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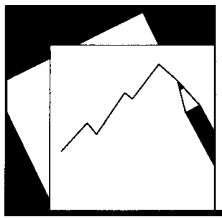

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State-Owned Banks and Fiscal Discipline

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State-Owned Banks and Fiscal Discipline

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Abstract

State-owned banks may help to soften the financing constraints of public sector entities and consequently become a factor that hampers fiscal discipline. Using a panel dataset, we find that a larger presence of state-owned banks in the banking system is associated with more credit to the public sector, larger fiscal deficits, higher public debt ratios, and the crowding out of credit to the private sector. These results suggest that the lending practices of state-owned banks should be carefully assessed in any strategy to pursue fiscal discipline.

JEL Classification Numbers: G21, H60, H81.

Keywords: Soft budget constraint; state-owned banks; fiscal discipline; crowding out.

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I. INTRODUCTION

The participation of governments in the banking system is still common despite the large number of privatizations observed over the last four decades (Sherif and others, 2003). As noted in Inter-American Development Bank (IADB) (2005), the main argument in favor of the existence of state-owned banks is that they can promote the development of certain sectors or regions that would not be served by private banks—the so-called *developmental* view (Gerschenkron, 1962). This view supported the nationalization of commercial banks and the creation of new state-owned banks after World War II. A contrasting view—the *political* one—argues that politicians may use state-owned banks for their own interests and to finance projects that are expected to be repaid with votes from supporters (Krueger, 1974, and Shleifer and Vishny, 1994).

There is an extensive literature on state-owned banks but the relationship between government ownership and fiscal discipline has not been investigated.[2] Most studies on state-owned banks focus on their performance (Levy-Yeyati and others, 2007), the effects on the stability of the financial system (Andrews, 2010), and their impact on economic growth (La-Porta and others, 2002, Andrianova and others, 2009, and Körner and Schnabel, 2010). However, state-owned banks pursue a variety of objectives and may respond to the needs of the government.[3] As a consequence, government's participation in the banking system may end up jeopardizing fiscal discipline by allowing the public sector to access financing that they would not obtain from other sources.

Using a panel dataset for 123 countries, we test whether government's ownership of commercial banks is associated with a relaxed financing constraint for public sector entities, which ultimately leads to the erosion of fiscal discipline. Also, we test whether a greater participation of governments in the banking system crowds out credit to the private sector. We find evidence of larger bank credit to the public sector in economies where the government has greater participation in the banking system. Moreover, the extent to which the government is present in the banking system is associated with larger fiscal deficits and public debt levels. Finally, we present evidence of crowding out of credit to the private sector.

The remainder of the paper is structured as follows. Section II provides a taxonomy of state-owned banks, discusses the roles usually assigned to these institutions, and describes the

[2] Fiscal discipline refers here to the capacity of governments to effectively control the public finances, which may be more difficult in an environment in which there is available financing for repeated slippages in meeting fiscal targets.

[3] The channeling of commercial banks' credit to the government is one of many forms of financial repression. See Shaw (1973), and McKinnon (1973).

hypotheses to be tested. Section III presents some stylized facts and the econometric results as well as robustness checks. Section IV concludes the paper.

II. THE ROLE(S) OF STATE-OWNED BANKS

A. What Is a State-Owned Bank and What It Does

IADB (2005) classifies state-owned banks by looking at the type of operations they perform and whether they act as first- or second-tier banks. In the next paragraph, we follow closely the taxonomy introduced by IADB (2005), which identifies four groups of state-owned financial institutions: retail commercial banks, development banks, quasi-narrow banks, and development agencies.

Retail commercial banks generally have social or development objectives but carry out the same type of operations as private commercial banks. In particular, they collect deposits and use them to give credit to firms and individuals, hence acting as first-tier banks on both the asset and liability sides. In some instances, these entities act as universal or near-universal commercial banks.[4] Development banks do not take deposits from the public, but are funded by multilateral agencies, bond issuances, and/or government transfers. Thus, they operate as second-tier banks on the liability side. On the assets side, they operate as both first- and second-tier banks, as they lend through other banks or directly to firms that operate in specific sectors. In some cases, these institutions are purely financial agents of the government and are involved in the government's structural reforms. Quasi-narrow banks collect deposits from the public (first-tier banks on the liabilities side), and act as second-tier banks on the asset side as they invest in short-term government paper without providing loans to the public. Finally, development agencies do not act as banks as they do not lend nor borrow, but operate with a wide range of instruments to provide guarantees, grants, subsidies, and technical assistance.

This paper focuses on state-owned retail commercial banks, which are typically assigned several objectives (see Levy-Yeyaty, 2004, and World Bank, 2013). These include: i) providing credit to specific sectors; ii) promoting the access to bank services for groups of population or regions not covered by private institutions; iii) mitigating market failures due to the presence of asymmetric information; iv) financing socially valuable (but possibly financially unprofitable) projects; and v) competing with private institutions to try to lower or at least keep at bay the costs of financial intermediation.

[4] If these banks are funded with government transfers or special deposits from the government instead of private deposits, they are called hybrid institutions. Since retail commercial banks often hold government deposits too, the distinction becomes blurred and these institutions can be grouped into the same set.

This diversity of objectives often leads to reduced profitability because these banks provide loans at non-commercial terms or based on non-economic criteria. This, in turn, leads to increased riskiness and misallocation of capital within the economy.[5] Moreover, if the governance in these institutions is weak, profitability is likely to be even lower and non-performing loans higher because they tend to be more sensitive to political interests. For instance, Dinç (2005) finds that lending by state-owned banks is positively related to the electoral cycle. A contrasting view is provided by Andrianova and others (2009), who suggest that state-owned banks can foster growth when they are managed with sound and transparent practices, and by Körner and Schnabel (2010), who argue that public ownership is harmful only if a country has low financial development and low institutional quality.

B. Soft Financing Constraint

An aspect that has gone virtually overlooked in the literature is whether state-owned banks contribute to softening the budget constraint of public sector entities.[6] As explained in Kornai and others (2003), soft budget constraints arise when an entity is not allowed by a supporting agent to cease operations as a result of financial problems, even when its financial conditions deteriorate. A clear example is a loss making public corporation that is repeatedly rescued by means of transfers or fully-fledged bailouts from the government. In this context, the financial support received expands the budget constraint of the failing entity in such a way that it can continue operations.

The case studied in this paper could be labeled with more precision as a "soft *financing* constraint" instead of a "soft *budget* constraint." While the latter refers to a transfer of resources from the government that allows an entity to survive, the former is a more subtle type of support. More specifically, softening the financing constraint refers to the case in which a public sector entity is able to access financing that would not be available if the government was not also the owner of the lender. In other words, if only private sources of financing were available, they could play an effective monitoring role of the financial situation of the public entity, which would face a binding financing constraint or harder financing conditions as soon as its financial soundness or viability were questioned by potential lenders. However, having a financial institution under the ownership of the government may remove such an obstacle. The main feature of the soft financing constraint

[5] There is ample evidence that state-owned banks' performance is generally weaker than in private banks. See for instance, Werbrugge and others (1999), Bonin and others (2003), Caprio and others (2004), Micco and others (2007) and World Bank (2013).

[6] We refer here to any entity in the public sector (central government, local governments, state-owned enterprises, hospitals, universities, and others).

is that there is no direct transfer of resources involved but the availability of credit that would not be obtained otherwise, or that could be obtained only at a higher cost.[7]

The softening of the financing constraint of a strained public entity could also be considered as a way to postpone the softening of the budget constraint. This is the case when the fragile entity still needs a bailout at a future date. Also, it may occur that the state-owned source of financing may weaken to the point that intervention of the government is needed. In both cases, the fiscal imbalances are temporarily hidden in the state-owned financial institution.

State-owned banks may end up being a captive source of financing for the public sector due to an obvious governance problem in their administration, and, as a result, fiscal discipline would be weaker. Consequently, in countries where state-owned banks have a larger presence we should observe larger credit to the public sector, as well as larger fiscal imbalances and higher levels of public debt. Also, relatively less financing to the private sector may be observed, implying some degree of crowding out. These hypotheses are tested in the next section.

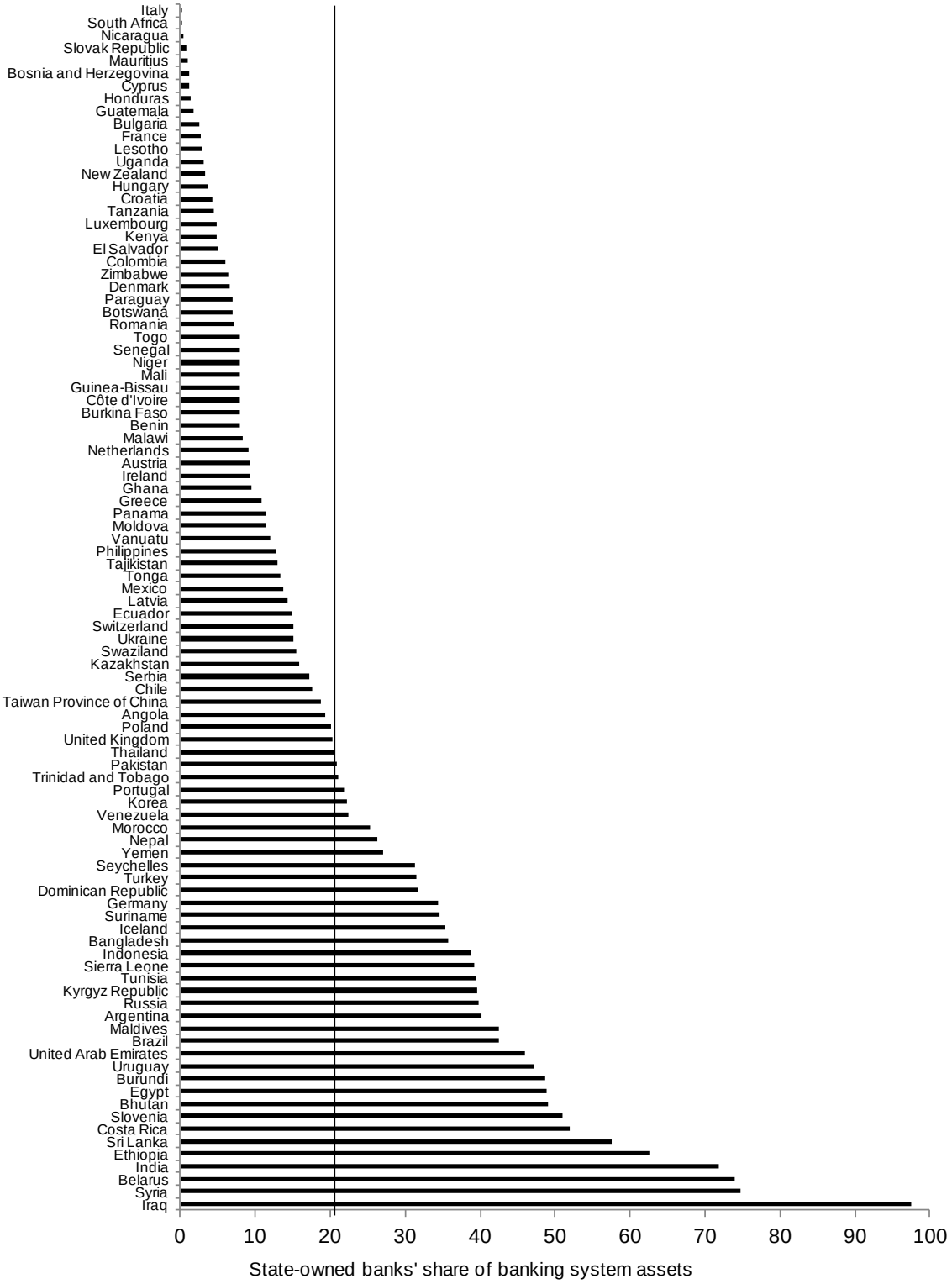
III. EMPIRICAL EVIDENCE

A. Credit to the Public Sector

Government ownership of the banking system can be measured by the share of assets of state-owned banks (institutions where the government owns 50 percent or more equity) as a percent of the banking system's assets. Figure 1 shows that in the 96 countries where the government owns some commercial banks, its ownership of the banking system is sizeable. On average, state-owned banks hold 21 percent of the assets of the banking system. While the average reflects high shares in some countries, the median is still high at 15 percent.

[7] This financing is possible because the boards of state-owned banks often include government officials, even the Minister of Finance, which can make these banks captive sources of financing for the public sector.

Figure 1. Government Ownership of the Banking System
(Average 2008-10)



Source: World Bank, Global Financial Development Report 2013 (Database and Survey).

A descriptive analysis of the data reveals that the higher the government's participation in the banking system, the larger the credit provided to the public sector. Table 1 shows that in a sample of 75 countries, state-owned banks hold on average 20 percent of the banking system's assets and 13 percent of their assets are claims on the public sector.[8] By contrast, in 24 countries where there is no participation of the government in the banking system, the banking system holds on average 9 percent of its assets in the public sector. This relationship is also depicted in Figure 2, which shows a positive and significant relationship between government's participation in the banking system and credit to the public sector as share of total assets.[9] This finding is formally tested below in a multivariate regression framework.

Table 1. Credit to the Public Sector
(Averages 2008-10)

Countries with state-owned banks 1/			Countries without state-owned banks		
Number of countries	Credit to public sector 2/ 3/		Number of countries	Credit to public sector 2/ 3/	
	Mean	Median		Mean	Median
75	13.0	8.4	24	9.0	5.7

Source: World Bank, Global Financial Development Report 2013 (Database and Survey).

1/ In this sample, state-owned banks' assets are on average about 20 percent of total assets of the banking system.

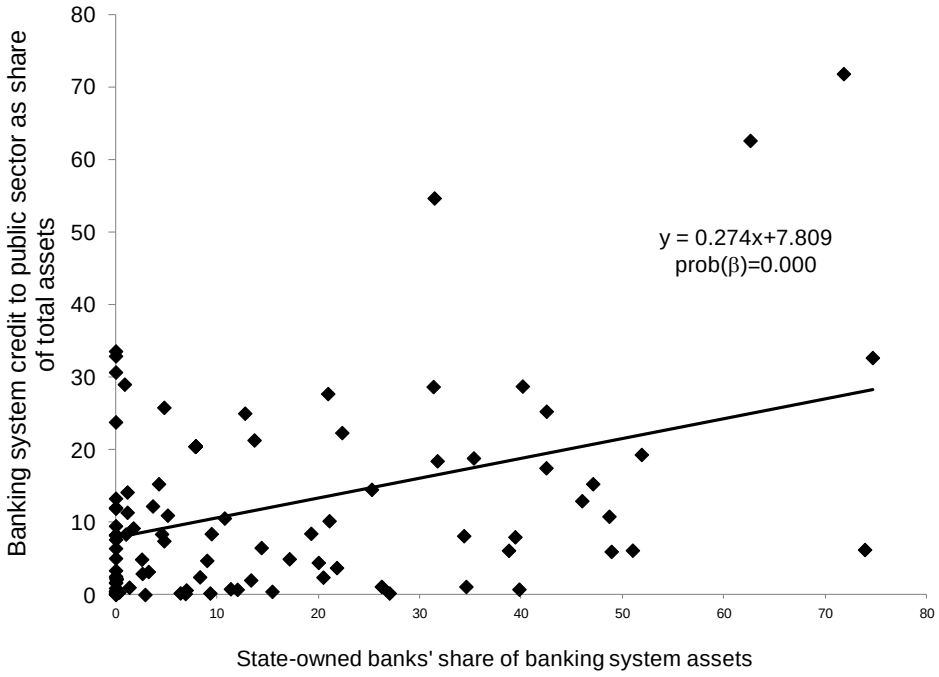
2/ Includes central government, state-owned enterprises and local governments.

3/ As share of assets.

[8] Note that the sample size is smaller than in Figure 1 because for some countries there are no data on credit to the public sector.

[9] Dropping the countries in which the government has no control of the banking system does not affect the slope and significance of the relationship. Hauner (2009) reports a similar finding, although this relationship is not the focus of his paper.

Figure 2. Credit to the Public Sector and Government Ownership of the Banking System
(Averages 2008-10)



In particular, we test whether the government's participation in the banking system is associated with larger amounts of credit to the public sector. We build a panel dataset spanning 123 countries over 2008–10 and estimate the following model:

$$y_{it} = \alpha + \beta \boldsymbol{x}_{it} + \delta \boldsymbol{z}_{it} + v_i + \tau_t + u_{it} \quad (1)$$

where y_{it} represents the ratio of credit to the public sector as a share of total assets of the banking system in the ith country in period t; x_{it} represents the government's ownership of the banking system, which is proxied by the assets of state-owned banks as a share of total assets of the banking system; z_{it} is a vector of covariates generally used in the literature,[10] including lagged real GDP growth, inflation, the overall fiscal balance, gross national savings, real interest rate, broad money as percent of GDP, a multidimensional indicator of governance,[11] and a set of dummies for extreme events as currency crisis, stock market

[10] See for instance Forslund and others (2011).

[11] We use a multidimensional indicator of governance to capture the overall governance environment rather than specific aspects of governance.

crashes, and banking crises.[12] The variable v_i is a set of country-specific effects, τ_t is a set of time-specific effects, and u_{it} is the error term, assumed normally distributed.[13]

Although the period covered in the dataset includes the global financial crisis, we believe that the dataset shape and the empirical strategy reduce the chances of distortions in the results. In particular, the relatively large number of countries (more than a hundred) compared to the observations over time (annual data for 2008–10) implies that the estimation results are derived mainly from cross-country variation rather than from the longitudinal variation. Second, the model incorporates time effects that help alleviate the time-varying effects of the crisis.

We estimate equation (1) by starting from a parsimonious specification that includes only a basic set of regressors such as lagged real GDP growth, inflation, and the government's ownership of the banking system. Then, we extend the model adding one control variable at a time, to check the robustness of the results to the inclusion of control variables and the loss of observations that including new variables implies.

The results of Table 2 suggest that higher government's participation in the banking system is associated with more financing to the public sector. More specifically, the variable representing government's participation in the banking system has a positive and significant sign, and this result is robust to the inclusion of other control variables. Specifically, the estimates suggest that a one percentage point increase in the share of assets of the banking system owned by the government is associated with an increase in the share of credit to the public sector as a percent of total assets ranging between 0.4 and 0.5 percentage points. Among the other regressors, only the indicator of governance turns out to be significant and shows a negative sign as expected. Note that the size of the sample varies markedly over the different specifications but the variable of interest maintains its significance.

[12] A detailed description of the variables used and their sources is provided in Appendix 1.

[13] The Hausman test rejects the null hypothesis that v_i is not correlated with the regressors in almost all the specifications, which suggests the need to estimate the model with fixed effects. We thus only report fixed effects estimation results. In the few cases where the null hypothesis cannot be rejected, we also estimated a random effects model. In these cases, the random effects estimates were similar to those under fixed effects.

Table 2. Regressions of Credit to the Public Sector

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Lagged real GDP growth	0.006	0.004	0.011	-0.066	-0.102	-0.103	-0.053	-0.045	-0.131
	(0.059)	(0.059)	(0.063)	(0.089)	(0.095)	(0.095)	(0.259)	(0.260)	(0.304)
Inflation	0.028	0.027	0.011	-0.045	-0.152	-0.149	0.010	-0.022	-0.076
	(0.023)	(0.023)	(0.057)	(0.188)	(0.198)	(0.198)	(0.389)	(0.394)	(0.408)
Government ownership of banking system	0.389***	0.380***	0.396***	0.363**	0.437**	0.427**	0.548*	0.545*	0.525*
	(0.115)	(0.116)	(0.125)	(0.152)	(0.167)	(0.167)	(0.281)	(0.283)	(0.287)
Overall balance		-0.044	-0.047	-0.110	-0.169	-0.156	0.179	0.178	0.144
		(0.086)	(0.097)	(0.133)	(0.137)	(0.137)	(0.269)	(0.270)	(0.278)
Gross national savings			0.022	0.002	0.036	0.028	-0.260	-0.270	-0.259
			(0.068)	(0.084)	(0.089)	(0.089)	(0.212)	(0.214)	(0.216)
Real interest rate				-0.011	-0.110	-0.098	0.014	0.049	0.016
				(0.172)	(0.181)	(0.182)	(0.304)	(0.309)	(0.317)
Broad money					-0.066	-0.048	-0.026	-0.101	-0.092
					(0.101)	(0.103)	(0.170)	(0.200)	(0.202)
Governance						-1.976	-5.580*	-5.750*	-5.688*
						(1.815)	(3.100)	(3.124)	(3.150)
Currency crisis							-3.981*	-3.461	-3.559
							(2.079)	(2.207)	(2.231)
Stock market crash								-1.615	-1.587
								(2.202)	(2.219)
Banking crisis									3.375
									(5.965)
Constant	4.675**	4.785**	4.652*	5.174	8.196	7.224	11.289	16.676	17.007
	(1.885)	(1.901)	(2.449)	(4.111)	(7.853)	(7.897)	(16.360)	(18.009)	(18.156)
Observations	288	288	272	189	173	173	89	89	89
R-squared	0.193	0.194	0.199	0.215	0.242	0.251	0.347	0.355	0.359
Countries	99	99	94	67	62	62	32	32	32

Notes: Includes country and time effects. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' calculations.

B. Fiscal Discipline

If state-owned banks contribute to soften the financing constraint of the public sector, one should observe weaker fiscal discipline in countries where the government has an important participation in the banking system. To test this hypothesis, we first perform some descriptive analysis and then investigate the relationship econometrically.

The descriptive analysis does not show a clear relationship between government's participation in the banking system and public debt ratios. Table 3 shows that in 93 countries where the government owns banks, public debt is about 45 percent of GDP, 7 percentage points lower than in the 25 countries where the government does not own banks. This difference, however, is not statistically significant. This is confirmed in the upper chart of Figure 3, which displays a flat line.

Similarly, the overall balance does not show any strong correlation with government ownership of the banking system. Table 3 shows that in the 96 countries where the government has some participation in the banking system, the average government deficit is 3.4 percent of GDP, only 0.4 percent of GDP higher that in the 27 countries in which the government has no participation in the banking system. Accordingly, the lower chart of

Figure 3 shows no discernible relationship between government's ownership of the banking system and the overall balance. These banking system and budget deficit nexus, however, should be investigated in a multivariate regression framework to control for factors that may influence these relationships.

Table 3. Fiscal Indicators
(Averages 2008-2010)

Countries with state-owned banks 1/

Number of countries	Public debt 2/		Number of countries	Overall balance 2/	
	Mean	Median		Mean	Median
93	44.9	38.9	96	-3.4	-3.1

Countries without state-owned banks

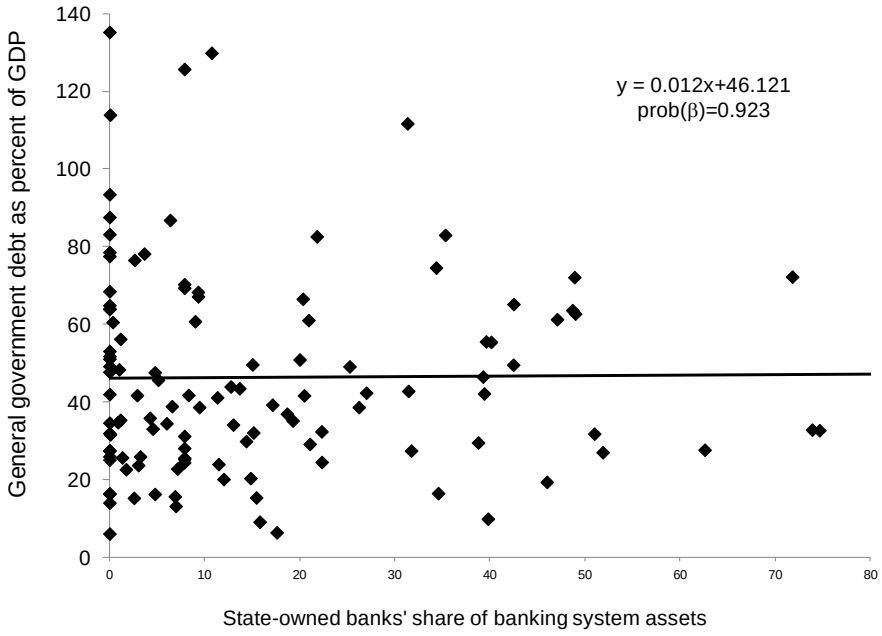
Number of countries	Public debt 2/		Number of countries	Overall balance 2/	
	Mean	Median		Mean	Median
25	52.4	51.1	27	-3.0	-3.3

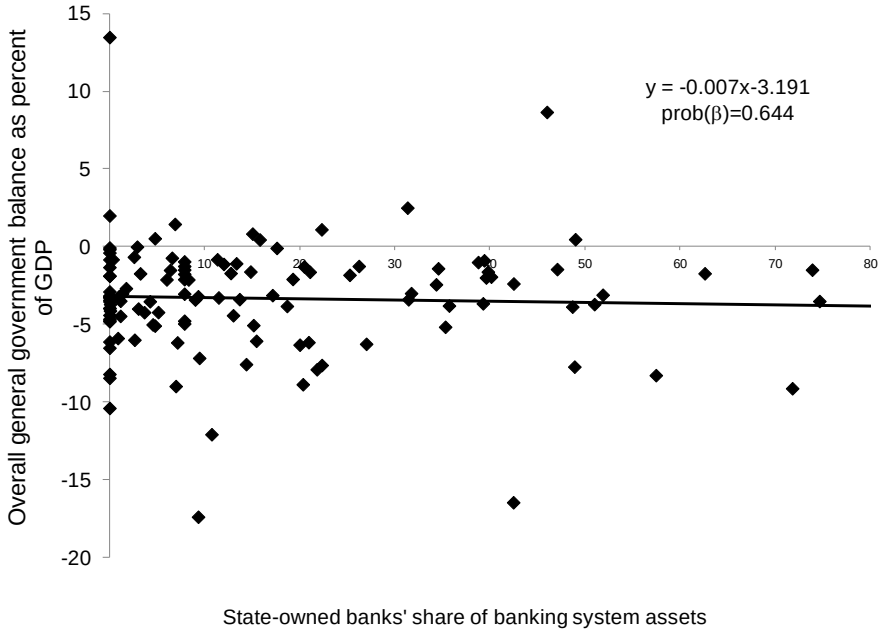
Sources: World Bank, Global Financial Development Report 2013 (Database and Survey).

1/ In this sample, state-owned banks assets are on average about 21 percent of total assets of the banking system for both the sample of 96 and 93 countries.

2/ Percent of GDP.

Figure 3. Fiscal Indicators and Government Ownership of the Banking System
(Averages 2008-2010)





In order to do this, we estimate a modified version of equation (1), where the dependent variable $\boldsymbol{y}_{it}$ is general government public debt in percent of GDP. However, since the stock of public debt is influenced by fiscal developments in earlier periods, a similar equation with the overall balance as dependent variable is also estimated.[14] It could be argued that the primary balance is a more appropriate dependent variable because interest payments are largely the result of earlier accumulation of debt. However, we prefer the overall balance because of data availability and include the lagged level of public debt in percent of GDP to take into account the effect of interest payments.

The set of covariates used in the equations varies according to the dependent variable used in the estimations. In the specification where the public debt is the dependent variable, $\boldsymbol{z}_{it}$ includes the overall general government balance, the real interest rate and the governance indicator. In the specification with the overall balance as dependent variable, $\boldsymbol{z}_{it}$ includes trade openness, oil exports, and the governance indicator. In both cases, we also include the variables of the parsimonious specification (i.e. lagged real GDP growth, inflation and government ownership of the banking system), and the extreme events dummies for currency crises, stock market crashes and banking crises.

The results presented in Table 4 indicate that government participation in the banking system is associated with higher public debt levels. In particular, the estimates suggest that each additional percentage point in the share of banking system's assets owned by the government is associated with an increase in public debt of 0.2–0.3 percent of GDP. Among the other regressors, GDP growth contributes to a lower public debt level, and higher inflation is associated with higher indebtedness, probably due to its effect on nominal interest rates. Larger deficits also increase indebtedness, and better governance is associated with lower levels of public debt, as expected.

[14] Given that some bank bailouts took place in the period covered by analysis, one could argue that increases in government's control of the banking system and public debt may be related to capital injections by the government, rather than to financing from banks to the public sector. The use of the fiscal balance as a dependent variable helps to address this problem. This issue is also addressed in the robustness section by running cross-section regressions for 2008 (before bailouts took place).

Table 4. Regressions of Public Debt

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Lagged real GDP growth	-0.723***	-0.745***	-0.673***	-0.673***	-0.096	-0.070	-0.049
	(0.171)	(0.170)	(0.153)	(0.154)	(0.220)	(0.219)	(0.224)
Inflation	0.169**	0.154**	1.225***	1.224***	0.169	0.174	0.163
	(0.069)	(0.069)	(0.315)	(0.316)	(0.309)	(0.307)	(0.309)
Government ownership of banking system	0.190	0.158	0.192*	0.191*	0.281*	0.313**	0.305*
	(0.138)	(0.137)	(0.111)	(0.114)	(0.153)	(0.153)	(0.155)
Overall balance		-0.548**	-0.436**	-0.436**	-0.127	-0.113	-0.107
		(0.229)	(0.218)	(0.219)	(0.232)	(0.230)	(0.232)
Real interest rate			0.481*	0.482*	0.271	0.362	0.343
			(0.275)	(0.276)	(0.247)	(0.253)	(0.257)
Governance				-0.113	-3.841	-4.645*	-4.602*
				(2.685)	(2.327)	(2.376)	(2.390)
Currency crisis					-0.534	0.200	0.320
					(1.524)	(1.597)	(1.622)
Stock market crash						-2.397	-2.234
						(1.670)	(1.708)
Banking crisis							-1.643
							(3.131)
Constant	43.170***	43.280***	27.994***	28.041***	40.929***	41.913***	42.210***
	(2.684)	(2.657)	(5.016)	(5.152)	(5.778)	(5.775)	(5.834)
Observations	349	349	250	250	119	119	119
R-squared	0.158	0.179	0.308	0.308	0.424	0.441	0.443
Countries	119	119	87	87	41	41	41

Notes: Includes time and fixed efects. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' calculations.

The results presented in Table 5 suggest that once the effects of other variables are controlled for, a larger participation of state-owned banks is negatively related to the overall balance and in most cases this relationship is significant. The estimates indicate that a one percentage point increase in the share of assets of banks owned by the government is associated with an increase in the overall deficit of about 0.15 percent of GDP.

Other significant regressors are GDP growth, trade openness, and oil exports. The negative relationship with GDP growth suggests that more dynamic economic activity is associated with a higher fiscal deficit. While this seems counter-intuitive, it is likely to reflect the fiscal expansions that occurred during the sample period to counteract the growth downturn resulting from the global financial crisis. Trade openness shows a positive sign and is assumed to capture the effect of higher collection from taxes related to international trade. Similarly, the positive association with oil exports is assumed to reflect the spillovers from oil to tax collection and royalties. The positive sign of the dummy for stock market crashes is due to the fact that 88 percent of the stock market crashes in our sample are concentrated in 2008, which is when annual fiscal imbalances were relatively narrower compared to 2009 and 2010.

Table 5. Regressions of Overall Balance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Lagged real GDP growth	-0.047	-0.047	-0.211***	-0.207**	-0.265**	-0.305**	-0.308**
	(0.053)	(0.053)	(0.080)	(0.081)	(0.127)	(0.126)	(0.130)
Inflation	-0.027	-0.027	0.117	0.119	0.143	0.193	0.191
	(0.020)	(0.020)	(0.094)	(0.095)	(0.153)	(0.153)	(0.155)
Lagged public debt	-0.010	-0.012	-0.063	-0.056	-0.082	-0.082	-0.082
	(0.024)	(0.024)	(0.038)	(0.042)	(0.050)	(0.049)	(0.050)
Government ownership of banking system	-0.058	-0.059	-0.126*	-0.123*	-0.147*	-0.154**	-0.153**
	(0.040)	(0.040)	(0.067)	(0.068)	(0.076)	(0.075)	(0.075)
Trade openness		0.009	-0.091**	-0.090**	-0.152**	-0.140**	-0.141**
		(0.023)	(0.035)	(0.035)	(0.064)	(0.063)	(0.063)
Oil exports			0.329***	0.328***	0.220	0.285**	0.284**
			(0.102)	(0.102)	(0.138)	(0.140)	(0.141)
Governance				0.513	0.607	1.182	1.186
				(1.232)	(1.443)	(1.448)	(1.459)
Currency crisis					0.150	-0.123	-0.150
					(0.897)	(0.893)	(0.936)
Stock market crash						1.746*	1.734*
						(0.909)	(0.923)
Banking crisis							0.243
							(2.331)
Constant	0.680	-0.187	10.119***	8.987*	14.534**	10.912*	10.914*
	(1.359)	(2.587)	(3.795)	(4.679)	(6.336)	(6.501)	(6.546)
Observations	349	343	203	203	127	127	127
R-squared	0.350	0.349	0.500	0.501	0.593	0.613	0.613
Countries	119	117	70	70	44	44	44

Notes: Includes time and fixed effects. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' calculations.

C. Crowding Out of Credit to the Private Sector

The role of state-owned banks as a source of financing for the public sector may result not only in softening the financing constraint of public entities—and thus weaker fiscal discipline—but also in crowding out lending to the private sector. If this is true, we should observe a relatively smaller share of bank's claims on the private sector in countries with more government participation in the banking system.

The possibility of crowding out of credit to the private sector can be inferred from the results in Section III.A. They imply that an increase in the share of credit to the public sector as percent of total assets is associated with a decrease in the share of credit to the private sector at any given level of total assets. Table 6 confirms this. In the 92 countries in which the government has a participation in the banking system, credit to the private sector averages 81 percent of total assets, which is 2 percentage points lower than in the 26 countries in which the government does not participate in the banking system. This negative relationship between government ownership of banks and credit to the private sector is clearly depicted in Figure 4 and is statistically significant.

Table 6. Credit to the Private Sector
(Averages 2008-10)

Countries with state-owned banks 1/			Countries without state-owned banks		
Number of countries	Credit to the private sector 2/ 3/		Number of countries	Credit to the private sector 2/ 3/	
	Mean	Median		Mean	Median
92	81.3	84.3	26	83.9	87.6

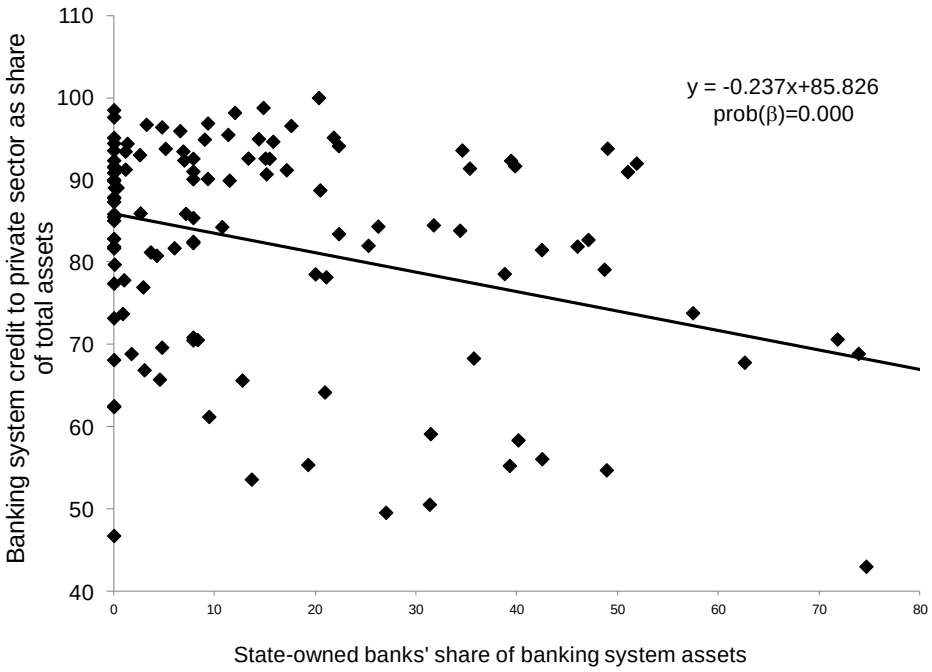
Sources: World Bank, Global Financial Development Report 2013 (Database and Survey).

1/ In this sample, state-owned banks assets are on average about 21 percent of total assets of the banking system.

2/ Includes central government, state-owned enterprises and local governments.

3/ As share of assets.

Figure 4. Credit to the Private Sector and Government Ownership of the Banking System
(Averages 2008-2010)



To test the crowding out hypothesis econometrically, we employ as dependent variable the difference between credit to private and public sectors as percent of GDP. Note that we normalize by GDP rather than total assets, as the latter would result in a linear combination

of the equation estimated in Table 2. For consistency, we normalize the government ownership of the banking system by GDP as well. The set of covariates in $\boldsymbol{z}_{it}$ includes the real interest rate, broad money, and the governance indicator (the variables of the parsimonious specification employed earlier) and the dummies for extreme events.

The results in Table 7 confirm that the participation of the government in the banking system is in most cases significantly associated with crowding out of credit to the private sector. The estimated coefficients suggest that an increase in the share of assets of banks owned by the government of one percentage point is associated with a decrease in the share of credit to the private sector (relative to the share devoted to the public sector) of slightly more than 0.5 of a percentage point. The other significant regressors indicate that credit to the private sector, compared to credit to the public sector, increases when GDP accelerates and is also positively associated with national savings.

Table 7. Regressions of Private-Public Credit Differential

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Lagged real GDP growth	-0.090	-0.117	-0.277	-0.105	-0.102	-0.040	-0.024	-0.011
	(0.151)	(0.157)	(0.170)	(0.094)	(0.095)	(0.139)	(0.140)	(0.165)
Inflation	-0.103	-0.097	-1.085***	-0.594***	-0.597***	-0.619***	-0.622***	-0.617***
	(0.130)	(0.137)	(0.325)	(0.180)	(0.180)	(0.193)	(0.193)	(0.198)
Government ownership of banking system	-0.040	0.005	-0.734***	-0.664***	-0.660***	-0.595***	-0.566***	-0.545**
	(0.146)	(0.149)	(0.261)	(0.166)	(0.166)	(0.156)	(0.160)	(0.209)
Gross national savings		0.277*	0.343**	0.061	0.059	-0.140	-0.142	-0.139
		(0.144)	(0.153)	(0.085)	(0.085)	(0.120)	(0.120)	(0.123)
Real interest rate			-1.061***	-0.515***	-0.518***	-0.340**	-0.302*	-0.301*
			(0.302)	(0.168)	(0.168)	(0.154)	(0.160)	(0.162)
Broad money				-0.029	-0.027	-0.456***	-0.499***	-0.500***
				(0.083)	(0.084)	(0.100)	(0.110)	(0.112)
Governance					-0.703	-0.558	-0.776	-0.756
					(1.659)	(1.697)	(1.716)	(1.738)
Currency crisis						-2.038*	-1.674	-1.603
						(1.060)	(1.133)	(1.231)
Stock market crash							-1.125	-1.119
							(1.223)	(1.235)
Banking crisis								-0.525
								(3.343)
Constant	-46.581***	-51.808***	-25.255***	-19.945***	-20.321***	3.157	5.699	5.370
	(2.094)	(3.684)	(6.040)	(6.133)	(6.218)	(8.402)	(8.856)	(9.185)
Observations	324	306	220	204	204	99	99	99
R-squared	0.029	0.047	0.181	0.245	0.246	0.556	0.564	0.564
Countries	117	111	81	76	76	37	37	37

Notes: Includes time and fixed effects. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' calculations.

D. Robustness

The sample period includes the economic downturn in the wake of the global financial crisis and this, if not properly accounted for, could distort the results. To check the robustness of our findings, we performed the following checks. As data availability does not allow

extending the sample longitudinally, we estimated all the models show above in a cross-section framework for the year 2008—before the peak of the global crisis and before any bailouts took place. The results of the estimations are reported in Appendix II, Table 1 and are broadly consistent with the ones shown above, although the effect of government ownership of banking system turns insignificant in the regressions of the overall balance. However, even in this case, the coefficients are very close to the 10 percent significance threshold.

As an alternative way to control for the effects of the crisis, we included the output gap in the panel specification as a way to control for the economy's position over the economic cycle. While the number of observation is considerably reduced, the results are also broadly consistent with the ones presented above.[15]

We also test the robustness of the results by controlling for country-group effects. To this aim, we introduce regional dummies for Asia and Pacific, Europe, Middle East and Central Asia, Western Hemisphere, and Africa. Also, in an alternative specification of the model we control for country-group effects by introducing a dummy for advanced economies and emerging and developing economies. In addition, we exclude the fixed effects. Once again, the results do not show noteworthy variations.

Serial correlation of the error term and heteroskedasticity can bias estimates and standard errors. We test for the autocorrelation in the residuals of order one and for heteroskedasticity of unknown forms and obtain mixed results depending on the specification. In this light, we re-estimate the models using the Feasible Generalized Least Squares (FGLS) estimator.[16] Despite the reduced sample size, the results in Appendix II, Table 2 show similar coefficient magnitudes and significance as before.

Finally, to check whether a specific aspect of governance is driving the results, we substituted the multidimensional indicator of governance with its subcomponents (government effectiveness, regulatory quality, rule of law and control of corruption). The results indicate that only when the dependent variable is the public debt does the variable control of corruption presents a negative and significant coefficient. In all other cases no other governance variable is significant. This implies that in the instances where the multidimensional indicator is significant, what matters is a conjunction of factors rather than a single specific element of governance.

[15] Results not presented in Appendix II are available upon request.

[16] The FGLS estimator allows for heterogeneous variance in the residuals. It also allows for non-zero covariance between the residual terms and therefore can be used to correct for different forms of correlation. Differently from the GLS, FGLS uses an estimated variance-covariance matrix for the residuals. FGLS is equivalent to the Maximum Likelihood estimator in its limit, enjoying the asymptotic properties.

IV. CONCLUSIONS

There is a vast literature on state-owned banks, but their relationship with fiscal discipline has not yet been investigated. The potential deleterious effects come about when state-owned banks are used as captive sources of financing by other public sector entities to soften their financing constraint. This paper attempts to fill a gap in the literature by studying whether government's participation in the banking system is associated with a relaxation of the financing constraints of public sector entities, and consequently with relatively weaker fiscal discipline. It also investigates if crowding out of credit to the private sector occurs.

The results suggest that government's participation in the banking industry is associated with more financing from the banking system to the public sector. Also, countries in which state-owned banks have more participation in the banking system show higher fiscal deficits and public debt. Finally, there is also evidence that a larger participation of state-owned banks in the banking system is associated with a relatively lower share of total credit going to the private sector. These results are robust to the inclusion of several control variables and the reduction of observations that it implies. The robustness checks yield consistent results.

From a policymaking perspective, this paper argues that it may be insufficient to insist in the pursuit of fiscal discipline without putting in place the conditions to achieve it. In particular, a close monitoring of the access of public sector entities to financing from the banks that it owns should be considered. Another, perhaps more extreme, solution may consist in the privatization of state-owned banks, which would solve the governance problem that lies at the root of the issue. However, this option would need to be carefully evaluated because state-owned banks are supposed to fulfill functions that are not performed by private banks and provide financing for projects that may generate positive externalities for the rest of the economy. More generally, we argue that assessing the financing practices of state-owned banks concerning the public sector should be considered in any strategy to pursue fiscal discipline.

Appendix I. Data

Table A1.1. Description and Sources of Variables

Variable	Description	Source
Credit to public sector	Ratio of banking system's credit to public sector as a share of total banking system's assets, percent	World Bank, Global Financial Development, 2013 (Database and Survey)
Overall balance	Ratio of net lending/borrowing of the general government to GDP, percent	WEO
Debt	Ratio of gross debt of the general government to GDP, percent	WEO
Private-public credit differential	Difference between banking system's credit to the private sector and banking system's credit to the public sector as a share of GDP, percent	World Bank, Global Financial Development, 2013 (Database and Survey)
Real GDP growth	Growth rate of real GDP, percent	WEO
Inflation	Growth rate of the Consumer Price Index, average, percent	WEO
Government ownership of banking system	Ratio of state-owned banks' assets to banking system's assets, percent	World Bank, Global Financial Development, 2013 (Database and Survey)
Gross national savings	Ratio of gross national savings to GDP, percent	WEO
Real interest rate	Nominal interest rate minus the inflation rate, percent	WEO
Broad money	Ratio of broad money to GDP, percent	WEO
Governance	Additive index of government effectiveness (capturing perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies), regulatory quality (capturing perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development), rule of law (capturing perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence), and control of corruption (capturing perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests)	World Governance Indicators
Currency crisis	Dummy taking the value 1 if there is an annual depreciation versus the US dollar (or the relevant anchor currency) of 15 percent or more, and/or a reduction in the metallic content of coins in circulation of 5 percent or more, and/or a currency reform where a new currency replaces a much-depreciated earlier currency in circulation, zero otherwise	Reinhart and Rogoff, 2010
Stock market crash	Dummy taking the value 1 if there are cumulated multi-year real returns of –25 percent or less, zero otherwise	Reinhart and Rogoff, 2010
Banking crisis	Dummy taking the value 1 if there is a bank run that leads to the closure, merging, or takeover by the public sector of one or more financial insitutions and/or there is no run, the closure, merging, takeover, or large-scale government assistance of an important financial institution (or groups of institutions) that marks the start of a string of similar outcomes for other financial institutions	Reinhart and Rogoff, 2010
Trade openness	Ratio of the sum of imports and exports of goods and services to GDP, percent	WEO
Oil exports	Ratio of oil exports to GDP, percent	WEO

Appendix II. Robustness Tests

Table A2.1. Cross-Section Regressions for 2008

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Credit to the public sector	Credit to the public sector	Overall balance	Overall balance	Debt	Debt	Private-public credit differential	Private-public credit differential
Lagged real GDP growth	0.560	0.478	-0.198*	-0.724*	-2.676***	-1.955	1.626*	0.410
	(0.373)	(0.486)	(0.115)	(0.363)	(0.876)	(1.324)	(0.855)	(1.034)
Inflation	0.044	0.635	-0.017	0.008	0.193*	-0.695	3.234***	-0.380
	(0.073)	(0.396)	(0.014)	(0.153)	(0.115)	(0.774)	(0.836)	(1.412)
Government ownership of banking system	0.239**	0.333*	0.009	0.038	0.184*	0.333*	-0.726*	0.705**
	(0.099)	(0.174)	(0.024)	(0.047)	(0.106)	(0.182)	(0.434)	(0.298)
Overall balance		-0.761				-1.636		
		(0.644)				(1.271)		
Gross national savings		0.024						-0.284
		(0.295)						(0.397)
Real interest rate		0.237				0.001		0.315
		(0.244)				(0.481)		(0.463)
Broad money		-0.010						-0.437***
		(0.065)						(0.100)
Governance		0.475		0.311		0.985		-6.144***
		(0.894)		(0.354)		(1.535)		(2.118)
Currency crisis		-2.883		-0.375		-12.630*		-3.241
		(4.521)		(1.709)		(6.866)		(7.696)
Stock market crash		15.114***		1.557		4.657		7.330
		(4.747)		(1.565)		(7.028)		(7.818)
Banking crisis		-6.840		-3.951		8.399		10.517
		(7.329)		(2.640)		(11.413)		(14.210)
Lagged public debt			-0.029	-0.068*				
			(0.018)	(0.039)				
Trade openness				0.004				
				(0.020)				
Oil exports				0.172				
				(0.107)				
Constant	-0.471	-11.351	1.295	3.654	54.304***	54.516***	-83.109***	-17.380
	(1.224)	(9.552)	(1.366)	(2.709)	(6.602)	(14.203)	(11.438)	(24.771)
Observations	98	31	119	44	119	41	114	34
R-squared	0.188	0.615	0.045	0.328	0.115	0.398	0.219	0.788

Notes: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' calculations.

Table A2.2. FGLS Regressions

	(1) Credit to the public sector	(2) Credit to the public sector	(3) Overall balance	(4) Overall balance	(5) Debt	(6) Debt	(7) Private-public credit differential	(8) Private-public credit differential
Lagged real GDP growth	0.017	-0.105*	-0.012	-0.211***	-0.762***	-0.045	-0.145***	-0.015
	(0.012)	(0.057)	(0.016)	(0.058)	(0.041)	(0.092)	(0.033)	(0.078)
Inflation	0.030***	-0.157*	-0.026***	0.304***	0.054*	0.127	-0.116***	-0.736***
	(0.004)	(0.092)	(0.008)	(0.058)	(0.032)	(0.090)	(0.028)	(0.071)
Government ownership of banking system	0.370***	0.593***	-0.089***	-0.130***	0.131**	0.196**	-0.119*	-0.569***
	(0.021)	(0.091)	(0.009)	(0.041)	(0.060)	(0.099)	(0.062)	(0.074)
Overall balance		-0.001				-0.052		
		(0.051)				(0.076)		
Gross national savings		-0.207***						-0.160***
		(0.050)						(0.048)
Real interest rate		-0.037				0.209***		-0.347***
		(0.073)				(0.071)		(0.071)
Broad money		-0.053*						-0.501***
		(0.030)						(0.039)
Governance		-3.441***		0.709		-4.620***		-1.924***
		(0.734)		(0.568)		(0.730)		(0.578)
Currency crisis		-2.744***		-0.051		0.584		-1.732***
		(0.507)		(0.338)		(0.674)		(0.483)
Stock market crash		-1.202***		1.988***		-2.386***		-1.135*
		(0.355)		(0.283)		(0.710)		(0.615)
Banking crisis		4.479		-0.438		1.281		0.120
				(2.094)		(2.596)		(1.409)
Lagged public debt			-0.013***	-0.096***				
			(0.002)	(0.020)				
Trade openness				-0.086***				
				(0.026)				
Oil exports				0.351***				
				(0.081)				
Constant	-0.471	-7.715*	1.295	-5.760	41.063***	5.402	4.671**	27.604***
	(1.224)	(4.590)	(1.366)	(6.000)	(2.365)	(4.589)	(2.011)	(4.040)
Observations	287	88	349	126	349	119	315	96
Countries	98	31	119	44	119	41	108	34

Notes: Includes country and time effects. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' calculations.

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