How bank competition influences liquidity creation ☆

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A B S T R A C T

This paper evaluates the effect of bank competition on liquidity creation by banks. Thus, we contribute to the literature on both bank competition and the determinants of liquidity creation by banks. To explore this relationship, we conduct dynamic GMM panel estimations on a dataset of Czech banks from 2002 to 2010. We find that enhanced competition reduces liquidity creation, a finding we observe under different specifications, including alternative measures of liquidity creation. We explain this finding in terms of the impact of increased bank competition on the financial fragility of banks, which leads banks to reduce their lending and deposit activities. The evidence suggests that pro-competitive policies in the banking industry can reduce liquidity provision by banks.

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1. Introduction

The increasing globalization of banking activities has brought to the foreground a debate about the role of competition in the banking industry. The effects of bank competition on access to credit (e.g., Beck et al., 2004), financial stability (e.g., Berger et al., 2009; Beck et al., 2013; Fungacova and Weill, 2013) and economic growth (e.g., Cetorelli and Gambera, 2001; Claessens and Laeven, 2005) have now been extensively studied.

However, the burgeoning literature on bank competition has not, to our knowledge, examined the impact of bank competition on liquidity provision by banks. Apart from risk transformation, the central function of banks is to supply liquidity to the economy. Banks create liquidity by financing relatively illiquid assets with relatively liquid liabilities, i.e., by using short-term liquid deposits to finance long-term illiquid lending. In doing so, they contribute to financing economic activity and facilitate transactions among economic agents. For many years, this role of banks has largely been ignored in the empirical literature, in contrast to their role in risk transformation. However, a seminal paper by Berger and Bouwman (2009)[1] proposes a novel approach to the measurement of bank liquidity creation, an approach that has led to an

emerging strand of literature devoted to the measurement, causes and consequences of liquidity creation by banks.[2]

The aim of this paper is to investigate how bank competition influences liquidity creation by banks. We thus contribute to both recent strands of the literature focused on bank competition and on bank liquidity creation.

Two opposing hypotheses can be suggested regarding the impact of bank competition on liquidity creation. The first is that increased competition increases the fragility of banks by reducing bank profits, which contribute to capital normally acting as a "buffer" against adverse shocks. As a consequence, banks are incentivized to reduce liquidity creation by limiting both the volume of loans granted and the volume of deposits accepted to reduce the threat of bank runs. Thus, according to this "fragility channel" view, bank competition should lead to a reduction in liquidity creation. The fragility channel view is reinforced by Petersen and Rajan (1995), who argue that increased competition reduces credit supply, as banks are less likely to grant credit to clients that are not locked in. The idea is that decreased market power reduces incentives for banks to establish long-term relationships with new borrowers, relationships that could create future surpluses to be shared.

The second hypothesis regarding the effect of bank competition on liquidity creation is that increased competition influences banking pricing policies—specifically, leading to diminished loan rates and increased deposit rates. As a consequence, demand for both loans and deposits rises. Several studies provide empirical support for a link between competition and low lending rates (e.g. Carbo-Valverde et al., 2009; Love and Martinez Peria, 2012). Enhanced competition stimulates demand

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[1] See Bouwman (2013) for further details on how banks create liquidity.

[2] Among others, Berger and Bouwman (2011) examine the role of liquidity creation in financial crises, while Berger and Bouwman (2009), Distinguin et al. (2013) and Horvath et al. (2014) investigate the relationship between capital and liquidity creation.

for loans by alleviating financing obstacles. Beck et al. (2004) provide empirical support for this argument in their finding that increased bank concentration increases financing obstacles in general, while Hainz et al. (2013) show that increased concentration is associated with higher collateral requirements. Thus, the "price channel" view suggests a positive link between competition and liquidity creation.

We analyze the relationship between bank competition and liquidity creation, using an exhaustive dataset of Czech banks, from 2002 to 2010, provided by the Czech National Bank. We restrict our study to a single country, as the measurement of liquidity creation, following Berger and Bouwman's (2009) methodology, requires very detailed bank-level data, including off-balance sheet items. As a consequence, cross-country databases, such as Bankscope, would not be suitable, as they do not provide bank-level information at a sufficient level of disaggregation.[3] The quarterly frequency of the data allows for the use of dynamic GMM estimation, enabling us to avoid endogeneity problems. In addition, the use of an exhaustive dataset of banks reduces the possibility of selection bias.

We measure bank competition using the Lerner index, which is an individual measure of competition commonly used in recent studies (Turk-Ariss, 2010; Fungacova and Weill, 2013). In comparison with concentration indices, the Lerner index has the major advantage of capturing the effective behavior of banks rather than assuming that concentration is negatively correlated with competition. In addition, the Lerner index enables us to exploit bank-level variations in market power in our estimations.

The Czech banking industry is an interesting case for our study. The Czech Republic has been an EU member since 2004, yet possesses certain key characteristics of an emerging country, such as a dominant role for the banking system in the financing of the economy and a high market share of foreign-owned banks. According to the figures from Czech National Bank, the depth of financial intermediation (measured as the ratio of total financial sector assets to GDP) reached 156%, while the ratio of banking sector assets to GDP was nearly 115% at the end of 2010. About 97% of banking assets are owned by foreign capital. So we can consider the Czech banking industry of particular interest to extract findings of general interest for the banking literature. The EU membership, the large presence of banks owned by foreign banks from Western European countries, and the depth of financial intermediation, contribute to make the banking industry comparable to what is found in developed countries.

The impact of bank competition on liquidity creation is of great interest because of its implications for policy. While regulators may be incentivized to favor bank competition to increase the welfare of bank consumers, any result suggesting a liquidity-destroying role of bank competition would indicate the existence of a policy trade-off. Thus, in this study, we seek to improve our understanding of the determinants of liquidity creation and the consequences of bank competition.

The remainder of this paper is structured as follows. Section 2 explains the methodology. Empirical results are presented in Section 3. Section 4 concludes.

2. Methodology

2.1. Data

We use quarterly data, from the Czech National Bank, for all Czech banks operating during the 2002–2010 period. All data are from balance sheets reported by banks to the Banking Supervision of the central bank. We do not include branches of foreign banks but only Czech legal entities. Branches of foreign banks are typically very small and represent only about 10% of total assets of the Czech banking industry. In addition,

the branches are not required to supply the data at the level of disaggregation that we need for our empirical analysis. We thus have a sample of 31 banks. Descriptive statistics of the main variables used to compute Lerner indices and liquidity creation measures are presented in Table 1.

2.2. Lerner indices

Tools used to measure bank competition can be divided into the traditional IO and the new empirical IO approaches. The traditional IO approach proposes tests of market structure to assess bank competition based on the Structure Conduct Performance (SCP) model. The SCP hypothesis states that increased concentration causes less competitive behavior among banks and leads to higher bank profitability. Competition can then be measured by concentration indices such as the market share of the largest banks or by the Herfindahl–Hirschman index. However, concentration has been shown to be a poor measure of bank competition (e.g., Bikker et al., 2012). The new empirical IO approach provides non-structural tests to circumvent the problems associated with the competition measures based on the traditional IO approach. Non-structural measures do not infer the competitive conduct of banks from an analysis of market structure but rather measure bank behavior directly.

In line with this approach, we compute the Lerner index, an individual measure of competition for each bank and each period, commonly used in recent studies of bank competition (e.g., Fang et al., 2011; Beck et al., 2013; Fungacova and Weill, 2013). The Lerner index is defined as the difference between price and marginal cost, divided by price, i.e., it measures the market power of a bank to set a price above marginal cost. Thus, high values of the Lerner index are associated with significant market power. Price here is the average price of bank output (proxied by total assets). Specifically, it is the ratio of total revenues to total assets, following, e.g., Carbo et al. (2009). Marginal cost is estimated using a translog cost function with one output (total assets) and three input prices (price of labor, price of physical capital,

Table 1

Descriptive statistics.

This table displays the mean and the standard deviation for all variables used to compute the Lerner indices or as control variables in the estimations. Assets, Loans, Total cost, and Revenues are in billion CZK. Price is the ratio of revenues to assets. Marginal cost is estimated using a translog cost function with one output (assets) and three input prices (price of labor, price of physical capital, and price of borrowed funds). Price of labor is the ratio of staff expenses to number of employees. Price of physical capital is the ratio of the sum of general and administrative expenses, depreciation and other operating expenses, divided by fixed assets. Price of borrowed funds is the ratio of expenses for borrowed funds to borrowed funds. Total cost is the sum of staff expenses, general and administrative expenses, depreciation, other operating expenses, and expenses for borrowed funds. Earnings Volatility is the standard deviation of a bank's quarterly return on assets measured over the previous six quarters. Credit Risk is the ratio of risk-weighted assets and off-balance-sheet activities divided by assets. Z-Score is the return on assets plus the ratio of equity to total assets divided by Earnings Volatility. NPL is the ratio of nonperforming loans to loans. Capital is the ratio of equity to total assets. Inflation is the year-on-year change in consumer prices. Unemployment is the unemployment rate.

Variable	Mean	Std. dev.	No. of observations
Assets	102	173	869
Loans	42.5	69.5	869
NPL	5.83	7.97	869
Credit risk	41.24	43.56	869
Capital	0.08	0.11	869
Earnings volatility	0.34	0.91	869
Z-score	11.18	16.87	869
Price	0.05	0.02	869
Marginal cost	0.03	0.01	869
Unemployment	7.19	1.28	869
Inflation	2.68	1.94	869
Price of labour	910	489	869
Price of physical capital	6.45	12.18	869
Price of borrowed funds	0.025	0.012	869
Total cost	4.096	6.577	869
Revenues	6.056	10.6	869

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[3] For instance, the disaggregation of loans by category or by maturity, which is required in the computation of liquidity creation measures, is not provided in the Bankscope database for most banks.