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THE IMPACT OF CAPITAL ON LENDING IN PUBLICLY-TRADED AND PRIVATELY- HELD BANKS IN THE EU

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The impact of capital on lending in publicly-traded and privately- held banks in the EU

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Abstract

This paper extends the literature on the link between lending and capital by examining the role of equity ownership structure for this link in banks operating in the European Union. As theory predicts, publicly-traded banks are more prone to heightened agency problems (moral hazard and adverse selection) due to dispersed ownership and therefore have stronger incentives to engage in excessive risk-taking especially in economic expansions. This may bring about procyclical lending effect in economic downturns. Theory also predicts that these banks are also more affected by capital market frictions in economic downturns. Applying Blundell and Bond (1998) two step robust GMM estimator we predict and find that the link between lending and capital in economic downturns is stronger in publicly-traded banks than in privately- held banks, which may be a result of greater conditional accounting conservatism of publicly-traded banks. Additionally, the link between lending and capital during expansions is stronger in the case of privately- held banks reporting unconsolidated data, but not for banks reporting consolidated financial reports, consistent with the view that limited access to capital markets increases the cost of external finance of private banks. Finally, we find empirical support for the view that lending of privately- held banks is not constrained by capital ratio in economic downturns. Our results stress the importance of conditional conservatism for the effectiveness macroprudential policy, in particular countercyclical capital buffers.

JEL Classification: *E32, G21, G28, G32*

Keywords: loan supply, capital ratio, procyclicality, accounting conservatism, privately-held and publicly-traded banks

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Contents

1. Introduction

In this paper we ask whether capital ownership structure affects the link between lending and capital in both economic expansions and economic downturns. To date, research provides little insight into this question, in part because of the scarcity of interest in this issue in the buoyant pre-crisis period, where the relationship between capital and lending seemed to be of no importance for the economic growth. This study provides empirical evidence on the relation between equity ownership (i.e. whether common equity shares are publicly-traded or privately- held) and the link between loan growth and capital ratio for a sample of EU banks.

In this paper we develop and test three sets of predictions about how public versus private ownership drives differences in the link between lending and capital. In the first set we predict that publicly-traded banks are more capital constrained during economic downturns than privately- held banks, which may be attributed to excessive risk-taking of publicly-traded banks in economic expansions or greater degree of conditional accounting conservatism of public banks. In the second set we predict that privately- held banks are more capital constrained in expansions – due to limited access to liquid equity capital markets. The lending of these banks will be less constrained by capital in economic downturns because of the importance of relationship banking and irrelevance of access to equity capital market. According to the third set of predictions lending of privately- held banks is not constrained by the capital ratio in economic downturns.

Economic theory and empirical evidence suggest a very wide range of possible values of the impact of a change in bank capital on bank's assets (and their composition) and consequently its lending (for a review see e.g. Borio and Zhu 2012; Berrospide and Edge 2010; Beatty and Liao, 2014). On the one hand, there is the possibility that a reduction in bank capital, which results from serious losses, can be absorbed without any change in bank assets – and thereby in bank lending – probably due to the high capital buffers (Fonseca and González 2010) the bank has both before and after the losses and because capital decline can be offset by supplementary sources of funding. In this extreme, a unit reduction in bank capital results in no reduction in bank's lending.

There is also a possibility that banks very actively manage the composition of their assets to keep a fixed relationship between capital and assets, since they have very limited access to external

financing, and thus have difficulties in raising equity to offset declines in bank capital. In this case, a bank attempting to maintain a constant capital ratio, must reduce its assets levels or change their composition, by decreasing the amount of risky loans and investing more in risk free government bonds (Berger and Udell 1994; Wagster 1999). Whatever method the bank chooses to keep the relationship between capital and assets fixed, the amount of risky assets, i.e. loans, must be adjusted.

We expect that relationship between lending and capital is diversified, and that this diversity may be attributed to fundamental decisions of bank owners about being publicly traded or privately-held. Previous research on the role of ownership structure stresses its importance for bank conditional accounting, because of organizational differences in control structure and capital market access (see Nichols et al., 2009). Control structure, or monitoring of banks, are also important drivers of bank-risk taking. Conditional conservatism in earnings recognition and loan loss accounting has salient consequences for the earnings retention capabilities of banks, and therefore explains levels of bank capital buffers. Low capital buffers have negative impact on bank lending extension, and create a supply side pressure on credit market, in particular during economic downturns.

To test our hypotheses we apply a two-step GMM robust estimator (Arrelano and Bond 1991; Blundell and Bond 1998) for data spanning 1996 – 2011 on individual banks available in the Bankscope database. Our study is important for the current regulatory challenges, in particular, those related to macroprudential policy (FSB, BIS, IMF, 2011; IMF, 2011; Claessens, 2014; Claessens et al., 2014). If our predictions will be supported by the results of our study, then it seems vital that bank regulators consider the role of capital ownership structure in the process of deciding on the levels of countercyclical buffers designed in the Basel III (see BCBS, 2011).

In preview, we find that publicly-traded banks exhibit greater sensitivity of loan growth to capital ratios in economic downturns. Additionally, privately-held banks' lending is more affected be the capital ratio during economic expansions, whereas in poor macroeconomic environment, capital ratio doesn't seem to have a significant impact for their credit extension. Following the results our study we recommend that macroprudential policy supervision considers the fact that the degree of conditional conservatism in earnings recognition and loan loss accounting affects publicly-traded banks' ability to absorb unexpected loan losses, and thus makes their loan growth more sensitive to capital ratio.

The rest of the paper is organized as follows. In Section 2 we present theoretical background of our study and develop our hypotheses. We describe our sample and research design in Section 3. We discuss results in Section 4. Section 5 concludes our work.

2. Theoretical and empirical background and hypotheses development

There are many studies focusing on the relationship between lending and capital (for a review see Beatty and Liao 2014 and Olszak et al. 2014: 38-40). Of those studies only two papers focus on the impact of capital on lending in publicly-traded banks (Beatty and Liao 2011; Gambacorta and Marqués-Ibáñez 2011) but they do not consider the role of being privately- held for the link between capital and lending. Similarly to other firms, banks that fulfill regulatory requirements established in the EU (see CRD IV and CRR) and in particular EU countries can choose to have their equity listed on an exchange market or can retain private ownership. As Nichols et al. (2009) find, such a choice has implications for conditional conservatism in bank accounting. In particular, they find that publicly-traded banks exhibit greater degrees of conditional conservatism (i.e. asymmetric timelines of the recognition of losses versus gains in accounting income) than private banks (see also Beatty et al. 2002). Moreover, public banks recognize more timely earnings declines, less timely earnings increases, and larger and more timely loan losses. This research thus shows that equity ownership structure has meaningful implications for conditional conservatism in bank accounting. However, this study does not consider the consequences of the differences in the equity ownership structure for the link between lending and capital. Theoretically, the equity ownership structure can affect the relationship between lending extension activity and capital ratio because it triggers differences along two organizational areas of a bank – monitoring (or control) and equity market access. Of those two, the monitoring has also implications for accounting, in particular for conditional conservatism.

2.1. Monitoring problems and conditional accounting conservatism

The need for monitoring is especially salient within banks due to the high potential for information asymmetry, which arises between bank managers and its shareholders and between the bank and its external stakeholders (Stultz 2014; IMF, 2014). This information asymmetry results in the potential for moral hazard and adverse selection problems (Jensen and Meckling 1976, Ang et al. 2000) and therefore determines the risk-taking incentives of a bank. The risk-taking incentives of a bank depend on the separation between bank managers and shareholders and between the bank and its stakeholders. Privately- held banks are more likely to be closely interrelated, with managers usually being major shareholders, which implies that they bear a higher proportion of the costs of these actions than public bank managers. In effect, the internal monitoring is definitely stronger and consequently the risk-taking incentives are reduced. In contrast, equity holders of publicly-traded banks cannot monitor the risk-taking activities of managers as closely, may have difficulties in access to managers' private information, who may engage in more risk-taking than shareholders

desire. In such banks the equity ownership tends to be more dispersed, which creates heightened potential for agency problems (moral hazard and adverse selection). Given these problems, rational owners and managers in these banks develop elaborate corporate governance structures which aim to reduce the side effects of this dispersed ownership. However, the externality of such structures is greater risk-taking (IMF 2014; Stultz 2014).

The theory thus suggests that publicly-traded banks are more prone to excessive risk-taking. Such excessive risk-taking takes place usually in expansions and results in heightened risk aversion during economic downturns. Consequently, to reduce the risks, publicly-traded banks may be more reluctant to extend new lending in unfavorable economic conditions, exactly when such lending is necessary to boost investments in the real economy. This excessive risk aversion in economic downturns should result in the heightened association between lending and capital. This brings us to put forward following hypothesis:

Hypothesis 1: The link between lending and capital in economic downturns is stronger in publicly-traded banks than in privately- held banks.

The prediction of stronger impact of capital on lending in economic downturns in publicly-traded relative to privately-held banks can also be supported by the accounting literature, in particular its strand focusing on conditional conservatism (Beaver and Ryan, 2005, Nichols et al., 2009). Accountants traditionally expressed conservatism by the adage "anticipate no profit, but anticipate all losses (Bliss, 1924). As Watts suggests (2003, p. 208) conservatism does not imply that all revenue cash flows should be received before profits are recognized, but rather that those cash flows should be verifiable. Basu (1997, p. 7) interprets this adage as representing "the accountant's tendency to require a higher degree of verification to recognize good news as gains than to recognize bad news as losses". Watts (2003, p. 208) also states "that conservatism is the asymmetrical verification requirements for gains and losses, thereby allowing for degrees of conservatism: the greater the difference in degree of verification required for gains versus losses, the greater the conservatism". Beaver and Ryan (2005, p. 269-270) refer to the asymmetric timelines of gains recognition as good news and loss recognition as bad news as conditional conservatism (see also Demski, 2004, p. 522).

Ball and Shivakumar (2005) and Watts (2003) argue that conditional conservatism reduces managerial opportunism in financial reporting by counteracting managers' opportunism bias and thus facilitates contracting efficiency between the firm and its stakeholders given asymmetric information and payoffs. Following Watts (2003, p. 209), Nichols et al. (2009, p. 94) argue that "the need to limit such managers' opportunism and optimism bias is increasing in information asymmetry" (see Ang et al. 2000, . Also, the higher the information asymmetry, the higher is the

demand for verifiable information. As the separation of ownership and monitoring is greater in publicly traded firms, and thus the information asymmetry is wider, the demand for conditional conservatism is likely to be greater among those firms.

Nichols et al. (2009) predict and give empirical support to the view that publicly-traded banks exhibit greater conditional conservatism than private ones, which has salient consequences for the recognition of earnings and loan loss accounting. Their analysis conducted for U.S. commercial banks over the period of 1990-2003 shows that publicly-traded banks recognized earnings increases less timely than earnings decreases. As for loan loss accounting, their study focuses on three types of loan loss related expenses, i.e.: loan loss provisions, loan loss allowance and loan chargeoffs and, additionally, on one type "income", which is related to the recovery of a portion or all of previously charged-off loan. Analysis of accounting behavior of U.S. banks lends empirical support to the prediction that publicly-traded banks recognize larger and timelier loan loss provisions relative to changes in nonperforming loans than private banks. Nichols et al. (2009) also find that publicly-traded banks recognize larger loan loss allowances (relative to total loans) than private banks. In the case when loan losses are realized, publicly-traded banks recognize larger and timelier loan chargeoffs than privately-held banks. And finally, in cases when banks anticipate that a portion or all of a previously charged-off loan will be recovered, then publicly-traded banks recognize smaller and less timely loan recoveries than private banks.

High conditional conservatism in both earnings recognition and loan loss accounting, has profound implications to the bank's ability to absorb unexpected loan losses, covered traditionally with bank's capital. Less timely earnings recognition, in particular during economic booms, gives rise to a reduced amount of retained earnings which could be applied to increase bank capital buffers, and therefore creates a potential supply side burden on lending extension during economic downturns. This effect is strengthened by larger and timelier loan loss provisions and loan loss allowance (negatively affecting bank net income in economic upturns) and larger and timelier chargeoffs recognition which takes place during poor economic conditions (and resulting in further decline in bank net income).

2.2. Capital market access issues and conditional conservatism

The decision to be a public or a private bank is inherently determined by the need to access the equity capital market. This implies differences in the cost of equity capital as well as external financing costs involved in raising new equity, during both economic expansions and downturns. In economic expansions, publicly-traded banks incur low transaction cost of external financing due to high liquidity of capital market. Consequently their lending activity is not constrained with the

levels of capital ratio. In case they needed more capital to cover increased demand for lending in expansions, they may raise new equity through seasoned equity offerings (see e.g. Nichols et al. 2009). Such equity raising options are also available to private banks but require them to go public and to pay for the access to capital market. This implies that privately- held banks may be more capital constrained in economic expansions than publicly-traded banks. We thus put forward the following hypothesis:

Hypothesis 2: The link between lending and capital during expansions is stronger in the case of privately- held banks.

The theory predicts that the equity capital market access is exacerbated and the transaction costs involved in raising equity are heightened during recessions (the so called capital crunch effect). Generally, in economic downturns banks are facing external financing frictions (such as Myers and Mayluf 1984 adverse – selection problem) (see also Borio and Zhu 2012). In this line Peek and Rosengren (1995) test the capital crunch theory suggesting that capital market imperfections making it difficult to raise new external equity capital will lead banks concerned about potential future capital constraints to reduce their lending in recessions. They find that Basel I capital requirements prompted banks to reduce lending due to difficulties in extending capital. Such effect is also found for publicly-traded banks by Beatty and Liao (2011) and Gambacorta and Marqués-Ibáñez (2011). Publicly-traded banks' lending is definitely more affected by the capital ratio during downturns because sudden increases in costs of external finance are compounded by decreases in reported earnings and increases in loan charge-offs, as is explained by the conditional conservatism literature (Nichols et al., 2009).

In contrast, privately- held banks do not have easy access to capital markets in expansions, so they do not find increased transaction costs in downturns as a constraint for their lending activity. They are accustomed to conducting their business exploiting internal finance to a greater extent. Moreover, due to their potentially local activity, they may be more engaged in creating stronger ties with their customers (e.g. applying relationship banking strategies). Additionally, Nichols et al. (2009) find that those banks engage in conditional conservatism to a lesser extent than publicly traded banks. Therefore, their net income and capital ratios are less affected by loan loss provisions, loan loss allowances and loan chargeoffs. Considering this we expect that:

Hypothesis 3: Lending of privately- held banks is not constrained by the capital ratio in economic downturns.

3. Data and research methodology

3.1. Data

We use pooled cross-section and time series data of individual banks' balance sheet items and profit and loss accounts from 27 EU countries and country-specific macroeconomic indicators for these countries, over a period from 1996 to 2011. The balance sheet and profit and loss account data are taken from the Bankscope database, whereas the macroeconomic data were accessed from the EUROSTAT and the IMF web pages. We look at both unconsolidated and consolidated data in a separate analysis to take account of the fact that banks the type of consolidation is a proxy for bank size. We expect that capital effect on lending is stronger in the case of publicly-traded banks reporting consolidated financial statements. We exclude from our sample outlier banks by eliminating the extreme bank-specific observations when a given variable adopts extreme values. Since most of these institutions are located in Ireland, the number of countries included in the final sample drops to 26. Based on this selection strategy, the number of banks included in our sample is 2523 in the case of unconsolidated data (27359 observations and 26 countries) and 357 banks (3776 bank year observations) in the case of consolidated financial data.

3.2. The econometric model

The empirical models that addressed the question of whether a bank-capital induced credit crunch was hindering the recovery were developed in the early- and mid-1990s in the US. We follow contemporary versions of those models available in several studies (Berrospide and Edge 2010; Beatty and Liao 2011; Carlson et al. 2013; Labonne and Lame 2014; Bridges et al. 2014). Our basic model is given in equation (1) and reads as follows:

$$\Delta Loan_{i,t} = \alpha_1 \Delta Loan_{i,t-1} + \alpha_2 \Delta Loan_{i,t-2} + \alpha_3 Downturn + \alpha_4 CAP_{i,t} + \alpha_5 Downturn * CAP_{i,t} + \alpha_6 LIQGAP_{i,t} + \alpha_7 DEPBANKS_{i,t} + \alpha_8 \Delta CAP_{i,t} + \alpha_9 QLP_{i,t} + \alpha_{10} size_{i,t} + \alpha_{11} \Delta UNEMPL_{j,t} + \alpha_{12} \sum_{j=1}^{27} Country_j + \alpha_{13} \sum_{t=1996}^{2011} T_t + \vartheta_{i,t} + \varepsilon_t \quad (1)$$

where: i - the number of the bank; j-the number of country; t- the number of observation for the i-th bank; ΔLoan – annual real loan growth rate; CAP – capital ratio, i.e. equity capital divided by total assets; LIQGAP –liquidity gap, calculated as (loans to nonfinancial sector subtract deposits of nonfinancial sector subtract interbank deposits)/loans to nonfinancial sector; this variable measures the extent to which bank loans are financed by unstable funding (i.e. securitizations, etc.); DEPBANKS – deposits from banks divided by total assets; ΔCAP – annual change in capital ratio; QLP – is quality of lending portfolio (it equals loan loss provisions divided by average loans); size

– logarithm of assets; ΔUNEMPL - annual change in unemployment rate. Elements $\sum_{j=1}^{27} Country_j \ and \ \sum_{t=1996}^{2011} T_t$ are a set of country and time dummy variables. ϑ are unobservable bank-specific effects that are not constant over time but vary across banks. Finally, ε is a white-noise error term.

Considering the fact that we have access to annual data, we relate the loan growth rate to the current period bank specific variables instead of their lagged values. Such a choice is motivated by three reasons. First, when banks design their capital allocation plans they do it based on the amount of current risks (expressed in the previous level of capital ratio) and any expected increases in the risks (which result from the loan extension plans) (see Resti and Sironi 2007, p. 712). Second, the actual lending decisions made throughout the year may also be adjusted taking account of the current changes in bank capital as well as the changes in the quality of credit portfolio (because loan loss charge-offs affect capital through changes in bank profits). This effect would be omitted if the capital ratio was incorporated as lagged. Consistent with this view, Mora and Logan (2012, p. 1109) show that bank capital affects loans contemporaneously, and not only with a lag. Third, the usage of lagged variables would not resolve the problem of simultaneity and the endogeneity bias (see also Roberts and Whited 2011: 32).

We predict a negative coefficient on Downturn if loan supply declines during Downturns for reasons other than capital and liquidity constraints (as do Beatty and Liao 2011: 7). Further, if external financing is not frictionless, and banks are concerned that they might violate capital requirements, then the coefficient on CAP is expected to be positive. That is banks with higher capital ratio will extend more loans. The coefficient on interaction term between Downturn and CAP is our measure of capital crunch effect. A positive coefficient implies that lending is constrained by capital in economic downturns. A negative coefficient would indicate that capital is not important determinant of lending extension.

In Table 1 we present all variables applied in our econometric model with expected impact they have on loan growth. We predict a negative coefficient on Downturn if loan supply declines during Downturns for reasons other than capital and liquidity constraints (as do Beatty and Liao 2011: 7). Further, if external financing is not frictionless, and banks are concerned that they might violate capital requirements, then the coefficient on CAP is expected to be positive. That is banks with higher capital ratio will extend more loans. Additionally, following the concept of conditional conservatism (see Nichols et al., 2009), we expect that loans growth of publicly-traded banks will be more sensitive to the current quality of loan portfolio (i.e. QLP) than the loans growth of privately held banks. This means that the regression coefficient measuring the association between loan growth and QLP will be more negative for publicly-traded banks than for privately-held banks.

INSTERT TABLE 1 HERE

In our study we apply the system of generalised method of moments (GMM) proposed by Blundell and Bond (1998) with Windmeijer correction (2005). We control for the potential endogeneity of CAP, LIQGAP, DEPBANKS, ΔCAP and QLP in the two step system GMM estimation procedure by the inclusion of lagged values of explanatory variables as instruments. The UNEMPL, as well as the country and the time dummy variables are the only variables considered exogenous. As the number of lags of explanatory variables determines the number of instruments – which may proliferate our estimations – we apply a two stage approach in our estimations. In the first stage we use up to eight lags of explanatory endogenous variables (to take into account the potential impact of the business cycle on the current levels of bank specific variables). In the second stage, we reduce the number of lags up to four. This robustness check is necessary to avoid the problem of biased estimators, i.e. estimators dramatically proliferated by the number of instruments. As the consistency of the GMM estimator depends on the validity of the instruments, we consider two specification tests. The first is the test verifying the hypothesis of absence of second-order serial correlation in the first difference residuals (AR(2)) and the absence of first-order serial correlation in the differentiated residuals (AR(1)). The second test which we apply is the Hansen's J statistic for overidentifying restrictions, which tests the overall validity of the instruments tests (see Roodman 2009: 141).

Our models include dynamic interaction between the capital ratio and the variables describing changes in economic activity, i.e. economic downturns in each EU country. As there is no comparable dataset including information on the business cycle stages in the EU member states, we assessed the business cycle fluctuations for the whole set of countries using the Almost Periodically Correlated (APC) stochastic process. This method describes deviations from the long term trend of the GDP growth observed quarterly (see e.g. Parzen and Pagano 1971; Frances and Dijk, 2005). In our study we apply dataset covering 72 observations in the period of 1st quarter of 1995 up to the 4th quarter 2012 in almost all EU countries (but for Croatia, Cyprus, Czech Republic, Iceland, Ireland, Malta, Romania and Spain). The cyclical component, estimated according to subsampling scheme was applied to assess whether in a particular year the economy has been in a downturn or not (Lenart and Pipień 2013). The Downturn period is identified in the case when at least two quarters in a year can be characterized by a slowdown or a recession. This means that in those quarters deviation from the long term growth trend may be positive or negative but the changes as compared to the previous quarter should be negative.

4. Empirical results

Table 2 reports descriptive statistics and correlations of the key regression variables in the sample of publicly-traded banks, whereas table 3 includes such statistics and correlations in the sample of privately-held banks. We find positive and statistically significant correlation between loan growth and capital ratio (in economic expansions) in the sample of publicly-traded and privately-held banks reporting unconsolidated financial statements. In the case of banks consolidating financial statements those correlations are negative and statistically insignificant. The correlations between capital ratio and loan growth in economic downturns are positive in almost all samples, but for privately-held banks reporting consolidated data. Correlations between loan growth and capital ratio in economic expansions and in economic downturns are thus diversified and may be a result of differences in monitoring and capital market access issues, as suggested in section 2.

INSTERT TABLES 2 AND 3 HERE

In Tables 4 we report results of our estimation conducted in a two stage approach described in section 3.2 and in Table 5 we test the sensitivity of regression coefficients to reduced number of instruments (see Roodman 2009). We find that the coefficient on DownturnxCAP is positive for publicly-traded banks reporting both unconsolidated and consolidated data (see columns 1 and 3 in Table 4). However, this effect is statistically significant only in the sample of banks reporting unconsolidated statements. Such a result is not found for privately- held banks. Thus, this supports our first hypothesis, that the link between lending and capital in economic downturns is stronger and economically significant in publicly-traded banks than in privately- held banks.

The coefficient on CAP is positive and statistically significant in the case of privately- held banks reporting unconsolidated data (see column 2 of Table 4). This lends empirical support to our second hypothesis that the link between lending and capital during expansions is stronger in the case of privately- held banks. However, our results in this respect are ambiguous, because we do not find such an effect for privately-held banks reporting consolidated data. Such a result in this subsample may be attributed to a greater diversity of risks in privately-held banks reporting consolidated data. In contrast, banks reporting unconsolidated data (e.g. cooperatives), conduct their business locally, with idiosyncratic risks relatively more concentrated.

Columns 3 and 4 in Table 4 present results of our test of hypothesis 3. As we can see the coefficient on Downturn*CAP is negative and statistically insignificant, which supports the view that lending of privately-held banks is not constrained by the capital ratio in economic downturns. Such results is found in both unconsolidated and consolidated data.

Robustness check of our estimations is presented in Table 5. As can be inferred from this table, the significant reduction of the number of instruments related to endogenous bank-specific

variables affecting loan growth does not diminish the empirical importance of results presented in Table 4. These results are further supported, because the regression coefficients on CAP and DownturnxCAP in all subsamples of banks are similar to those obtained in Table 4.

Additionally, our results support the phenomenon of conditional conservatism in loan loss accounting. As can be inferred from Table 4 and Table 5, the regression coefficient measuring the association between loan growth and QLP is definitely more negative (and statistically significant in the case of unconsolidated data) for publicly-traded banks than for privately-held banks, consistent with the view that privately held banks create higher (and more timely) net total loan loss provisions when loans growth is high.

INSTERT TABLES 4 AND 5 HERE

5. Conclusions

In this paper we test two sets of predictions about how public versus private ownership drives differences in the link between lending and capital. In the first set we predict that publicly-traded banks are more capital constrained during economic downturns than privately- held banks, which may be attributed to excessive risk-taking of publicly-traded banks in economic expansions and to conditional accounting conservatism. In the second set we predict that privately- held banks are more capital constrained in expansions – due to limited access to liquid equity capital markets. The lending of these banks will be less constrained by capital in economic downturns because of the importance of relationship banking and irrelevance of access to equity capital market.

Our research shows that the link between lending and capital in economic downturns is stronger in publicly-traded banks than in privately- held banks. Additionally, the link between lending and capital during expansions is stronger in the case of privately- held banks reporting unconsolidated data, but not for banks reporting consolidated financial reports. Finally, we find empirical support for the view that lending of privately- held banks is not constrained by capital ratio in economic downturns. Such results is found in both unconsolidated and consolidated data.

The results of our study have implications for the current regulatory challenges, in particularly those related to macroprudential policy. It seems vital that bank standard setters consider the role of capital ownership structure in the process of deciding on the levels of countercyclical capital buffers defined in Basel III. In particular, publicly traded banks, due to the greater sensitivity of loan growth to capital ratios in economic downturns should be recommended

to keep higher capital buffers in economic booms. These buffers could be used in downturns to stimulate lending extension, which is necessary to boost weakened economic growth.

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ANNEX: TABLES

Table 1.

Variables description and expected signs in the regressions

Variable name	Variable description	Expected sign	Basic argument
Δloan	Loan growth rate		
Downturn	Dummy equal to one in Downturns and 0 otherwise	-	A negative coefficient on Downturn is predicted if loan supply declines during Downturns for reasons other than capital and liquidity constraints
DownturnxCAP	Interaction between Downturn and capital ratio (CAP)	+/-	A positive sign is expected if banks' loan growth is constrained by capital in Downturns, a negative sign is expected otherwise
CAP	Capital ratio, i.e. equity capital to total assets	+	A positive sign is expected if loan growth is constrained by capital ratio
LIQGAP	Loans less Total customer deposits less Deposits from banks divided by Loans	-	Banks which have more stable funding (deposits) relative to loans should be able to extend loans. The higher the LIQGAP the less loans are financed by stable deposits
DEPBANKS	Deposits from banks to total assets	+	A positive sign is expected if interbank deposits boost liquidity of a bank, and make lending easier
ΔCAP	Annual change in the capital ratio (i.e. end of year CAP subtract beginning year CAP)	-	To increase capital ratio a bank must either increase its capital (without changes in risk weighted assets) or decrease risky loans (without change in capital).
QLP	Loan loss provisions divided by average loans	-	The higher the share of loan loss provisions in bank loans the lower the loan growth
Size	Logarithm of total assets	+/-	On the one hand, large banks may benefit from too-big-to-fail position and thus might isolate better adverse shocks (a positive coefficient). On the other hand, in the case of small banks, strong relationships between banks and their borrowers may result in negative relationship (a negative coefficient)
ΔUNEMPL	Change in the annual unemployment rate	-	The higher the unemployment rate the lower is the demand for loans, and thus the loan growth is reduced

Table 2. Summary descriptive statistics and correlations of key regressions variables in the sample of publicly-traded banks

PANEL A - summary descriptive statistics (publicly-traded banks)

	ΔLOANS	Downturn	CAP	Downturn*CAP	ΔUNEMPL	LIQGAP	DEPBANKS	ΔCAP	QLP	size
UNCONSOLIDATED										
Mean	6.01	0.52	9.37	4.89	-0.04	-68.66	12.31	-0.09	0.96	15.21
sd	26.25	0.50	5.17	5.98	1.34	204.85	8.69	1.83	2.36	2.50
# obs	1699	2166	1804	1795	1975	1776	1342	1643	1753	1872
CONSOLIDATED										
Mean	3.38	0.52	7.08	3.73	-0.03	-41.20	17.73	-0.02	0.47	7.37
sd	16.55	0.50	3.46	4.25	1.34	121.38	14.65	1.36	0.69	0.98
# obs	1532	1792	1604	1604	1767	1609	1604	1490	1543	1609

PANEL B – correlations (publicly-traded banks)

	ΔLOANS	Downturn	CAP	Downturn*CAP	ΔUNEMPL	LIQGAP	DEPBANKS	ΔCAP	QLP	size
UNCONSOLIDATED										

		p-value		*p-value*		*p-value*		*p-value*		*p-value*		*p-value*		*p-value*		*p-value*		*p-value*		
ΔLOANS	1.000																			
Downturn	0.00	0.89	1.00																	
CAP	0.08	0.00	-0.02	0.31	1.00															
Downturn*CAP	0.09	0.00	0.77	0.00	0.44	0.00	1.00													
ΔUNEMPL	-0.08	0.00	0.13	0.00	0.02	0.53	0.14	0.00	1.00											
LIQGAP	-0.04	0.10	-0.02	0.46	0.00	0.96	0.01	0.83	0.07	0.01	1.00									
DEPBANKS	0.02	0.51	0.07	0.02	-0.34	0.00	-0.11	0.00	0.02	0.45	0.07	0.01	1.00							
ΔCAP	-0.12	0.00	0.03	0.30	0.08	0.00	0.08	0.00	0.04	0.13	0.07	0.01	-0.04	0.18	1.00					
QLP	-0.05	0.05	0.05	0.04	0.09	0.00	0.13	0.00	0.23	0.00	-0.05	0.05	-0.03	0.37	-0.09	0.00	1.00			
size	-0.05	0.05	0.03	0.15	-0.59	0.00	-0.22	0.00	0.02	0.37	0.04	0.08	0.45	0.00	0.07	0.00	-0.16	0.00	1.00	
CONSOLIDATED																				
ΔLOANS	1.000																			
Downturn	0.01	0.57	1.00																	
CAP	-0.01	0.72	-0.02	0.39	1.00															
Downturn*CAP	0.02	0.51	0.82	0.00	0.38	0.00	1.00													
ΔUNEMPL	-0.07	0.01	0.14	0.00	0.00	0.93	0.11	0.00	1.00											
LIQGAP	0.03	0.27	-0.03	0.27	0.08	0.00	0.01	0.70	0.04	0.13	1.00									
DEPBANKS	-0.04	0.12	-0.01	0.63	0.07	0.00	0.03	0.18	-0.03	0.28	0.07	0.00	1.00							
ΔCAP	-0.01	0.65	0.03	0.31	0.11	0.00	0.09	0.00	0.07	0.01	0.02	0.39	0.04	0.10	1.00					
QLP	-0.03	0.22	0.04	0.17	0.18	0.00	0.14	0.00	0.21	0.00	0.09	0.00	0.00	1.00	-0.09	0.00	1.00			
size	0.04	0.16	0.01	0.84	-0.61	0.00	-0.25	0.00	0.06	0.02	0.00	0.96	-0.08	0.00	0.08	0.00	-0.17	0.00	1.00	

Notes: Δloan – annual loan growth rate (deflated) CAP - capital ratio, i.e. equity capital to total assets; ΔCAP – annual change in capital ratio; DEPBANKS - Deposits from banks to total assets; LIQGAP - Loans less Total customer deposits less Deposits from banks divided by Loans; size - logarithm of total assets; QLP - Loan loss provisions divided by average loans ; ΔUNEMPL – change in annual unemployment rate.

Table 3. Summary descriptive statistics and correlations of key regressions variables in the sample of privately-held banks

	ΔLOANS	Downturn	CAP	Downturn*CAP	ΔUNEMPL	LIQGAP	DEPBANKS	ΔCAP	QLP	size
PANEL A - summary descriptive statistics (privately-held banks)										
UNCONSOLIDATED										
Mean	3.74	0.51	7.96	4.35	-0.16	-79.28	11.89	0.04	0.81	13.45
sd	15.81	0.50	4.95	5.41	0.95	240.14	8.22	1.56	1.72	1.52
# obs	30240	38145	32594	32580	35200	31184	26024	29678	30824	33016
CONSOLIDATED										
Mean	3.94	0.51	8.32	4.38	-0.03	-104.49	20.65	0.02	0.48	6.89
sd	21.13	0.50	6.09	6.13	1.35	552.76	18.30	2.21	1.14	0.88
# obs	3277	3920	3448	3448	3893	3447	3419	3198	3246	3450
PANEL B – correlations (privately-held banks)										
	ΔLOANS	Downturn	CAP	Downturn*CAP	ΔUNEMPL	LIQGAP	DEPBANKS	ΔCAP	QLP	size
UNCONSOLIDATED										
	p-value	*p-value*	*p-value*	*p-value*	*p-value*	*p-value*	*p-value*	*p-value*	*p-value*	

ΔLOANS	1.000																			
Downturn	0.02	0.00																		
CAP	0.06	0.00	0.02	0.00	1.00															
Downturn*CAP	0.04	0.00	0.74	0.00	0.51	0.00	1.00													
ΔUNEMPL	0.06	0.00	0.27	0.00	-0.04	0.00	0.18	0.00	1.00											
LIQGAP	-0.07	0.00	0.01	0.23	0.01	0.26	0.01	0.07	0.01	0.20	1.00									
DEPBANKS	-0.06	0.00	-0.03	0.00	-0.41	0.00	-0.23	0.00	0.00	0.47	0.01	0.05	1.00							
ΔCAP	-0.13	0.00	-0.02	0.00	0.09	0.00	0.03	0.00	0.01	0.07	0.02	0.00	0.04	0.00	1.00					
QLP	0.03	0.00	0.01	0.29	0.00	0.93	0.00	0.63	0.09	0.00	-0.03	0.00	0.02	0.00	-0.08	0.00	1.00			
size	0.03	0.00	0.00	0.67	-0.35	0.00	-0.18	0.00	0.06	0.00	-0.07	0.00	0.25	0.00	0.01	0.03	-0.04	0.00	1.00	
CONSOLIDATED																				
ΔLOANS	1.000																			
Downturn	-0.01	0.57	1.00																	
CAP	-0.03	0.08	-0.01	0.65	1.00															
Downturn*CAP	-0.02	0.17	0.67	0.00	0.54	0.00	1.00													
ΔUNEMPL	-0.01	0.75	0.13	0.00	0.00	0.81	0.09	0.00	1.00											
LIQGAP	0.01	0.68	0.00	0.80	0.02	0.15	0.02	0.16	0.02	0.31	1.00									
DEPBANKS	0.01	0.46	-0.01	0.46	-0.03	0.13	-0.03	0.06	0.04	0.04	-0.12	0.00	1.00							
ΔCAP	-0.08	0.00	0.01	0.40	0.16	0.00	0.12	0.00	0.03	0.07	0.03	0.08	-0.02	0.24	1.00					
QLP	0.07	0.00	0.04	0.02	0.14	0.00	0.12	0.00	0.20	0.00	-0.02	0.38	0.01	0.57	0.06	0.00	1.00			
size	0.01	0.45	0.01	0.50	-0.54	0.00	-0.29	0.00	0.09	0.00	0.05	0.01	0.06	0.00	0.00	0.96	-0.14	0.00	1.00	

Notes: Δloan – annual loan growth rate (deflated) CAP - capital ratio, i.e. equity capital to total assets; ΔCAP – annual change in capital ratio; DEPBANKS - Deposits from banks to total assets; LIQGAP - Loans less Total customer deposits less Deposits from banks divided by Loans; size - logarithm of total assets; QLP - Loan loss provisions divided by average loans ; ΔUNEMPL – change in annual unemployment rate.

Table 4. The empirical results – unconsolidated versus consolidated data.

	unconsolidated				***consolidated***			
	pub traded		***priv held***		***pub traded***		***priv held***	
	1		***2***		***3***		***4***	
		p-value		*p-value*		*p-value*		*p-value*
Δloan(-1)	0.155	0.04	-0.077	0.00	-0.010	0.52	-0.067	0.14
	(2.02)		(-3.48)		(-0.65)		(-1.49)	
Δloan(-2)	0.032	0.49	-0.082	0.00	-0.061	0.00	0.122	0.00
	(0.7)		(-3.35)		(-2.99)		(4.08)	
Downturn	-0.841	0.72	-1.663	0.00	-1.333	0.69	-1.586	0.49
	(-0.36)		(-3.46)		(-0.4)		(-0.69)	
CAP	**0.043**	**0.80**	**0.366**	**0.00**	**-0.100**	**0.85**	**-0.374**	**0.15**
	(**0.25**)		(**4.47**)		(**-0.19**)		(**-1.45**)	
DownturnxCAP	**0.265**	**0.04**	**-0.045**	**0.47**	**0.365**	**0.50**	**-0.006**	**0.97**
	(**2.06**)		(**-0.73**)		(**0.67**)		(**-0.04**)	
LIQGAP	0.009	0.01	0.002	0.52	0.010	0.43	0.003	0.02
	(2.55)		(0.64)		(0.8)		(2.33)	
DEPBANKS	0.262	0.10	-0.085	0.05	-0.053	0.10	0.022	0.68
	(1.67)		(-1.98)		(-1.66)		(0.41)	
ΔCAP	-1.798	0.11	-0.893	0.00	-0.069	0.88	-0.569	0.08
	(-1.59)		(-5.19)		(-0.15)		(-1.73)	
QLP	-1.813	0.01	-0.583	0.01	-0.979	0.67	4.824	0.23
	(-2.74)		(-2.72)		(-0.42)		(1.19)	
size	-0.467	0.12	0.563	0.03	1.043	0.36	0.503	0.81
	(-1.55)		(2.18)		(0.92)		(0.24)	
ΔUNEMPL	-1.058	0.00	2.820	0.00	-1.329	0.00	-1.186	0.15
	(-3.14)		(13.13)		(-4.62)		(-1.42)	
Intercept	8.663	0.07	-3.635	0.34	-2.774	0.71	1.777	0.91
	(1.79)		(-0.96)		(-0.38)		(0.11)	
ar1	-3.62	0.00	-3.82	0.00	-1.31	0.19	-2.48	0.01
ar2	-0.93	0.35	-3.25	0.00	0.09	0.93	-1.41	0.16
hansen	107.45	1.00	1894.58	0.00	101.65	1.00	239.32	1.00
#observations	963		19476		1218		2558	
#banks	113		2197		112		245	
#instruments	444		471		454		460	

The model is given by equation (1). The symbols have the following meaning: Δloan – annual loan growth rate; Downturn - Dummy equal to one in Downturns and 0 otherwise; CAP - capital ratio, i.e. equity capital to total assets; DownturnxCAP - Interaction between Downturn and capital ratio (CAP); ΔCAP – annual change in capital ratio; DEPBANKS - Deposits from banks to total assets; LIQGAP - Loans less Total customer deposits less Deposits from banks divided by Loans; size - logarithm of total assets; QLP - Loan loss provisions divided by average loans ; ΔUNEMPL – change in annual unemployment rate. #- denotes number of observations, banks and instruments. T-statistics are given in brackets. Data range 1996-2011.

Table 5. Robustness check – sensitivity of results to reduced number of instruments.

	unconsolidated				*consolidated*			
	pub traded		***priv held***		***pub traded***		***priv held***	
	1		***2***		***3***		***4***	
		p-value		*p-value*		*p-value*		*p-value*
Δloan(-1)	0.194	0.06	-0.071	0.00	0.055	0.10	0.016	0.80
	(1.91)		(-3.44)		(1.63)		(0.25)	
Δloan(-2)	0.057	0.28	-0.099	0.00	-0.083	0.00	0.186	0.01
	(1.08)		(-3.76)		(-3.82)		(2.54)	
Downturn	-0.671	0.79	-1.792	0.00	-1.646	0.54	-0.626	0.80
	(-0.26)		(-3.61)		(-0.62)		(-0.26)	
CAP	**0.088**	**0.61**	**0.345**	**0.00**	**0.206**	**0.64**	**-0.297**	**0.17**
	(**0.5**)		(**3.88**)		(**0.47**)		(**-1.39**)	
DownturnxCAP	**0.258**	**0.06**	**-0.042**	**0.52**	**0.256**	**0.47**	**-0.117**	**0.55**
	(**1.87**)		(**-0.64**)		(**0.73**)		(**-0.6**)	
LIQGAP	0.009	0.02	0.002	0.54	0.009	0.54	0.004	0.02
	(2.31)		(0.62)		(0.61)		(2.26)	
DEPBANKS	0.279	0.16	-0.100	0.03	-0.023	0.60	-0.001	0.98
	(1.39)		(-2.17)		(-0.52)		(-0.02)	
ΔCAP	-1.784	0.11	-0.881	0.00	-0.098	0.84	-0.563	0.11
	(-1.59)		(-4.9)		(-0.2)		(-1.61)	
QLP	-1.932	0.02	-0.637	0.00	-0.330	0.91	4.861	0.23
	(-2.43)		(-3.00)		(-0.12)		(1.21)	
size	-0.370	0.34	0.482	0.07	1.423	0.27	0.733	0.75
	(-0.96)		(1.79)		(1.11)		(0.32)	
ΔUNEMPL	-1.060	0.01	2.917	0.00	-1.447	0.00	-1.659	0.11
	(-2.72)		(13.67)		(-3.29)		(-1.59)	
Intercept	6.203	0.28	-2.096	0.60	-8.022	0.40	-0.580	0.97
	(1.08)		(-0.53)		(-0.85)		(-0.03)	
ar1	-3.39	0.00	-3.9	0.00	-1.3	0.20	-2.44	0.02
ar2	-0.99	0.32	-2.13	0.03	1.34	0.18	-1.27	0.20
hansen	104.67	1.00	1787.93	0.00	106.97	1.00	232.63	0.06
#observations	963		19476		1218		2558	
#banks	113		2197		112		245	
#instruments	283		305		210		213	

The model is given by equation (1). The symbols have the following meaning: Δloan – annual loan growth rate; Downturn - Dummy equal to one in Downturns and 0 otherwise; CAP - capital ratio, i.e. equity capital to total assets; DownturnxCAP - Interaction between Downturn and capital ratio (CAP); ΔCAP – annual change in capital ratio; DEPBANKS - Deposits from banks to total assets; LIQGAP - Loans less Total customer deposits less Deposits from banks divided by Loans; size - logarithm of total assets; QLP - Loan loss provisions divided by average loans ; ΔUNEMPL – change in annual unemployment rate. #- denotes number of observations, banks and instruments. T-statistics are given in brackets. Data range 1996-2011.