by Crivelli and Staal (2006) who use a model centred on economies of scale in the local public goods provision. The validation of the "too big to fail" argument therefore depends on the modelling framework used.

Another factor yielding local authorities to favour soft budget constraints is the possible conflicts caused by the management of the tax base. Goodspeed (2002) stresses that transfers from the federal level to the regional level generally involve a "common property problem", since the increasing federal tax rate levied to finance the bail-out reduces the opportunity behaviour of the regional government by increasing cost of borrowing. Developing this line of arguments, Breuillé et al. (2007) show that the structure of the tax system has a significant influence on the degree of "softness" of the budget constraint for local governments.

A third factor is the opportunistic behaviour of local governments which seek additional transfers from the federal government (such a behaviour is reinforced if the federal government accepts to make these transfers ex post). In Europe many examples of such failures have been identified. For example, in the early 1990s, the poorest regions of southern Italy have experienced very large deficits in their health care system and have asked for the federal government assistance through transfers (Von Hagen et al. (2000)). In Sweden, the central government has had to assist municipalities in financial distress during the period 1974-1992 (Dalhberg-Lidbom and Petterson (2003)). In 1992, the German region of Bremen and Saarland were refunded by the federal government because they were unable to cope with excessive debt and the increase in the share of interest expenses in their budget (Rodden, 2003).

Thus the question of the automaticity of a financial rescue from the central government is central to understand why some French regions do not interpret the Golden rule as a hard rule and why, heterogeneous borrowing behaviours can be observed when regions face a positive debt shock (for instance a deterioration of the financing conditions as was the case during the

2008 financial crisis). In other words, we propose to explain the observed heterogeneity in borrowing behaviours by discussing the links between the golden rule and the soft budget constraint. We can assume that regions aim at producing an optimal public investment level. Their problem is therefore to obtain a proper financing to invest. The way they make their decisions can be summarized by the following four situations (see Table 3).

- If the financing conditions are easy, the Golden rule is not binding because regions have no difficulty to abide by the rule thanks to borrowing. One can then consider two hypothetical cases to deal with our problem.

  - 1/ The first one is a case where the regions do not meet the Golden rule and where the central government intervenes. This intervention corresponds in fact to a local bankruptcy. Regions act under the control of the "préfet" which is the head of the central government administration at the regional level through the *Chambres Régionales et Territoriales des Comptes*[11]. Such developments never occurred at the regional level so far but there are some examples at the municipality level in France (bankruptcy of the city of Angoulême).

  - 2/ The second one is a case where regions consider that the central government will not intervene (soft law status of the soft budget constraint). Then, the only way to avoid bankruptcy is to find other revenues. For instance, the city of Berlin in Germany had to get rid of some of its lands to achieve it.

- If the financing conditions are tightening, two different cases can occur.

  - 3/ If the local administrations believe that central government's financial rescue is automatic, then the Golden Rule will no longer be binding. This scenario could describe a too big to fail behaviour.

[11] For more information about the procedures see Bouvier, 2008.

– 4/ If, conversely, the local administrations believe that central government intervention may not take place, then they are unable to achieve the required level of investment. The Golden Rule is binding and becomes the adjustment variable to balance the budget is investment that must be reduced compared to the optimal level.

To summarize, if the soft budget constraint is interpreted as a hard law (the central government financial rescue is automatic), then regions should not encounter obstacles to increase their investment. However, these investments involve a higher risk of default[12]. Thus, if rescue plan investments can benefit from being achieved at local level (principle of subsidiarity, minimization of transaction costs), financial transfers to the local level can hide problems related to public debt sustainability. In the case of a "hard" budget constraint, the risk of default depends ultimately on the central state which may decide not to transfer the implementation of rescue plans at the local level without counterparts.

If the budget constraint is a soft law (the central government financial rescue is not automatic), then the risk is that the regions be unable to finance investment and thus do not implement it because of insufficient funds.

Hence, the latter case could explain why such heterogeneity is observed. If Regions consider that a financial rescue from the central government, through a raise of transfers for instance, is automatic in case of financial difficulties, then the Golden rule is no longer economically constraining. At present time, in order to face the commitments taken in the recovery plans, French local governments have raised local taxation by 6% on average. If this rise of local taxation will prove in the end to be insufficient to cover the new expenditures then we could face the situation that we have just discussed. What we predict is that the heterogeneity of local borrowing behaviours will increase.

[12] It should be noted that the golden rule does not ensure compliance with the Maastricht criteria. Indeed, at least theoretically, the local governments can issue debt infinitely as long as they find appropriate financing. The Golden Rule only requires investment section to be balanced. Regions can issue debt which represents more than 60 % of regional GDP. In practice, regions indebtedness amounts for 65% of current revenue in 2007.

Table3. Financing conditions and soft budget constraint

		Soft Budget Constraint	
		Hard Law	*Soft Law*
Financing Conditions	*Easy*	**Non constraining Golden Rule** (1) *Quasi bankruptcy of Angoulême*	**Non constraining Golden Rule** (2) *Berlin's bankruptcy*
	Tight	**Non constraining Golden Rule** (3) *Too Big to Fail*	**Constraining Golden Rule** (4) *Adjustment Variable = Investment*

5. Conclusion

The French stimulus package adopted at the end of 2008 yielded French regions to boost local public investment. If the crisis results in a tightening of financial conditions, the capacity of regions to meet their commitments could be jeopardized.

To deal with this issue, we first conduct a quantile regression analysis that reveals that the impact of indebtedness on borrowing is steeper for the high-borrowing regions. Consequently, though all regions adopt a debt management policy to contain debt growth, they exhibit heterogeneous behaviours that reflect differences in terms of investment policies and more generally in terms of supply of public goods.

We consider how a shock on the debt level may alter the conditional distribution of borrowing in regions. We found that both a positive and a negative shock lead to increase this heterogeneity. While the latter is rather intuitive, the former is quite puzzling. Indeed, the so-called Golden rule, by requiring budget to be voted on balance, should lead to an uniformization of borrowing behaviour.

We propose an explanation to this phenomenon by linking the Golden rule framework to the law and economics debate between hard law and soft law. Our analysis suggests that, up to now, the Golden rule has not constituted an economic constraint. With a tightening of

financing condition, this situation could change and French regions could be confronted to a trade-off between investment reduction and non-compliance with the Golden rule. The latter could be detrimental to the implementation of the French recovery plan, the former to local public finance sustainability.

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nathalie.bataille-salle@banque-france.f