Determinants of Liquidity Risk in the Countries of the European Economic Area

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ABSTRACT

The paper documents cross-country variation in the relationship between the deposit insurance scheme and liquidity risk in banks and explores the banking sector specific and macroeconomic determinants that can explain the variation. There is a lack of articles exploring the phenomenon in Europe, authors studying the issue focus on the United States and other parts of the world, so it is difficult to apply their results to Europe. The results of their research are also ambiguous. Using data from 28 countries of the European Economic Area by means of panel regression calculated with the use of GLS estimator with random effects, I established that an increase in deposit insurance coverage reduces the risk of liquidity. The study provides new information to help evaluate deposit insurance schemes across EEA countries.

JEL classification: G01, G21, G22, G28

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1. INTRODUCTION

Liquidity risk is the risk of a situation in which a bank is unable to finance daily financial operations (Shelagh, 2007), (Acharya 2006, 2012). It may be caused by inadequate risk management by a financial institution or by systemic reasons – the occurrence of a market collapse (e.g., the Great Depression 1929–1933, the Financial Crisis 2007–2009), oil crises (e.g., the one from 1973) and stock exchange (e.g., in the USA in 1987). There have been various methods of estimating liquidity risk used for many years. The most popular is the Loan to Deposit Ratio LTD, the ratio of illiquid assets (loans) to deposits. The higher the LTD ratio is, the less liquid the bank is (Klepková Vodová et al., 2016), (Tucker, 2009).

To counteract the collapse of the economy around the world, various security systems were introduced, including deposit insurance. The protection was established in 1934 in the USA and was a response to the Great Depression. Calomiris and Jaremski (2016) described the process of its creation, pointing to the fact that the implementation of the solution took over 50 years.

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In theory, deposit insurance was intended to prevent a run on the banks, i.e., a situation when many depositors withdraw their deposits during a crisis, which may result in a temporary liquidity shortage. This, in turn, can lead to the insolvency of a bank, and may even cause a failure of the entire banking system. What is more, implementing deposit insurance was supposed to increase the bank competition and reduce concentration. The intention was for depositors to distribute their money among various banks.

Many researchers point out, however, that introducing deposit insurance did not reduce the risk of a bank failure. Implementation of the protection increased the moral hazard since bank management and shareholders felt encouraged to take larger risks in order to increase profits. Depositors, on the other hand, lost their motivation to monitor the risk inherent in management's behavior. They also do not penalize banks by withdrawing deposits when the risk increases. This, in turn, reduces the market discipline. Deposit insurance may also increase prices of the banking services. Banks may partially impose the financing costs of the insurance mechanism on depositors.

The study of the phenomenon is particularly interesting since the literature on the subject indicates different consequences of the introduction of deposit insurance in different countries, and there is no clear opinion on whether the consequences of introducing the instrument have a negative or a positive impact on the stability of the banking sector. It seems justified to continue research in this regard, in particular by using empirical data.

The paper is structured as follows: Section 2 presents the relevant literature on liquidity risk in banks. Section 3 explains dependent and independent variables used in the model. Section 4 shows the data sample and estimated method applied. Section 5 presents the results of my analysis. Section 6 concludes the survey.

2. LITERATURE REVIEW

Theory suggests that deposit insurance can either increase or decrease the banking system risk. It can make the banking system more stable by reducing liquidity risk – in case of instability depositors do not feel the need to withdraw their funds from banks right away, which helps to prevent bank runs to occur (Calomiris et al., 2020). At the same time, deposit insurance may be a source of moral hazard. It causes depositors to no longer fear for their portfolios, and thus, they lose incentive to monitor banks' financial stability (Barth et al., 2006).

There is an ongoing discussion in the literature on the impact of the introduction of deposit insurance on the stability of the banking sector. There are many supporters and opponents of the solution. Results of the research conducted by many authors are also ambiguous.

Supporters of the solution include such authors as Cook and Spellman (1996), Huizinga and Nicodème (2006), Guizani and Watanabe (2016), Johari et al. (2020), who, like Ashraf et al. (2020) found that stricter capital requirements not only reduce risk in the banking sector under normal economic conditions, but also have a stabilizing effect in the event of a crisis. In the event of a crash, positive impact is even stronger in countries that implement deposit insurance. Karels and McClatchey (1999) and Imai (2006) assessed that the reform had a positive effect on market discipline. In turn, they made the relocation of deposits between banks dependent on the tactics of "banks too big to fail".

Flannery and Sorescu (1966), Jones and Oshinsky (2009), Bartholdy et al. (2003), Qian et al. (2019), Chiang and Tsai (2020) and Bergbrant et al. (2016) have a different opinion in relation to the supporters of the use of deposit insurance. They showed that the long-term impact of the introduction of deposit insurance strongly depends on the legal situation of a given country. In poorly regulated countries, the result is always clear – there is a weakening of the development of the banking, non-banking and stock markets. Kane (1989), Keeley (1990), and Grossman (1992)

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also examined periods of frequent bank failures and linked them to the moral hazard effect and the strength of deposit insurance institutions. Demirgüç-Kunt and Detragiache (2000), DeLong and Saunders (2011), on the other hand, have shown, based on empirical research, that deposit insurance has a negative impact on bank stability. The stronger the effect, the greater the coverage of losses in given countries.

Other authors, i.e., Govern (2006), Demirgüç-Kunt and Huizinga (2004), Anginer, Demirgüç--Kunt and Zhu (2013) Chernykh and Cole (2011), Nys et al. (2015) as well as Ji et al. (2018) drew attention to the unexpected, negative consequences of introducing deposit insurance in that depositors lost their incentive to control banks, making them much more inclined to take risks.

In turn, Calomiris (1990), Grossman (1992), Alston (1994), Hutchison and McDill (1999), Demirgüç-Kunt and Detragiache (2002), as well as Khan and Dewan (2011) showed that the introduction of deposit insurance leads to an increase in the likelihood of a crisis in the banking sector. Shy et al. (2016), in addition to the existence of moral hazard and other important problems, also showed that the top-down limit deposit insurance weakens competition between banks and overall welfare.

Another problem was pointed out by Fecht et al. (2019), they concluded that the heterogeneous nature of deposit insurance coverage causes depositors to relocate funds between banks due to the fear of a possible collapse of financial institutions. In the Eurozone, depositors tended to take funds from indebted countries to more solvent ones, only worsening the risk of collapse.

Demirgüç-Kunt et al. (2015) considered the 2013 deposit coverage arrangements and noted that bonuses have become more widespread and more extensive over the years. After the crisis in 2008, the state‘s protection of non-deposit liabilities and bank assets increased. Most of the guarantees have been lifted. However, deposit insurance remains at a higher level than it was before the economic collapse, which may lead to increased moral hazard.

Based on the literature, the following hypotheses are made:

1. **The size of the LTD ratio depends not only on banking variables, but also on macroeconomic variables.**

2. **The higher the deposit insurance coverage ratio, the higher the liquidity risk.**

To the best of author’s knowledge, no previous study has investigated the relationship between deposit insurance and liquidity risk. Most research on deposit insurance concerns the United States and other large countries in the world, while there is no research focused on Europe.

3. DETERMINANTS OF LIQUIDITY RISK

The following section describes the explanatory variables used to analyze liquidity risk in banks. They include banking-sector-specific and macroeconomic variables. Table 1 lists the variables used in the study.

Loan to Deposit Ratio is the most popular method of estimating liquidity risk. It shows the relation between the financial resources provided to the private sector by domestic money bank total deposits. Domestic money banks comprise commercial banks and other financial institutions that accept transferable deposits, such as demand deposits. Total deposits include demand, time and saving deposits in deposit money banks. LTD is expressed as a percentage and it should be less than 100%. Typically, the ideal LTD is 80% to 90%. LTD larger than 100% means that a bank may not have enough liquidity to cover any unforeseen fund requirements.

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The European Systemic Risk Board (2018) points out that while LCR and NSFR address some of the externalities of liquidity, as presently designed, they are not sufficient to do so comprehensively. They point out that LTD provides some signaling power regarding the build-up of the systemic liquidity risk.

Many authors prove that macroprudential policy should be built around the LTD ratio (Satria et al., 2015; van den End, 2016). Jorda et al. (2021) stated that the LTD ratio is very useful in signaling financial fragility. Other researchers, like Cecchetti et al. (2011) established that the economies which performed better during crises featured lower LTD ratios.

Anginer et al. (2013) examined the impact of deposit insurance on bank risk and system fragility in the years to and during the 2007–2009 financial crisis but they did not focus on liquidity risk and did not use the LTD ratio as a measure. Overall, they found that deposit insurance increases bank risk in pre-crisis years and decreases bank risk in crisis years, with an average negative effect for the entire sample period.

Table 1
Definitions and sources of variables

Variable	Source	Description
Dependent variable		
LTD	Anginer et al. (2013) Boda et al. (2021) Cecchetti et al. (2011) Dia et al. (2019) Satria et al. (2015) van den End (2016)	Bank credit to bank deposits
Independent variables		
Banking sector specific:		
Activity Restrictions	Ashraf (2020) Barth et al. (2008) Beck et al. (2013) Claessens et al. (2004) Demirguc-Kunt et al. (2010) Laeven et al. (2009)	Range of non-interest income activities banks can participate in, dummy variable that takes the value of 1 when there are any restrictions
Credit/GDP	Anginer et al. (2013) Bergbrant et al. (2016) Boda et al. (2021) Cecchetti et al. (2011) Demirguc-Kunt (1998)	Domestic credit by deposit money to private sector (% of GDP)
Deposit Insurance Coverage	Allen et al. (2015) Anginer et al. (2014, 2019) Ashraf et al. (2020) Ashraf et al. (2020) Barth et al. (2008) DeLong et al. (2011) Demirguc-Kunt (2002, 2004, 2005) Houston (2010) Lambert et al., (2017)	Deposit insurance coverage relative to GDP

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continued Table 1

Variable	Source	Description
Deposits/GDP	Boda et al. (2021) Cecchetti et al. (2011)	Ratio of total deposits to GDP
Ex-ante or ex-post	DeLong et al. (2011)	Defining the approach to the method of financing deposit insurance
Lerner Index	Anginer et al. (2014) Jimenez et al. (2006) Qian et al. (2019)	Measure of market power in the banking market. An increase in the Lerner index indicates a deterioration of the competitive conduct of financial intermediaries
Multiple Supervisors dummy	Demirguc-Kunt et al. (2005, 2015)	Dummy equal one when there are multiple bank supervisors
ROA	Anginer et al. (2013, 2019) Kim et al. (2017)	Return on total assets
Z-Score	Anginer et al. (2013) Beck et al. (2013) Boyd et al. (1993) Boyson et al. (2014) Laeven at. al. (2009)	Probability of default of a country's banking system calculated as a natural logarithm of the sum of ROA and equity ratio (ratio of book equity to total assets), averaged over the past five years, divided by the standard deviation of ROA over the past five years
Macroeconomic:		
Crisis dummy	Anginer et al. (2013, 2019) Ashraf (2020) Cornett et al. (2011) Jorda et al. (2021)	Indicator variable that assumes a value of 1 when crisis occurred
Inflation	Ashraf (2020) Cecchetti et al. (2011) Demirguc-Kunt et al. (1998, 2004) Houston (2010)	Consumer price index (2010 = 100)
GDP Growth	Bergbrant et al. (2016) Cecchetti et al. (2011) Demirguc-Kunt (1998, 2004)	Logarithm difference of successive GDP values
GDP per Capita	Anginer et al. (2013) Ashraf et al. (2020) Demirguc-Kunt et al. (1998, 2004) Houston (2010) Jorda et al. (2021)	Natural logarithm of GDP divided by its total population

Source: Author's development.

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3.1. Banking sector specific variables

Risk measures (i.e., Z-Score, Activity Restrictions), operating efficiency measures (ROA), and measures related to deposit insurance scheme (i.e., Deposit Insurance Coverage, Ex-ante or ex-post, Multiple Supervisors dummy) have been chosen ss the banking sector specific determinants of liquidity risk.

Activity Restrictions is a dummy variable which explains the conditions under which banks can engage in nonfinancial business except those businesses that are auxiliary to the banking business (e.g., IT company, debt collection company etc.). This variable comes from the Bank Regulation and Supervision Database and it takes the value of zero if nonfinancial activities can be conducted directly in banks. Otherwise, when there are any restrictions, it takes the value of 1.

Beck et al. (2013) documented large cross-country variation in the relationship between bank competition and bank stability. They used the Activity Restrictions variable as an index measuring the degree to which banks are prohibited from engaging in fee-based activities related to securities, insurance and real estate and thus diversify away from more traditional interest spread-based activities. In their case, lower values of the index indicate that fewer restrictions are placed on this type of diversification by banks. They proved that activity restrictions are negatively and significantly correlated with systemic stability. Countries with riskier banking systems also experience higher activity restrictions. Their findings also show that activity restrictions are positively and significantly correlated with the competition-stability relationship in the banking system.

Demirguc-Kunt et al. (2010) showed the implications of bank activity and short-term funding strategies for bank risk and return. They provided a very interesting insight into activity restrictions. Their paper proved that activity restrictions, among other things, are associated with bank circumventing such regulations by increasing nondeposit funding. The practice allows them to increase their risk-taking.

Ashraf (2020) showed that bank risk is lower in countries with higher restrictions on bank activities, which is consistent with research by Claessens et al. (2004) proving that lower activity restrictions make banks risky by promoting banking industry competition. Contrary to the fact, Barth et al. (2008) established that regulatory restrictions on banking activities increase the probability of banking crisis.

To the best of author's knowledge, there is no research which examined the impact of activity restrictions on LTD. Conclusions from literature are ambiguous, but based on Ashraf (2020), it is assumed that countries which have Activity Restrictions have lower LTD.

Following Anginer et al. (2013), **Credit/GDP** was used to control differences in financial development and structure. Their research has proven that countries with lower private credits have banks with lower stock return volatility. What is more, stock return volatility is significantly higher in crisis years. They found that bank risk is negatively correlated with credits offered by financial institutions.

Bergbrant et al. (2016) examined how the introduction of deposit insurance affected equity market and the banking sector. They used Credit/GDP as one of their main variables. They found out that the introduction of deposit insurance declined the banking sector activity by approximately 20% of GDP, but only if the country has a mean law and order score of zero. With law and order score equal to or greater than 4 the effect of deposit insurance on the baking sector activity is neutralized. For the countries with the highest law and order score of 6 (Denmark, Iceland, and Sweden) introducing deposit insurance had a large positive effect on the banking sector activity.

Boda et al. (2021) proved that banking LTD ratios are negatively and strongly correlated with relative levels of bank credit. Cecchetti et al. (2011) established that Credit/GDP is negatively correlated with the cumulative GDP gap which is a measurement of country's relative

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macroeconomic performance over the crisis period. On the other hand, Demirguc-Kunt's (1998) research showed that Credit/GDP ratio had no significant impact on banking crisis risk.

Based on the literature, i.e., Cecchetti et al. (2011), it is expected that the higher the Credit/GDP is, the higher the LTD ratio is.

Data on the variable comes from the Global Financial Development Report and is expressed in USD. In my sample, only a minority of countries have activity restrictions. The countries are Austria, Belgium, France, Germany, Netherlands, Poland, Romania and Sweden.

Deposit Insurance Coverage is a variable used by Demirguc-Kunt in a comprehensive database created in 2005. It was counted by the author of the paper as a ratio between deposit coverage limit and GDP per Capita. Data on deposit coverage limit comes from the International Association of Deposit Insurers database and from the database created by Demirguc-Kunt in 2015. The data on GDP per Capita comes from the Global Financial Development Report.

Houston (2010) found that Deposit Insurance Coverage is negatively and statistically significantly correlated with bank risk.

Anginer et al. (2019) stated that the Global Financial Crisis led to unprecedented government interventions to rescue distressed banks. Deposit insurance systems around the world have become more generous, expanding in both scope and coverage. The expansions may have reinforced investor expectations of government support for financial institutions, thus reducing the long-term incentives of depositors to monitor and discipline banks.

Many researchers proved that because of moral hazard, the explicit deposit insurance scheme increases the probability of banking crisis and decreases banking stability (Anginer et al., 2014; Ashraf et al., 2020; DeLong et al., 2011; Demirguc-Kunt et al., 2002, 2004; Houston, 2010 and Lambert et al., 2017). However, capital regulation can be used to counter that effect (Allen et al., 2015; Ashraf et al., 2020).

Values of the variable vary greatly from country to country, with the lowest value being equal to 0.20 and the largest being equal to 19.35. The variable is expressed in USD.

Based on the other authors' research, the assumption is that the higher Deposit Insurance Coverage is, the higher the LTD ratio is.

Deposits/GDP was used by Boda et al. (2021) as a relation between bank deposits to GDP. It is the total value of demand, time and saving deposits at domestic deposit money banks as a share of GDP. Deposit money banks comprise commercial banks and other financial institutions that accept transferable deposits, such as demand deposits. Cecchetti et al. (2011) proved that Deposits/GDP have positive but statistically insignificant impact on a country's performance during crisis.

Data on the variable comes from the Global Financial Development Report and is expressed in USD.

Based on the literature, it is expected that Deposit/GDP has a negative impact on the LTD ratio.

Ex-ante or **Ex-post** are deposit insurance scheme characteristics. The distinction was used by Demirguc-Kunt (2015) and DeLong et al. (2011).

The Ex-ante system resembles the classic insurance in which the insurer collects a specific contribution and then creates a fund from it to be used for possible damage coverage. In the event of a bank failure, the institution makes payments with the use of a permanent accumulative fund, and the system members are obliged to pay regular contributions so that the fund level does not fall below the required minimum. As a result, a greater stabilization of the sector is achieved when banks pay fees to the fund they use in case of problems in the sector. After the collapse of a given institution, they do not have to incur additional costs. Thus, Ex-ante financing enables anti-cyclical premium collection and the use of the fund in times of recession, when collecting increased contributions would be difficult. In an Ex-post system, the guarantee institution obliges the system members to the payment of funds for guarantee payments in the event of a bank failure, therefore banks are not charged earlier than necessary, but on the other hand at the moment crisis

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must take into account additional costs of contributions. Data on ex-ante and ex-post approaches comes from the European Banking Authority and Bank Regulation and Supervision Survey. What is worth noting is that some countries changed their approach during the period of 2005–2017. For example, Ireland used both Ex-ante and Ex-post up to 2015, and then changed it to only Ex-ante. Italy used Ex-post up to 2014 and changed it to Ex-ante in 2016. The Netherlands used to use both to 2016, and then decided to only use Ex-ante. Slovenia gave up Ex-post in favor of Ex-ante in 2016. As of 2017, there were no countries which only used the Ex-post approach. Almost all the countries in my sample use the Ex-ante approach with only few exceptions: Austria, Malta and Poland use both Ex-ante and Ex-post approaches.

To the best of author's knowledge, there is no research which examines the impact of using either the Ex-ante or Ex-post approach on the LTD ratio. However, based on the theoretical assumptions, it is an expected result that LTD is lower in countries which use the Ex-ante approach.

Lerner Index is a measure of market power in the banking market. It compares output pricing and marginal costs (that is, markup). An increase in the Lerner index indicates a deterioration of the competitive conduct of financial intermediaries.

The Lerner index is a proxy for profits that accrue to a bank as a result of its pricing power in the market. It is a competition measure and was used by Anginer et al. (2014) and Jimenez et al. (2006) to determine how it affects systemic bank risk. They proved that the relationship between the Lerner index and the bank systemic risk remains positive and statistically significant.

Qian et al. (2019), on the other hand, proved that a one-standard deviation increase in the Lerner index leads to a decrease in the probability of a banking crisis ranging approximately from 3.9% to 4.6% which is economically important. They found that an increase in bank competition makes an explicit deposit insurance scheme ineffective and therefore it leads to banks taking more risk. However, their results confirm that improved regulatory ability could decrease that effect.

To the best of author's knowledge, no author has examined the impact of the Lerner Index on the LTD ratio. Based on the work by Anginer et al. (2014) and Jimenez et al. (2006) it is assumed that the higher the Lerner Index is, the higher the LTD is.

Data on the variable comes from the Global Financial Development Report.

Multiple Supervisors dummy is a variable which indicates whether there is more than one deposit insurance supervision institution in a given country. This variable takes the value of zero when there is only one supervision institution, otherwise it takes the value of one. Data on this value comes from Demirguc-Kunt's databases created in 2005 and 2015 and directly from the institutions' websites.

To the best of author's knowledge, there is no research which examines the impact of presence of multiple supervisors on LTD, nor there is for any type of banking risk.

ROA is bank return on assets. It is measured as a commercial banks' after-tax net income to yearly averaged total assets.

It was used by Kim et al. (2017) and Anginer et al. (2013, 2019). Their findings prove that ROA has negative and statistically significant effect on bank risk.

Based on the literature, it is expected that the higher ROA is, the lower LTD is.

Data on the variable comes from the Global Financial Development Report and is expressed in USD.

Z-Score is a measure of systemic risk. It captures the probability of default of a country's commercial banking system. Z-score compares the buffer of a country's commercial banking system (capitalization and returns) with the volatility of the returns. The variable shows the number of standard deviations by which returns would have to fall from the mean to wipe out all equity in the bank (Boyd et al., 1993). A higher Z-score implies a lower probability of insolvency, providing a more direct measure of soundness than, for example, simple leverage measures

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(Beck et al., 2013). Because the Z-score is highly skewed, it was decided to use the natural logarithm of Z-score to smoothen out higher values.

Beck et al. (2013) proved that there is a strong dependence between bank soundness (measured using Z-Score) and bank competition. Their paper shows that increased competition results in a much lower Z-Score which means that more competition is harmful for bank stability.

Laeven et. al. (2009) conducted an empirical assessment of theories concerning risk taking by banks, their ownership structures, and national bank regulations. They also used Z-Score as a measure of bank risk taking. They found out that more stable banks have lower cash flow rights and are located in countries with fewer activity restrictions.

Other researchers, like Houston et al. (2010), explored interactions between the level of creditor rights, information sharing and risk taking among banks. They also used Z-Score as a primary measure of bank risk taking and proved that stronger creditor rights are correlated with higher bank risk taking.

Anginer et al. (2013) examined the relationship between deposit insurance and bank risk. They used Z-Score to measure the standalone risk of an individual bank. Their findings prove that deposit insurance has a positive and statistically significant effect on Z-Score during crisis. In pre-crisis years, however, it has a negative and statistically significant effect on Z-Score. Still, the average effect of deposit insurance during the entire examined period is negative. It means that generous financial safety nets increase bank risk and reduce systemic stability in non-crisis years. On the other hand, during financial crisis the effect is opposite – bank risk is lower. Despite the fact, the overall impact of deposit insurance remains negative since the destabilizing effect during normal times is greater in magnitude, as compared to the stabilizing effect during global turbulence.

Based on the literature, it is expected that Z-Score has negative impact on the LTD ratio.

Data on the variable comes from the Global Financial Development Report.

3.2. Macroeconomic variables

In addition to the banking specific variables described above, the analysis also includes macroeconomic determinants, which are expected to have an impact in liquidity risk. I have decided to focus on four macroeconomic variables – Crisis dummy, Inflation, GDP per Capita, and also the natural logarithm of GDP per Capita.

Crisis dummy is a variable for the presence of banking crisis. It takes the value of one when a crisis occurred in a given year, and zero otherwise. A banking crisis is defined as systemic if two conditions are met: firstly, significant signs of financial distress in the banking system (as indicated by significant bank runs, losses in the banking system, and/or bank liquidations); secondly, significant banking policy intervention measures in response to significant losses in the banking system. The first year that both criteria are met is considered as the year when the crisis starts becoming systemic.

This variable comes from Anginer et al. (2013) and it is defined it to be equal to 1 for years 2007–2009 and 0 for the remaining years. They found that during financial crisis, the banking system is more stable and the bank risk is lower in countries with generous deposit insurance coverage. However, the countries which use the safety net creates moral hazard effect and this effect in fact dominates in stable times.

The variable was used by Cornett et al. (2011) examined how banks' efforts to manage the liquidity risk led to a decline in credit supply. They used the crisis indicator to define the quarters affected by crisis. Their results suggest that the mean and median changes in loans and total credit are both lower in the crisis quarters relative to noncrisis ones. This effect was stronger for larger banks. Overall, they determined that during the crisis, liquidity risk exposure led to greater increases in liquid assets, mirrored by greater decreases in credit origination. They also suggest

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that banks that were more reliant on core deposit financing faced fewer liquidity problems during the crisis than banks that relied more heavily on wholesale sources of debt financing.

Jorda et al. (2021) proved that the LTD ratio is positively related to financial crisis, and Ashraf (2020) showed that the crisis dummy variable has positive and significant impact on bank risk which means that probability of a bank default rises during the financial crisis.

Based on the literature, it is assumed that occurrence of banking crisis has a positive impact on the LTD ratio.

Data on the variable comes from the Global Financial Development Report.

The Consumer Price Index is understood by **Inflation**. The CPI is used to index the real value of wages, salaries and pensions. It can also represent the buying habits of urban consumers. Consistent with the objective of the CPI as a measure of price inflation for the household sector as a whole, the price index covers all services acquired by households in relation to the acquisition, holding and disposal of financial and real assets. The index measures the price change for some of the most significant financial services acquired by households – deposit and loan facilities provided by financial institutions. The CPI is calculated as an average yearly change in the price of goods and services between two periods – in the research the year 2010 is taken as a 100.

Cecchetti et al. (2011) showed that inflation rate did have a negative but statistically insignificant impact on country's performance during crisis. Demirguc-Kunt et al. (2004) discussed how deposit insurance affects market discipline. Among other macroeconomic variables they used inflation and proved that it has a negative and statistically significant impact on liquidity. Demirguc-Kunt (1998) proved that inflation is positively associated with risk of banking crisis. Similarly, Ashraf (2020) established that inflation is positively correlated with bank risk.

On the other hand, Houston (2010) found that inflation is negatively and statistically significantly correlated with bank risk.

Conclusions from the literature are ambiguous, but based on Demirguc-Kunt's (1998) and Ashraf's (2020) research, it is expected that Inflation has a positive impact on the LTD ratio.

Data on the Consumer Price Index comes from the Global Financial Development Report.

Following the research by Anginer et al. (2013), **GDP Growth** was used as a measure of the size of the economy and how an economy is performing. It is an often-used indicator of the general health of the economy.

Most researchers, like Cecchetti et al. (2011), Bergbrant et al. (2016) and Demirguc-Kunt (1998, 2004) agree that GDP growth is negatively correlated with banking crisis and that banking sector development is positively related to the size of the country's GDP. Their research proved that GDP growth is positively correlated with liquidity. They also found that GDP growth is negatively associated with a higher probability of banking crisis.

Contrary to this, Ashraf (2020) proved that GDP growth is positively correlated with bank risk which suggests that bank risk is higher in growing economies.

Conclusions from the literature are, once again, ambiguous, but based on Cecchetti's et al. (2011), Bergbrant's et al. (2016) and Demirguc-Kunt's (1998, 2004) research, it is expected is that the higher GDP growth is, the lower the LTD ratio is.

GDP growth is calculated as a logarithm difference of successive values. Data on the variable comes from the Global Financial Development Report and is expressed in USD.

The final variable is **GDP per Capita**. It is a financial metric that breaks down a country's economic output per person and is calculated by dividing the GDP of a nation by its population. It is used to analyze a country's prosperity based on its economic growth. Small, rich countries and more developed industrial countries tend to have the highest per capita GDP. The International Monetary Fund shows that there are Ireland, Norway and Denmark among the top 10 nations with the highest GDP per capita. They are use in the research. Because GDP per Capita is highly skewed, it was decided to use the natural logarithm of GDP per Capita to smoothen ut higher values.

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Anginer et al. (2013) found that countries with higher GDP per capita have banks with lower stock return volatility, while Jorda et al. (2021) proved that GDP is slightly lower for high LTD ratios but the difference between the coefficients are not statistically significant. Demirguc--Kunt (1998, 2004) established that GDP per Capita is positively correlated with liquidity and is negatively associated with a higher probability of banking crisis.

Ashraf (2020) proved that GDP per Capita is negatively correlated with bank risk. It indicates that bank risk is lower in high-income countries. Likewise, Houston (2010) found that GDP per Capita is negatively and statistically significantly correlated with bank risk.

Based on the literature, it is expected that GDP per Capita has a negative impact on the LTD ratio.

Data on the variable comes from the Global Financial Development Report and is expressed in USD.

3.3. Data characteristics

Table 2 demonstrates summary statistics for the variables used in the analysis and Table 3 reports the degree of correlation amongst dependent and independent variables. Table 4 presents countries grouped according to different factors. Table 5 shows sources of data and expected impact of the variables on the LTD ratio.

Table 2
Summary statistics

Variable	Mean	Median	S.D.	Min	Max
LTD	127.4	119.4	57.79	17.79	367.1
Credit/GDP	89.38	83.81	43.91	16.70	260.7
Deposit Insurance Coverage	3.787	2.642	3.660	0.2030	19.35
Deposits/GDP	80.92	64.09	65.93	21.88	472.0
GDP Growth	0.02787	0.04041	0.1051	-0.3254	0.3895
GDP per Capita	10.23	10.26	0.6829	8.624	11.63
Inflation	101.0	102.9	8.203	72.14	115.5
Lerner Index	0.2351	0.2521	0.09869	-0.06694	0.4672
ROA	0.4552	0.6504	1.376	-10.47	4.241
Z-Score	2.258	2.249	0.7771	-4.092	3.862
Activity Restrictions	0.2865	0.000	0.4528	0.000	1.000
Crisis dummy	0.1841	0.000	0.3881	0.000	1.000
Ex-ante	0.7335	1.000	0.4427	0.000	1.000
Ex-post	0.06044	0.000	0.2386	0.000	1.000
Ex-ante & Ex-post	0.2060	0.000	0.405	0.000	1.000
EURO	0.6786	1.000	0.4947	0.000	1.000
CEE	0.3571	0.000	0.4798	0.000	1.000
Multiple Supervisors dummy	0.1429	0.000	0.3504	0.000	1.000

Source: Author's calculation.

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Table 3
Correlation matrix

	LTD	Activity Restrictions	Credit/GDP	Deposit Insurance Coverage	Deposits/GDP	Ex-ante	Ex-post	Ex-ante & Ex-post	GDP Growth	GDP per Capita	Crisis dummy	Inflation	Lerner Index	Multiple Supervisors dummy	ROA	Z-Score
LTD	1															
Activity Restrictions	-0.1010	1														
Credit/GDP	0.5626	-0.1464	1													
Deposit Insurance Coverage	-0.1332	-0.0877	-0.2676	1												
Deposits/ GDP	-0.3876	-0.1159	0.2909	-0.2208	1											
Ex-ante	0.1178	-0.1440	0.0719	0.0597	0.0613	1										
Ex-post	0.0112	-0.1588	-0.0721	-0.0345	-0.0822	-0.4231	1									
Ex-ante & Ex-post	-0.1357	0.2517	-0.0358	-0.0449	-0.0180	-0.8435	-0.1298	1								
GDP Growth	-0.0194	0.0091	-0.1877	-0.1474	-0.0416	-0.0117	-0.0532	0.0440	1							
GDP per Capita	0.1732	0.1264	0.4894	-0.5288	0.4831	-0.0066	0.0210	-0.0052	-0.0574	1						
Crisis dummy	0.0949	-0.0106	0.3213	-0.1225	0.1898	-0.0183	0.0866	-0.0313	-0.2065	0.1275	1					
Inflation	-0.0782	0.0400	0.0968	0.5117	0.0943	-0.0066	-0.0389	0.0303	-0.3875	0.1413	-0.0034	1				
Lerner Index	0.1366	-0.2507	0.0351	0.2043	-0.1262	0.0984	-0.2796	0.0774	0.0173	-0.1940	-0.2105	-0.0010	1			
Multiple Supervisors dummy	0.0206	0.1921	0.1239	-0.1470	-0.0163	-0.1693	0.2622	0.0299	-0.0620	0.2050	0.0923.	0.0558	-0.2543	1		
ROA	-0.1065	0.0373	-0.3028	-0.0801	-0.0927	0.0457	-0.1483	0.0379	0.3374	-0.0901	-0.3357	-0.2204	0.2886	-0.0502	1	
Z-Score	-0.2064	0.1084	0.1229	-0.2202	0.5698	-0.0281	-0.1110	0.0951	-0.0093	0.4566	-0.0857	-0.1698	-0.0576	0.3465	0.1469	1

Source: Author's calculation.

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Table 4
Countries grouped according to different factors as of 2017

Country	Activity Restrictions	Crisis	Ex-ante	Ex-post	Ex-ante & Ex-post	EURO	CEE	Multiple Supervisors
Austria	X				X	X		X
Belgium	X		X			X		
Bulgaria			X				X	
Croatia			X				X	
Cyprus			X			X[1)]		
Czech Republic			X					
Denmark			X					
Estonia			X			X[2)]		
Finland			X			X		
France	X		X			X		
Germany	X		X			X		X
Greece			X			X		
Hungary			X					
Ireland			X[3)]			X		
Italy			X[4)]			X		X
Latvia			X			X[5)]		
Lithuania			X			X[6)]		
Luxembourg			X			X		
Malta					X	X[7)]		
Netherlands	X		X[8)]			X		
Norway			X					
Poland	X				X		X	
Portugal			X			X		
Romania	X		X					
Slovak Republic			X			X[9)]		
Slovenia			X[10)]			X		
Spain			X			X		X
Sweden	X		X					

[1)] Cyprus adopted the euro as the national currency in 2008.
[2)] Estonia adopted the euro as the national currency in 2011.
[3)] Ireland used both Ex-ante and Ex-post approaches up to 2015.
[4)] Italy used both Ex-ante and Ex-post approaches up to 2014.
[5)] Latvia adopted the euro as the national currency in 2014.
[6)] Lithuania adopted the euro as the national currency in 2015.
[7)] Malta adopted the euro as the national currency in 2008.
[8)] Netherlands used both Ex-ante and Ex-post approaches up to 2016.
[9)] Slovak Republic adopted the euro as the national currency in 2009.
[10)] Slovenia used the Ex-post approach up to 2015.

Source: Author's calculation

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Table 5
Sources of data and expected impact of the variables

Variable	Source	Expected impact on LTD
Banking sector specific:		
Activity Restrictions	Bank Regulation and Supervision Database	–
Credit/GDP	Global Financial Development Report	+
Deposit Insurance Coverage	International Association of Deposit Insurers Demirguc-Kunt's 2015 database Global Financial Development Report	+
Deposits/GDP	Global Financial Development Report	–
Ex-ante or Ex-post	European Banking Authority Bank Regulation and Supervision Survey	LTD should be lower in countries which use the Ex-ante approach
Lerner Index	Global Financial Development Report	+
Multiple Supervisors dummy	Demirguc-Kunt's 2005 and 2015 databases Supervisor institutions' websites	–/+
ROA	Global Financial Development Report	–
Z-Score	Global Financial Development Report	–
Macroeconomic:		
Crisis dummy	Global Financial Development Report	+
Inflation	Global Financial Development Report	+
GDP Growth	Global Financial Development Report	–
GDP per Capita	Global Financial Development Report	–

Source: Author's calculation.

4. METHODOLOGY AND DATA

The survey covers the period 2005–2017. It is a very interesting period due to the numerous events and changes that took place. First and foremost, the Global Financial Crisis of 2007–2009. In addition to this, in 2009 the European Commission announced an amending directive which required the EU members to increase their protection of deposits firstly to the minimum of €50 000, and then to a uniform level of €100 000 by the end of 2010. In 2014, the European Union adopted another directive requiring the EU countries to introduce laws setting up at least one deposit guarantee scheme that all banks must join.

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The research covers 28 countries of the European Economic Area. There is no data on Iceland and Liechtenstein in the Global Financial Development Report, which is the main source used in the survey. It is a particularly interesting sample because even though the European Union countries' deposit insurance schemes seem very similar (since 2010 they all have had a universal guarantee limit) it is in fact a diverse area. The EEA members took a different approach to deposit insurance scheme. Not all of them use the Ex-ante approach. Some of them have more than one supervisor institution. Finally, not all the countries are the EU and Eurozone members. Many variables also vary widely – most notably GDP per Capita and the Deposit Insurance Coverage.

Using the model presented by Beck et al. (2013) and adjusting it to define the importance of individual factors determining liquidity risk, the final model can be presented as follows:

$$Risk_{i,t} = bc + \alpha I_{t\text{-}1} + \Sigma\beta BSV_{i,t\text{-}1} + \gamma C_{i,t} + \varepsilon_i$$

where *i* means country, *t* – year. *Risk* means the liquidity risk ratio (in the survey the LTD ratio is used). *I* defines a vector of variables containing the size of deposit guarantees in a given country in a given year. *BSV* is a vector of variables defining parameters characterizing banks, i.e., Activity Restrictions, Credit/GDP, Deposits/GDP, Ex-ante or Ex-post, Lerner Index, Multiple Supervisors dummy, ROA and Z-Score. *C* is a vector of variables defining a given country, i.e., Crisis dummy, Inflation, and GDP per Capita. ε_i is the estimation error; *bc*, α, β, and γ are vectors of estimated coefficients.

The analysis of liquidity risk in banks in a given country is carried out taking into account the dependent variable – by means of panel regression calculated with the use of the GLS estimator with random effects. In order to eliminate the potential problem of endogeneity, the econometric analysis uses data related to the amount of deposit guarantees and parameters characterizing banks in the previous year. Thanks to it, it can be assumed that the estimated relationship between the amount of deposit guarantees, the characteristics of banks and the characteristics of a given country is not burdened with an error resulting from the failure to consider unobservable factors that affect all the variables (Angrist, Krueger 2001). The selection of explanatory variables for the model was based on the literature on the subject – mainly Demirgüç-Kunt et al. (1998, 2004, 2005), Bart et al. (2008), Beck et al. (2013), Boyson et al. (2014), and Anginer et al. (2014). The research in the study is based on the data of commercial banks from the European Economic Area. Data on information on the economic situation of countries and the amount of deposit coverage in a specific year was obtained from the World Bank, European Systemic Risk Board, International Association of Deposit Insurers and International Monetary Fund. The research period covers the years 2005–2017 and shows the dependence of the obtained results on the economic situation, including the financial crisis 2007–2009.

5. ESTIMATION RESULTS

This chapter presents estimation results. Table 6 reports the results when all countries are simultaneously considered. Table 7 presents results related to bank management i.e., whether a country has activity restrictions and multiple supervisors. Table 8, 9 and 10 show the results for countries split according to the banking sector specific and macroeconomic factors.

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Table 6
Estimation results for the full sample

	Dependent variable LTD
	Full sample
Explanatory variables	1
Banking sector specific:	
Activity Restrictions	-7.40938
Credit/GDP	0.832694***
Deposit Insurance Coverage	-0.733256*
Deposits/GDP	-0.443872***
Ex-ante	17.3053
Ex-post	20.7321
Lerner Index	-32.1815**
Multiple Supervisors dummy	-17.7628
ROA	4.33197***
Z-Score	-3.45838
Macroeconomic:	
Crisis dummy	2.49024
Inflation	-0.200537
GDP Growth	16.5806*
GDP per Capita	12.1421
No. of observations	253

*, ** and *** denote significance at 1%, 5% and 10%, respectively.
Source: Author's calculation.

Table 7
Estimation results related to bank management

	Dependent variable LTD			
	Activity Restrictions	**No Activity Restrictions**	**Multiple Supervisors**	**One Supervisor**
Explanatory variables	2	3	4	5
Banking sector specific:				
Credit/GDP	0.446028	0.782946***	0.528176*	0.760040***
Deposit Insurance Coverage	0.326539	-1.07521***	-2.35048	-0.995193**
Deposits/GDP	-2.03710***	-0.378006***	-2.26909***	-0.381521***
Lerner Index	-24.9579	-29.1532*	28.9865	-33.1344**

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continued Table 7

	Dependent variable LTD			
	Activity Restrictions	**No Activity Restrictions**	**Multiple Supervisors**	**One Supervisor**
ROA	4.93325	3.40848***	-2.26877	3.94944***
Z-Score	-0.00115360	-0.450362	0.732788	-1.90171
Macroeconomic:				
Inflation	1.05290**	-0.157570	1.00639	0.00991986
GDP Growth	-41.6852*	24.2323**	-10.9069	17.2962*
GDP per Capita	0.000990842	10.5239	-0.000233634	8.81769
No. of observations	245	245	249	249

*, ** and *** denote significance at 1%, 5% and 10%, respectively.
Source: Author's calculation.

Table 8
Estimation results related to the euro currency

	Dependent variable LTD	
	EURO	**Not EURO**
Explanatory variables	6	7
Banking sector specific:		
Credit/GDP	-0.500358***	1.25543***
Deposit Insurance Coverage	-0.468811	-0.483000
Deposits/GDP	0.395688***	-0.715754***
Lerner Index	-16.3737	-0.158770
ROA	4.65507**	4.84495***
Z-Score	-0.0298420	-10.4917**
Macroeconomic:		
Inflation	0.103177	-0.273833
GDP Growth	-6.75160	9.11580
GDP per Capita	-0.000285218	8.61110
No. of observations	234	234

*, ** and *** denote significance at 1%, 5% and 10%, respectively.
Source: Author's calculation.

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Table 9
Estimation results related to Central and Eastern Europe countries

	Dependent variable LTD	
	CEE	**Not CEE**
Explanatory variables	8	9
Banking sector specific:		
Credit/GDP	1.79643***	0.657309***
Deposit Insurance Coverage	-0.0963871	0.0777179
Deposits/GDP	-1.97657***	-0.326532***
Lerner Index	-20.6264	-24.6599**
ROA	-0.0682531	4.15905***
Z-Score	1.33935	-2.45514
Macroeconomic:		
Inflation	0.113665	-0.398455*
GDP Growth	11.5562	7.55492
GDP per Capita	-0.00043880	14.3762
No. of observations	243	243

*, ** and *** denote significance at 1%, 5% and 10%, respectively.
Source: Author's calculation.

Table 10
Estimation results related to Ex-ante, Ex-post and both Ex-ante and Ex-post approaches

	Dependent variable LTD		
	Ex-ante	**Ex-post**	**Ex-ante & Ex-post**
Explanatory variables	10	11	12
Banking sector specific:			
Credit/GDP	0.255136*	1.14531	0.744571**
Deposit Insurance Coverage	0.329385	-0.546583	-0.919003
Deposits/GDP	-0.141788	-1.94465	-1.39073**
Lerner Index	-40.7225**	16.5108	-34.9576
ROA	1.63906	0.602643	2.20912
Z-Score	-0.42079	1.52688	0.299232
Macroeconomic:			
Inflation	0.196164	0.615804	0.481603
GDP Growth	-21.2030	-11.3449	2.50694
GDP per Capita	-0.0275207	-3.74549	-2.07754
No. of observations	234	251	248

*, ** and *** denote significance at 1%, 5% and 10%, respectively.
Source: Author's calculation.

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Overall, some significant differences between the estimation results of the different country samples have been observed, both with respect to the significance and the size of the coefficients.

In the **full sample** findings show that **activity restrictions** have a negative, statistically insignificant on the LTD ratio. To the best of author's knowledge, there were no previous researches which would examine the impact of activity restrictions on LTD. The paper findings are somewhat consistent with the conclusions made by Ashraf (2020) and Claessens et al. (2004) taking into account the impact direction, but, contrary to their results, the impact of activity restrictions in the sample is not statistically significant.

Referring to the relation between **Credit and GDP**, it has significant and positive impact on LTD which is consistent with the literature, i.e., Cecchetti et al. (2011) and Bergbrant et al. (2016) who got similar results. The paper findings contradict those by Boda et al. (2021) and also Demirguc-Kunt (1998).

Deposit insurance coverage has a negative and statistically significant impact on LTD, which is particularly interesting, because it contradicts other researchers' papers, i.e., Anginer et al. (2014), Ashraf et al. (2020), DeLong et al. (2011), Demirguc-Kunt et al. (2002, 2004), Houston, (2010) and Lambert et al. (2017). Literature suggests that the difference is due to the focus on a different area. None of the mentioned authors focused on Europe. The results prove that Hypothesis 2 is false.

As for **Deposits/GDP**, it has a significant and negative impact on LTD which is consistent with the findings by Boda et al. (2021) and Cecchetti et al. (2011), the difference is that in the case of the latter, the results were statistically insignificant.

Using either the **Ex-ante** or **Ex-post** approach does not have a significant impact on the LTD ratio in the full sample. Results regarding using both Ex-ante and Ex-post approaches were omitted due to exact collinearity. The paper results are not statistically significant but the impact direction is consistent with the expatiation.

The empirical results show that **Lerner Index** has a negative and statistically significant impact on LTD. The findings contradict theoretical assumptions based on research by other authors, i.e., Anginer et al. (2014) and Jimenez et al. (2006) who proved that the higher Lerner Index is, the higher the systemic bank risk is. However, my results are consistent with Qian et al. (2019).

When it comes to the **Multiple Supervisors dummy**, it has a negative, statistically insignificant impact on LTD. To the best of author's knowledge, there was no previous research which would examine the impact of presence of multiple supervisors on LTD, nor there was for any type of banking risk.

Referring to the **ROA** variable, it has a positive and statistically significant impact on the LTD ratio. It is intriguing because it contradicts other authors' papers, i.e., Kim et al. (2017) and Anginer et al. (2013, 2019).

The findings show that **Z-Score** has a negative and statistically insignificant impact on LTD. It is somewhat consistent with (Beck et al., 2013) and Laeven at. al. (2009) when it comes to the impact direction , but, contrary to their results, the impact of Z-Score in the sample used in the paper is not statistically significant.

As for **Crisis dummy**, it has a positive, but statistically insignificant impact on LTD which again, when it comes to the direction of the impact, is consistent with Jorda et al. (2021) and Cornett et al. (2011).

As to examining **Inflation**, my results show that it does not have a significant impact on the LTD ratio. It contradicts other papers, i.e., Demirguc-Kunt et al. (1998, 2004) and Ashraf (2020). On the other hand, the findings are consistent with Cecchetti et al. (2011), who also got negative and statistically insignificant results.

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Referring to **GDP Growth** it has a positive and statistically significant impact on LTD which contradicts papers by Cecchetti et al. (2011), Bergbrant et al. (2016) and Demirguc-Kunt (1998, 2004). It is consistent with Ashraf (2020), who established that bank risk is higher in growing economies.

GDP per Capita is positively correlated with the LTD ratio but its impact is statistically insignificant. It contradicts research by Anginer et al. (2013), Jorda et al. (2021), Demirguc--Kunt (1998, 2004), Ashraf (2020) and Houston (2010). It is my opinion that this variable is not significant because all the countries in my sample are high-income countries.

When it comes to the countries with **Activity Restrictions**, the results are similar for the **Deposits/GDP** variable but the impact is stronger. Other variables lost their significance. **GDP Growth** has the opposite effect – it is negatively and statistically significantly correlated with LTD. **Inflation** has a positive and statistically significant impact on LTD.

Results for the countries with no **Activity Restrictions** are very similar to those concerning the full sample. All of the variables have the same impact direction. **Deposit Insurance Coverage** has stronger and still negative impact on LTD.

When considering the countries with **Multiple Supervisors**, most of the variables lose their significance. Only **Credit/GDP** and **Deposits/GDP** still have statistically significant impact on LTD.

The impact of variables among the countries with only one supervisor are almost the same as for the full sample. **Deposit Insurance Coverage** has stronger and still negative impact on LTD.

Referring to the countries in the **Eurozone**, only **ROA** has the same impact as for the full sample. This impact is the same for both euro and non-euro area countries. However, when it comes to **Credit/GDP** and **Deposits/GDP** the results are especially interesting. When it comes to the countries which have not adopted the euro as their currency, the impact of the two variables are the same as it is for the full sample. The opposite is true for the euro area countries – **Credit/GDP** has a negative and statistically significant impact on LTD, and **Deposits/GDP** has a positive and statistically significant impact on LTD. The rest of the variables do not have statistical significance except for **Z-Score**, it has a negative impact within the non-euro area countries.

When it comes to geographic location, **countries from Central and Eastern Europe** only have two statistically significant variables. **Credit/GDP** has a positive, and **Deposits/GDP** has a negative impact on LTD, the same as for the full sample. Countries outside Central and Eastern Europe have the same impact when it comes to the **relation of Credit and Deposits to GDP**. In addition, **Lerner Index** and **Inflation** both have a negative and statistically significant impact on LTD. **ROA** is positively and statistically significantly correlated with LTD. The results are very similar to those regarding the full sample. The other variables havge no significant impact.

The division of countries according to the chosen method of deposit insurance sadly did not bring interesting information. For countries which use the **Ex-ante** approach **Credit/GDP** has a positive, and **Lerner Index** has a negative impact on the LTD ratio, which is in line with the test for the whole sample. The other variables have no statistical significance. When it comes to the countries which use the **Ex-post** approach, no variables have any statistical significance which may be because the sample is very small. Within countries using both **Ex-ante and Ex-post** approaches, both Credit/GDP and Deposits/GDP have the same impact as for the full sample. Credit/GDP has a positive, and Deposits/GDP has a negative impact on LTD. The other variables have no significant impact. The above results confirm Hypothesis 1.

The findings were subject to a battery of robustness tests. The results are robust to (1) adding random macroeconomic variables from the Global Financial Development Report database, (2) dropping random variables from the model, (3) using a different bank risk measure, and finally (4) a regression was run in which fixed effects were used. None of the alternative setups has a major impact on the findings.

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6. CONCLUSIONS

The paper examined how banking sector specific and macroeconomic factors, as related to deposit insurance, affected liquidity risk in banks in 28 of the European Economic Area countries over the period from 2005 to 2017.

Results show that the impact varies between subsamples. For the full sample, higher ratios of Credits/GDP cause banks to be less liquid. The same goes for ROA and GDP Growth. Higher Deposits/GDP and Lerner Index on the other hand both increase liquidity, which suggests that within the European Economic Area worse competition in the banking market actually reduces liquidity risk. However, the most interesting results concern the Deposit Insurance Coverage variable. The paper results show that increasing the coverage makes banks more liquid which contradicts most of the studies for different regions.

When it comes to the division due to restrictions in banking activity, GDP Growth has the opposite impact depending on the criterion. Growing economy reduces liquidity risk within countries with activity restrictions. The effect is opposite for countries without such restrictions. Higher Deposits to GDP ratio makes banks more liquid for both subgroups. For the countries with activity restrictions, higher inflation exposes banks to the risk of insufficient liquidity. When it comes to the countries without activity restrictions, the results are very similar to those for the full sample. The Deposit Insurance Coverage has even stronger, and still negative, impact on liquidity risk. The paper results suggest that having higher deposit coverage has a beneficial effect for countries without activity restrictions for bank liquidity.

Referring to the countries divided due to the adoption of the euro as a currency, higher ROA reduces liquidity risk, the same as for the full sample. However, ratios of credits and deposits to GDP have the opposite effect on liquidity. Among the countries in the euro area higher ratio of credits to GDP reduces liquidity risk, while higher deposits to GDP ratio analogously makes banks more exposed to liquidity risk. Systemic risk measured by Z-Score only has an impact for the countries outside the euro area. Lower systemic risk reduces liquidity risk.

Geographic location did not appear to have a major impact on the results. In case of both CEE and not CEE countries Credit/GDP and Deposits/GDP ratios have similar effect on liquidity as they have in the full sample. In addition, the higher Lerner index and inflation are, the lower the liquidity risk is. The opposite is true for ROA – higher ROA makes banks more exposed to liquidity risk.

Lastly, it has been tested how chosen financing approach would affect the paper results. It sadly did not bring interesting information. The subsample consisting of countries which use the Ex-post approach is unfortunately very small, so no variables turned out to be statistically significant. When it comes to the Ex-ante subgroup only Credit/GDP and Lerner index have an impact which is similar to the one in the full sample, while among the countries which use both Ex-ante and Ex-post approaches only Credit/GDP and Deposits/GDP ratios have a statistically significant impact, which again, is similar to the full sample.

Overall, the paper results provide a large amount of new information to help evaluate the deposit insurance scheme in the countries of the European Economic Area. No previous study of this type has focused on the area so the article is an interesting contribution to research on risk in banks.

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