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To cite this version:

Thibaut Duprey. Do publicly owned banks lend against the wind?. International Journal of Central Banking, 2015, 11 (2), pp.65-112. hal-02630038

HAL Id: hal-02630038

https://hal.inrae.fr/hal-02630038

Submitted on 27 May 2020

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Do Publicly Owned Banks Lend Against the Wind?*

Thibaut Duprey
Paris School of Economics and Banque de France

This paper investigates the lending pattern of state-owned banks over the business cycle. I take the endogeneity of public banking into account by including records on both privatizations and nationalizations during banking crises. I find that public bank lending is (i) significantly less cyclical except for low-income countries, (ii) asymmetric along the business cycle, (iii) heterogeneous across stages of economic development, and (iv) related to banks' vulnerability on their funding side. Public banks reduce their lending less during economic downturns, but their ability to absorb negative shocks is marginally decreasing as the size of the shock increases.

JEL Codes: G21, G28, G32, H44.

1. Introduction

Since the seminal paper by La Porta, Lopez-de-Silanes, and Shleifer (2002),[1] which accompanied the wave of privatizations in the 1990s, it has been widely accepted that state-owned banks (hereafter public

*The opinions expressed herein do not necessarily reflect the position of the Banque de France. This paper was previously circulated under the title "Bank Ownership and Credit Cycle: The Lower Sensitivity of Public Bank Lending to the Business Cycle." I am grateful to Jean Imbs, Xavier Ragot, and Romain Rancière for guidance, as well as Vincent Bouvatier, Régis Breton, Balazs Egert, Benjamin Klaus, Mathias Lé, Thomas Piketty, and seminar participants at the Banque de France, the Paris School of Economics, the 2012 CSAEM conference, the 2013 Risks in Finance Conference at Orléans University, the 2013 ADRES-AFSE conference, and the 2nd PhD Conference on International Macroeconomics and Financial Econometrics for helpful comments on previous drafts. E-mail: thibaut.duprey@gmail.com.

[1]See also, for instance, Barth, Caprio, and Levine (2004) or Galindo and Micco (2004).

banks) are a source of long-term inefficiency.[2] However, little is known about the role of public bank lending in the short run over the business cycle, especially in times of crisis when the access to bank loans is more difficult.

In this context, using individual bank balance sheet data over 1990–2010 for eighty-three countries covering at most 366 public banks, the present paper shows that public banking is associated with less cyclical lending policies, especially in the case of economic downturn. However, this effect is reversed for less developed countries, where public banks tend to have a more vulnerable funding structure.

Only a handful of papers have focused on this issue by analyzing short-term variations in credit supply to the economy. First, using a cross-country data set over the period 1995–2002, Micco and Panizza (2006) find that lending by state-owned banks is less correlated with the business cycle. Two case studies provide similar results (Germany from 1987 until 2005: see Foos 2009; South Korea around the 2008 recession: see Leonya and Romeub 2011). Cull and Martinez Peria (2013) present a before/after 2008 analysis and find that public banks reacted in a countercyclical fashion in Latin America, but not in Europe. The present paper is more closely related to the contemporaneous analysis by Bertay, Demirgüç-Kunt, and Huizinga (2015), where they conclude that lending by state banks is less procyclical than lending by private banks, especially in countries with good governance and a high level of economic development. To deal with the endogeneity of public banking, they use a generalized method of moments (GMM) methodology to instrument the public ownership dummy, which becomes time varying as they reconstruct ownership changes from the successive updates of the Bankscope database over the last ten years. In addition, they use indices of governance quality to track the heterogeneity in lending cyclicality across their panel.

The present paper adopts a different but complementary strategy and contributes to the literature in three ways. First, I combine the public bank ownership dummy with records of individual bank

[2]This is partly because public banks fail to screen out good projects, which squeezes interest margins (Sapienza 2004; Allen et al. 2005; Mian 2006; Micco and Panizza 2006; Iannotta, Nocera, and Sironi 2007) and fails to ensure an efficient allocation of credit (Megginson 2005).

privatization events and also with an indicator on bank nationalizations during crises. However, I ignore the intensity of the government's involvement in the bank around privatization events, and I can only single out nationalizations during crises at the country level, without identifying each nationalized bank. Nevertheless, failing to take the endogeneity of public banking into account could bias the results. The real impact of public ownership may be blurred by capturing the negative effect of newly rescued or bailed-out banks appearing as state owned. Likewise, newly privatized banks appear as private but may still be in the process of adjusting their lending behavior.

A second novelty is the focus on asymmetric reactions over the business cycle and heterogeneity across the stages of economic development. Overall, public banks tend to reduce their aggregate lending volumes less during economic downturns, but this stabilizing effect is marginally decreasing as the size of the negative shock increases. This is especially true for middle-income countries, while public banks can be even more procyclical in low-income countries. However, the lower procyclicality of public bank lending in high-income countries is rather the consequence of banks increasing their lending less during phases of expansion. Thus the results show a non-linear relation between economic development and public banks' ability to absorb negative shocks. This finding may appear in contradiction with both the development and political views of public banking,[3] which suggest more countercyclical lending by the public banking sector for countries with lower economic or institutional development. But these studies focus more on either long-term development or short-term fluctuations over the political cycle, not over the business cycle.

Last, I show that this asymmetric and heterogeneous lending pattern of public banks is consistent with the variation in their liabilities. The funding sources of public banks are less procyclical in medium- to high-income countries, with a lower reliance on short-term funds, as well as a lower volatility of wholesale funds in the case

[3]For the development view see, for instance, Gerschenkron 1962 and Barth, Caprio, and Levine 2000. For the political view, see Shleifer and Vishny 1994; Sapienza 2004; Dinc 2005; Khwaja and Mian 2005; and Micco, Panizza, and Yanez 2007.

of a negative macroeconomic shock. Conversely, public banks have a more vulnerable funding structure in low-income countries. However, the different cyclicality of public bank lending could also have other sources, which are beyond the scope of the present paper, such as corporate governance issues, lending relationship management, or loan maturity extensions.

The next section describes the data set, especially the way public banking is handled, and the methodology. Section 3 presents the key results of the paper about the lower cyclicality of public bank lending. Then section 4 investigates the asymmetric and heterogeneous cyclical reactions of public bank lending across the phases of the economic cycle and the stages of economic development. Section 5 shows that funding sources of public banks display similar cyclical properties. Section 6 concludes.

2. Data Set and Methodology

2.1 Data Set Construction

I use Bankscope[4] for bank-specific variables, as well as data from the United Nations Statistics Division (UNSTAT), the World Bank, and Standard & Poor's (S&P) for country-wide variables. I cover the period 1990–2010, but it should be noted that the coverage of the Bankscope data set increased over time and stabilized somewhat in 1999. Even if a single bank rarely remains in the data set over twenty years,[5] I prefer to keep the largest time span of each bank and to start in 1990, which allows me to include many privatization events that took place in the 1990s. I stop in 2010, as this is the last date of my public ownership dummy and I do not have data on public ownership changes after 2009. Tables 1 and 2 describe the variables used.

I focus on the main types of banking institutions (excluding bank holdings), namely commercial, real estate, savings, and investment banks. When banks report multiple balance sheet statements, I use

[4]For a description of issues specific to the Bankscope database and the codes associated with it, see Duprey and Lé (2014).

[5]For instance, due to increased coverage, merger, divestiture, accounting change, or bankruptcy.

Table 1. Variables Definition

Variable	Label	Source
gGDP	Growth of GDP, constant 2005 USD	UNSTAT
OutputPotential	Deviation of GDP from potential GDP in percent of potential GDP	OECD Economic Outlook
OutputGap	Deviation of GDP from its trend (HP filter with smoothing parameter 6.25) over GDP	UNSTAT
gLoan	Growth of gross loans	Bankscope
gLoanCorp	Growth of loans to group companies and other corporate	Bankscope
Size	Log of bank asset in million USD	Bankscope
SizeRel	Asset of one bank relative to top 20 in each country/year	Bankscope
gSizeRel	Growth of *SizeRel*	Bankscope
SizeMarket	Asset top 20 banks of one banking sector relative to the sum of the top 20 in all countries	Bankscope
gSizeMarket	Growth of *SizeMarket*	Bankscope
CR4	Concentration ratio of top 4 banks over top 10	Bankscope
RatingChange	Change of long-term country rating and outlook in foreign currency scale from 1 ("D" and negative outlook) to 69 ("AAA" and positive outlook)	Standard & Poors
GDPperCapita	Log of GDP per capita, constant 2005 USD	UNSTAT
Inflation	Inflation rate	UNSTAT
RealInterestRate	Real interest rate by country	World Bank
chLendingInterestRate	Change end of the year average bank lending interest rate by country	World Bank
gMMF	Growth of money-market funds	Bankscope
gSTfunding	Growth of short-term liabilities defined as: total liabilities—total deposits—long-term funding—reserves	Bankscope

(continued)

Table 1. (Continued)

Variable	Label	Source
gLTfunding	Growth of long-term liabilities	Bankscope
gNonCoreRatio	Growth of the ratio of non-core over core liabilities (customer deposits)	Bankscope
gLLPratio	Growth of the ratio of loan loss provisions over net income	Bankscope
Privatized	Dummy equals one for full/partial privatization of the bank, 1988–2008	World Bank Privatization
BeforePrivatized	Dummy equals one for years before latest privatization wave	World Bank Privatization
GOB_CSH50	Dummy equals one for direct government ownership of more than 50% of the bank: – National public controlling shareholder 50%, 2008–10 – Includes years before privatization recoded as public banks	Bankscope World Bank Privatization
GOB_UO50	Dummy equals one for indirect government ownership of more than 50% of the bank: – National public ultimate owner 50%, 2008–10 – National public controlling shareholder 50%, 2008–10 – Includes years before privatization recoded as public banks	Bankscope Bankscope World Bank Privatization
GOB_UO25	Dummy equals one for indirect government ownership of more than 25% of the bank: – National public ultimate owner 25%, 2008–10 – National public controlling shareholder 50%, 2008–10 – Includes years before privatization recoded as public banks	Bankscope Bankscope World Bank Privatization
Foreign	Dummy equals one for foreign ownership: – Foreign ultimate owner 25%, 2008–10 – Foreign controlling shareholder 50%, 2008–10	Bankscope Bankscope

(continued)

Table 1. (Continued)

Variable	Label	Source
SavingsBank	Dummy for savings bank	Bankscope
InvestBank	Dummy for banks defined as investment banks or investment and trust corporations	Bankscope
RealEstBank	Dummy for banks defined as real estate and mortgage banks	Bankscope
CommercialBank	Dummy for commercial and credit card banks	Bankscope
GvtCreditInstit	Dummy for specialized government credit institutions (all publicly owned)	Bankscope
NatCrisis	Dummy equals one if nationalizations occurred during a banking crisis: – From 1970 to 1995 – From 1980 to 2003	La Porta, Lopez-de-Silanes, and Shleifer (2002) World Bank Banking Crises
NatIn2008	Dummy banks nationalized during the 2008–10 systemic banking crisis	IMF Systemic Banking Crises

Table 2. Summary Statistics

Summary statistics are displayed for all banks and then split for the sample of private and public banks, where the public ownership of bank dummy is *GOB_UO50*. This is the indirect public ownership dummy that equals one when the identified ultimate owner of more than 50 percent of the bank is the government. Variable definitions are given in table 1.

	All Banks					Private Banks $GOB_UO50 = 0$			Public Banks $GOB_UO50 = 1$		
Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**	**N**	**Mean**	**Std. Dev.**	**N**	**Mean**	**Std. Dev.**	**N**
gGDP	3.48	3.63	−17.73	26.17	23339	3.39	3.61	20661	4.12	3.73	2678
OutputGap	0.22	2.10	−11.02	13.33	12461	0.23	2.11	11335	0.13	2.00	1126
OutputTrend	−0.12	1.90	−15.15	9.40	23339	−0.13	1.91	20661	−0.07	1.82	2678
gLoan	12.00	26.03	−100.00	100.00	23339	11.95	26.59	20661	12.45	21.19	2678
gLoanCorp	6.63	34.98	−100.00	100.00	17759	6.46	35.33	15850	8.01	31.91	1909
L.Size	8.40	2.88	−4.43	18.86	23339	8.32	2.92	20661	9.02	2.44	2678
L.SizeRel	2.71	5.73	0.00	92.30	23339	2.62	5.79	20661	3.44	5.15	2678
L.gSizeRel	6.50	634.11	−97.54	95847.37	23339	2.75	96.09	20661	35.41	1852.90	2678
L.SizeMarket	2.89	5.45	0.00	48.30	23339	3.01	5.64	20661	2.03	3.56	2678
L.gSizeMarket	4.09	46.37	−81.48	1782.93	23339	4.19	47.79	20661	3.37	33.41	2678
L.CR4	0.70	0.11	0.47	1.00	23339	0.70	0.11	20661	0.71	0.11	2678
L.ChangeRatingLT	0.10	2.89	−31.00	18.00	23339	0.09	2.89	20661	0.20	2.89	2678
L.lnGDPperCapita	9.21	1.32	5.76	11.12	23339	9.27	1.28	20661	8.78	1.55	2678
L.Inflation	5.51	7.41	−24.25	115.52	23339	5.52	7.52	20661	5.45	6.57	2678
RealInterestRate	6.86	10.22	−35.31	93.92	23310	6.87	10.22	20470	6.78	10.26	2640
chLendingInterestRate	−0.68	4.54	−59.44	69.82	23339	−0.68	4.64	20661	−0.67	3.67	2678
gMMF	−3.13	44.10	−100.00	100.00	11062	−3.22	44.31	9588	−2.59	42.67	1474
gSTfunding	3.72	36.29	−100.00	100.00	9839	3.43	36.30	8836	6.25	36.16	1003
gLTfunding	3.44	33.95	−99.99	100.00	13468	2.88	34.56	11690	7.14	29.37	1778
gNonCoreRatio	−2.39	34.93	−99.99	100.00	19789	−2.37	35.41	17616	−2.61	30.71	2173
gLLPratio	−19.01	49.69	−99.99	100.00	11979	−19.15	49.84	10523	−18.00	48.59	1456

the unconsolidated ones to obtain the most disaggregated information, and when they publish their results with different closing dates, I use those that are closest to the end of the fourth quarter.[6]

Nevertheless, duplicated assets potentially remain if included in different balance sheets—for instance, after a merger[7]—or when banks are subsidiaries of others. This is a common issue in the Bankscope database, which does not allow to track the evolution of cross-ownership over time. But this is not of major concern here, as I do not focus on country aggregates of banking variables. When needed as control variables, I keep only consolidated publications of the top 20 banks to compute aggregate assets at the country level, so that I am more likely to capture the actual size of the banking sector.

I focus only on countries with at least two banks, since I sometimes have only a single pair of public/private banks for the same year. Additionally, I restrict the study to banks that are among the largest 100 banks ranked yearly by country[8] and drop banks with less than five observations, to prevent my data set from being excessively unbalanced.

Eventually, the sample size is further reduced as I use growth rates as well as lagged variables. I define growth rates above 100 percent as missing, except for asset size, so that I can approximately control for mergers and acquisitions that create spikes in growth rates.

I am left with a panel-stationary[9] data set including eighty-three countries over the 1990–2010 period.

[6]Some countries (such as Canada or Japan) usually publish their financial statements in March and have to be recoded as belonging to the year $t-1$. I discard releases made from April until September which cannot really be attributed to either year t or year $t-1$.

[7]I ran all regressions by excluding all banks that did not appear in my data set in 2008, which almost completely removes the risk of a bank merged in the 1990s or early 2000s of being still recorded as a separate entity in 2008. All results remain unchanged.

[8]This is not very restrictive, as I want to keep most public and privatized bank observations. Results are not sensitive to this threshold and remain unchanged if, for instance, I only focus on the top 20 banks.

[9]The Fisher stationarity statistic for panel data tests for the hypothesis that at least one series is stationary against the null of all series being non-stationary.

2.2 Public Ownership Definition

I use five data sources: Bankscope, the World Bank privatization database, the World Bank database of banking crises, the International Monetary Fund (IMF) systemic banking crises database, and the data set compiled by La Porta, Lopez-de-Silanes, and Shleifer (2002) in their seminal work. Table 3 summarizes the composition of the data set.

The benchmark for the construction of the public ownership dummies are three variables of government ownership of banks (GOB) from Bankscope. This database provides data on the intensity in the government-bank relation, namely banks directly owned by the government (as controlling shareholder, CSH) or possibly indirectly owned (ultimate owner, UO). The share of public ownership is also included: when more than 50 percent is owned by the government (my variables *GOB_CSH50* or *GOB_UO50*) or when more than 25 percent of the bank is owned by the government (my variable *GOB_UO25*). When compiling the different government ownership dummies, I focus only on public banks owned by the public authorities of the country in which they operate and I discard government-owned banks operating abroad. This is because I want to focus only on public banks that are likely to respond differently to the national economic cycle due to the involvement of the government. From the Bankscope data set, I obtain records for at most 280 public banks, possibly indirectly owned at the 25 percent threshold by the national public authorities.

But the Bankscope database does not provide bank ownership over time, so that the public ownership information in the raw data reflects the ownership structure at the date of the last update (in my data set, somewhere between 2007 and 2010, depending on the bank). Note that due to the large wave of privatizations in the 1980s and 1990s, banks that are not owned by the public authorities at the end of my sample may have been privatized earlier, perhaps still impacting their subsequent lending policies.

I therefore proxy for this time variation in government ownership of banks by matching individual banks with the record of privatizations of the World Bank[10] that covers privatization events of

[10]Banks from the World Bank privatization database are matched with the Bankscope database using either the current or previous name of the bank.

Table 3. Composition of the Panel of Banks

SavingsBank, InvestBank, RealEstBank, CommercialBank, and *GvtCredit-Instit* are dummy variables for, respectively, savings banks, investment banks and trust corporations, real estate and mortgage banks, commercial and credit card banks, and finally government credit institutions. *Privatized* and *BeforePrivatized* are two dummy variables for banks privatized during the sample period (sometimes the first year available is the year of the privatization) and the years before the privatization took place. Variable *GOB_CSH50* is the direct public ownership dummy when the government is the controlling shareholder of more than 50 percent of a bank. Variables *GOB_UO50* and *GOB_UO25* are indirect public ownership dummies when the government is the ultimate owner of, respectively, more than 50 or 25 percent of a bank. *Foreign* is a dummy variable for banks ultimately owned by a foreign entity at a minimum of 25 percent. *NatCrisis* and *NatIn2008* are two dummy variables, respectively, for banks of countries that nationalized part of their banking system during a banking crisis and for banks nationalized over the 2008 systemic banking crisis. The precise definition of variables is given in table 1.

Variable	**Obs.**	**No. of Banks**	**No. of Countries**	**Percent**
SavingsBank	2226	311	30	9.54
InvestBank	1533	198	48	6.57
RealEstBank	867	128	25	3.71
CommercialBank	17213	2057	83	70.49
GvtCreditInstit	1500	158	51	6.43
Privatized	752	86	30	3.22
BeforePrivatized	246	49	22	1.05
GOB_CSH50	1821	244	58	7.80
GOB_UO50	2678	327	64	11.47
GOB_UO25	3049	366	68	13.06
Foreign	6150	763	81	26.35
NatCrisis	6874	721	18	29.45
NatIn2008	96	21	12	0.41
All	23339	2852	83	100

at least 1 million USD during the period 1988–2008. This method allows me to identify eighty-six additional government-owned banks in thirty countries[11] that were privatized during my reference period. Privatization events that took place before the first available observation in Bankscope are captured by bank fixed effects. However, some privatization events cannot be dealt with, if they concerned smaller deals or took the form of divestitures in which none of the privatized entities kept the name of the previous public bank. Another limitation is that I only know the date on which a privatization occurred, with the public authorities selling part of their shares for a certain amount; but I do not know the initial level of public ownership, which prevents me from computing the post-privatization share of public ownership. Therefore, I only consider the last round of privatization events of each bank as the cut-off date at which the bank is no longer considered public. Henceforth, when the ownership dummy signals the bank as being private, it has no more than 50 or 25 percent of public ownership. But when the ownership dummy signals the bank as being public only at the beginning of my sample, I cannot be sure that the public authorities owned more than a specific fraction of the bank. If my public bank dummies do not take into account all privatized banks, the bias should be towards a smaller difference in the lending cycle between what I consider as public and private banks.

Ideally, I would also like to capture the nationalization events in order to get a better proxy of the time variation of my public ownership dummies. However, such a record does not exist across countries, except for banks nationalized after the outbreak of the 2008 crisis, some of which are listed in the IMF database on systemic banking crises. Therefore, I can only track countries that nationalized some banks (which I am unable to identify precisely) during specific periods of stress. This is the relevant piece of information

[11]Out of 703 privatization episodes for financial institutions, I obtain 195 individual matches. A large number of privatization events are not matched, as the categories recorded are much broader than banks (financial services, insurance, industrial groups, pension funds, real estate, social security), and privatization of banks may have occurred before they started being recorded by Bankscope. Conversely, the number of banks matched is smaller than the number of individual matches, as several banks went through multiple waves of privatization over time.

for the purpose at hand, as banks nationalized during a banking crisis may introduce a selection bias in the public/private ownership dummy: public banks include the banks that once failed and had to be restructured, which probably limited their lending abilities and thus darkened the case for public banking. I account for bank nationalizations at the country level using two data sets: the World Bank database on banking crises, which reports countries where the state took over troubled financial institutions over the period 1980–2003,[12] and the nationalization-during-crisis dummy used by La Porta, Lopez-de-Silanes, and Shleifer (2002). Banks rescued but without transfer of ownership are not considered nationalized; hence, if they were able to lend more or reduce their lending activities less over the crisis, these banks that are coded as private would appear less procyclical, and the bias would go against the results presented here. However, the effect of banks rescued without ownership transfer is likely to be captured when controlling for the evolution of the country rating.

The data set includes at most 366 public banks in sixty-eight countries, of which 86 banks in thirty countries were privatized, out of a total of 2,852 distinct banks. Among the eighty-three countries I cover, sixty-five did not experience nationalizations during a crisis before 2008.

2.3 Methodology

2.3.1 Baseline Specification

I focus on the role of the economic cycle and ownership status in determining the evolution of credit distributed by banks (loan growth, $gLoan$[13]) by estimating the following model as a benchmark:

$$\begin{aligned} gLoan_{i,t} = {} & MacroShock_{c,t} \cdot \{\beta_1 + \beta_2 \cdot Pu_i + \beta_3 \cdot Sav_i + \beta_4 \cdot Est_i \\ & + \beta_5 \cdot Inv_i + \beta_6 \cdot For_i\} + \beta_7 \cdot Pu_i + \beta_8 \cdot Sav_i + \beta_9 \cdot Est_i \\ & + \beta_{10} \cdot Inv_i + \beta_{11} \cdot For_i + \beta_{12} \cdot \mathbf{X}_{i/c,t-1} + \upsilon_{i,t}, \end{aligned} \tag{1}$$

[12] I use the "Comments" column of this database, which describes the evolution of each banking crisis and reports nationalizations as they occurred.

[13] The results are indifferent to choosing gross or net loan growth as the explained variable.

where i stands for the bank, t for the year, and c for the country. Pu (respectively, Sav, Est, Inv, For) is a dummy variable that takes the value 1 if the bank is considered public (respectively, savings, real estate, investment bank, or foreign).

I use several alternative variables to proxy for the economic cycle, which I here call $MacroShock$; as a benchmark, I use GDP growth,[14] but also the deviation from the HP-filtered output trend. Hence β_1 represents the systematic relationship between *private* bank loan growth and the cycle when the proxy for macro shocks increases by 1 percentage point, while $\beta_1 + \beta_2$ is the specific co-movement of *public* bank lending with macroeconomic fluctuations. I am interested in the sign and significance of β_2, which gives the additional effect on lending growth due to public ownership.

Moreover, to ensure that the cyclicality of public bank lending does not capture the distinction between domestic and foreign ownership, I need to include the foreign dummy[15] and its interaction with the macro shock. Failing to take the larger volatility of foreign bank lending into account would artificially increase the aggregate lending cyclicality of private banks and widen the gap with public bank lending fluctuations.

Likewise, in order not to confuse the effect of specific banking models with the ownership feature, I control for each bank type and its interaction with the macro shock variable. Commercial banks are taken as the benchmark, so that the dummy and the interaction term do not appear in the regression. It is worth noting that banks

[14] I use GDP growth rather than the growth rate of GDP per capita; the latter is useful if one is focused on development issues related to public banking, but I prefer the former, as I want the evolution over the cycle, in response to shocks: what matters is the aggregate size of bank lending in relation to the expansion of GDP, rather than the actual availability of loans to each individual and its interaction with individual wealth.

[15] The foreign ownership dummy is limited to the extent that it only reflects end-of-period ownership, as of 2007–10. Consequently, I might capture banks that were sold to a foreign institution and were not foreign at an earlier date, but this would only dilute the specific lending cyclicality properties of foreign banks; what really matters here is to capture away the foreign banks to avoid misinterpreting the impact of public banking.

classified by Bankscope as special government credit institutions[16] de facto have no private counterparts in their sub-category. As a robustness check, I consider only public and private commercial banks without special credit institutions.

2.3.2 Controls

I control for macroeconomic country-wide variables, banking-sector specificities, and individual bank features.

First, I control for country rating changes[17] over the previous year. My concern is to ensure that the interaction between public bailout and implicit guarantees does not blur the picture: an increase in the support of ailing banks by public authorities is likely to boost their lending, but as it increases the fiscal burden on the government, it may reduce the implicit guarantees enjoyed by private banks and thus increase the rate at which they refinance themselves. In turn, this would limit their lending abilities in the following period and induce them to lend more procyclically in the case of a bad shock. I also control for the lagged logarithm of GDP per capita in order to proxy for economic development, which might not be orthogonal to the use of public banking as a way of boosting lending, if one takes a development approach to public banking.[18] I also include lagged GDP growth, lagged inflation, the real interest rate, and the average change in national lending rate, which capture the evolution of the demand side in a specific country and the ability of banks to make profitable lending decisions. As a matter of fact, public ownership

[16]This group of banks includes major public banks, such as the Landesbanken in Germany or the Banques Cantonales in Switzerland, that are commercial/retail banks, or export-import banks in many countries providing corporate loans.

[17]S&P ratings and outlooks for long-term ratings in foreign currency are converted to a numerical scale from 1 ("D" and negative outlook) to 69 ("AAA" and positive outlook), so that a downgrade decreases the rating by several notches while a mere change in the outlook is equivalent to a one-notch decrease. However, a shortcoming of this approach is that the effect of a change in country ratings is linear and, as a result, the effect does not depend on the initial grade of the country.

[18]The alternative would be to consider indices of financial and institutional development, which are unlikely to be time varying and available for all countries. Also, some of those indices include government intervention in the banking sector as an input, which de facto makes them useless here. See Bertay, Demirgüç-Kunt, and Huizinga (2015) for a similar paper taking this route.

can be understood as a rent in a protected market, so that it should be distinguished from the overall macroeconomic conditions that provide more or less profit opportunities for the banking sector as a whole. And when required, I include crisis years and nationalizations in crisis dummies.

Second, I control for banking-sector specificities,[19] namely lagged banking concentration (concentration ratio of the top 4 banks) as well as previous period market size and its evolution over time. The level of competition within a banking sector is important, as banks tend to increase their leverage when the intensity of competition increases; also deeper markets can have access to cheaper financing sources, while smaller markets can have a stronger growth potential. In addition, by including the growth rate of market size, I can to some extent capture breaks in the reporting of bank balance sheets by Bankscope.

Third, I control for bank-specific balance sheet variables. I focus mainly on size variables[20] (the absolute size with the log of assets and the relative size with the business share of each bank) without retaining liquidity, capital positions, or profitability in the baseline, as these variables may actually reflect the difference between public and private banks. Including these controls would reduce the number of public banks in the data set that may not be subject to the same market disclosure rules, and would therefore restrict cyclical differences in lending growth to banks having similar balance sheet composition and similar profitability. On the contrary, I prefer in a second step to study the extent to which balance sheet composition impacts lending cyclicality differently for public or private banks. In addition, by controlling for the growth rate of the relative size of the bank, I intend to grasp post-merger situations, which are characterized by spikes in relative bank size. If mergers and acquisitions are procyclical, this would tend to increase the loan cyclicality of private banks more than that of public banks. When required, I include

[19]For market-wide aggregates, I use figures of the banking sector based on the same Bankscope data set but with only consolidated data, so that I am sure to avoid double-counting assets when working with the larger, unconsolidated, data set.

[20]There is some evidence that smaller banks invest more in the collection of "soft" information (Berger et al. 2005), which may induce more stable credit policies and less cyclical long-term relationships.

dummies for privatized banks (possibly before/after) and/or 2008–9 bank bailout packages.

2.3.3 Lending through the Cycle Regression

To analyze the behavior of public banks during the upswing or the downturn, I now distinguish between expansionary and recessionary phases as well as the intensity of the positive or negative shock. First, I cannot use the same reference point (e.g., positive or negative growth rates) across countries, or else I would blur the effects in a cross-country analysis that includes fast-growing developing countries and slow-growing developed countries. I can instead consider observations above or below the mean growth rate of GDP by country over the whole period, so that I have roughly the same number of observations above or below. But in this particular case I would implicitly assume that the correct country-specific reference point is time invariant, and the interpretation of the coefficient would be difficult. In fact, I would only observe the cyclicality of bank lending clustered by above/below mean GDP growth, but would not be able to say, for instance, that public banks reduced their loans less in the case of bad economic conditions.[21]

Ideally, one would rather focus on the positive or negative deviation from the country-specific potential output.[22] But this output gap is only available for OECD member states. Instead, to keep the largest cross-section, I use the deviation from the HP-filtered output trend,[23] so that the expansionary phase corresponds to GDP growing faster than its trend.

[21] Above/below country average growth rates might combine both positive and negative growth rates so that sign interpretation would not be possible. Hence, results are not reported but support the results presented thereafter, with government-owned banks featuring less cyclical lending mostly in the below-average cluster.

[22] Potential output is defined as the level of output that an economy can in principle produce at a constant inflation rate, in the absence of temporary shocks. It depends on the capital stock, the potential labor force, the non-accelerating inflation rate of unemployment (NAIRU), and the level of labor efficiency.

[23] The output trend is calculated using a Hodrick-Prescott filter with smoothing parameter of 6.25 on the data set of yearly GDP from 1970 to 2010, as suggested by Ravn and Uhlig (2002).

Thus, I estimate equation (1), but by considering positive or negative macroeconomic shocks (β_2 is broken down into $\beta_{2,1}$ and $\beta_{2,2}$) as well as square terms (the α terms) to see whether the impact intensifies when the shock is more or less positive or negative. Pos (Neg) is a dummy variable which takes the value 1 if the variable $MacroShock$ is positive (negative).

$$\begin{aligned} gLoan_{i,t} = MacroShock_{c,t} \cdot \big\{\beta_1 + \beta_{21} \cdot Pu_i \cdot Pos_{c,t} + \beta_{22} \cdot Pu_i \\ \cdot Neg_{c,t} + \ldots\big\} + MacroShock^2_{c,t} \cdot \big\{\alpha_1 + \alpha_{21} \cdot Pu_i \cdot Pos_{c,t} \\ + \alpha_{22} \cdot Pu_i \cdot Neg_{c,t}\big\} + \alpha_3 \cdot Pos_{c,t} + \cdots + \upsilon_{i,t} \end{aligned} \tag{2}$$

Alternatively, I test the asymmetric behavior of public banks over the business cycle and the differential effect depending on the magnitude of the shock by splitting the sample into four categories (Cat). Large (small) positive shocks correspond to the observations above (below) the median positive shocks for each country, and likewise for large and small negative shocks. Hence, the estimated equation is

$$\begin{aligned} gLoan_{i,t} = MacroShock_{c,t} \cdot \left\{\beta_1 + \sum_{Cat} \beta_{Cat} \cdot Pu_i \cdot Cat_{c,t} + \ldots\right\} \\ + \sum_{Cat} \mu_{Cat} \cdot Cat_{c,t} + \cdots + \upsilon_{i,t}. \end{aligned} \tag{3}$$

2.3.4 Estimation Choice

As a baseline, I use the within estimator[24] and I consider the following structure for the error term:

$$\upsilon_{i,t} = \alpha_i + \alpha_c + \alpha_t + \alpha_{c,t} + \epsilon_{i,t}.$$

When using the within estimator, time-invariant bank (α_i) and country (α_c) fixed effects are taken care of while controlling for the time trend. When the panel is reduced to 1999–2010 so that it is better balanced, the interaction between country and year dummies ($\alpha_{c,t}$) is included; then I can compare public and private bank

[24] As the results of Haussman tests suggest, I reject the hypothesis of uncorrelated individual effects.

lending variations within each country for each year. As a result of my specification, I discard all country-specific and time-invariant institutional arrangements.

To make sure the results are not driven by the over-representation of some countries, which is a common problem in Bankscope, I give each country an equal weight.[25]

3. Public Bank Lending Is Less Cyclical than Private Bank Lending

3.1 Graphical Analysis

Figure 1 displays the evolution in bank loan growth in percentage points associated with a 1 percent change in GDP, using an eight-year rolling window.[26] The graph on the left pictures a lending boom by private banks where each additional percentage point of GDP tends to be associated with at least a 1 percent growth in gross loans. As far as public banks are concerned, the graph on the right illustrates acyclical loan growth, with a deviation associated with a 1 percent increase in GDP not significantly different from zero, at least until 2004. But from 2004 onwards, on average, public bank lending starts to be procyclical, even if less procyclical than private banks, suggesting that they both increased their lending to benefit from the boom and/or that, when hit by the crisis, they had to readjust their lending policy.

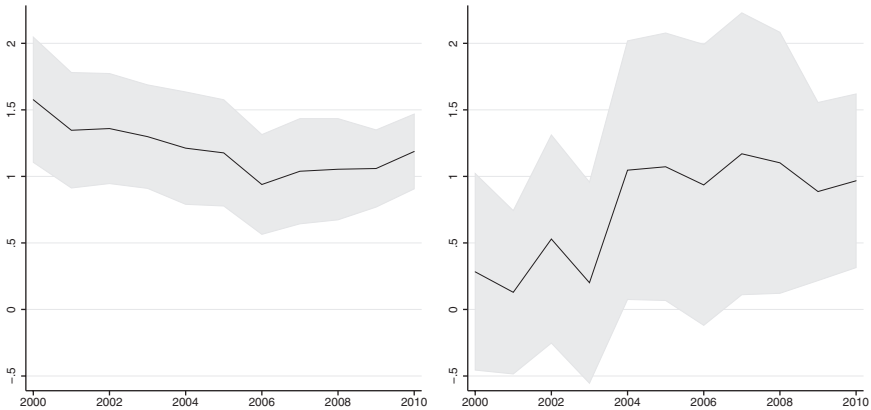
3.2 Regression Analysis

The main results are presented in table 4. Public bank lending appears to be significantly less cyclical than private bank lending, whether public ownership is direct (columns 1 and 2) or not (columns 3–6).

[25]For that purpose, I use the frequency weights option which is directly provided by Stata; thus, the weight of an observation is inversely proportional to the number of observations within a given country. In other words, an observation in an over-represented country like Germany or the United States will be assigned a smaller importance, so that ultimately each country has the same contribution to the average effect.

[26]The graph is similar whether I keep or drop countries with nationalizations during a crisis and banks nationalized over the 2008–9 financial crisis.

Figure 1. Evolution of Lending Cyclicality for Private (Left) and Public (Right) Banks



Notes: For private (respectively, public) banks, the estimates correspond to the coefficient β_1 (respectively, $\beta_1 + \beta_2$) of equation (1). Each point of the graph reports the estimates of the benchmark model, with a rolling window over the past eight years. Public ownership is defined as ultimate ownership (*GOB_UO50*), that is to say the indirect public ownership of more than 50 percent of a bank. The solid line is the movement of loan growth (in percentage points) associated with a 1 percent change of GDP. The shaded area displays the 95 percent confidence bands.

Nevertheless, two complementary remarks call for a more careful look at ownership change. First, some ailing banks may have been nationalized during a crisis, either after 2008 or since 1970, precisely to avoid a lending freeze, which could be captured by the public bank dummy and could artificially increase the difference in lending cyclicality. This effect seems to be present for banks directly controlled by the government. As a matter of fact, when I remove banks nationalized during the 2008 crisis and drop the countries that nationalized banks during a banking crisis between 1970 and 2004, the lower cyclicality of public bank lending is somewhat weaker (column 2).

Second, failing private banks nationalized during a crisis are unlikely to feature countercyclical lending; hence, this correlation between public ownership and asset restructuring blurs the possible "lending against the wind" ability of public banks. And this effect seems to prevail for indirect public ownership of banks. The gap

Table 4. Main Results on Lending Cyclicality, 1990–2010

Results of the loan growth equation (1) using the within estimator. The left-side variable is total gross loan growth. The proxy of the macroeconomic shock is GDP growth. Direct public ownership of more than 50% of a bank means that the government is the controlling shareholder (*GOB_CSH50*). Indirect public ownership of more than 50 or 25% of a bank means the government is the ultimate owner (*GOB_UO50* or *GOB_UO25*). The additional effect of being publicly owned on the co-movement between lending growth and macroeconomic shocks is captured by the interaction between the proxy for the macro shock and the public ownership dummy. Other covariates include a constant term, the public bank dummy, the lag market size, the lag concentration ratio, the lag inflation, the lag log of GDP per capita, and the change in lending interest rate. Country clustered robust standard errors are in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)
Public Ownership Dummy Definition	**Direct, >50%**		**Indirect, >50%**		**Indirect, >25%**	
Dependent Variable	**Loan Growth**		**Loan Growth**		**Loan Growth**	
Macro Shock	**GDP Growth**		**GDP Growth**		**GDP Growth**	
Macro Shock*Public Dummy	−0.811***	−0.738***	−0.416	−0.895***	−0.371	−0.725***
	(0.197)	(0.258)	(0.309)	(0.281)	(0.269)	(0.256)
Macro Shock*Foreign Dummy	0.183	0.288**	0.195	0.201	0.188	0.186
	(0.112)	(0.139)	(0.123)	(0.143)	(0.124)	(0.150)
Macro Shock*Savings Bank Dummy	0.550	0.657	0.610	0.644	0.596	0.615
	(0.499)	(0.567)	(0.515)	(0.581)	(0.517)	(0.564)
Macro Shock*Investment Bank	0.156	0.299	0.127	0.263	0.134	0.295
	(0.415)	(0.530)	(0.423)	(0.522)	(0.420)	(0.501)
Macro Shock*Real Estate Bank	0.724*	0.791	0.716*	0.815	0.707*	0.786
	(0.412)	(0.577)	(0.419)	(0.586)	(0.419)	(0.585)
GDP Growth	1.158***	0.829***	1.152***	0.929***	1.156***	0.936***
	(0.134)	(0.164)	(0.125)	(0.174)	(0.127)	(0.185)
Lag GDP Growth	0.570***	0.558***	0.569***	0.552***	0.567***	0.546***
	(0.144)	(0.161)	(0.142)	(0.160)	(0.141)	(0.160)
Lag Log of Bank Asset	−4.378***	−4.513**	−4.372***	−4.554**	−4.375***	−4.548**
	(1.475)	(1.886)	(1.473)	(1.890)	(1.471)	(1.883)
Lag Change Long-Term Rating	0.571***	0.899***	0.572***	0.894***	0.570***	0.898***
	(0.175)	(0.239)	(0.174)	(0.239)	(0.175)	(0.239)

(continued)

Table 4. (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)
Public Ownership Dummy Definition	**Direct, >50%**		**Indirect, >50%**		**Indirect, >25%**	
Dependent Variable	**Loan Growth**		**Loan Growth**		**Loan Growth**	
Macro Shock	**GDP Growth**		**GDP Growth**		**GDP Growth**	
Real Interest Rate	−0.167*	−0.182*	−0.167*	−0.181*	−0.168*	−0.182*
	(0.095)	(0.097)	(0.094)	(0.097)	(0.094)	(0.097)
Lag Bank Relative Size	−0.343**	−0.428***	−0.341**	−0.431***	−0.339**	−0.423***
	(0.148)	(0.142)	(0.149)	(0.143)	(0.147)	(0.140)
Growth of Bank Relative Size	0.075*	0.117*	0.076*	0.118*	0.076*	0.117*
	(0.040)	(0.063)	(0.040)	(0.063)	(0.040)	(0.063)
Lag of Growth of Bank Relative Size	0.027**	0.042**	0.028***	0.043**	0.028**	0.042**
	(0.011)	(0.019)	(0.011)	(0.018)	(0.011)	(0.018)
Market Size Growth	0.019	0.071**	0.019	0.071**	0.019	0.071**
	(0.025)	(0.033)	(0.025)	(0.033)	(0.025)	(0.033)
Lag Market Size Growth	0.038***	0.019	0.038***	0.020	0.038***	0.020
	(0.010)	(0.012)	(0.010)	(0.012)	(0.010)	(0.012)
Macro Shock + Macro Shock*Public Dummy	.347	.091	.736**	.034	.785***	.21
	(.247)	(.334)	(.345)	(.317)	(.303)	(.281)
R^2	0.142	0.148	0.142	0.148	0.142	0.148
No. Countries	83	65	83	65	83	65
No. Public Bank Observations	2067	1667	2907	2310	3231	2568
No. Private Bank Observations	21272	14773	20432	14130	20108	13872
Bank and Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country*Year Interaction Fixed Effects	No	No	No	No	No	No
Drop Nationalization in Crisis	No	Yes	No	Yes	No	Yes
Drop Nationalizations 2008–10	No	Yes	No	Yes	No	Yes

*p < 0.10, **p < 0.05, ***p < 0.01.

between public and private banks in terms of lending fluctuations is significantly different from zero only when I drop nationalizations during a banking crisis (columns 4 and 6). In short, by excluding nationalizations, when I combine the coefficients to obtain the total effect, public bank lending becomes acyclical.

In addition, the feedback loop of reduced implicit public guarantees of private banks as a result of costly bank bailouts does indeed limit the ability of private banks to issue new loans; this specific effect, captured by the change in long-term country rating, is such that a downgrade during the previous period reduces private bank loan growth.

Moreover, foreign-owned banks tend to feature a somewhat stronger reaction to macroeconomic fluctuations, probably due to their ability to attract international flows in the expansion phase and to reallocate funds in areas with less correlated business cycles in case of downturn.

3.3 Robustness Checks

I now display alternative strategies to identify the effect of public bank ownership on lending cyclicality, first using different specifications, then a sub-sample of commercial banks only, and last a sub-sample of countries that privatized part of their public banking sector.

3.3.1 Alternative Specifications

A set of robustness checks is displayed in table 5. First, regression 1 includes the lag dependant variable (lagged loan growth), which turns out not to be significant, as I already control for variables such as the lag of GDP growth or the lag of absolute and relative asset size.

Second, in regression 2, I use the subset of corporate loans, although it reduces the sample size by one-fourth. The lower lending cyclicality could be driven by forced loans to the government, not business or housing loans, but this is no longer an issue when restricted to corporate loans.

Third, I use the output gap as an alternative metric for the size of the macroeconomic shock with consistent results (column 3).

Table 5. Robustness Check: Alternative Specifications

Results of the loan growth equation (1). The left-side variable is total gross loan growth (*gLoan*) or corporate loan growth (*gLoanCorp*). The proxy of the macroeconomic shock is GDP growth or the HP-filtered output gap. Public ownership is defined as ultimate ownership (*GOB_UO50*), i.e., the indirect public ownership of more than 50% of a bank. The additional effect of being publicly owned on the co-movement between lending growth and macroeconomic shocks is captured by the interaction between the proxy for the macro shock and the public ownership dummy. Estimated either using the within estimator or a GMM specification using the forward orthogonal deviation transform as well as collapsed instruments. When using the GMM estimation with the xtabond2 command (that does not report R^2), the sample is reduced to countries with at least one public bank after 1997; all available lags are used as instrument of the macro shock. Country-year interaction fixed effects require a more balanced sample starting in 1999; in this case, time-varying variables at the country level are not estimated. The usual set of covariates is used but not reported. Country clustered robust standard errors are in parentheses.

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Sample	**All**	**All**	**All**	**Restricted**	**Since 1999**	
Estimator	**Within**	**Within**	**Within**	**GMM**	**Within**	
Dependent Variable	***gLoan***	***gLoanCorp***	***gLoan***	***gLoan***	***gLoan***	
Macro Shock	**GDP Growth**	**GDP Growth**	**Output Gap**	**GDP Growth**	**GDP Growth**	**Output Gap**
GDP Growth	0.933***	0.613**	1.007***	−1.250		
	(0.173)	(0.300)	(0.172)	(1.644)		
Lag GDP Growth	0.567***	0.976***	0.591***			
	(0.149)	(0.210)	(0.160)			
Output Gap			−0.219			
			(0.328)			
Lag Dependent Variable	−0.011					
	(0.024)					
Macro Shock*Public Dummy	−0.903***	−1.381***	−0.805**	−2.681**	−0.627**	−0.657**
	(0.275)	(0.487)	(0.342)	(1.226)	(0.298)	(0.324)
Macro Shock*Foreign Dummy	0.202	0.349	0.338	0.411	0.175	0.412
	(0.144)	(0.242)	(0.347)	(0.779)	(0.146)	(0.266)

(continued)

Table 5. (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)
Sample	**All**	**All**	**All**	**Restricted**	**Since 1999**	
Estimator	**Within**	**Within**	**Within**	**GMM**	**Within**	
Dependent Variable	***gLoan***	***gLoanCorp***	***gLoan***	***gLoan***	***gLoan***	
Macro Shock	**GDP Growth**	**GDP Growth**	**Output Gap**	**GDP Growth**	**GDP Growth**	**Output Gap**
Macro Shock*Savings Bank	0.645	1.638***	0.012	2.216	0.521	−0.302
	(0.584)	(0.344)	(0.932)	(1.402)	(0.596)	(0.961)
Macro Shock*Investment Bank	0.257	0.960**	−0.326	0.978	0.248	−0.253
	(0.519)	(0.433)	(1.055)	(0.964)	(0.288)	(0.804)
Macro Shock*Real Estate Bank	0.808	2.334***	0.945	1.873	0.061	0.547
	(0.588)	(0.511)	(0.975)	(1.133)	(0.379)	(0.844)
R^2	0.148	0.065	0.147		0.262	0.261
No. Countries	65	76	65	60	64	64
No. Public Bank Obs.	2310	1484	2310	2656	1945	1945
No. Private Bank Obs.	14130	16604	14130	14347	10431	10431
Bank and Country Fixed Effects	Yes	Yes	Yes	No	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country*Year Fixed Effects	No	No	No	No	Yes	Yes
Drop Nationalization in Crisis	Yes	No	Yes	No	Yes	Yes
Drop Nationalizations 2008–10	Yes	Yes	Yes	Yes	Yes	Yes
First-Order AR Test				0		
Second-Order AR Test				.970		
Hansen Test				.302		

*p < 0.10, **p < 0.05, ***p < 0.01.

Fourth, regression 4 estimates a system-GMM specification[27] in order to be able to instrument GDP growth and all relevant interaction terms that include the macroeconomic shock.[28] Even though I am mostly interested in the co-movement of bank lending with economic fluctuations, I want to make sure that my parameter estimation does not suffer from the possibility of reverse causality, whereby loan growth fosters current GDP growth or vice versa. Consistent results are obtained.[29]

Last, in order to fully account for macroeconomic conditions at the country level, I include country-year fixed effects, at the cost of a more balanced sample starting in 1999 (columns 5 and 6). Thus all time-varying country-specific factors are netted out; that is to say, I compare public and private bank lending within the same country for the same year.

3.3.2 Sub-Sample of Commercial Banks Only

At the cost of a smaller set of public banks, instead of controlling for banks' business models as in the benchmark case, I can compare loan growth by public versus private banks with the same business model so that results are less likely to be driven by the heterogeneity in

[27]I use the xtabond2 command in Stata which allows me, first, to limit the number of missing observations by using the forward orthogonal deviation transform instead of the first-difference transformation, and second, to use the collapsed option in order to avoid the proliferation of instruments, as I am using all available lags as internal instruments. Moreover, I reduce my data set to countries with at least one public bank in order to avoid estimation problems when a dummy, here the public bank ownership dummy, has only a limited number of ones (Roodman 2009). In addition, in order to include country clustered standard errors, I need a more balanced data set, and for that reason I drop the years before 1997, for which I have fewer observations. Last, when several lags were used in the benchmark within regression, the additional lags are removed from the GMM, as the variables are precisely instrumented by their lags.

[28]Nevertheless, my focus here is not to instrument the public ownership dummy as in Bertay, Demirgüç-Kunt, and Huizinga (2015), which is a slow and rarely moving dummy unlikely to be well instrumented; I control instead for nationalizations in crisis.

[29]It successfully passes the Hansen J-statistic and difference-in-Hansen statistic tests. The former tests for the joint validity of all the internal instruments and is robust to heteroskedasticity; the latter tests for the validity of the lagged loan growth, GDP growth, and relevant interaction terms as instruments for the transformed equation and their first differences as instruments in the level equation.

corporate governance structures. Table 6 displays results restricted to the sub-sample of commercial banks for countries with at least one pair of public/private banks for some years. I am left with 111 public commercial banks for indirect public control at the 50 percent threshold.

When restricted to the 1999–2010 period to get a more balanced coverage, I can even compare public commercial banks with privately owned commercial banks of the same country in the same year (column 2), while column 1 uses more observations but instead captures the time variation in country-wide variables using a set of macro controls.

The same lower sensitivity of public bank lending is obtained if I now consider the output gap as an alternative proxy for macroeconomic shocks (columns 3 and 4). Last, it is interesting to note that only the subset of public commercial banks in high-income countries is less sensitive to macroeconomic shocks (GDP growth or output gap) once nationalizations during crises are taken into account and all the country-specific time variation is netted out (columns 5 and 6).

3.3.3 Before and After Privatization Events

I now make use of the time variation in my definition of public bank dummies: I focus on the same bank in a given country before and after the round of privatization[30] compared with the evolution of the banks that remained private or public during the whole period. Even if I ignore the magnitude of public ownership before the privatization event,[31] these events correspond to a dilution of the intensity of the public ownership of the bank which should be associated with a change in lending variations if bank ownership matters.

Results are displayed in table 7. When restricted to the thirty countries in which the eighty-six privatization events occurred, I observe that privatized banks are less cyclical before their privatization, whether the macroeconomic shock is proxied by GDP growth

[30] Whether I consider the largest or the latest privatization event in the case of multiple rounds of privatization, results are very similar.

[31] After the privatization event, I know by construction that the bank is not public if it is still in my database in 2008–10. If the bank drops out of my data set before, I also ignore the magnitude of the public ownership for the years after the last privatization round.

Table 6. Robustness Check: Commercial Banks Only

The sample is restricted to countries with at least one public bank at the 25% ownership threshold and to commercial banks only (narrowly defined as commercial and credit card banks, excluding specialized government credit institutions). The table reports results of the loan growth equation (1) using the within estimator. The left-side variable is total gross loan growth. The proxy of the macroeconomic shock is GDP growth or the HP-filtered output gap. Public ownership is defined as ultimate ownership (*GOB_UO50*), i.e., the indirect public ownership of more than 50% of a bank. The additional effect of being publicly owned on the co-movement between lending growth and macroeconomic shocks is captured by the interaction between the proxy for the macro shock and the public ownership dummy. Other covariates include a constant term and the public bank dummy, the real interest rate, the lag market size, the lag market size growth, and the lag inflation. Country-year interaction fixed effects require a more balanced sample starting in 1999; in this case, time-varying variables at the country level are not estimated. Country clustered robust standard errors are in parentheses.

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Sample	**Only Countries with Public Banks**		**Only Countries with Public Banks**		**High-Income Countries**	
Time Span	**All**	**Since 1999**	**All**	**Since 1999**	**Since 1999**	
Dependent Variable	**Loan Growth**		**Loan Growth**		**Loan Growth**	
Macro Shock	**GDP Growth**		**Output Gap**		**GDP Growth**	**Output Gap**
Macro Shock*Public Dummy	−0.868***	−0.886**	−1.404**	−1.061*	−2.753***	−3.274**
	(0.306)	(0.364)	(0.554)	(0.610)	(0.980)	(1.260)
Macro Shock*Foreign Dummy	0.040	−0.049	0.072	0.273	0.120	−1.086
	(0.161)	(0.114)	(0.371)	(0.309)	(0.262)	(0.667)
GDP Growth	1.091***		0.784***			
	(0.175)		(0.273)			
Lag GDP Growth	0.488***		0.381***			
	(0.112)		(0.134)			
Output Gap			0.726			
			(0.453)			
Lag Log of Bank Asset	−3.855**	−5.628**	−4.025**	−5.661**	5.920***	5.905***
	(1.696)	(2.535)	(1.667)	(2.511)	(2.011)	(1.921)

(continued)

Table 6. (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)
Sample	**Only Countries with Public Banks**		**Only Countries with Public Banks**		**High-Income Countries**	
Time Span	**All**	**Since 1999**	**All**	**Since 1999**	**Since 1999**	
Dependent Variable	**Loan Growth**		**Loan Growth**		**Loan Growth**	
Macro Shock	**GDP Growth**		**Output Gap**		**GDP Growth**	**Output Gap**
Lag Change Long-Term Rating	0.854***		0.893***			
	(0.170)		(0.178)			
Lag Bank Relative Size	−0.243	−0.637*	−0.214	−0.584	−0.705*	−0.698*
	(0.177)	(0.357)	(0.174)	(0.353)	(0.369)	(0.368)
Growth of Bank Relative Size	0.373***	0.410***	0.374***	0.410***	0.653***	0.654***
	(0.060)	(0.098)	(0.060)	(0.097)	(0.073)	(0.073)
Lag of Growth of Bank Relative Size	0.090***	0.087***	0.090***	0.087***	0.062*	0.063*
	(0.023)	(0.029)	(0.023)	(0.029)	(0.031)	(0.031)
Market Size Growth	0.140***		0.139***			
	(0.044)		(0.044)			
Lag Log of GDP per Capita	23.128*		20.548*			
	(11.464)		(11.020)			
Change Lending Interest Rate	−0.458*		−0.498**			
	(0.228)		(0.235)			
R^2	0.283	0.399	0.283	0.399	0.438	0.438
No. Countries	40	40	40	40	29	29
No. Public Bank Obs.	983	855	983	855	131	131
No. Private Bank Obs.	8261	6423	8261	6423	3169	3169
Bank and Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country*Year Fixed Effects	No	Yes	No	Yes	Yes	Yes
Drop Nationalization in Crisis	Yes	Yes	Yes	Yes	Yes	Yes
Drop Nationalizations 2008–10	Yes	Yes	Yes	Yes	Yes	Yes

*p < 0.10, **p < 0.05, ***p < 0.01.

Table 7. Robustness Check: Before/After Privatization

The estimation sample is limited to the thirty countries where privatizations took place over the sample time span 1990–2010. Results of the loan growth equation (1) using the within estimator. The left-side variable is total gross loan growth. The proxy of the macroeconomic shock is GDP growth or the HP-filtered output gap. Public ownership is defined as ultimate ownership (*GOB_UO50*), i.e., the indirect public ownership of more than 50% of a bank. The additional effect of being publicly owned before the privatization on the co-movement between lending growth and macroeconomic shocks is captured by the interaction between the proxy for the macro shock and the years before privatization dummy. Other covariates include a constant term, the public bank dummy, the real interest rate, the lag bank relative size, the lag inflation, the lag log of GDP per capita, and the change in lending interest rate. Country clustered robust standard errors are in parentheses.

	(1)	**(2)**	**(3)**	**(4)**
Sample	**Only Countries with Privatized Banks**		**Only Countries with Privatized Banks**	
Bank Type	**All**		**Commercial**	
Dependent Variable	**Loan Growth**		**Loan Growth**	
Macro Shock	**GDP Growth**	**Output Gap**	**GDP Growth**	**Output Gap**
Macro Shock*Public Dummy	0.039	−0.029	0.551	0.783
	(0.444)	(0.465)	(0.723)	(1.283)
Macro Shock*Foreign Dummy	0.143	0.173	0.097	0.235
	(0.183)	(0.201)	(0.183)	(0.196)
Macro Shock*Before Privatization Dummy	−1.492*	−3.188**	−1.710**	−4.175**
	(0.749)	(1.457)	(0.800)	(1.847)
Macro Shock*Savings Bank Dummy	1.239***	1.068***		
	(0.297)	(0.324)		
Macro Shock*Investment Bank Dummy	−0.398	0.104		
	(0.274)	(0.422)		
Macro Shock*Real Estate Bank Dummy	1.019**	1.690*		
	(0.425)	(0.909)		
GDP Growth	1.359***	1.623***	1.359***	1.555***
	(0.254)	(0.314)	(0.273)	(0.328)
Lag GDP Growth	0.237**	0.330**	0.189	0.258*
	(0.113)	(0.124)	(0.129)	(0.129)
Output Gap		−0.534		−0.384
		(0.481)		(0.564)
Lag Log of Bank Asset	−4.878**	−4.790**	−4.997**	−4.924**
	(1.845)	(1.756)	(2.046)	(1.962)

(continued)

Table 7. (Continued)

	(1)	(2)	(3)	(4)
Sample	**Only Countries with Privatized Banks**		**Only Countries with Privatized Banks**	
Bank Type	**All**		**Commercial**	
Dependent Variable	**Loan Growth**		**Loan Growth**	
Macro Shock	**GDP Growth**	**Output Gap**	**GDP Growth**	**Output Gap**
Lag Change Long-Term Rating	0.933***	0.929***	0.811***	0.794***
	(0.296)	(0.291)	(0.276)	(0.270)
Lag Bank Relative Size	−0.190	−0.190	−0.117	−0.128
	(0.289)	(0.275)	(0.314)	(0.281)
Growth of Bank Relative Size	0.231***	0.231***	0.219***	0.220***
	(0.049)	(0.049)	(0.048)	(0.048)
Lag of Growth of Bank Relative Size	0.036*	0.036*	0.034	0.033
	(0.018)	(0.018)	(0.020)	(0.020)
Lag Market Size	0.573*	0.603**	0.655*	0.679*
	(0.292)	(0.276)	(0.366)	(0.358)
Market Size Growth	0.062*	0.062*	0.051	0.051
	(0.035)	(0.035)	(0.033)	(0.033)
Lag Market Size Growth	0.035**	0.035**	0.030	0.030*
	(0.017)	(0.016)	(0.018)	(0.017)
Lag Concentration Ratio	36.351*	35.025*	46.500**	44.930**
	(18.027)	(17.977)	(19.501)	(20.044)
R^2	0.240	0.239	0.242	0.242
No. Countries	30	30	30	30
No. Public Bank Obs.	1209	1209	581	581
No. Private Bank Obs.	7333	7333	6367	6367
Bank and Country Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Country*Year Interaction Fixed Effects	No	No	No	No
Drop Nationalization in Crisis	No	No	No	No
Drop Nationalizations 2008–10	Yes	Yes	Yes	Yes

*p < 0.10, **p < 0.05, ***p < 0.01.

(column 1) or by the output gap (column 2). This result is robust to the profile of the buyer of the stakes relinquished by the government or to a placebo analysis concerning the year of privatization.[32]

The result remains unchanged if I focus only on privatized commercial banks before and after the last wave of privatization (columns 3 and 4).

4. The Lower Lending Cyclicality of Public Banks Is Heterogeneous

4.1 Heterogeneity across the Stages of the Business Cycle

I now concentrate on the evolution of public bank lending over the stages of the business cycle. Thus I investigate the extent to which the lower cyclicality of public bank lending occurs mainly in reaction to negative shocks, when additional lending is particularly needed. Table 8 displays the results.

First, this asymmetric pattern can be tested using square terms for the negative macro shock. Column 1 shows that public banks reduce their lending less after a negative shock. But when the output deviates further from its trend, this effect weakens: the tendency of direct public ownership of banks to favor lending against the wind decreases when the economy deteriorates.

Second, I distinguish four categories, namely large and small, positive and negative macro shocks, defined as deviation from the output trend. I observe that public banks reduce significantly less their lending in the case of small negative shocks compared with similar private banks, whether countries with bank nationalizations are included or not (columns 2 and 4). But public banks fail to absorb larger negative shocks. As expected, when including bank nationalizations during a crisis, public banks cannot smooth credit relative to private banks in the case of a large negative macro shock (column 2). But even after dropping countries that experienced bank

[32]Regardless of who bought the stakes relinquished by the government (national or foreign block holding after privatizations), I find no additional effect. Also, when I do a placebo analysis, results do not vary if I take the year $t-1$ as the year of the privatization, but results are no longer significant when I take $t+1$.

Table 8. Heterogeneous Lending Cyclicality across Stages of the Business Cycle

The left-side variable is total gross loan growth. The proxy of the macroeconomic shock is the HP-filtered output gap. Public ownership is defined as ultimate ownership (*GOB_UO50*), i.e., the indirect public ownership of more than 50% of a bank. With two buckets, positive or negative macro shocks, equation (2) is estimated using the within estimator. The additional effect of being publicly owned on the co-movement between lending growth and macroeconomic shocks during a crisis is captured by the sum of the linear and square interaction between the proxy for the negative macro shock and the public ownership dummy. With four categories, large or small, positive or negative macro shocks, equation (3) is estimated using the within estimator. The additional effect of being publicly owned on the co-movement between lending growth and macroeconomic shocks when the macro shock is in one of the four categories (large or small positive or negative macro shock) is captured by the interaction between the proxy for the macro shock, the dummy for the category of the shock, and the public ownership dummy. Country-year interaction fixed effects require a more balanced sample starting in 1999; in this case, time-varying variables at the country level are not estimated. The usual set of covariates is used but not reported. Country clustered robust standard errors are in parentheses.

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Sample	**All**				**Since 1999**	
Dependent Variable	**Loan Growth**				**Loan Growth**	
Output Gap	−0.528*	−0.333	0.009	0.510	−0.934*	2.634***
	(0.303)	(0.366)	(0.417)	(0.519)	(0.486)	(0.331)
GDP Growth	1.382***	1.448***	1.007***	1.007***	0.099	0.979***
	(0.184)	(0.203)	(0.188)	(0.182)	(0.222)	(0.255)
Positive Output Gap*Public Dummy	−0.700		−1.618			
	(1.075)		(1.564)			
Negative Output Gap*Public Dummy	−2.633***		−1.553			
	(0.935)		(1.625)			
(Positive Output Gap)^2*Public Dummy	0.268		0.535			
	(0.226)		(0.373)			
(Negative Output Gap)^2*Public Dummy	−0.233***		0.025			
	(0.068)		(0.201)			

(continued)

Table 8. (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)
Sample **Dependent Variable**	**All** **Loan Growth**				**Since 1999** **Loan Growth**	
Large Positive Output Gap*Public Dummy		0.321		1.172	0.240	1.620*
		(0.564)		(0.791)	(0.629)	(0.953)
Small Positive Output Gap*Public Dummy		−0.881		−2.720	3.445	2.631
		(2.133)		(3.678)	(2.075)	(3.881)
Large Negative Output Gap*Public Dummy		−0.467		−1.961**	−0.341	−2.088**
		(0.819)		(0.912)	(0.843)	(0.893)
Small Negative Output Gap*Public Dummy		−6.442**		−11.537***	−7.477**	−13.352***
		(2.706)		(3.602)	(3.330)	(4.788)
R^2	0.143	0.137	0.148	0.146	0.253	0.263
No. Countries	83	83	65	65	82	64
No. Public Bank Observations	20432	20432	14130	14130	15093	10431
No. Private Bank Observations	2907	2907	2310	2310	2456	1945
Bank and Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country*Year Interaction Fixed Effects	No	No	No	No	Yes	Yes
Drop Nationalization in Crisis	No	No	Yes	Yes	No	Yes
Drop Nationalizations 2008–10	No	No	Yes	Yes	No	Yes

*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

nationalizations during a crisis, the ability of public banks to absorb negative shocks is significantly reduced during periods of large output losses compared with its trend (column 4). Conversely, in the case of a positive macro shock with a GDP above its trend, public banks do not show a different pattern in the variation of their lending compared with the other banks. With a more balanced data set, the same results survive the inclusion of country-year interaction dummies, so that all time-varying country-specific effects are captured out (columns 5 and 6).

4.2 Heterogeneity across the Stages of Economic Development

I now turn to the interaction between ownership and lending cyclicality and economic development, in order to assess the extent to which the development view of public banking in the long run can be reconciled with an analysis of short-term variations. I split my data set into three sub-groups—low-, middle-, and high-income countries—roughly following the classification of the World Bank.[33] Table 9 displays the results of this operation.

The middle-income group is the one closest to the aggregate results presented above, with lower lending cyclicality of public banking, whether I consider GDP growth or the output gap as a proxy for macroeconomic shocks with or without country-year interaction dummies (columns 5 and 6). This lower cyclicality of public bank lending is especially significant in the case of a negative shock but at a decreasing pace as the size of the negative shock increases (column 7).

The high-income group also tends to show a lower lending cyclicality of public bank lending[34] (column 9, but this does not survive the inclusion of country-year effects in column 10), but this may be driven rather by a slower expansion of the activities of public bank

[33]Low-income countries are defined as countries with GDP per capita below 4,000 USD and high-income countries above 12,000 USD; if some countries have observations both above and below the threshold, they are included in the upper group. Compared with the grouping of the World Bank, the low-income group here corresponds to the low- and middle-low income groups of the World Bank.

[34]This is particularly the case for commercial banks, as shown in table 6, columns 5 and 6.

Table 9. Heterogeneous Lending Cyclicality across Stages of Economic Development

The sub-sample of countries by level of development roughly follows the classification of the World Bank. The left-side variable is total gross loan growth. The proxy of the macroeconomic shock is GDP growth (*gGDP*) or the HP-filtered output gap. Public ownership is defined as ultimate ownership (*GOB_UO50*), i.e., the indirect public ownership of more than 50% of a bank. When looking at the homogeneous reaction across the business cycle, equation (1) is estimated using the within estimator. The additional effect of being publicly owned on the co-movement between lending growth and macroeconomic shocks is captured by the interaction between the proxy for the macro shock and the public ownership dummy. With two buckets, positive or negative macro shocks, equation (2) is estimated using the within estimator. The additional effect of being publicly owned on the co-movement between lending growth and macroeconomic shocks during a crisis is captured by the sum of the linear and square interaction between the proxy for the negative macro shock and the public ownership dummy. The usual set of covariates is used but not reported. Country-year interaction fixed effects require a more balanced sample starting in 1999; in this case, time-varying variables at the country level are not estimated. Country clustered robust standard errors are in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Sample	**Low-Income Countries**				**Middle-Income Countries**				**High-Income Countries**			
Dependent Variable	**Loan Growth**				**Loan Growth**				**Loan Growth**			
Macro Shock	**GDP Growth**	**Output Gap**			**GDP Growth**	**Output Gap**			**GDP Growth**	**Output Gap**		
Output Gap			2.993	3.088			−1.127	−1.554			0.477	1.623
			(1.030)	(0.256)			(0.352)	(0.906)			(0.489)	(0.460)
GDP Growth	0.007	−1.196	−1.484	−0.403	0.933	2.007	1.466	0.900	0.787	0.484	0.698	−1.648
	(0.334)	(0.101)	(0.580)	(0.100)	(0.404)	(0.255)	(0.289)	(0.439)	(0.218)	(0.127)	(0.257)	(0.334)
Macro Shock*	−0.222	0.334			−0.869	−1.074			−1.672	0.245		
Public Dummy	(0.250)	(0.321)			(0.435)	(0.474)			(0.595)	(0.775)		
Positive Macro			−3.640	−3.543			1.260	2.587			−7.315	−5.183
Shock*Public			(1.594)	(0.995)			(1.332)	(4.177)			(3.271)	(3.776)
Dummy												
Negative Macro			4.049	4.179			−3.709	−3.799			−1.489	−0.613
Shock*Public			(1.873)	(1.354)			(1.479)	(2.890)			(2.270)	(4.338)
Dummy												
Positive Macro			0.730	0.765			−0.087	−0.473			3.041	2.768
Shock Square*			(0.300)	(0.161)			(0.187)	(0.772)			(0.960)	(0.689)
Public Dummy												
Negative Macro			0.540	0.609			−0.317	−0.153			−0.055	0.074
Shock Square*			(0.212)	(0.149)			(0.095)	(0.594)			(0.228)	(0.467)
Public Dummy												

(continued)

Table 9. (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Sample	**Low-Income Countries**				**Middle-Income Countries**				**High-Income Countries**			
Dependent Variable	**Loan Growth**				**Loan Growth**				**Loan Growth**			
Macro Shock	**GDP Growth**	**Output Gap**			**GDP Growth**	**Output Gap**			**GDP Growth**	**Output Gap**		
R^2	0.421	0.548	0.443	0.550	0.159	0.237	0.194	0.238	0.157	0.366	0.156	0.368
No. Countries	15	15	15	15	20	20	25	20	30	29	30	29
No. Private Bank Obs.	2052	1892	2052	1892	4056	3659	5487	3659	8022	4880	8022	4880
No. Public Bank Obs.	743	674	743	674	595	546	778	546	972	725	972	725
Bank and Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country*Year Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Drop Nationalization in Crisis	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Drop Nationalizations 2008–10	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*p < 0.10, **p < 0.05, ***p < 0.01.

lending when the economy expands[35] (column 11). It is also worth noting that as the magnitude of the positive shock increases, public banks become more similar to private banks in their lending pattern (columns 11 and 12).

As for the public banks in the low-income group, they have the opposite characteristic in terms of lending variations over the cycle.[36] Overall, it is not significantly different from privately owned banks, whatever the proxy or restrictions used (columns 1 and 2). Then regressions 3 and 4, with or without country-year interaction fixed effects, reveal that public banks are less likely to benefit from the boom phase, but this effect marginally decreases when the size of the positive shock increases (as in the case of the high-income group). And they are more affected during the periods of below-trend growth: in fact, this effect increases as the size of the negative shock increases. As the public banks in less developed countries are rather less procyclical in periods of boom, but more procyclical in periods of bust, it is logical to observe that when the two effects are pooled, as in columns 1 and 2, the average lending cyclicality of public banks is not significantly different from their private counterparts. So failing to distinguish the different stages of the business cycle would wrongly support the view that there is little difference in behavior between public and private banks, while public banks, even after excluding the countries that nationalized ailing banks during a crisis, tend to reduce their lending relatively more during economic downturns.

In short, I find a non-linear relation between economic development and public banks' ability to absorb shocks, whereas one might have expected low-income countries to be keener on using public banking as a political tool to smooth out economic fluctuations. However, the cycle that matters most for low-income countries, with potentially weaker institutions, may not be the economic cycle but rather the political cycle (Dinc 2005; Khwaja and Mian 2005).

[35]On the sub-sample of OECD member countries, the deviation from potential output of the economy (instead of output trend) can be used and similar results are obtained, i.e., overall lower cyclicality, especially during phases of expansion. However, in the European case, public banks still reduce their lending significantly less when facing negative shocks.

[36]Likewise, foreign banks in the low-income group are more procyclical, while the effect becomes not statistically significant for the high-income group.

5. The Lending Cyclicality of Public Banks and Their Funding Sources

If public banks lend in a less procyclical manner, especially in times of economic stress, this pattern should be reflected in either their liability structure or the provisions left on the asset side to absorb potential shocks. In other words, the less cyclical lending policy of public banks may be associated with a less volatile funding structure (for instance, linked with explicit government support or a different business model) or with more procyclical loan loss provisioning.

5.1 Middle- and High-Income Countries Have Less Volatile Funding Sources in Bad Times

The evolution of the liability side of public banks in middle- and high-income countries is displayed in table 10.

If public banks in middle-income countries benefit from the upside by increasing both their wholesale (columns 1–3) and their long-term funding (columns 4–6), wholesale funding is less subject to a sudden dry-up in the case of a bad macro shock, which can sustain less cyclical lending practices (column 3).

In high-income countries, public banks appear to rely less on short-term funding captured by the growth rate of money-market funding[37] during expansionary phases (columns 7–9), so that their reliance on wholesale funding is less cyclical, which is consistent with the lower procyclicality of public bank lending, especially during booms. Public bank lending growth in developed countries is also restricted by a more limited expansion of their longer-term funding maturities (column 12).

These two complementary effects are in line with the "dark side" view of wholesale funding, which posits that wholesale markets create severe liquidity risks in the case of negative news (Huang and Ratnovski 2010). As a matter of fact, during a downturn, public ownership may act as a guarantee against possible losses and, for

[37]The same results are obtained by looking at the share of short-term funding broadly defined as total liabilities net of deposits, other liabilities, long-term funding, and total reserves.

Table 10. Bank Funding as a Potential Source of Balance Sheet Cyclicality: Middle- and High-Income Countries

The sub-sample of countries by level of development roughly follows the classification of the World Bank. The left-side variable is the growth rate of a balance sheet variable. The proxy of the macroeconomic shock is GDP growth or the HP-filtered output gap. Public ownership is defined as ultimate ownership (*GOB_UO50*), i.e., the indirect public ownership of more than 50% of a bank. When looking at the homogeneous reaction of the growth rate of a balance sheet variable across the business cycle, the equation estimated with the within estimator is similar to equation (1). The additional effect of being publicly owned on the co-movement between the balance sheet variable and macroeconomic shocks is captured by the interaction between the proxy for the macro shock and the public ownership dummy. With two buckets, positive or negative macro shocks, the equation estimated using the within estimator is similar to equation (2). The additional effect of being publicly owned during a crisis is captured by the interaction between the proxy for the macro shock, the dummy for the negative macro shock, and the public ownership dummy. The usual set of covariates is used but not reported. The use of country-year interaction fixed effects requires a more balanced sample starting in 1999; in this case, time-varying variables at the country level are not estimated. Country clustered robust standard errors are in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Sample	**Middle-Income Countries**						**High-Income Countries**					
Dependent Variable	**Growth of Money-Market Funding**			**Growth of Long-Term Funding**			**Growth of Money-Market Funding**			**Growth of Long-Term Funding**		
Macro Shock	**GDP Growth**	**Output Gap**		**GDP Growth**	**Output Gap**		**GDP Growth**	**Output Gap**		**GDP Growth**	**Output Gap**	
Output Gap		6.822	−4.777		−4.60	−4.789		1.344	−13.04		12.525	−0.509
		(1.916)	(3.049)		(1.502)	(0.701)		(1.275)	(1.361)		(0.610)	(1.753)
GDP Growth	−1.274	−3.484	−4.923	0.114	3.334	−0.982	5.051	1.329	4.076	3.095	−1.845	2.710
	(0.342)	(0.925)	(1.297)	(0.771)	(0.310)	(0.552)	(1.175)	(0.919)	(0.439)	(0.567)	(0.306)	(0.175)
Positive Shock*			10.94			6.307			−7.204			−7.368
Public Dummy			(2.265)			(1.674)			(3.275)			(3.578)
Negative Shock*			−6.939			−0.452			−4.851			5.026
Public Dummy			(2.921)			(1.970)			(2.914)			(2.423)
Macro Shock*	−0.447	2.323		0.179	3.137		−3.665	−5.657		−2.299	−0.951	
Public Dummy	(1.041)	(1.279)		(0.508)	(0.894)		(1.465)	(1.930)		(0.520)	(2.170)	

(continued)

Table 10. (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Sample	**Middle-Income Countries**						**High-Income Countries**					
Dependent Variable	**Growth of Money-Market Funding**			**Growth of Long-Term Funding**			**Growth of Money-Market Funding**			**Growth of Long-Term Funding**		
Macro Shock	**GDP Growth**	**Output Gap**		**GDP Growth**	**Output Gap**		**GDP Growth**	**Output Gap**		**GDP Growth**	**Output Gap**	
R^2	0.294	0.291	0.300	0.209	0.219	0.220	0.295	0.289	0.289	0.238	0.239	0.242
No. Countries	19	19	19	19	19	19	25	25	25	29	29	29
No. Private Bank Obs.	1535	1535	1535	1789	1789	1789	2143	2143	2143	3039	3039	3039
No. Public Bank Obs.	248	248	248	273	273	273	415	415	415	512	512	512
Bank and Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country*Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Drop Nationalization in Crisis	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Drop Nationalizations 2008–10	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*p < 0.10, **p < 0.05, ***p < 0.01.

instance, discourage wholesale withdrawals when economic conditions deteriorate. Moreover, public banks tend to engage more in relationship lending (Delgado, Salas, and Saurina 2007) and thus try to acquire more private information; but this activity requires more monitoring on behalf of investors and the bank has to pay a premium on outside finance. Thus public banks may have an incentive to rely less on short-term funding, as observed for middle- and high-income countries, and favor longer-term funding sources.[38]

5.2 Low-Income Countries Have More Volatile Funding Sources in Bad Times

The evolution of the liability side of public banks in low-income countries is displayed in table 11.

The funding structure of public banks in low-income countries seems to rely less on short-term money-market funds during expansionary phases, but results suggest that both short- and long-term funding may be more cyclical overall (respectively, columns 1 and 5 for significant results, but insignificant in columns 2 and 4). Thus it is more appropriate to look at the cyclical behavior of the ratio of possibly volatile over more stable funding.

As proposed by Hahm, Shin, and Shin (2012), the vulnerability of a bank on the liabilities side can be measured by the evolution of the non-core liabilities ratio, i.e., the ratio of less stable funding sources (non-core liabilities) over customer deposits (core liabilities). This reflects the growing financing needs that cannot be met with traditional deposits. The results in columns 7 and 9 show that the non-core liabilities ratio is more procyclical for public banks and decreases more in the case of a bad macro shock, whereas it is less cyclical and mostly non-significant for other income groups. Thus, the larger procyclicality of public bank lending during downturns

[38]Customer deposits, another type of short-term finance (as they can be withdrawn without any restrictions), do not move along the cycle significantly differently for public versus private banks. Indeed, customer deposits are usually considered to be sluggish (see, e.g., Song and Thakor 2007) due to deposit insurance schemes available to all banks, except maybe during periods of extreme stress with possible "flight to quality" towards banks directly backed by the government (e.g., in Russia, see Karas, Schoors, and Weill 2008, p. 26).

Table 11. Bank Funding as a Potential Source of Balance Sheet Cyclicality: Low-Income Countries

The sub-sample of countries by level of development roughly follows the classification of the World Bank. The left-side variable is the growth rate of a balance sheet variable. The ratio of non-core liabilities is defined as liabilities other than customer deposits over the traditional (or core) funding source, i.e., customer deposits. The proxy of the macroeconomic shock is GDP growth or the HP-filtered output gap. Public ownership is defined as ultimate ownership (*GOB_UO50*), i.e., the indirect public ownership of more than 50% of a bank. When looking at the homogeneous reaction of the growth rate of a balance sheet variable across the business cycle, the equation estimated with the within estimator is similar to equation (1). The additional effect of being publicly owned on the co-movement between the balance sheet variable and macroeconomic shocks is captured by the interaction between the proxy for the macro shock and the public ownership dummy. With two buckets, positive or negative macro shocks, the equation estimated with the within estimator is similar to equation (2). The additional effect of being publicly owned during a crisis is captured by the interaction between the proxy for the macro shock, the dummy for the negative macro shock, and the public ownership dummy. The usual set of covariates is used but not reported. The use of country-year interaction fixed effects requires a more balanced sample starting in 1999; in this case, time-varying variables at the country level are not estimated. Country clustered robust standard errors are in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Dependent Variable	**Growth of Money-Market Funding**			**Growth of Long-Term Funding**			**Growth of Ratio of Non-Core Liabilities**			**Growth of Loan Loss Provisions over Net Income**		
Macro Shock	**GDP Growth**	**Output Gap**		**GDP Growth**	**Output Gap**		**GDP Growth**	**Output Gap**		**GDP Growth**	**Output Gap**	
Output Gap		−6.890	−26.905		−5.109	−2.674		−0.107	3.713		−3.437	2.073
		(4.731)	(4.586)		(1.267)	(1.322)		(0.751)	(0.439)		(3.560)	(3.720)
GDP Growth	−1.889	−2.340	14.307	4.830	3.296	3.176	−0.267	−2.733	−2.870	3.754	0.801	−0.409
	(3.326)	(0.291)	(0.379)	(0.822)	(0.412)	(1.039)	(0.181)	(0.203)	(0.395)	(2.341)	(0.881)	(1.196)
Positive Shock*			−9.624			3.911			−2.804			10.647
Public Dummy			(2.316)			(3.151)			(5.486)			(9.066)
Negative Shock*			0.245			1.976			7.641			3.210
Public Dummy			(2.171)			(3.205)			(1.946)			(2.642)
Macro Shock*	2.731	−3.306		−0.406	2.769		1.165	2.824		5.375	8.101	
Public Dummy	(1.143)	(1.942)		(0.763)	(1.067)		(0.447)	(1.618)		(2.527)	(2.128)	

(continued)

Table 11. (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Dependent Variable	**Growth of Money-Market Funding**			**Growth of Long-Term Funding**			**Growth of Ratio of Non-Core Liabilities**			**Growth of Loan Loss Provisions over Net Income**		
Macro Shock	**GDP Growth**	**Output Gap**		**GDP Growth**	**Output Gap**		**GDP Growth**	**Output Gap**		**GDP Growth**	**Output Gap**	
R^2	0.163	0.161	0.162	0.141	0.143	0.143	0.133	0.130	0.133	0.195	0.193	0.194
No. Countries	13	13	13	15	15	15	15	15	15	15	15	15
No. Private Bank Obs.	773	773	773	947	947	947	1705	1705	1705	1040	1040	1040
No. Public Bank Obs.	391	391	391	471	471	471	603	603	603	396	396	396
Bank and Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country*Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Drop Nationalization in Crisis	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Drop Nationalizations 2008–10	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*p < 0.10, **p < 0.05, ***p < 0.01.

observed for low-income countries maps into a less stable funding structure in the case of a negative shock.

If public banks in low-income countries are constrained on their liability side during downturns, they make loan loss provisions more procyclically, which should prevent excessive loan expansion and limit loan deterioration and, as a consequence, favor more countercyclical lending (columns 10 and 11). But this could also arise as a result of lower provisioning in periods of negative shock—for instance, if public banks prefer to roll over their loan book rather than write off non-performing loans, an issue which is beyond the scope of this paper.

6. Conclusion

This paper examines the extent to which public banks display a different pattern in their lending behavior not only according to macroeconomic fluctuations but also across the stages of economic development.

Public bank lending, even when restricted to commercial banks, is less reactive to economic fluctuations. This is especially true in periods of economic downturn: public banks are able to cut back on their new loans less when hit by a negative macroeconomic shock. But as the size of the negative shock increases, the ability of public banks to absorb the shock and lean against the wind is more limited. This asymmetry over the business cycle is particularly relevant for countries in the middle-income group, while public banks in low-income countries have a lending policy that does not ease so much in the case of positive shocks but tightens more in the case of negative ones. This lending pattern is reflected on the liability side by a different funding structure, so that the vulnerability of wholesale funds and non-deposit financing is a consistent explanation for the heterogeneity of public bank lending cyclicality. Moreover, nationalizations during a banking crisis have a tendency to blur the picture due to their correlation with public banking: one has to distinguish public banks which can engage in alternative lending practices from recently nationalized banks which need restructuring and downsizing. Conversely, privatized banks are associated with a shift from low to high lending cyclicality, which is to be expected if ownership does indeed influence lending policies.

The underlying question behind the cyclicality of lending by public banks is their ability to efficiently manage their loan portfolio and funding structure in such a way that their explicit public support allows them to lean against the wind without experiencing any larger default risks (despite larger operational risks; Iannotta, Nocera, and Sironi 2013). This apparently desirable short-term property of public banks calls for more empirical study to investigate the issues of allocation efficiency and corporate governance. For instance, if public banks are less efficient in their monitoring, they can lend in a less procyclical way, but without necessarily ensuring a good allocation of resources (Duprey 2013). Likewise, a different business model may favor more stable lending but may also be associated with more credit forbearance or delayed loan deterioration, which may make public bank lending look less cyclical. Thus the short-term and long-term views of public banking could be two sides of the same coin, an inviting avenue for future research.

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