

The Countercyclical Role of National Development Banks

Alfredo Schclarek Curutchet

Universidad Nacional de Córdoba, CONICET and CIPPES,
Argentina

Michael Brei

University of the West Indies, Barbados, and University Paris
Ouest, France

www.cbaeconomia.com

April 2017

Introduction

1. Motivation
2. Data description (incl. lending pattern and funding structure)
3. Econometric results for Countercyclical behavior by NDB
4. Theoretical explanations for Countercyclical behavior by NDB
5. Conclusions and policy implications

Motivation

Roles of National Development Banks:

- **Development finance:** NDBs play an important role in economic development, especially in less developed countries
- **Countercyclical credit policies:** NDBs can *also* counteract credit slowdowns during recessions or crisis times
- Other roles: **market maker** in financial sector (ex. CDB underwrites Panda bonds via “bondconnect”, **Dealer function**, taking advantage of knowledge from issuance of own bonds)

Literature review on NDB

- Many policy papers argue for countercyclical policy:
 - UN-DESA (2005); Griffith-Jones and Ocampo (2008); Gutierrez et al. (2011); de Ollouqui (2013); Rudolph (2010); Griffith-Jones and Gottschalk (2012); World Bank (2012).
- Summary statistics paper: De Luna-Martinez and Vicente (2012)
- No papers based on econometric evidence for NDB.
 - Exception for State-Owned Commercial Banks: Brei and Schclarek (2013), Bertay et al. (2015), Cull and Martínez Pería (2013) and others.

Scope for an econometric paper on NDB

Data description

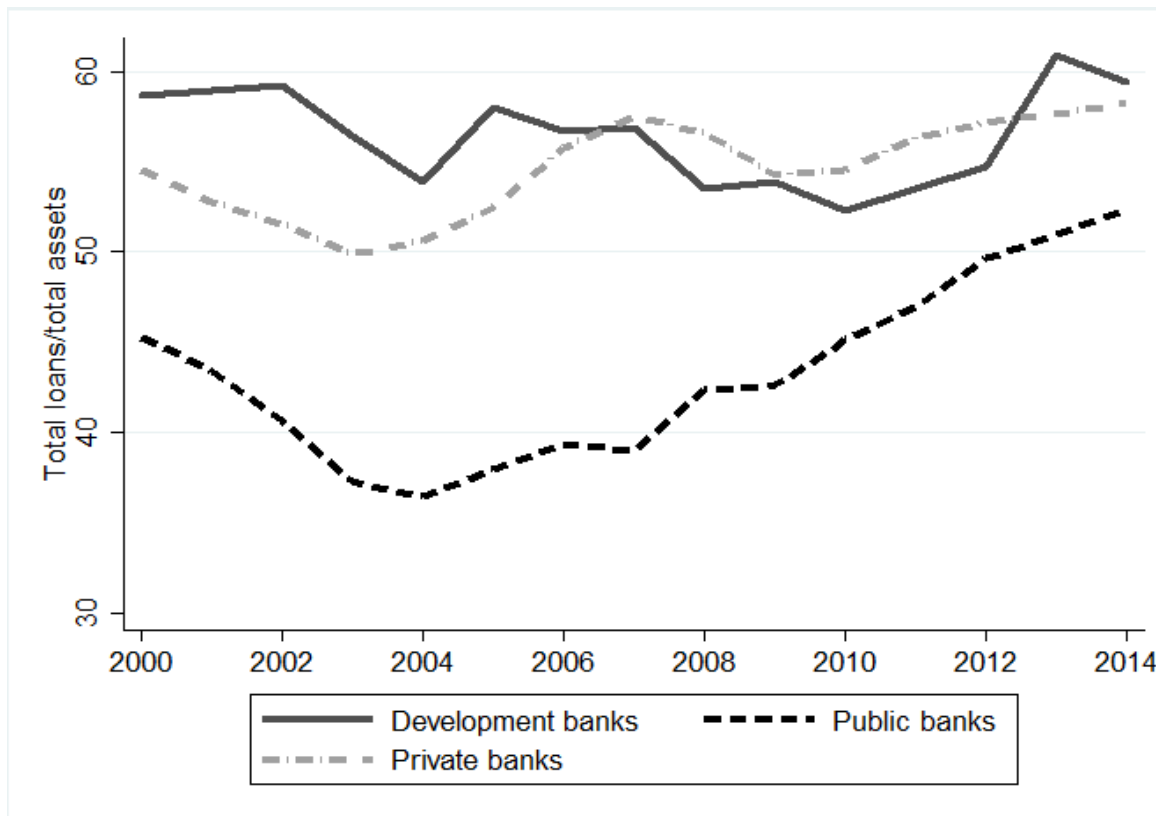
- Fitch-BankScope: consolidated and unconsolidated financial statements of deposit-taking banks and national development banks from 31 Latin American and Caribbean countries
- The final sample includes 336 banks, of which 14 are national development banks, 31 public banks, 157 domestic banks, and 134 foreign Banks.
- Annual data, between 1995-2014 (2835 observations)
- Banking and currency crises: Leaven and Valencia paper

Table 1: Composition and characteristics of the database

Region	No. of banks	No. of dev. banks	No. of foreign banks	No. of public banks	Total assets, 2014 (bil. USD)	Growth of lending (%) ¹
Caribbean	65	4	27	4	26.9	8.0
Central America	99	3	51	4	626.5	11.4
South America	172	7	56	23	3270.5	12.9
Average/sum*	336*	14*	134*	31*	3923.9*	10.8

Lending pattern

Total Loans/Total assets



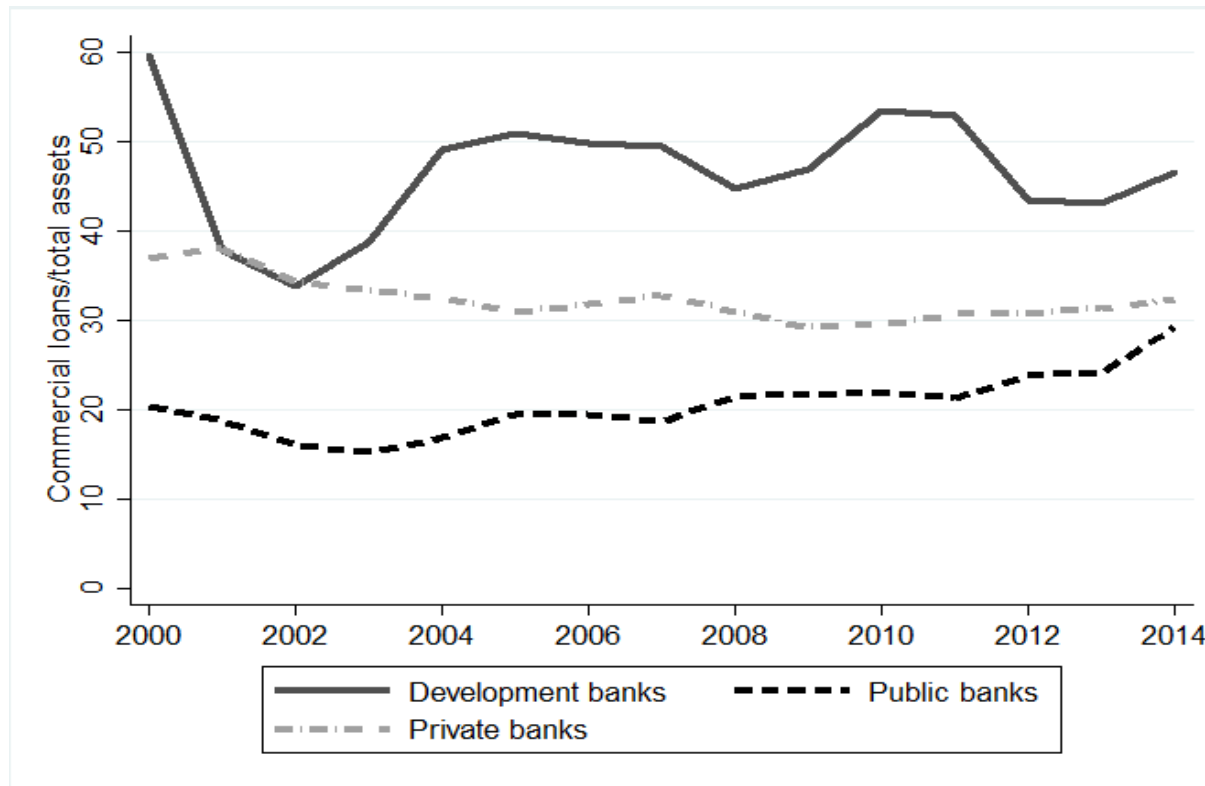
Dev and Priv
higher loans/TA
than Pub

Dev: 58,3%

Priv: 54,8%

Pub: 44%

Corporate and Commercial Loans/ Total Assets



- Dev higher corporate and commercial loans than Pri and Pub:

Dev: 47,2%

Priv: 31,8%

Pub: 21%

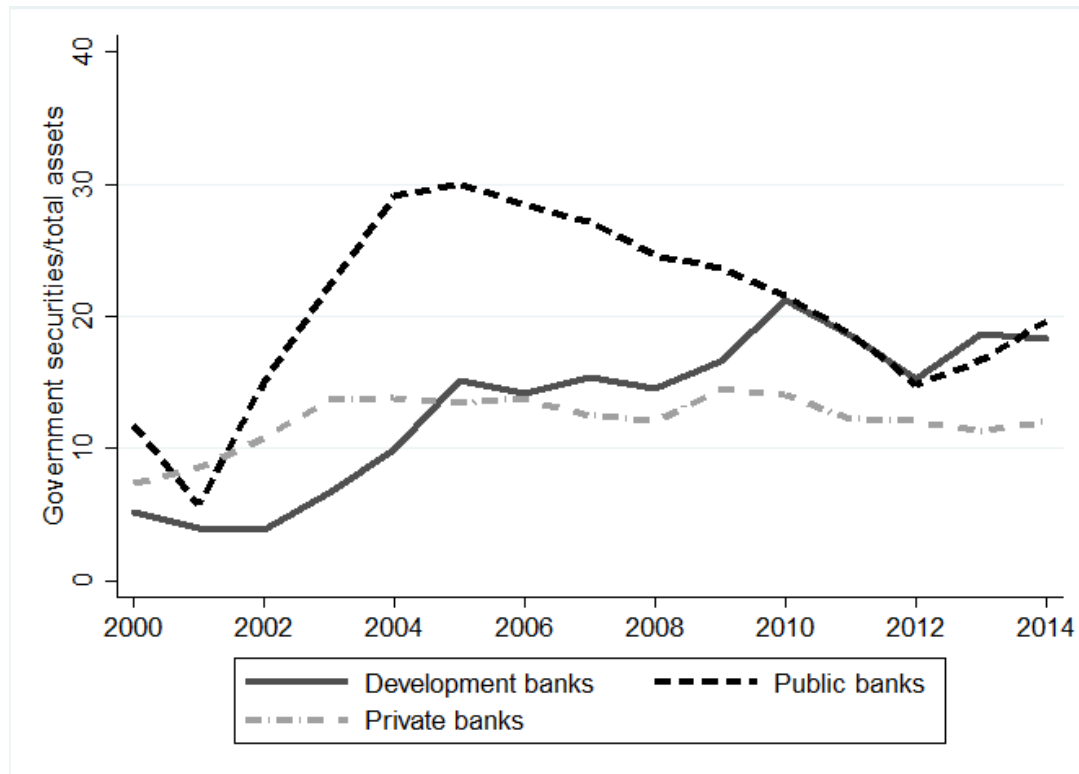
- Pri and Pub higher consumer and mortgages loans than Dev:

Priv: 17,5%; 7,6%

Pub: 11,4%; 7,6%

Dev: 3,7%; 4,9%

Govt Securities/Total Assets



Pub lend more to the govt than Dev and Priv

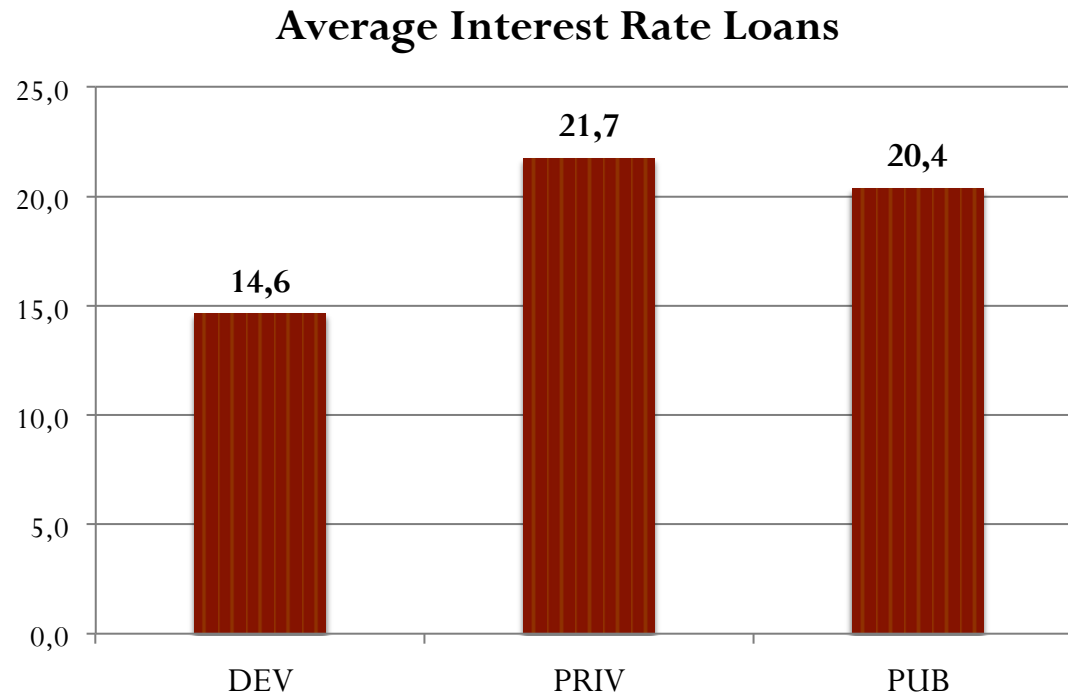
Pub: 21,5%

Dev: 14,8%

Priv: 12,3%

Maybe explanation for lower Loans/TA by Pub

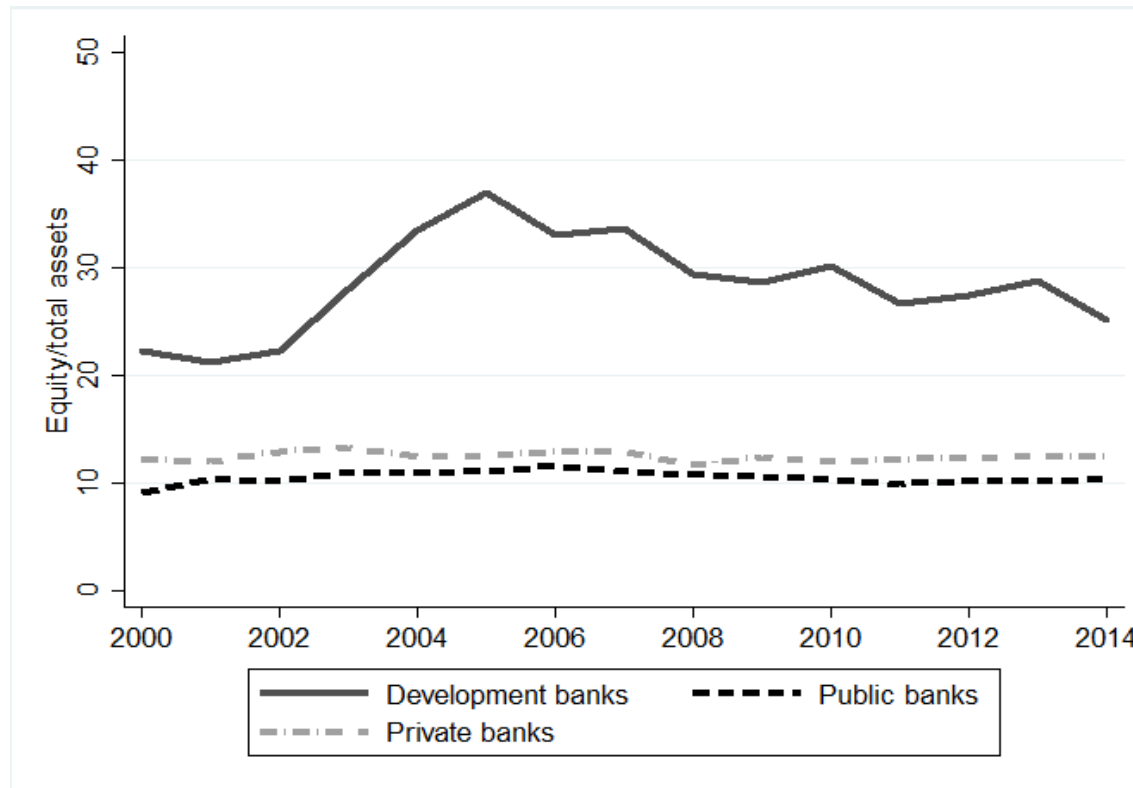
Average Interest Rate Loans



Dev provide loans with lower interest rates than Priv and Pub

Funding structure

Equity/Total Assets



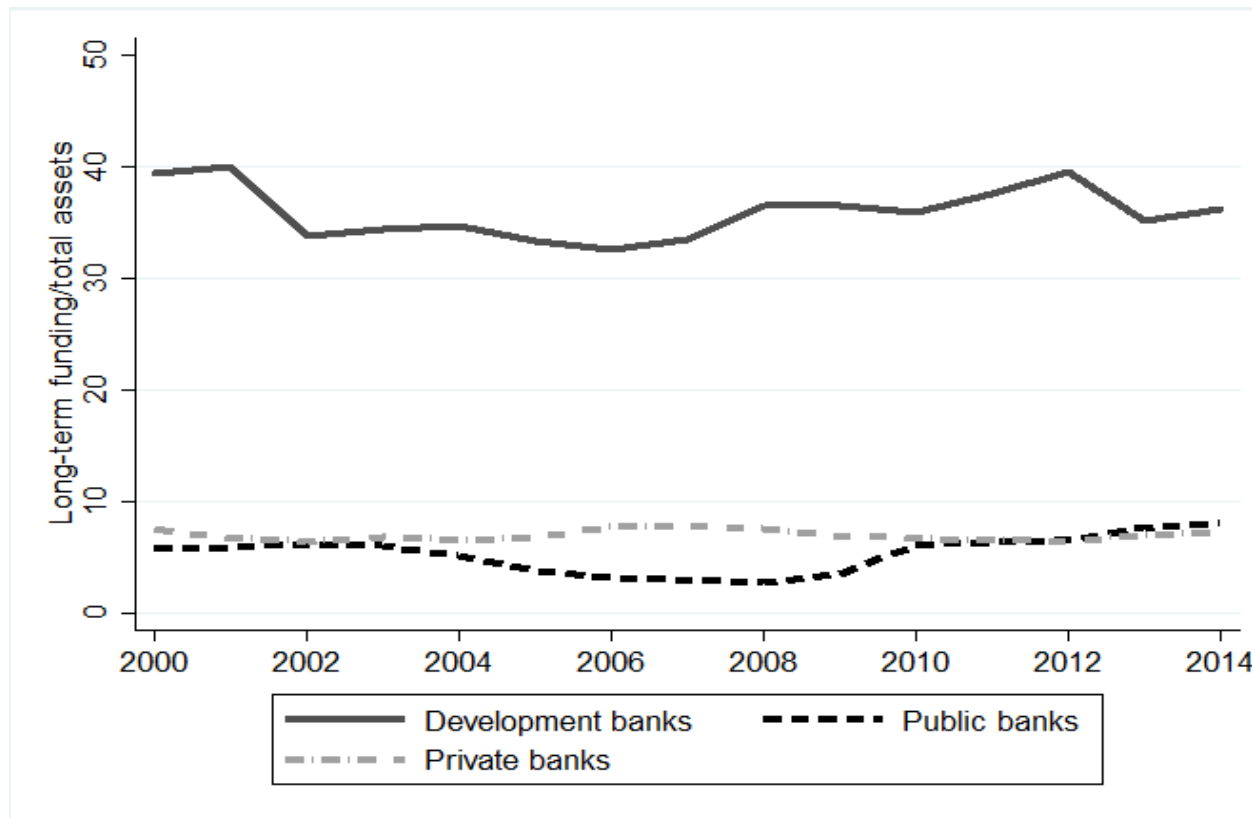
Dev higher
Equity than
Priv and
Pub:

Dev: 28%

Priv: 12,4%

Pub: 10%

Long-term Funding/Total Assets



Dev higher
Long-Term
Funding than
Priv and Pub:

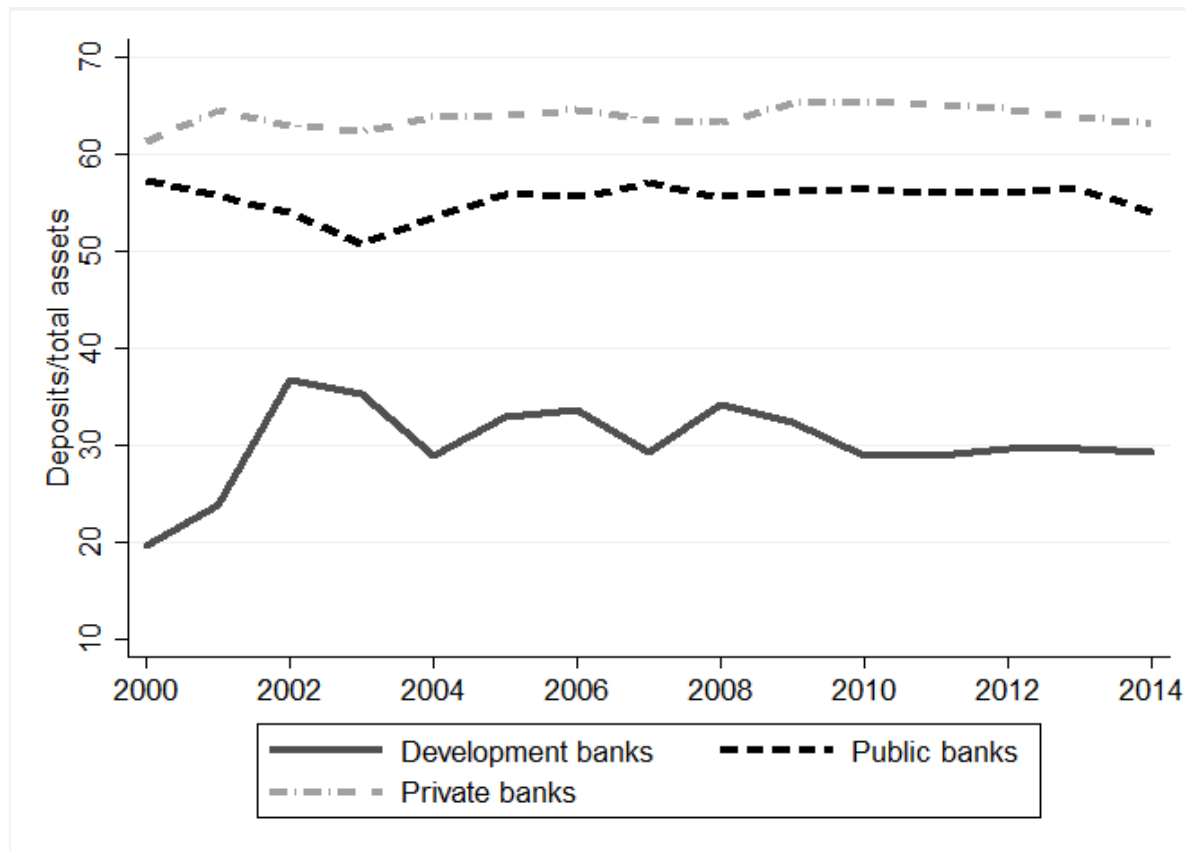
Dev: 36,6%

Priv: 7,2%

Pub: 5,9%

LT funding: Includes Senior Debt Maturing after 1 Year + Subordinated borrowing + Other funding

Deposits/Total Assets



- Priv and Pub
higher deposits
than Dev:

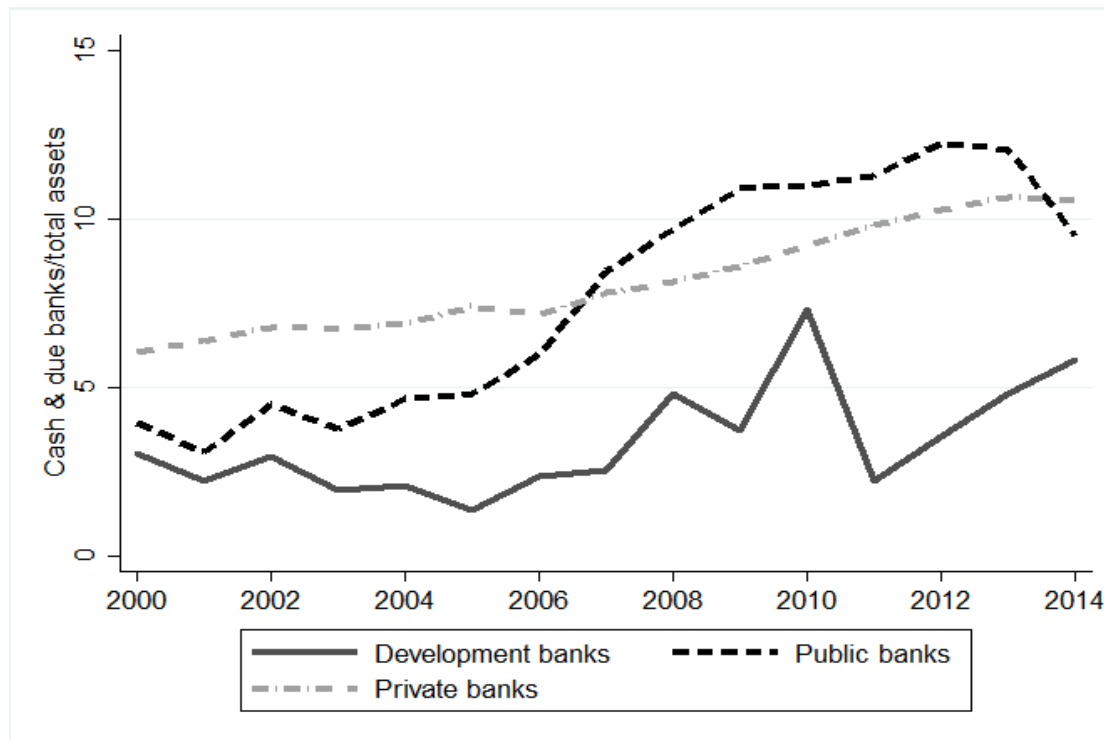
Priv: 65,2%
Pub: 57,5%
Dev: 31,5%

- Similar levels of
Money Market and
Short-term
Funding:

Pub: 20,4%
Dev: 15,3%
Priv: 13,1%

Liquidity position

Cash and deposits at Central Bank



Average cash and deposits at CB/Total Assets:

- Dev: 3,1% (normal); 3,9% (crisis).
- Priv: 7,3% (normal); 9,1% (crisis).
- Pub: 6,2% (normal); 9,1% (crisis)

Table 2: Bank-specific characteristics across bank types

Bank type	National development banks	Foreign banks	Domestic private banks	Local public banks
Number of banks	14	134	157	31
Total assets, end-2014	424	994	1448	1058
Interest income on loans/loans	11.34	20.56	15.95	15.41
Non-interest income/income	13.04	20.31	21.42	29.45
Return on equity	5.21	12.59	14.28	16.13
Liquidity ratio	8.17	18.76	16.18	18.02
Government securities/assets	16.56	12.30	13.47	22.14
Lending growth, normal times	3.42	11.72	14.42	6.06
Lending growth, crisis	10.33	9.42	12.31	15.36

Countercyclical Behavior

Econometric setup

- Econometric model:

$$\Delta L_{ijt} = \alpha_1 \Delta L_{ijt-1} + (\alpha + \alpha^* C_{jt}) + (\alpha_{DB} + \alpha_{DB}^* C_{jt}) DB_{ijt} + (\alpha_{PB} + \alpha_{PB}^* C_{jt}) PB_{ijt} + (\alpha_{FB} + \alpha_{FB}^* C_{jt}) FB_{ijt} + \beta X_{ijt} + \gamma M_{jt} + u_i + \varepsilon_{ijt}$$

ΔL_{ijt} : Real growth rate of lending,

C_{jt} : Crisis dummy; DB_{ijt} , PB_{ijt} , FB_{ijt} : Bank type dummies

X_{ijt} : Bank-specific (size, ROE, capital, NPLs, liquidity)

M_{jt} : Macro (real GDP growth, inflation, interest rate, depreciation)

Differential lending response

	Domestic banks, $DB_{ijt} = 0$	Development banks, $DB_{ijt} = 1$
No crisis, $C_{jt} = 0$	$\Delta L_{ijt} = \alpha_1 \Delta L_{ijt-1} + \alpha$	$\Delta L_{ijt} = \alpha_1 \Delta L_{ijt-1} + \alpha + \alpha_{DB}$
Crisis, $C_{jt} = 1$	$\Delta L_{ijt} = \alpha_1 \Delta L_{ijt-1} + \alpha + \alpha^*$	$\Delta L_{ijt} = \alpha_1 \Delta L_{ijt-1} + \alpha + \alpha^* + \alpha_{DB} + \alpha^*_{DB}$

- The model allows to investigate differential lending responses of the different types of banks during normal and times of crisis
- If α_{DB} is sig. positive: DB lend at a higher growth rate than domestic banks in **normal times**
- If $\alpha_{DB} + \alpha^*_{DB}$ is sig. positive: DB lend at a higher growth rate than domestic banks in **times of crisis**

Econometric results

Dependent variable: Growth rate of lending								
	Macro model		Bank type model		Bank-specific model		Pooled OLS	
	(I)		(II)		(III)		(IV)	
	Coeff.	Std. error	Coeff.	Std. error	Coeff.	Std. error	Coeff.	Std. error
α	6.704***	1.330	9.362***	1.634	9.359***	1.561	7.903***	1.432
α_{DB}			-10.31**	4.157	-6.153*	3.586	-7.636**	3.218
α_{FB}			-3.398**	1.406	-2.962**	1.291	-1.920	1.256
α_{PB}			-5.456***	2.033	-3.377*	1.952	-4.513***	1.653
α^*			-3.259**	1.407	-3.190**	1.364	-2.324*	1.398
α^*_{DB}			13.10***	4.215	10.60**	4.212	8.716**	4.127
α^*_{FB}			2.818	2.157	2.090	1.996	-0.005	1.891
α^*_{PB}			10.29***	2.662	6.663***	2.324	6.909***	2.215
Macro controls	Yes		Yes		Yes		Yes	
Bank-specific controls	No		No		Yes		Yes	
Bank-fixed effects	Yes		Yes		Yes		No	
Observations	2733		2733		2733		2733	
Banks	336		336		336		336	
Hansen	0.155		0.146		0.205		R ² = 0.14	
AR2	0.730		0.701		0.591			

Discussion of results

- ***Normal times:***

- (Average) domestic bank expanded lending at a growth rate of $\alpha = 9.36$ percent per year
- National development banks: $\alpha + \alpha_{DB} = 9.36 - 6.15 = 3.21\%$
- Foreign banks: $\alpha + \alpha_{FB} = 9.36 - 2.96 = 6.4\%$
- Public banks: $\alpha + \alpha_{PB} = 9.36 - 3.38 = 5.98\%$

- ***During crises:***

- Domestic banks: $\alpha + \alpha^* = 9.36 - 3.19 = 6.17\%$
- National development banks:
 $\alpha + \alpha^* + \alpha_{DB} + \alpha_{DB}^* = 9.36 - 3.19 - 6.15 + 10.60 = 10.62\%$
- Foreign banks: $\alpha + \alpha^* + \alpha_{FB} = 9.36 - 3.19 - 2.96 = 3.21\%$
- Public: $\alpha + \alpha^* + \alpha_{PB} + \alpha_{PB}^* = 9.36 - 3.19 - 3.38 + 6.66 = 9.45\%$

Discussion of results

- (Average) **domestic and foreign banks** reduced their lending growth rates in **crisis times** (Procyclical)
- (Average) **National development banks and public commercial banks** increased their lending growth rates in **crisis times** (Countercyclical)
- **National development banks** act more countercyclical than *public commercial banks* (increase more their lending growth rates) in **crisis times**
- **Countercyclical behavior** even **stronger** when only considering **corporate and commercial loans**, and not including residential mortgages and other consumer loans

Possible theoretical explanations for countercyclical behavior during crisis

- NDBs and PCBs' **objective not only to maximize profits given risk** but also **avoid credit crunch** and transmission to real sector (**less risk averse** than other banks)
- NDBs and PCBs are **more likely recapitalized**; govts have more resources than private bankers during crisis (requires solvent govt.)
- NDBs and PCBs suffer **less deposit withdrawals** and rollover problems for securities; govts higher credibility during crisis (requires solvent govt.)

Theoretical model

Brei, M., Schclarek, A., 2015. A theoretical model of bank lending: Does ownership matter in times of crises?. *Journal of Banking and Finance*, Vol. 50, pp 298–307 (January 2015).

Basic model

- **Firm liquidity demand model:** Holmström and Tirole (1998) 'Private and public supply of liquidity' JPE
- **Consumer liquidity demand model:** Allen and Gale (1998) 'Optimal financial crises' JF
- **Four agents:** depositors/consumers, firms/entrepreneurs, private bank and public bank.

Setup

- **Entrepreneurs:** stochastic investment project but no liquid funds; outcome in period 2
- **Depositors/Consumers:** deposit initial liquidity in banks; risk neutral but bank leverage averse; consume in period 2
- **Banks:** initial own capital; risk averse; lend to entrepreneurs (investment project) and/or hold liquid funds (no return)
- **Three periods:** period 0 (initial investment); period 1 (observe signal: real variance and real leverage; partial liquidation); period 2 (outcome)

Uncertainty

Information about stochastic shocks

- Initial investment: I (period 0)
- Stochastic return: R (period 2)
- $E(R)$ known with certainty in period 0
- $V(R)$ NOT known with certainty in period 0
- Signal in period 1: real $V(R)$
- Limit leverage: $LE \equiv \frac{D+A}{A} \leq 1 + \beta_0 - \beta_1 \frac{V(R)}{A}$

Result

- **Partial liquidation (period 1):** Investment project continued smaller scale; conversion into liquid funds; due to optimal bank decision and/or withdrawal of deposits
- Normal times (no partial liq.): $V_1(R) \leq V_0(R)$
- Financial crisis (partial liq. by optimal bank decision):
 $V_0(R) < V_1(R) < V(\bar{R})$
- Severe financial crisis (partial liq. by withdrawal of deposits): $V_1(R) > V(R)$

Period 1

Consumers' objective function

$$\max_{C_2} E(C_2) \quad (1)$$

s.t.

$$C_2 \leq D1_{PR} + D1_{PU} + LF1$$

$$D1_{PR} + D1_{PU} + LF1 = D0_{PR} + D0_{PU} + LF0$$

$$D1_{PR} \leq \beta_0 A_0 - \beta_1 V_1(R) \quad (2)$$

$$D1_{PU} \leq \beta_0 (A_0 + A_1) - \beta_1 V_1(R) \quad (3)$$

Period 1

Private banks' objective function

$$\max_{\delta_{PR}} \delta_{PR} E(R) I_{PR} + (1 - \delta_{PR}) I_{PR} - \frac{\gamma}{2} \delta_{PR}^2 I_{PR}^2 V_1(R)$$

s.t.

$$D0_{PR} - D1_{PR} \leq S0_{PR} + (1 - \delta_{PR}) I_{PR}$$

$$0 \leq \delta_{PR} \leq 1$$

Public banks' objective function

$$\max_{\delta_{PU}} \delta_{PU} E(R) I_{PU} + (1 - \delta_{PU}) I_{PU} - \theta(1 - \delta_{PU}) I_{PU} - \frac{\gamma}{2} \delta_{PU}^2 I_{PU}^2 V_1(R)$$

s.t.

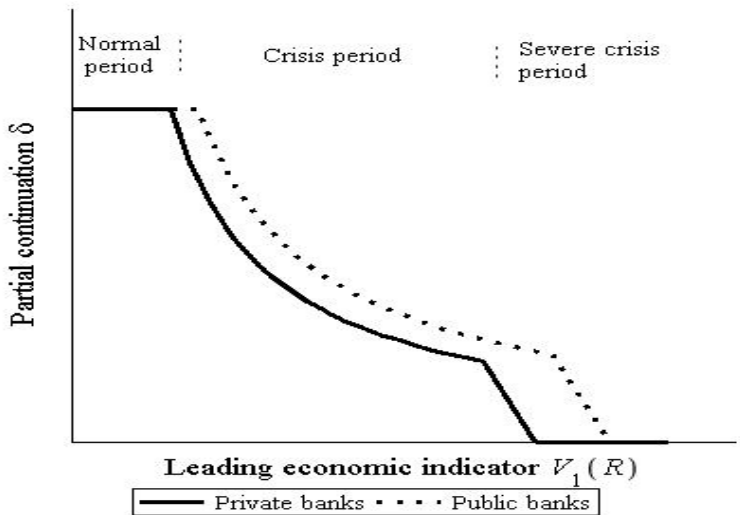
$$D0_{PU} - D1_{PU} \leq S0_{PU} + (1 - \delta_{PU}) I_{PU} + A1_{PU}$$

$$0 \leq \delta_{PU} \leq 1$$

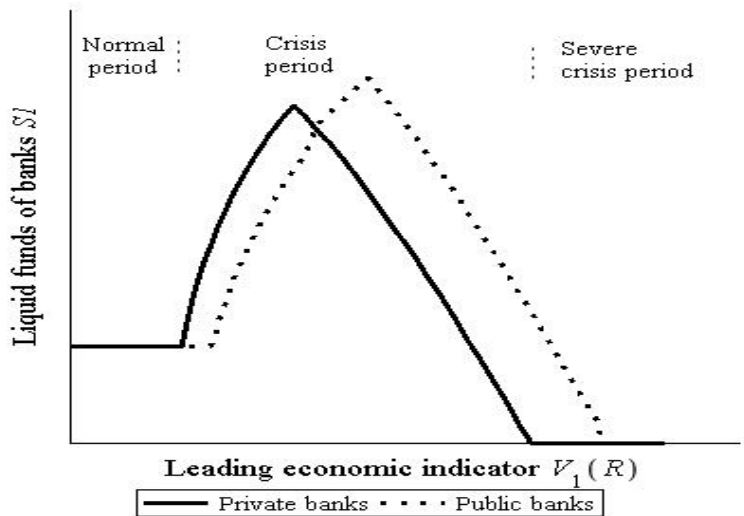
Differences between Public and Private Banks

- $-\theta(1 - \delta_{PU})I_{PU}$: public banks' disutility of partially liquidating investment projects
- $A1_{PU}$: higher recapitalization of public banks than private banks (obtain liquidity by taxation)
- $\beta0_{PU} > \beta0_{PR}$: depositors trust more public banks and accept a higher leverage (less leverage averse)

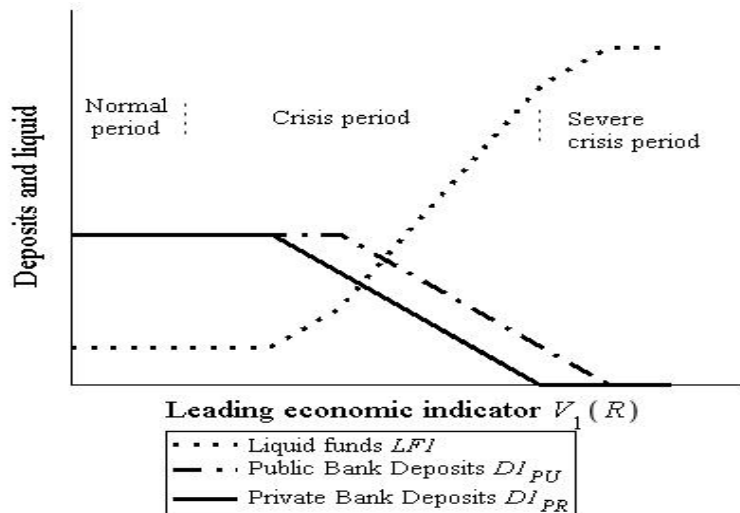
Continuation of the investment project



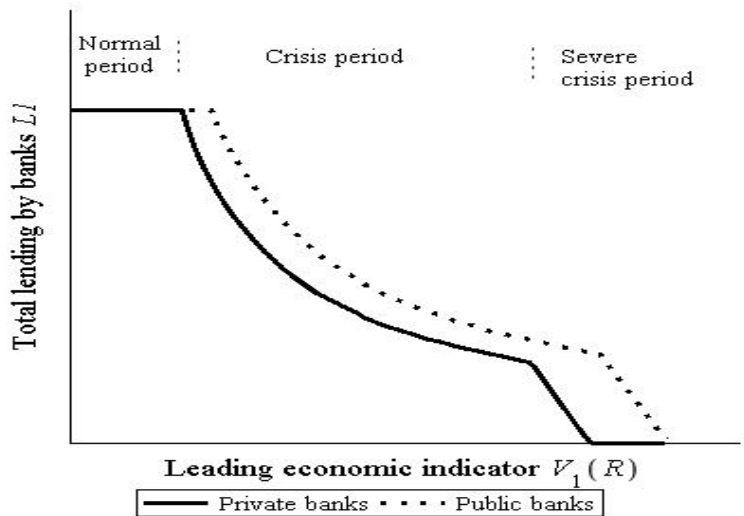
Liquid funds holding by banks



Deposits and liquid funds holding by consumers



Lending decisions by banks

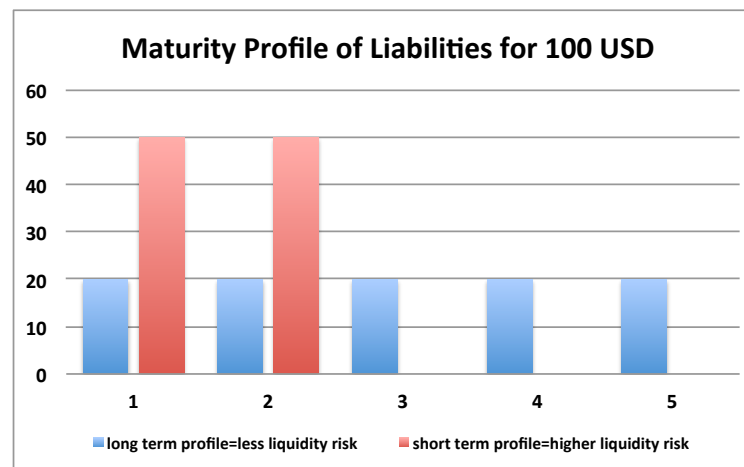


Advantage of NDBs over PCBs for countercyclical policy

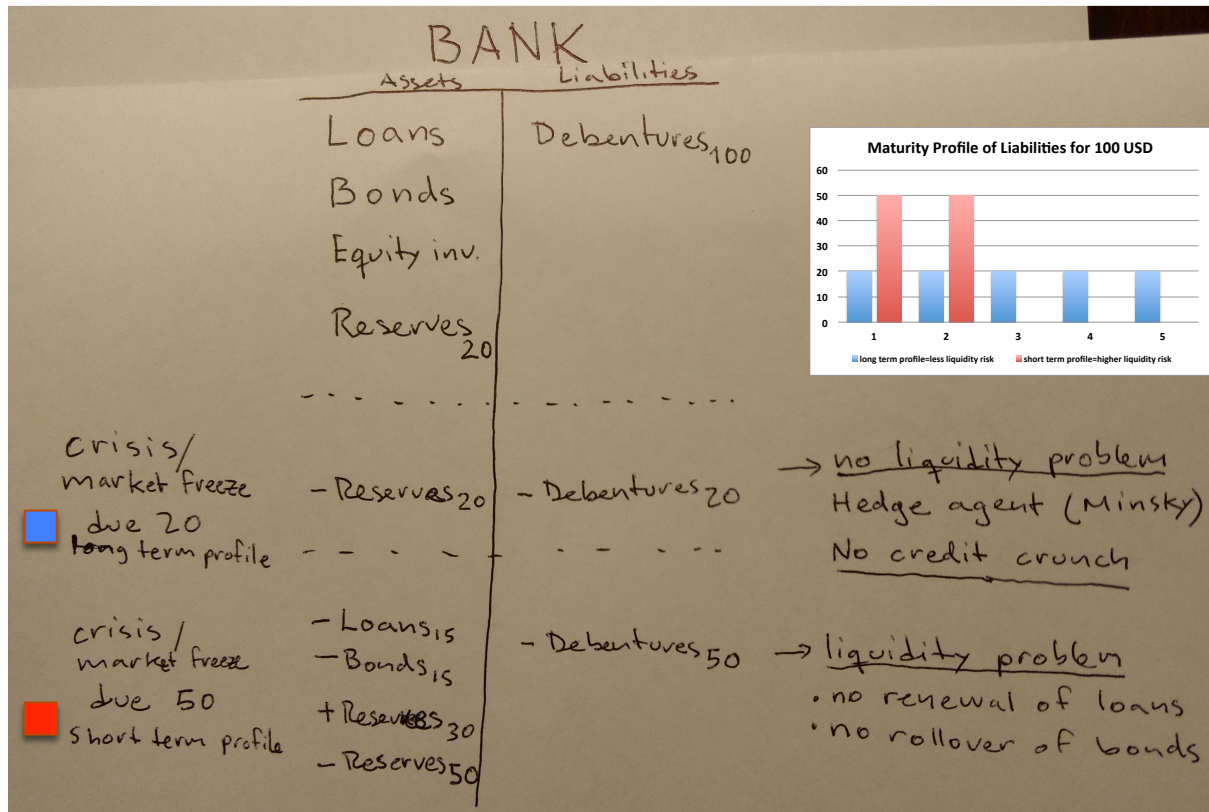
- NDBs have more equity and LT funding, and less deposits than commercial banks



more stable funding structure and longer maturity profile of liabilities



Maturity profile of liabilities and crisis



Funding structure and maturity profile of liabilities

- Stable funding structure and longer maturity profile of liabilities → lower risk of rollover and liquidity problems in case of market freeze (crisis) → less credit contraction/more credit expansion in case of crisis (advantage)

- Stable funding structure and longer maturity profile of liabilities → higher funding costs (disadvantage)

Conclusions and policy implications

- Effectiveness of countercyclical lending by NDB:
 - **Size** with respect to financial system to have macro-level impact
 - **Financial strength** to be solvent and liquid when needed
 - **Governance structure** that assures financial strength
- Need for special and innovative credit lines that suites companies in crisis times (not focus on investment but on working capital and liquidity management).
- Credit lines for infrastructure projects that increase productive and export capabilities also advisable.

Thanks!

Alfredo Schclarek Curutchet

cbaeconomia.com