Società italiana di economia pubblica
XX CONFERENZA

ECONOMIA DELLA TASSAZIONE
Sistemi tributari, pressione fiscale, crescita

Pavia, Università, 25 - 26 settembre 2008

FISCAL POLICY AND THE BANKING SYSTEM IN ITALY. HAVE TAXES, PUBLIC SPENDING AND BANKS BEEN PROCYCLICAL IN THE LONG-RUN?

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pubblicazione internet realizzata con contributo della

COMPAGNIA di San Paolo

Fiscal Policy and the Banking System in Italy. Have Taxes, Public Spending and Banks Been Procyclical in the Long-Run?*

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This paper analyses the relations between the banking system fluctuations, on one hand, and taxation and public spending, on the other one using a VAR methodology. We find significant correlation between government spending on loans and total assets for the whole banking system. Using the primary surplus, an indicator of expansionary/restrictive fiscal policy and government debt as fiscal variables, we find that primary surplus, in contrast with debt, has a short-term effect on banking behaviour. For Savings and Loans we find that government expenditure has a significantly negative effect on loans; instead there are no effects on total assets. Taxes have significantly negative effects on loans and total assets. Saving and Loans seem more affected by fiscal policy than the whole banking system, in particular they are negatively affected by taxes.

JEL codes: N130, N140, E320, E600.

Keywords: credit cycles, fiscal policy, procyclicality.

* We wish to thank seminar participants at the European University Institute for useful comments.

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As the international credit crisis related to sub-prime loans has recently suggested, some relevant relations exist between credit cycles and fiscal policy over the business cycle. The fiscal package launched by president George W. Bush intended for producing a stimulus for the slowing American economy is a vivid example of such a relation. In fact, in order to contrast a possible macroeconomic downturn stemming out from the sub-prime credit crisis the US government is providing an expansionary fiscal package. Thus, one may argue, there is not only a typical relation between fiscal cycles and political cycles, as stated by Alesina *et alii* (2008) with relation to different institutional contexts, but a certain relation between fiscal policy and credit cycles could be observed as well, whilst this kind of relationship is not considered in the theoretical literature on credit cycles (Kiyotaki and Moore, 1997). This paper will try to explore and verify empirically some hypotheses on the relations between credit cycles and fiscal policy emerging from the positive observation of the Italian banking system in the long run. The key hypothesis is related to previous analysis of the procyclicality of the Italian banking system and fiscal policy (Brambilla and Piluso, 2007; Ricciuti, 2008). The paper is organised as follows: a first section will deal with the current literature on the procyclicality of the banking and financial sectors; a second one will show and discuss some general trends in the behaviour of the Italian banking system in the long period, from 1890 to 1973, and why this could be considered an interesting case for evaluating correlations, if any, with fiscal policies all over the business cycle. Section three will present both data and methodologies here used to verify some key hypotheses on the relationship between credit cycles and fiscal policies in the long run. Finally, some general conclusions will be drawn from this specific national experience.

1. Are banking system and fiscal policies procyclical in the long run?

The procyclicality of credit in relation with economic dynamics has recently gained a certain momentum in the literature as a specific macroeconomic theme as a consequence of the increasing interest arising from central bankers and lawmakers for its several prudential and regulatory implications (Kaminsky, 1999; Logan, 2000; Berger and Udell, 2002; Bliss and Kaufman, 2003). Some authors directly related their studies on credit procyclicality to the risk-capital requirements proposed by the Basel Committee on Banking Supervision (Krainer, 2002; Altman *et alii*, 2005; Goodhart *et*

alii, 2004). The topic is apparently related to credit-risk models and to the relative efficiency of borrowers screening models over economic fluctuations. It deals with defining the best incentives to develop prudential tools (Jimenez and Saurina, 2005), while an explicit counter-cyclical hypothesis is less generally considered (Bernanke *et alii*, 1998). The prescriptive goal of these studies is quite explicit. The more or less explicit starting point it that ineffectiveness in managing credit risks and boosting risky loans in the expansionary phase of the business cycle could damage the economic growth in the long term. In fact, a typical effect of the huge increase in the bank lending during the upturn phase is the tendency to the worsening of capital allocation by the banking system. In contrast, banks tend to rationing credit even to the best borrowers during the downturn phase of the cycle. Thus, it is highly probable that a credit crunch occurs with tough effects on investments and, as a consequence, on the pace of the economic growth (Demirguç-Kunt and Levine, 2001).

Even if a growing number of empirical studies on the procyclicality of financial and banking systems have been published, it remains rather hard to assess this complex phenomenon over the long period. As Benjamin Friedman already stressed twenty years ago, it is not simple to generalise findings relating to some specific period (Friedman, 1988). Indeed, one of the most difficult point to evaluate is the role of the change occurred in the main characteristics of business and trade cycles, banking crises, and financial regulation. As Barry Eichengreen and Michael Bordo (2001) have more recently observed, we can recognise at least four different main periods in the 120 years from 1880 onwards: 1880-1913, 1919-1939, 1945-1971, and 1973-1997. These periods profoundly differ for the relative intensity and frequency of bank crises, for the nature, or the absence, of financial regulation, for diversity of inflation rates and exchange rates regimes, on the financial side; for the variation of the growth rate of productivity and output, for relevant distinctions of tendencies in trade cycles, on the real economy side. According to Eichengreen and Bordo, up to 1913 the richest countries and developing economies experienced a substantially low, even if increasing, inflation and a relative stability of exchange rates, frequent and recurrent banking crises were faced by light bank supervision and regulation. On the contrary, the second period was characterised by increasing monetary instability and banking crises, critical phenomena followed by the emergence of a rather rigid regulation, whilst dramatic economic fluctuations were

accompanied by a harsh reduction in the international trade. In the third period in most advanced and developing economies bank lending was seriously constrained by credit controls in the aggregate and, frequently, forced towards preferred manufacturing and exporting sectors, while inflation became more and more rampant and, at the end of the period, exchange rates fluctuated and investments were gradually dwarfed by shocks in the oil and raw materials supply (Bordo *et alii*, 2001; Eichengreen and Bordo, 2003).

The current analysis on prociclicality is mostly concerned on relatively short and medium term periods. This approach has almost two main effects on the results: first, it is quite apparent that significant changes in regulation or in the nature of the business cycles are not considered; second, a long-period analysis on distinct individual national cases, whose banking system was significantly altered by regulation after a major crisis, may offer some innovative perspective on the phenomenon. A first attempt to analyse credit fluctuations over business cycles in the long run has recently been done for the Italian case. Business cycles and the banking sector have been considered over a quasi-century period (1890-1973), during which major changes in the economic structure and one institutional break occurred with major effects on the regulatory scheme. According to its main empirical findings, banking system's cycles appear strongly correlated with business fluctuations, both for size (measured through banks' total assets as a proxy) and activities (credit supply is measured through a loans-on-liabilities ratio as a proxy), even if the profitability of the banking sector is not correlated to business cycles at all (even if measured as a long term profitability through variations of capital requirements, i.e. net worth capital). The smoothing process over the cycles emerging after a structural break, more or less in the middle of our time series, suggests that some role could be recognised for the large upsurge in public spending as an increasing component of the aggregate demand after the Second World War (Brambilla and Piluso, 2007).[1]

This is an interesting point that may suggest a new perspective on the complex relation between banks and government over the business cycle, as economic literature usually tends to relate the procyclicality of the banking system, or financial systems, to regulation (Bernauer and Koubi, 2004; White, 2006) or to monetary policy (Toolsema, 2004). The paper analyses the relations between the banking system fluctuations, on one

[1] The Italian case has been considered in the short and medium run by other authors relatively recently; there are three studies available: Gambacorta and Mistrulli, 2003; Quagliariello, 2006; Filosa 2007. Both the two latter ones use a VAR approach as we do.

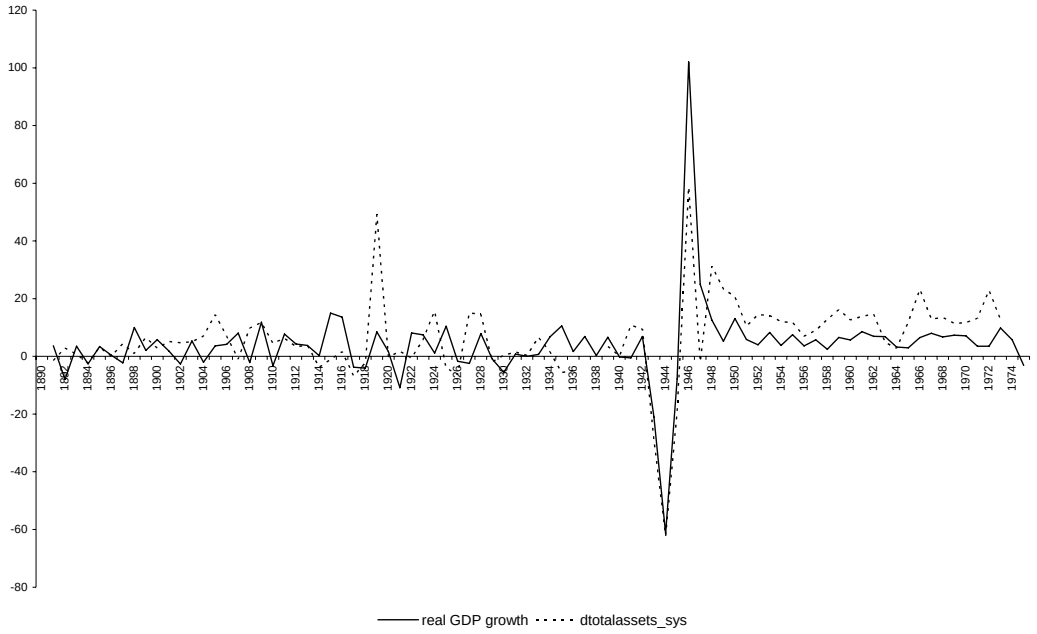
hand, and taxation and public spending dynamics, on the other one, by using a VAR methodology. We have found significant correlation between government spending on the loans-to-liabilities ratio and on total assets variations for the whole banking system. Using the primary surplus, an indicator of expansionary or restrictive fiscal policy and government debt as fiscal variables, we find that primary surplus, in contrast with debt, has a short-term effect on banking behaviour when the banking system is considered as whole. When turning our attention to the relatively small subset of saving banks we find that government expenditure has a significantly negative effect on the loans-to-liabilities ratio. Instead there are no effects on total assets, whilst taxes have significantly negative effects on loans and total assets. Saving banks, therefore, seem more affected by fiscal policy than the whole banking system and, in particular, they are negatively affected by taxes. These findings are rather consistent with the semi-public nature of this group of more prudent financial institutions according to the Italian regulatory scheme prevailing over the entire period. Finally, it is rather noteworthy that, according to our estimates, both banking and fiscal procyclicality emerged in the long run, even if some major regulatory and political changes occurred.

2. Stylised facts on the Italian banking system and fiscal policy

From its very beginning, after the Unification promoted by Piedmont in 1861, the Italian banking system experienced several recurrent crises until the adoption of a rigid regulatory scheme in the mid-1930s, whilst fiscal policies were rather erratic under different political regimes. Banking crises did not cause serious operational restriction throughout supervision and regulation until the 1920s. Even if governments and central authorities did not intervene directly in regulating banking behaviour for a long time, government was repeatedly forced to bail out a number of banks and cooperative banks through the indirect support of the main bank of issue, whenever *Banca Nazionale nel Regno d'Italia* re-financed failing banks by obtaining a favourable tax regime on the exceeding share of note issuing (Luzzatto, 1968). This practice of bailing out banks in troubles had some negative effects on public finances, even if it has been recognised by scholars only at a micro level up to now (Pantaleoni, 1895; Confalonieri, 1975). Even though a certain relation between banking bail-outs and fiscal policy has been observed in some case-studies, there are no quantitative assessments of this phenomenon. Neither

there is any tentative evaluation of fiscal policies adopted by governments in order to stimulate the real economy when some financial failure could negatively affect the pace of growth. The smoothing effect emerging on the dynamics of both credit cycles and business cycles after the Second World War, just when public spending became an increasing relevant share of the aggregate demand and when a tough financial regulation was introduced, may suggest that there could be interesting and significant relations between them (as we can see in chart 1) (Brambilla and Piluso, 2007).

Chart 1. Real GDP growth and variations of total assets of the banking system (1890-1973)



In fact, these time series present a remarkable change in the second half of the 1940s when the Banking Law of 1936 became really effective after the autarky and the Second World War. The GDP growth rate in the economic miracle period was less volatile as well, with a minor slow in 1964. Both business and credit cycles became more stable, most likely because of expansionary fiscal policies related to the Keynesian mood then prevailing in Europe and in the USA (Cohn and Federico, 2001). A more regulated banking sector and gradually expansionary fiscal policies from the early 1950s seem to suggest that there is a certain correlation between them, at least in that period of high economic growth, low inflation and increasing aggregate demand at least

partly drawn by growing public spending and, mostly, exports[2] (Delli Gatti *et alii*, 2003).

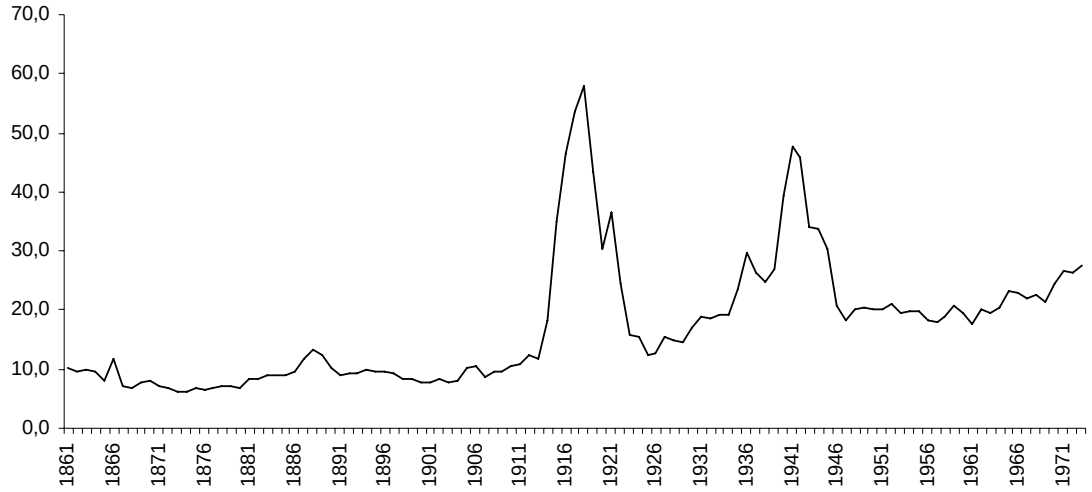
As it has been observed, from the Unification to the European integration of the 1980s Italian public finance was dominated by a long run fiscal rule largely accepted and pursued by even very differently oriented governments, such as liberal or fascist, or post-war centre-left/centre-right democratic coalitions. All over the period governments engaged themselves in putting public finance in balance (Ricciuti, 2008). Another view on the Italian fiscal history maintains that the fiscal dominance of the monetary policy was a long term feature of the Italian economy, only broken in the early 1980s when the Bank of Italy acquired a substantial independence in setting the monetary policy (Spinelli and Fratianni, 2001). Thus, if in the long period fiscal policies appeared to be constantly oriented to the balance, banking regulation was significantly revised after a remarkable series of crises and failures in the mid-1930s. Nevertheless, procyclicality emerges from our estimates: banking variables of the overall size of the sector and of the whole offer of credit are correlated to real variables of income and investments[3] (Brambilla and Piluso, 2007).

The micro-analysis has shown that banking crises and failures were generally faced by recurring to tolerant monetary policy measures. By strongly refinancing banks in troubles in order to avoid their failure, the Bank of Italy related its stabilisation policy to fiscal dynamics via variations on the taxation regime of the money supply exceeding reserve standards (Toniolo, 1978 and 1980; Bonelli, 1991). Thus, major bail-outs produced an expansionary fiscal policy with an impact on the public debt. Oddly enough, our estimates do not show any significant correlation between banking variables and monetary ones. Indeed, it may be argued that the true mechanics depicted above it is more like to work when banking variables and fiscal variables are estimated. In fact, this is what we can observe, even if there is a certain difference between periods about the frequency and the strength of banking crises and bankruptcies. In the first part of the period, when universal banks were operating predominantly all the major crises occurred (in 1892-93, 1907, 1914, 1921, 1923, 1928, 1932-33) hitting the largest banks

[2] The role of exports as a leading force of the so-called economic miracle has been criticised nearly forty years ago by Ciocca, Roccas, 197*.
[3] The latter ones are particularly sensitive in the subset of the investments in construction and public works

and either a high number of local banks (Bonelli, 1971 and 1991; Confalonieri, 1974-1976, 1980-1982, 1994; Toniolo, 1993 and 1995). In these decades governments pursued the balance among their most important objectives, even if some exceptions to the rule were experienced during periods of war, such as at the eve of the First World War. As plotted in Chart 2, the government expenditure over GDP ratio was completely out of control only during the two world wars and the autarky in the second part of the 1930s, when it peaked up to over 40% (Chart 2).

Chart 2. Government expenditure over GDP ratio, percentage (1890-1973)



It is noteworthy that after the Second World War this variable tended to stay over the average of the previous period. Along all the 1950s and 1960s government spending over the GDP ratio gained a steady double digit value, a trend initially loomed in the late 1920s. The debt over GDP ratio has a different movement over the long period. This variable tends to decline sharply when economic growth gained a momentum, which is in the first decade of the century and in the 1950s and 1960s. A long period of high growth and increasing public spending during the Golden age seems to be associated to a certain stability within the banking system (see Charts 1, 2 and 3).

Chart 3. Government debt over GDP ratio, percentage (1890-1973)

Indeed, during the Golden age the Italian banking system did not experience any serious banking crisis, except the failure of a semi-public institution, heavily involved in a political scandal: the bankruptcy of the *Banco di Santo Spirito* was silently faced by a *de facto* bail-out in 1963-1964. The subsequent significant crisis occurred only after the end of our series, in 1980, when *Banco Ambrosiano*, involved in a political scandal and in a currency turmoil which produced some huge write-offs, failed without any serious intervention by central monetary authorities (Bellavite Pellegrini, 2002).

As fiscal policy is positively correlated with investments, in particular growth in public expenditures foster investments, it is easy to suppose that some relations between banking behaviour and fiscal policy could be each other related via investments' cycles.

3. Data, methodology and sources

We analyse the relationship between fiscal and banking variables. In the latter variables include the log of government spending over GDP (*LogGovGdp*), the log of taxes over GDP (*LogTaxGdp*), the log of government debt over GDP (*LogDebtGdp*), and the primary budget surplus over GDP (*SurGdp*). These data are taken from Fratianni and Spinelli (2001). Banking data are collected from balance-sheets figures from three different databases realised by the Bank of Italy, reclassified to get

homogeneous data (Cotula *et alii*, 1996; Banca d'Italia, 1937-1975).[4] As we lack of information on interest rates applied to different borrowers (by size, sector, ownership) and on non-performing loans we employ rougher indicators as proxies: i) total assets, as a proxy of credit supply as a whole in order to evaluate effects of cycles on the size of the entire sector; ii) the loans over liabilities ratio is here used to measure the rate of intermediation; iii) the liquidity of the system is a proxy aiming to have a control of credit crunch. In particular, we consider the behaviour of the whole banking system and the behaviour of a subset, Savings and Loans. *LogLoanssys* and *LogLoan_s&l* are the logs of loans on total liabilities both from the whole system and from the subset of Savings and Loans, respectively, while *Gtotalassetssys* and *Gtotalassets_s&l* refer to the growth of total assets of the banking system and of Savings and Loans: finally, *LogLiqsys* is the overall liquidity of the banking system**.** For real variables (gross domestic product and investments as a whole) we use historical estimates and series provided by Rossi *et alii* (1993).[5] *Realinvgrowth* is the growth of real investments**.** Data are in logs because a Wierner process cannot be bounded.

We are interested in the relationship between fiscal and banking variables, therefore we estimate an unrestricted VAR. We take this agnostic choice because, as seen in section 1, there is no explicit theory linking these variables, therefore we place ourselves in the position of looking at what the data say. The VAR has the following form:

$$y_t = A_1 t_{t-1} + ... + A_p y_{t-p} + u_t \qquad (1)$$

where $y_t = (y_{1t},...,y_{Kt})$ is a set of K time series variables, the A_i's are $(K \times K)$ coefficient matrices and u_t is an unobservable error term. The lag-length is selected according to the Akaike Information Criterion (AIC, thereafter). VAR estimates are then used to detect Granger-causality.

[4] The first part of our series is based on Cotula *et alii* (1890-1936), while the other parts are depending on historical statistics publicly provided by the Bank of Italy (1937-1965) and by the *Bollettino bimestrale* every two months by the same institution (1966-1973).

[5] There are more updated reconstructions of Italian historical national accounts (Fenoaltea, 2005) but they consider only a subset of the time-span we have considered. For homogeneity we decided to use the estimates by Rossi *et alii* (1993).

4. Results

Stochastic properties of the series

The first step of the analysis is the assessment of the stochastic properties of the series. We perform this task by using two tests: the Augmented Dickey-Fuller (ADF) in which the null hypothesis is unit root against the alternative of stationarity (Dickey and Fuller, 1979), and the KPSS test proposed by Kwiatkowski *et alii*. (1992) where the null hypothesis is stationarity against the alternative of unit root. Ideally, rejection of the null in the first test should be confirmed by non rejection of the null in the second (and vice versa), leading to a consistent result.

Table 1 reports the specifications and the results of the two tests. For the ADF test the lag-length is determined according to the Akaike Information Criterion, searching for up to 10 lags. The time trend is included according to its significance in the estimations. The lag-length for the KPSS test is set equal to 2 by default. The trend is included when it is used in the relevant ADF test.

Table 1 – Unit root tests

Variable	ADF			KPSS	Verdict
	Lag-length	Trend	Test statistics		
Gtotalassetssys	1	Y	-6.5209	0.1058	Stationary
Gtotalassets_s&l	0	N	-5.8265	0.1049	Stationary
LogGovGdp	3	Y	-3.1400	0.2687	Non-stationary
LogDebtGdp	2	Y	-2.8780	0.2651	Non-stationary
LogLiqsys	2	Y	-2.8780	0.3456	Non-stationary
LogLoan_ s&l	1	Y	-3.8681	0.2066	Stationary
LogLoansys	2	N	-2.4057	0.2035	Non-stationary
LogTaxGdp	3	Y	-3.8321	0.0826	Stationary
Realinvgrowth	1	N	-7.1159	0.0821	Stationary
SurGdp	4	N	-2.9710	0.2430	Stationary

For the ADF test with trend critical values are: -3.96, -3.41, -3.13, while for the test without trend are they are -3.43, -2.86, and -2.57 at the 1%, 5% and 10% significance levels, respectively. For the KPSS test critical values for mean stationarity are 0.347, 0.463, 0.739, whereas for trend stationarity they are: 0.119, 0.146, and 0.216 at the 10%, 5% and 1% significance levels, respectively. The column trend indicates the inclusion (or not) of a trend in the tests.

For all the series but one we got consistent results. For example, in the case of *Gtotalassetssys*, *Gtotalassets_s&l*, *LogLoan_s&l* and *Realinvgrowth* we can reject the null of non-stationarity in the ADF test at the 1% significance level, and the KPSS does

not reject the null of stationarity. For *LogTaxGdp* and *SurGdp*, we reject the null of unit root at the 5% significance level in the ADF test, and cannot reject stationarity in the KPSS test. Therefore, we conclude that these series are I(0). In contrast, for *LogDbtGdp* and *LogLiqSys* we cannot reject the null of unit root, and we do reject the null of stationarity in the KPSS test at the 1% level. The same applies to *LogLoansys*, where the null of stationarity is rejected at the 5% level. Therefore, we conclude that these series are I(1).

The only case in which there is some inconsistency between the ADF and the KPSS tests is for *LogGovGdp*: the former test rejects non-stationarity at the 10% significance level, whereas the latter rejects stationarity at the 1% level. We conclude that the risk of mistakenly assuming that *LogGovGdp* is stationary is higher than supposing that the series is I(1). For all the series that are non-stationary we take their first-differences in the VAR.

VAR and Granger-causality analysis

Table 2 considers the VAR between *DLogGovGdp*, *LogtaxGdp*, *Gtotalassetssys* and *DLogLoansys*.[6] In these estimations we are interested in the effects of fiscal policy on the whole banking system. The AIC suggests using three lags. The two fiscal variables show different effects: government spending significantly impacts on banking activity with one or two lags. In particular, government spending substitutes loans one year after an increase in government spending, while after two years both variables increase. The effect on the growth of total assets is negative at lag two. In contrast, taxes are never significant.[7]

Table 3 replicates the analysis of Table 2, substituting the growth of total assets with the growth of total investments, a measure of demand for loans from firms. In this case the suggested optimal number of lags is four. The effect of fiscal variables on the growth of real investments is stronger than on the growth of total assets: an increase in government spending has a negative effect at lag one, and positive at lag four; an increase in taxes has a negative effect on at lags two, three and four. As in Table 2, taxes do not affect loans, in contrast government spending does.

[6] For this and the following estimates we have also included a dummy for the two World Wars, but results do not substantially change. Results are available upon request.
[7] Impulse response functions for all the VARs are available upon request.

In Table 4 we include on the fiscal side the size of government debt, and the primary surplus, an indicator of expansionary/restrictive fiscal policy. Primary surplus, in contrast with debt, has a short-term effect on banking behaviour: while surplus is significant at lags one and two, debt is significant at lags two and three.

Table 2 – VAR between government spending, taxes, growth of assets and loans

	DLogGovGdp	LogTaxGdp	Gtotalassetssys	DLogLoansys
DLogGovGdp	0.541	0.133	14.063	-5.346
(t-1)	(0.000)	(0.123)	(0.139)	(0.010)
LogTaxGdp	-0.332	0.785	-8.906	0.289
(t-1)	(0.154)	(0.000)	(0.606)	(0.939)
Gtotalassetssys	-0.002	-0.003	-0.045	0.000
(t-1)	(0.333)	(0.037)	(0.752)	(0.988)
DLogLoansys	-0.007	-0.020	-3.524	0.363
(t-1)	(0.428)	(0.001)	(0.000)	(0.017)
DLogGovGdp	-0.197	-0.114	-17.710	5.748
(t-2)	(0.161)	(0.225)	(0.088)	(0.012)
LogTaxGdp	0.500	0.077	-5.280	-1.872
(t-2)	(0.111)	(0.715)	(0.820)	(0.713)
Gtotalassetssys	0.002	-0.001	-0.086	0.003
(t-2)	(0.217)	(0.534)	(0.563)	(0.933)
DLogLoansys	-0.005	-0.002	1.502	-0.512
(t-2)	(0.587)	(0.757)	(0.029)	(0.001)
DLogGovGdp	0.175	-0.007	5.459	1.871
(t-3)	(0.150)	(0.936)	(0.544)	(0.343)
LogTaxGdp	-0.207	-0.057	4.599	5.571
(t-3)	(0.373)	(0.716)	(0.789)	(0.140)
Gtotalassetssys	-0.001	0.001	-0.089	0.022
(t-3)	(0.677)	(0.526)	(0.508)	(0.467)
DLogLoansys	0.001	-0.005	-2.066	-0.103
(t-3)	(0.893)	(0.392)	(0.003)	(0.504)
Const	0.115	0.499	26.081	-9.636
	(0.682)	(0.008)	(0.208)	(0.034)
Trend	0.000	0.002	0.199	-0.033
	(0.917)	(0.026)	(0.009)	(0.047)
Log Likelihood	-340.3747			
Determinant (Cov)	0.05830			
AIC	-1.4421			
T	80			

Numbers in parentheses are p-values.

Table 3 – VAR between government spending, taxes, investments' growth, and loans

	DLogGovGdp	LogTaxGdp	RealInvgrowth	DLogLoansys
DLogGovGdp	0.624	0.184	-41.354	-6.572
(t-1)	(0.000)	(0.055)	(0.028)	(0.003)
LogTaxGdp	-0.572	0.700	35.832	-1.319
(t-1)	(0.025)	(0.000)	(0.251)	(0.716)
RealInvgrowth	-0.001	-0.001	-0.076	0.002
(t-1)	(0.455)	(0.213)	(0.627)	(0.903)
DLogLoansys	-0.012	-0.016	-5.539	0.364
(t-1)	(0.338)	(0.034)	(0.000)	(0.038)
DLogGovGdp	-0.392	-0.158	0.450	6.688
(t-2)	(0.043)	(0.188)	(0.985)	(0.015)
LogTaxGdp	0.818	0.132	-118.310	-2.871
(t-2)	(0.015)	(0.529)	(0.004)	(0.550)
RealInvgrowth	0.001	0.002	0.204	-0.050
(t-2)	(0.667)	(0.057)	(0.190)	(0.005)
DLogLoansys	-0.009	0.005	10.080	-0.865
(t-2)	(0.553)	(0.606)	(0.000)	(0.000)
DLogGovGdp	0.408	0.026	-35.652	-0.766
(t-3)	(0.043)	(0.835)	(0.148)	(0.789)
LogTaxGdp	-0.660	0.106	171.928	2.295
(t-3)	(0.082)	(0.654)	(0.000)	(0.670)
RealInvgrowth	-0.001	0.000	-0.002	0.022
(t-3)	(0.259)	(0.752)	(0.992)	(0.206)
DLogLoansys	-0.006	0.010	4.051	-0.391
(t-3)	(0.733)	(0.374)	(0.065)	(0.125)
DLogGovGdp	-0.437	-0.178	44.813	5.101
(t-4)	(0.020)	(0.127)	(0.051)	(0.055)
LogTaxGdp	0.744	0.090	-126.785	-0.995
(t-4)	(0.076)	(0.729)	(0.014)	(0.867)
RealInvgrowth	-0.001	0.000	0.092	-0.014
(t-4)	(0.474)	(0.955)	(0.525)	(0.401)
DLogLoansys	-0.011	-0.011	1.689	0.260
(t-4)	(0.510)	(0.293)	(0.417)	(0.283)
Const	0.513	0.884	140.697	-12.646
	(0.270)	(0.002)	(0.013)	(0.056)
Trend	0.001	0.002	0.463	-0.040
	(0.481)	(0.011)	(0.011)	(0.062)
Log Likelihood	-379.9004			
Determinant (Cov)	0.25817			
AIC	1.3472			
T	79			

Numbers in parentheses are p-values.

Table 4 – VAR between, debt, primary surplus, growth of assets and loans.

	DLogDbtGdp	SurGdp	Gtotalassetssys	DLogLoansys
DLogDbtGdp	0.043	7.283	4.757	-1.309
(t-1)	(0.698)	(0.053)	(0.651)	(0.561)
SurGdp	-0.005	1.433	-0.827	0.254
(t-1)	(0.190)	(0.000)	(0.030)	(0.002)
Gtotalassetssys	0.004	0.039	0.021	-0.046
(t-1)	(0.030)	(0.487)	(0.892)	(0.166)
DLogLoansys	0.015	-0.169	-4.213	0.474
(t-1)	(0.052)	(0.506)	(0.000)	(0.002)
DLogDbtGdp	0.255	-5.780	-18.191	3.081
(t-2)	(0.015)	(0.106)	(0.069)	(0.150)
SurGdp	0.005	-0.675	2.046	-0.567
(t-2)	(0.509)	(0.007)	(0.003)	(0.000)
Gtotalassetssys	0.002	-0.165	-0.392	0.062
(t-2)	(0.188)	(0.005)	(0.018)	(0.079)
DLogLoansys	-0.010	-0.110	1.842	-0.542
(t-2)	(0.214)	(0.686)	(0.016)	(0.001)
DLogDbtGdp	-0.049	1.414	8.163	-2.043
(t-3)	(0.620)	(0.675)	(0.387)	(0.312)
SurGdp	-0.008	0.280	-1.789	0.227
(t-3)	(0.310)	(0.280)	(0.014)	(0.144)
Gtotalassetssys	0.001	0.129	0.033	0.036
(t-3)	(0.662)	(0.040)	(0.848)	(0.331)
DLogLoansys	0.030	-0.117	-2.791	0.112
(t-3)	(0.000)	(0.650)	(0.000)	(0.468)
DLogDbtGdp	0.182	0.394	-16.065	4.366
(t-4)	(0.053)	(0.902)	(0.072)	(0.022)
SurGdp	0.007	-0.207	0.507	0.094
(t-4)	(0.108)	(0.139)	(0.197)	(0.261)
Gtotalassetssys	0.003	0.018	0.220	-0.005
(t-4)	(0.121)	(0.760)	(0.176)	(0.882)
DLogLoansys	-0.028	0.173	0.966	-0.091
(t-4)	(0.001)	(0.534)	(0.216)	(0.586)
Const	-0.024	-0.443	2.105	0.283
	(0.094)	(0.650)	(0.042)	(0.629)
Trend	-0.001	-0.009	0.112	-0.008
	(0.113)	(0.691)	(0.075)	(0.037)
Log Likelihood	-594.0792			
Determinant (Cov)	48.487			
AIC	5.7041			
T	79			

Numbers in parentheses are p-values.

Table 5 – VAR between government spending, taxes, growth of assets and S&L loans.

	DLogGovGdp	LogTaxGdp	Gtotalassets_ s&l	LogLoan_ s&l
DLogGovGdp	0.446	0.031	5.362	-0.171
(t-1)	(0.001)	(0.752)	(0.653)	(0.001)
LogTaxGdp	-0.445	0.760	10.118	-0.018
(t-1)	(0.024)	(0.000)	(0.549)	(0.799)
Gtotalassets_ s&l	-0.001	0.000	0.294	0.003
(t-1)	(0.431)	(0.853)	(0.037)	(0.000)
LogLoan_ s&l	0.855	0.417	20.159	1.184
(t-1)	(0.017)	(0.096)	(0.510)	(0.000)
DLogGovGdp	-0.073	0.015	10.054	-0.057
(t-2)	(0.627)	(0.889)	(0.433)	(0.287)
LogTaxGdp	0.641	-0.025	-48.373	-0.162
(t-2)	(0.015)	(0.894)	(0.031)	(0.081)
Gtotalassets_ s&l	-0.002	-0.003	-0.110	-0.002
(t-2)	(0.394)	(0.031)	(0.479)	(0.003)
LogLoan_ s&l	0.008	0.072	31.281	-0.364
(t-2)	(0.990)	(0.864)	(0.541)	(0.086)
DLogGovGdp	0.464	0.005	-13.690	-0.170
(t-3)	(0.002)	(0.962)	(0.279)	(0.001)
LogTaxGdp	-0.325	0.453	89.133	0.160
(t-3)	(0.247)	(0.022)	(0.000)	(0.108)
Gtotalassets_ s&l	0.000	-0.003	-0.389	-0.001
(t-3)	(0.822)	(0.029)	(0.022)	(0.249)
LogLoan_ s&l	-0.616	-0.107	-42.771	-0.041
(t-3)	(0.288)	(0.793)	(0.389)	(0.841)
DLogGovGdp	-0.075	0.050	9.499	0.025
(t-4)	(0.551)	(0.575)	(0.379)	(0.570)
LogTaxGdp	0.222	-0.345	-50.541	-0.153
(t-4)	(0.291)	(0.020)	(0.005)	(0.040)
Gtotalassets_ s&l	0.001	0.000	0.242	0.000
(t-4)	(0.609)	(0.918)	(0.123)	(0.522)
LogLoan_ s&l	0.114	-0.185	-14.865	0.212
(t-4)	(0.733)	(0.432)	(0.604)	(0.074)
Const	-1.562	-0.340	22.337	0.480
	(0.003)	(0.350)	(0.614)	(0.009)
Trend	-0.001	0.001	0.118	0.001
	(0.339)	(0.040)	(0.158)	(0.018)
Log Likelihood	41.29588			
Determinant (Cov)	0.03388			
AIC	-8.4698			
T	79			

Numbers in parentheses are p-values.

Table 5 considers the variables *DLogGovGdp*, *LogtaxGdp*, *Gtotalassets_s&l* and *LogLoan_s&l*, turning our attention to the subset of Savings and Loans. In this case the number of lags suggested by the AIC is four. The results are quite different form the previous ones: government expenditure has a significantly negative effect on loans at lags two and three; instead there are no effects on total assets. Taxes are significant at

lags two, three and four on loans and total assets, usually with a negative sign. Saving and Loans, therefore, seem more affected by fiscal policy than the whole banking system, in particular they are negatively affected by taxes.

Table 6 reports Granger causality tests for the VARs estimated in the previous tables. We distinguish between Granger causality and Instantaneous Granger causality. Granger (1969) defines a variable y_{2t} to be causal for a variable y_{1t} if it helps to improve the forecasts of the latter. A variable y_2 is defined as instantaneously causal to y_1 if knowing the value of y_2 in the forecast period helps to improve the forecasts of y_1.

The null hypothesis of non-causality is rejected for taxes on government spending, growth of total assets and overall loans, and for debt on government surplus, growth of total assets and overall loans, which confirm the results of the previous VARs showing that taxes and debt do not have significant effect on banking policy. Instantaneous Granger causality cannot be rejected for any of the estimations. Therefore, there may be extremely short-lived effects from taxes and government debt.

Table 6 – Granger causality tests

	Granger causality	Inst. Granger causality
LogGovGdp→ LogTaxGdp, Gtotalassetssys, DlogLoansys	1.8635 (0.0575)	9.2789 (0.0258)
LogTaxGdp → LogGovGdp, Gtotalassetssys, DlogLoansys	1.3133 (0.2297)	39.6650 (0.0000)
LogTaxGdp → LogGovGdp, RealInvGrowth, DLogLoansys	2.5314 (0.0009)	9.8082 (0.0203)
LogGovGdp → LogTaxGdp, RealInvGrowth, DLogLoansys	2.7108 (0.0003)	16.4590 (0.0009)
LogDbtGdp → SurGdp, Gtotalassetssys, DlogLoansys	1.3510 (0.1903)	8.4440 (0.0377)
SurGdp → LogDbtGdp, Gtotalassetssys, DLogLoansys	3.7342 (0.0000)	29.0435 (0.0000)
LogGovGdp→LogTaxGdp, Gtotalassets_s&l, LogLoan_s&l	2.5834 (0.0030)	8.4501 (0.0374)
LogTaxGdp → LogGovGdp, Gtotalassets_s&l, LogLoan_s&l	3.1561 (0.0003)	29.1486 (0.0000)

The lag-length in the first column is the same used in the VARs. Numbers in parentheses are p-values.

Stability

In order to check for the stability of the relationships we have analysed before, it is appropriate to use the CUSUM statistics. For fully unrestricted VAR models with stationary variables, single-equation OLS is efficient and this set of statistics can be

applied (Lütkepohl, 2004). Charts 4-7 show that for all the equations the statistics remain safely within the 5% significance level boundaries, indicating no structural breaks during the period, with the exception of *Gtotalassets_s&l* in Chart 7.

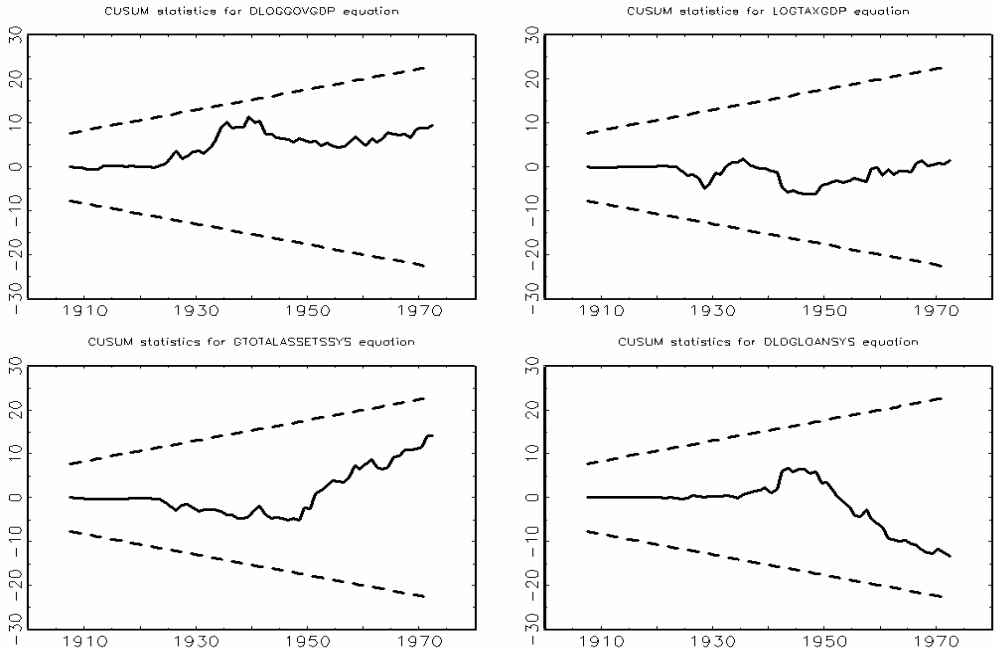


Chart 4. Stability of the VAR between government spending, taxes, growth of assets and loans

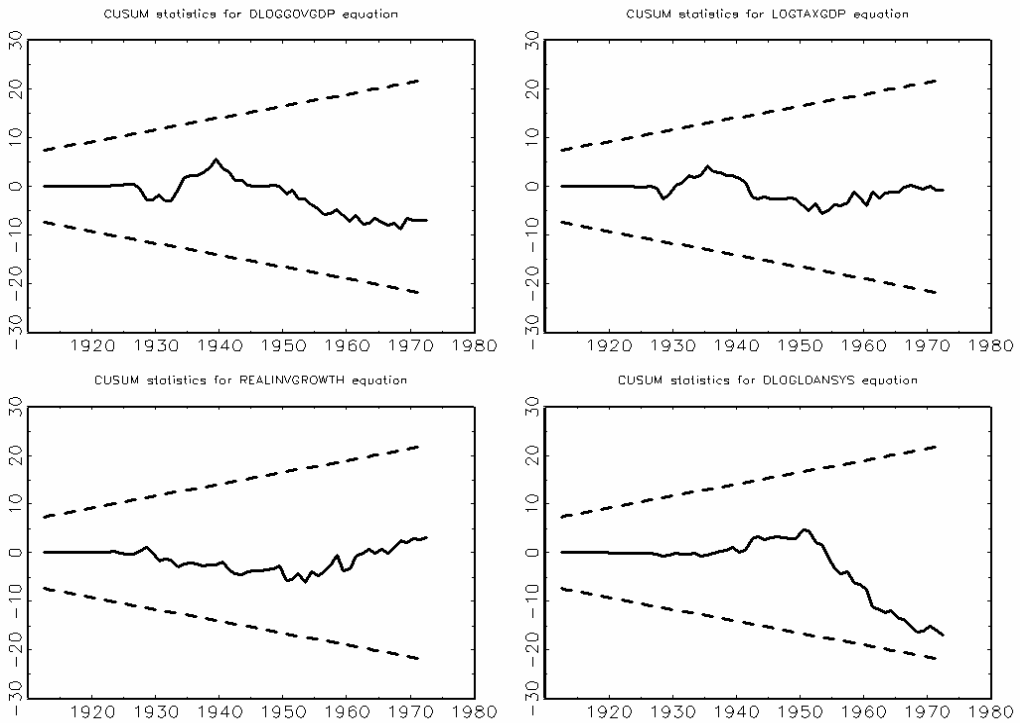


Chart 5. Stability of the VAR between government spending, taxes, growth of investment and loans

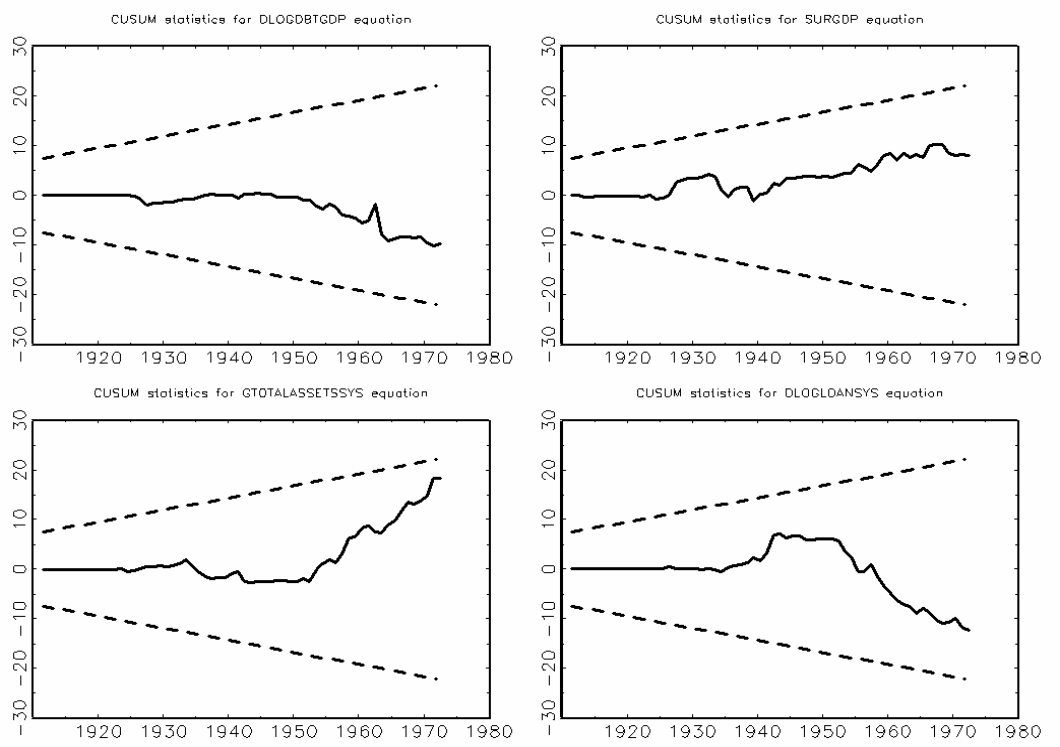


Chart 6. Stability of the VAR between government debt, surplus, growth of assets and loans

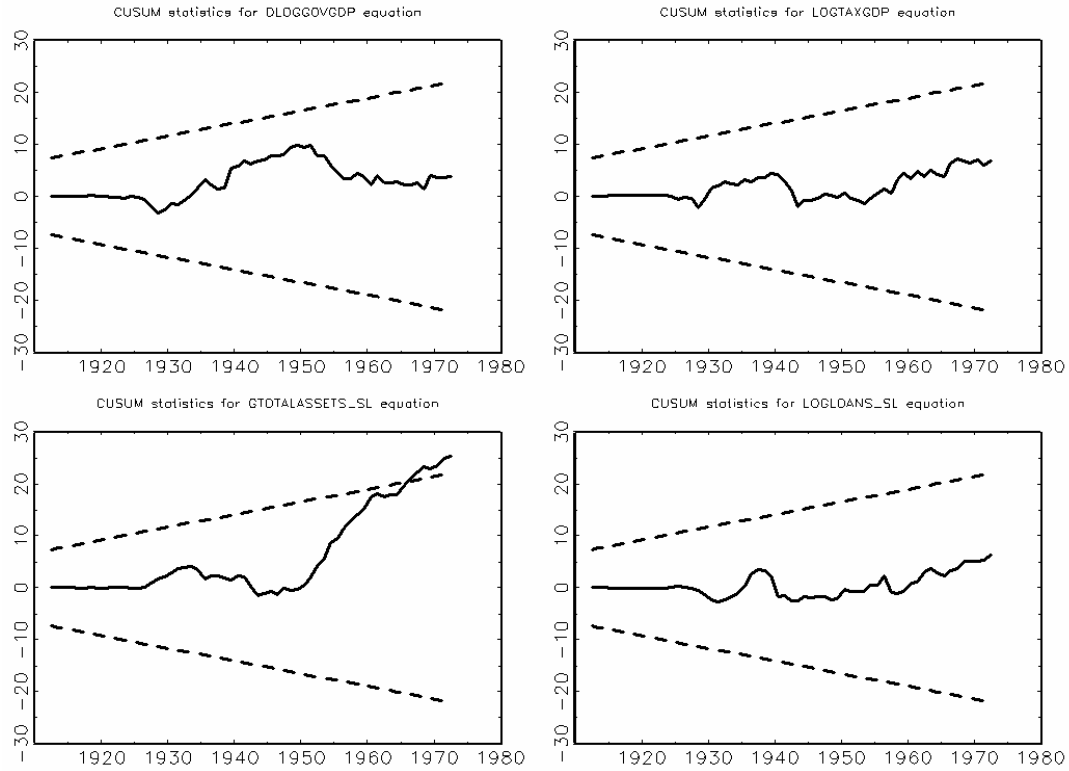


Chart 7. Stability of the VAR between government spending, taxes, growth of asset and loans of S&Ls

5. Conclusions

We have analysed the relations between the banking system fluctuations, on one hand, and taxation and public spending, on the other hand, using a VAR approach. Among our major findings a significant correlation emerges between government spending and loans and total assets for the whole banking system. The primary surplus, an indicator of expansionary/restrictive fiscal policy, has a short-term effect on banking behaviour, as well. Public debt, in contrast, has lasting effects. Turning our attention to the subset of Savings and Loans we find that government expenditure has a significantly negative effect on loans. In contrast, there are no effects on total assets. Taxes have significantly negative effects on loans and total assets. Saving and Loans, therefore, seem more affected by fiscal policy than the whole banking system. The relations we have uncovered appear stable over time.

The VAR approach we have followed here is very simple because of the lack of a clear theory of credit and fiscal policy interrelations. Further research may estimate Structural VARs by explicitly assuming relationships among the variables, and by identifying shocks.

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