



# A theoretical model of bank lending: Does ownership matter in times of crisis?



Michael Brei<sup>a,d</sup>, Alfredo Schclarek<sup>b,c,\*</sup>

<sup>a</sup> *EconomiX-CNRS, University of Paris Ouest, France*

<sup>b</sup> *Department of Economics, Universidad Nacional de Córdoba, Argentina*

<sup>c</sup> *CONICET, Argentina*

<sup>d</sup> *SALISES, The University of the West Indies, Trinidad and Tobago*

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## ABSTRACT

The present study investigates theoretically the lending responses of government-owned and private banks in the event of unexpected financial shocks. Our model predicts that public banks provide more loans to the real sector during times of crisis, compared to private banks which cut down on lending and increase liquidity holdings. We put forth three reasons for this heterogeneous behavior. First, the objective of public banks, in contrast to their private peers, is not only to maximize profits given risks, but also to stabilize and promote the recovery of the economy. Second, public banks may suffer less deposit withdrawals or avoid a bank run in a severe crisis, because the state has better access to additional funds making a recapitalization more likely. And finally, public banks may suffer less deposit withdrawals due to their higher credibility in promising a future recapitalization in the case of a severe crisis.

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## 1. Introduction

Since the onset of the global financial crisis, the balance sheets of banks worldwide have continuously come under stress. The freezing of money markets, the significant asset write downs and the associated fall in bank capital have led to liquidity and solvency problems in many financial systems, especially in the United States and Europe. Accordingly, central banks have acted as lenders of last resort, and they have also intervened in money markets as dealers of last resort by directly buying up toxic assets (Mehrling, 2011). In addition, the fiscal authorities have implemented rescue programs involving individually targeted capital injections or debt guarantees, and system-wide interventions such as increases in deposit

insurance. In some extreme but not isolated cases, we have even seen nationalizations of private banks, such as in the case of Iceland, England or Ireland. The justification for the state intervention has not only been to prevent the bankruptcy of systemically important institutions but also that the injections of capital and liquidity allow banks to supply more credit to the productive sector.

One of the major risks of a cut back in lending is that the problems in the financial sector end up becoming a problem in the real sector due to the difficulties of firms to obtain bank credit to finance profitable investment projects. Through this channel, a strictly financial crisis spreads to the real sector, worsening the general economic situation and potentially creating a backlash on the financial sector. It appears that the different types of capital and liquidity provisions for banks have prevented the collapse of the financial sector, but it is not clear whether they have been successful in increasing productive credit to the real sector, or whether they have made the financial system safer and more stable. There is evidence that bank balance sheet strength plays an important role in determining banks' responses to a financial crisis,

\* Corresponding author at: Department of Economics, Universidad Nacional de Córdoba, Argentina. Tel.: +54 93516880078.

E-mail addresses: [michael.brei@uni-bonn.de](mailto:michael.brei@uni-bonn.de) (M. Brei), [alfredo@eco.unc.edu.ar](mailto:alfredo@eco.unc.edu.ar) (A. Schclarek).

URL: <http://www.cbaeconomia.com> (A. Schclarek).

in the sense that banks with higher capitalization and/or lower dependence on wholesale funding may counteract a potential credit crunch that spills over to the real sector, see amongst others (Ivashina and Scharfstein, 2010; Allen and Paligorova, 2011; Puri et al., 2011; Jimenez et al., 2012; Holton et al., 2012; Brei et al., 2013).

Concurrently, the role that government-owned banks may play in the financial system and in the economy in general has come to attract more attention, following a prolonged period of financial liberalization. Indeed, there has been a continuous move towards financial privatization since the 1970s, both in advanced and emerging economies alike, based on the view that liberalized banking sectors are associated with a more efficient, competitive, and sounder financial system (see, amongst others, (Krueger, 1974; Shleifer and Vishny, 1994; LaPorta et al., 2002)). The main argument of this line of thought is that government control of banks tends to be associated with distortions in the allocation of savings, because banks' decisions are biased by political objectives resulting in politically connected lending problems. The recent experience with the global financial crisis, however, has put this view into question, since a number of highly privatized banking systems such as in the United States and the United Kingdom have collapsed. Indeed, there exists increasing evidence that public banks have played an important counter-cyclical role in the banking system, helping the economies to recover from financial turmoil (see, amongst others, Allen et al. (2013), Bertay et al. (2012), Brei and Schclarek (2013), and De Haas et al. (2012)). Thus, without denying that public banks may be more inefficient than private banks and that advances in institutional quality are needed, it is necessary to reassess the costs and benefits of state-owned banks.

The recent empirical literature on public banks focuses on the cyclical properties of bank lending using information on the financial statements of large samples of banks. The work of Micco and Panizza (2006) suggests that lending by public banks is less procyclical than that of private banks. Similar results are reached by Bertay et al. (2012) who find evidence that public bank lending is less adversely affected during economic downturns than private bank lending, while during booms private banks' lending tends to outpace that of public banks. A related strand of literature focuses on the differential crisis responses of private and public banks. Several cross-country studies suggest that public banks may play a stabilizing role during financial crises, by providing more lending to the economy than their private competitors relative to normal times (see, amongst others, Allen et al. (2013), Brei and Schclarek (2013), De Haas et al. (2012), and Cull and Martínez Pería (2013)). In addition, the evidence for the pro-active role of government-owned banks during crises is supported by a number of country-specific studies (see, Coleman and Feler (2012) for Brazil, Foos (2009) for Germany, Lin et al. (2012) for Japan, Davydov (2013) for Russia, Leony and Romeu (2011) for South Korea, and Onder and Ozyildirim (2013) for Turkey).

The theoretical literature is much less abundant with some notable exceptions. Andrianova et al. (2008) develop a locational model of banking that distinguishes between public and private banks. They show that public banks can play an important role in the banking system but this depends on the institutional quality of a given country. More specifically, in the presence of opportunistic private banks and poor institutional quality, the nonexistence of state banks may lead to financial disintermediation. Andries and Billon (2010) build a theoretical model in which banks face a risk of failure in bad states of the economy, i.e. when productive firms suffer a low productivity state. They put forth that public banks have a more stable deposit base, because depositors perceive that their funds are better protected in times of crisis in the case of public banks. This mechanism helps government-owned banks to

insulate their slowdown of lending from downturns when the economy is hit by a financial shock.

Against these backdrops, our study investigates the differential lending responses of public and private banks from a theoretical perspective. In particular, we develop an overlapping generation model of three periods in which depositors, firms, and private and public banks interact, based on the consumer liquidity demand model of Allen and Gale (1998) and the firm liquidity demand model of Holmstrom and Tirole (1998). However, instead of focusing on the consumption preferences of depositors and borrowers' net worth, the focus of our analysis is set on the portfolio allocation decisions of banks as a function of the riskiness of the borrowing firms' investment projects. Depending on the risk of the investment projects, banks decide to grant a certain amount of productive lending (illiquid asset) and hold a proportion of liquid funds. In a crisis, when faced by a mild adverse shock to the riskiness of borrowers, banks partially liquidate the investment projects and increase their liquid asset holdings. However, in a severe crisis, when the increase in the riskiness is large, depositors run on banks and the entire investment projects have to be liquidated. In other words, a bank's role of a stable liquidity provider during crises, owing to inflows of funds from investors which seek a safe haven during market stress (Kashyap et al., 2002; Gatev and Strahan, 2006), may break down during a severe crisis (Acharya and Mora, 2013). In addition, we investigate how an actual and/or promised future bank recapitalization may avoid a bank run. Note also that we model a crisis period by an exogenous increase in the variance of the return of the investment project.<sup>1</sup> Although we do not deny that a crisis episode usually brings about a reduction in expected asset returns, we also view crises as a regime in which the system suffers high aggregate uncertainty and thus high volatility. Further, by focusing on the variance, we are better able to model banks' portfolio allocation changes between liquid and illiquid assets and, as will become clearer below, distinguish between public and private banks.

Using the above stated framework we model the differential crisis responses of private and public banks as a function of different levels of risk in the economy. We model three possible causes by which the portfolio allocation and lending responses might differ. First, public banks might be less risk averse than private banks and more willing to accept riskier lending in an economic downturn, because their objective is not only to maximize profits given risk, but also to sustain growth by the supply of lending to the economy. This implies that, in response to an increase in risk, public banks prefer an asset portfolio with a higher proportion of loans to entrepreneurs and less liquid asset holdings compared to private banks. Second, public banks may suffer less deposit withdrawals, or even avoid a bank run, in a severe crisis, because their owners have more financial resources for a recapitalization, or are more willing to recapitalize their banks, compared to the shareholders of private banks. And finally, depositors perceive that public banks have a higher probability of being recapitalized in the future in the case of a severe crisis, and thus are less inclined to withdraw funds or run on public banks.

The paper is organized as follows. In Section 2 we present the theoretical model and the final Section 3 concludes.

## 2. The theoretical model

This section presents a theoretical model that offers a framework to model the differential behavior across private and public

<sup>1</sup> Other papers that incorporate time-varying variance include Brunnermeier and Pedersen (2009), Brunnermeier and Sannikov (2013), He and Xiong (2012), Morris and Shin (2009).

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