

Tobias Bücher

Impact on Commercial Banks' Liquidity Risks caused by ECB's Negative Interest Rate Policy

Abstract

ECB's negative interest rate policy leads to more and more higher liquidity in banks. Higher risks for commercial banks are suspected from this. The hypothesis is, that ECB's Negative interest rate policy leads to significantly higher liquidity risks. The article researches the effects on liquidity risk controlling, supervision and the indeed risk development in banks. Those liquidity risks are typically measured by LCR, NSFR and survival period. The author extends the analyzes carried out by other authors with his own data evaluation in the key figures net liquidity, excess liquidity and LCR as the top liquidity key figure of the banking supervisory authority. Direct effects on commercial banks liquidity risks based on risk models cannot be proven by quantitative research. Qualitative evaluation on the other hand shows increasing risks as a follow of extended maturity transformation and increasing stocks of high risk government bonds. Commercial banks try to buffer those risks by increasing liquidity stocks and emissions of long-term-bonds. Floating above is the threat of the fact that high market liquidity is depended on ECBs low interest policy.

Keywords

Banks risks, liquidity risk, Financial Risk and Risk Management, negative interest rate policy

JEL classification

G32

Introduction

ECBs primary goal is price stability in the euro area. To this end, a number of monetary policy measures are carried out, which have a direct influence on market interest rates and indirect influence on the banks' investment and lending rates. In 2014, a negative interest rate was charged for the first time on the deposit facility. So far, there have never been negative interest rates in either the euro area or any of the member states. Therefore, historical or empirical knowledge is also lacking. The European economy becomes more and more dependent on cheap money. Commercial Banks eased up their guidelines for customer loans, to counteract

downcreasing profits. This could have an impact on banks main risk types. This article focuses on liquidity risk, cause Negative interest rate policy leads to the fact, that commercial banks are inundated with liquidity. The aim of the contribution is to evaluate, if ECB’s negative interest rate policy (NIRP) leads significantly to increasing liquidity risks in commercial banks.

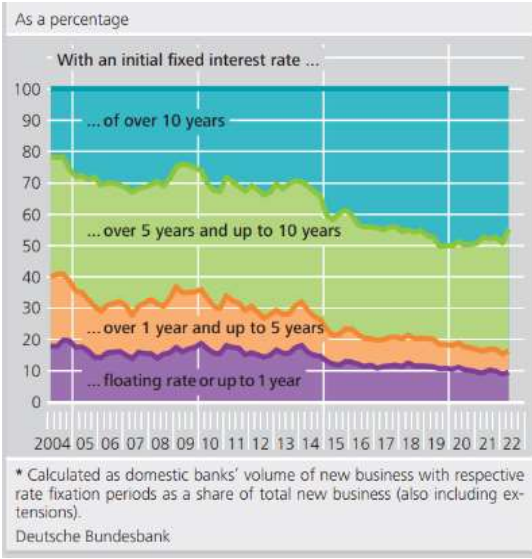
1 Literature review

1.1 Liquidity Risk Framework

The liquidity risk harbors the risk of own payment obligations at the time not being able to meet the due date (risk of insolvency). (European Central Bank (ECB), 2009) (European Banking Authority (EBA), 2021) (Hellwig, 1994)

In addition to the increase in interest rate risk, the expansion of maturity transformation as a result of the low interest rate level also harbors an increased liquidity risk. An increased call risk may arise with the European commercial banks. Due to the ever lower interest rates, customers have shifted time deposits into sight deposits. This means that the majority of customer deposits can be withdrawn within three months. On the other hand, a large part of the fixed-interest periods of loans is extended in order to obtain a higher interest margin. (European Central Bank (ECB), 2021a)

Figure no. 1: Fixed interest periods for loans to households in Germany for house purchase



Source: <https://www.bundesbank.de/en/statistics/sets-of-indicators/fixed-interest-periods-for-loans-to-households-in-germany-for-house-purchase-622706>

Due to the higher elasticity of deposits, an increase in interest rates or the possible passing on of negative deposit interest to customers can result in an increased and uncalculated withdrawal of deposits. However, since these deposits were given out as long-term loans, European commercial banks cannot repay the deposits. As a result, there is an increased liquidity risk for European commercial banks from maturity transformation, which requires assessment and control at all times. This increased liquidity risk contrasts with the positive impact of the low-interest phase. (European Central Bank (ECB), 2021b)

The interest level of the money and interbank market adapts to the general interest rate level. As a result, commercial banks have the opportunity, in addition to the open market transactions at the ECB, to obtain short-term and cheap liquidity on the interbank market. The example of the German commercial banks shows that they operate a long-term liquidity protection in the context of the low-interest phase. In addition to obtaining liquidity from participants in the banking system, German commercial banks have increased the issuance of bank bonds to secure long-term liquidity. Figure 1 shows the average remaining term of existing bank bonds. Since 2013, there has been a significant increase in transit times. For institutions in the German commercial banking sector, this is the highest at around three and a half years. (Guerra, et al., 2022)

1.2 Liquidity risk management

The German commercial banks are therefore reacting to a possible liquidity risk by granting medium-term deposits at favorable conditions and thus increasing the planning reliability of liquidity.

The liquidity risk for European commercial banks is essentially measured using three indicators: LCR, NSFR and survival period.

Liquidity Coverage Requirement, LCR

The LCR defines the minimum stock of highly liquid assets that the credit institution defines as a liquid assets reserve to meet net payment obligations over a 30-day period in the event of a severe stress scenario to be able to come. (European Banking Authority (EBA), 2021)

Compliance is regularly checked by the banks and, in many cases, simulated in advance if necessary. Some banks even add additional stress tests to the LCR indicator. According to the current prevailing opinion, this is not necessary. (Guerra, et al., 2022)

The inclusion of highly liquid assets is often criticized. In addition to cash, 100 percent eligible assets include EU government bonds, federal state bonds and government bonds from

third countries with the best credit ratings. The criticism is particularly directed at the fact that all EU government bonds are counted at 100%. So also those from countries with a weaker credit rating, such as Greece, Spain or Portugal. (Galletta & Mazzù, 2019) (Saleh & Afifa, 2020)

Net Stable Funding Ratio, NSFR

The LCR defines the minimum stock of highly liquid assets, the credit institute as a liquidity reserve to meet net payment obligations over a 30-day period in the event of a severe stress scenario to be able to come. (European Banking Authority (EBA), 2021)

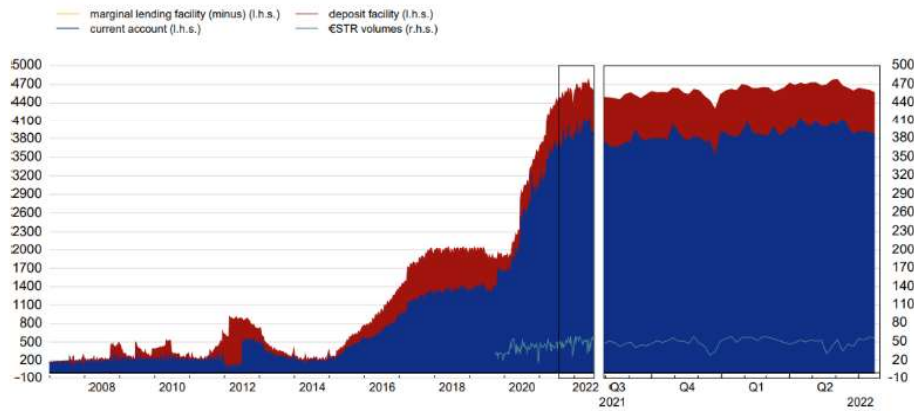
Survival Period

With the help of a stress test, the survival period is used to measure the period during which commercial banks remain solvent without being able to obtain liquidity. By comparing the liquidity requirements from stress scenarios with the realizable funding potential, a survival horizon in the event of stress is determined and prepared in the form of a liquidity risk report. Here a new perspective is implemented in the consideration of liquidity risks. In concrete terms, the period means how long the bank can still survive after the occurrence of a stress scenario in relation to the liquidity situation. In some cases, if banks join together to liquidity groups, the determination of the survival period is of a more theoretical nature. (European Central Bank (ECB), 2021b) (Guerra, et al., 2022)

1.2 Qualitative Research of Liquidity Risk

The first negative impact is that the extension of maturity transformation leads to higher liquidity risk. The standing facilities in the euro area have increased on average over the period 2008 to date. The deposit facility and current accounts of commercial banks show an uptrend from 2008 to 2013, then a decline and since 2015 an exponential increase. In the years from 2020 in particular, the curve will be steeper than ever before. As a result, the banks have massive excess liquidity. (Galletta & Mazzù, 2019)

Figure no. 2: Money Markets and the Eurosystem standing facilities (ECB Statistical Data Warehouse, 2021)

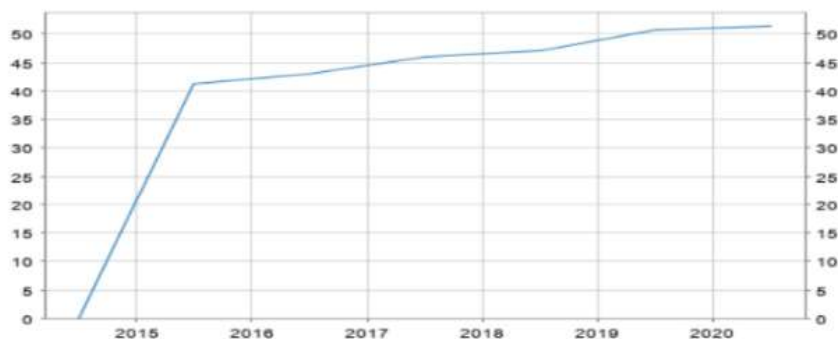


(euro area; EUR billions; last observation: 1 Sep. 2022)

Source: ECB (<https://sdw.ecb.europa.eu/servlet/desis?node=1000003327>)

A look at the customer deposits to total liabilities over the same period, you can also see a steady increase. What's interesting is, that it grew exponentially over the 12-month period between mid-2014 and mid-2015. The reason is obviously the drop in the deposit facility rate into negative territory. The banks were initially unable to accommodate the excess liquidity in the market as loans, and then also in the long term. While we are seeing nominal credit growth, deposits continue to grow at a faster pace. This is consistent with the chart above showing that the standing facilities have been growing steadily. The result is an income problem that can only be alleviated by expanding maturity transformation. (Jakovicka, 2018)

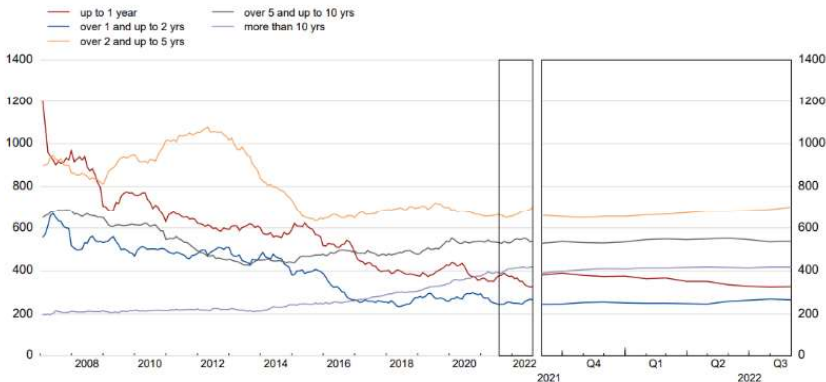
Figure no. 3: Customer deposits to total liabilities (ECB Statistical Data Warehouse, 2021)



Source: ECB (<https://sdw.ecb.europa.eu/>)

The maturity profile of the banks in the European Union shows a clear reduction in short-term maturity transformation. The maturity gaps between 1 and 5 years have been steadily decreasing since the financial crisis in 2008. With the drop in the deposit facility rate into negative territory, it is the maturity transformations of up to two years in particular that are once again significantly and significantly reduced. The volume of the two to five-year maturity transformation has remained largely constant in the period between 2014 and today. Since then, however, there has been an increase in maturity transformation in the long-term maturities of 5 to ten years, but above all and significantly over ten years. The banks are therefore prepared to build up maturity transformation risks in this business environment. The reason, as described, is the decline in yields. An attempt is made to stabilize interest income via the longer maturity transformation. This is very risky, since loans are no longer refinanced with matching maturities. If you move in short maturity transformation areas, this is less critical because the interest rate difference is small. With longer maturities, however, the risk increases significantly with a normal steep yield curve. The ECB's NIRP therefore creates significant maturity transformation risks. These will come into play when market interest rates rise. Because then the bank pays a higher interest rate for the short-term procurement of funds than the calculated interest without generating higher income from the loan at the same time, provided that it has issued fixed loan terms. However, the share of variable loans has also decreased in these years, which further increases the risks. This is a problem in Germany in particular, because the proportion of loans with a fixed term is above average here. (Galletta & Mazzù, 2019) (Drehmann & Nikolaou, 2013) (d’Avernas, et al., 2019)

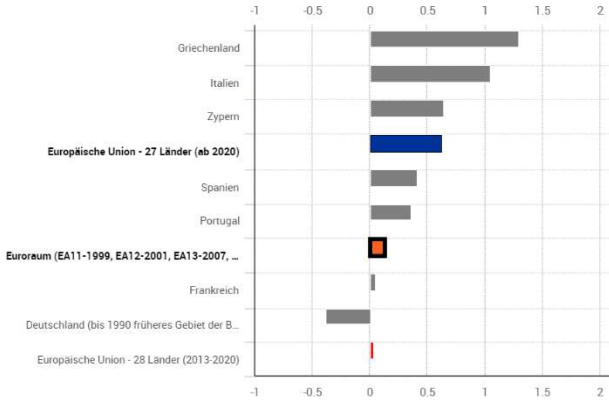
Figure no. 4: Maturity profile of Banks’ outstanding debt securities (ECB Statistical Data Warehouse, 2021)



Maturity profile of Banks’ outstanding debt securities (EU27 fixed composition; EUR billions; last observation: Aug. 2022)
 Source: ECB (<https://sdw.ecb.europa.eu/reports.do?node=1000003328>)

The second negative impact on the banks' liquidity risks results from the restructuring of the proprietary trading portfolio. An increase in government bonds from Greece, Italy, Portugal and Spain can be observed here. The reason is the overvaluation of these bonds in the calculation of the LCR and NSFR. EU bonds, regardless of their creditworthiness, can be counted 100% for the source of funds. This fuels a negative effect: Risk of the national economic crisis being passed on to the EU banks. (d'Avernas, et al., 2019) (Demiralp, et al., 2017)

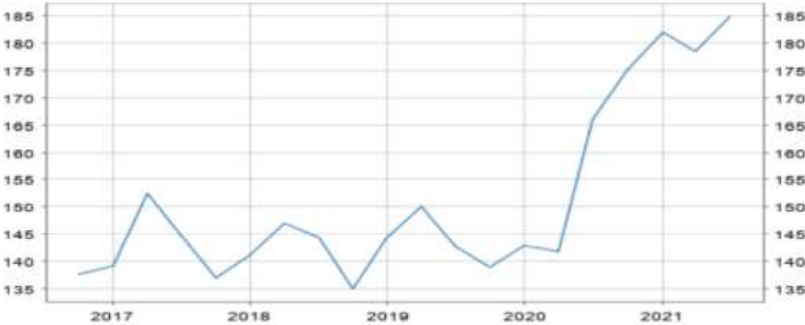
Figure no. 5: Long-term yield on selected public bonds; December 2021(ECB Statistical Data Warehouse, 2021)



Source: ECB (<https://ec.europa.eu/eurostat/databrowser/view/teimf050/default/bar>)

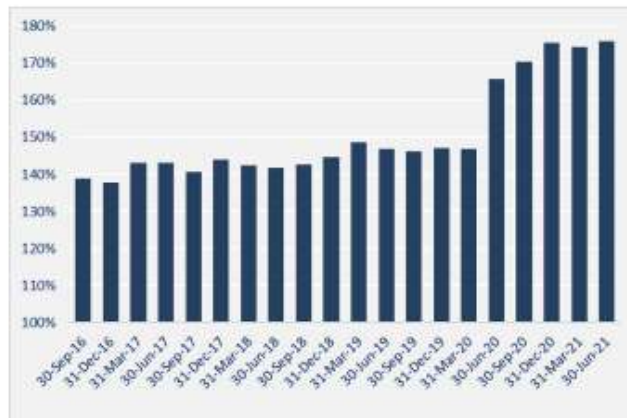
The LCR has been increasing consistently since 2020. This would actually indicate reduced liquidity risks. In fact, however, it is apparent that banks overweight bonds with poor credit ratings in their portfolios for controlling reasons. They build up risks instead of reducing them. (Chen, et al., 2021)

Figure no. 6: LCR in EU-27 banks



Source: ECB (<https://sdw.ecb.europa.eu/>)

Figure no. 7: LCR evolution (weighted average)

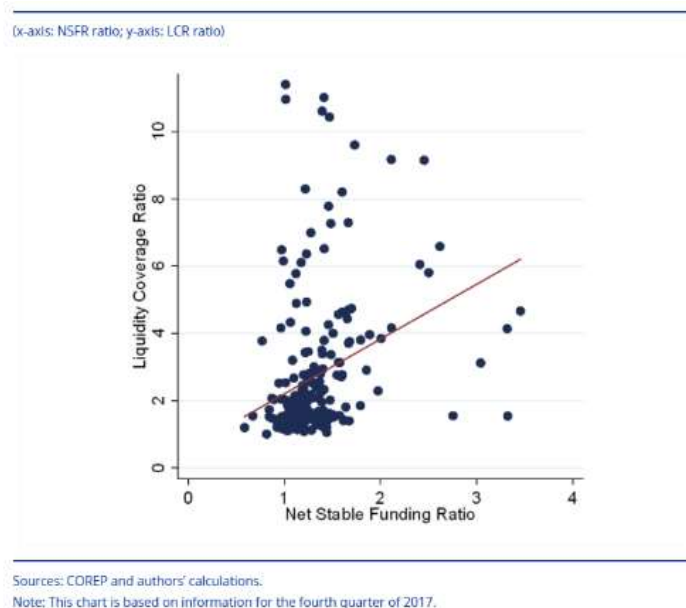


Source: EBA

(https://www.eba.europa.eu/sites/default/documents/files/document_library/Publications/Reports/2021/1025522/EBA%20Report%20on%20Liquidity%20Measures%20under%20Article%20509%281%29%20of%20the%20CRR.pdf)

The NSFR ratio also rises, although banks with high LCR does not conclusively have high NSFR ratio. This can be taken as proof that liquidity risks have in fact not been reduced. If this were the case, the banks with high LCR would also have to show a significantly increasing NSFR as they would have to be more resilient to liquidity risk on average. But this is not the case. (Chen, et al., 2021)

Figure no. 8: LCR and NSFR for the sample of banks

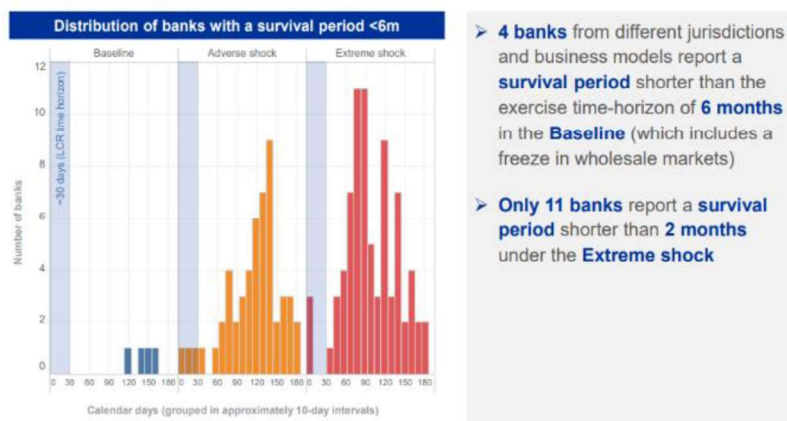


Source: ECB

(https://www.bankingsupervision.europa.eu/press/pr/date/2019/html/ssm.pr191007_annex~537c259b6d.en.pdf)

If we look at the survival period at high level in the EU, it shows that 90% of banks report a survival period longer than 2 months, even under the extreme shock scenario.

Figure no. 9: Distribution of EU-27-banks with a survival period <6 months



Source: ECB

(https://www.bankingsupervision.europa.eu/press/pr/date/2019/html/ssm.pr191007_annex~537c259b6d.en.pdf)

Negative effect number three for liquidity risks is the increasing risk of bank run (cash withdrawal), if customers do not longer accept negative interest rates on their bank accounts. This can be buffered by easy and cheap liquidity procurement by ECB, Interbank Market and Customer Market, as well as by increasing emissions of banks' bonds. However, this risk appears to be more of an additional marginal phenomenon. Such bank runs have not occurred in Europe in the past. They are more of a phenomenon in weak economies. (Drehmann & Nikolaou, 2013)

2 Methodology

In addition to the literature review, in which the key figures LCR, NSFR and survival period observed under fishing law were considered, the author carries out his own data analysis. Data from the ECB was used here. These aggregate the data of all banks in the euro member states. The ECB provides the liquidity indicators net liquidity, excess liquidity and LCR. The hypothesis of this paper is: ECB's NIRP leads to significantly higher liquidity risks. Therefore, a causal relationship between the NIRP and the impact on the liquidity ratios was examined. The NIRP can be easily derived from the deposit facility rate. The rate defines the interest banks receive for depositing money with the central bank overnight. It is the policy rate that has also been lowered into negative territory. Therefore, the correlation between

the deposit facility rate and the characteristics net liquidity, excess liquidity and LCR was evaluated over time.

3 Research

The author made a measurement of the significance of NIRP on liquidity risk. The correlation of the deposit facility rate, which is becoming increasingly negative, with the indicators LCR, excess liquidity and net liquidity of the commercial banks was tested. Significant results were obtained here.

Table no. 1: Correlation between deposit facility and liquidity figures

		deposit_facility	net_liquidity_lowrisk	net_liquidity_medhighrisk	excess_liquidity	lcr_lowrisk	lcr_medhighrisk
deposit_facility	Pearson-Korrelation	1	-.656**	-.864**	-.656**	-.758**	-.778**
	Sig. (2-seitig)		<.001	<.001	<.001	<.001	<.001
	N	23	23	23	23	23	23

** . The correlation is significant at the 0.01 (2-tailed) level.
 Source: Author’s own according to ECBs supervisory and prudential statistics
 (<https://sdw.ecb.europa.eu/browse.do?node=9689366>)

The following results are shown for the tested variables: The following results are shown for the tested variables:

Liquidity Coverage Requirement, LCR

The LCR of banks with low risk as well as banks with medium and high risk is significantly negatively correlated with the deposit facility rate. This means that the lower the deposit facility rate, the higher the LCR for banks in all risk groups. This is statistical evidence that banks' liquidity is increasing in times of ever lower deposit facility rates. The reason has been described previously: Banks are being inundated with liquidity that they cannot fully lend out. This is a significant problem because while they build liquidity, it is unprofitable. The result is a build-up of maturity transformation and bond buying. The latter is increasingly taking place in poorer credit ratings, also with the intention of increasing overall profitability.

excess liquidity

The test for the correlation between deposit facility rate and excess liquidity also shows a significant negative relationship. The interpretation is the same as for the LCR. The increasing reduction in the deposit facility rate leads to a steady build-up of excess liquidity, which cannot be accommodated on the market and therefore accumulates on the bank's ECB account.

net liquidity

As the third key figure analyzed, net liquidity also correlates significantly negatively with the deposit facility rate. And this at all banks, both with low, medium and high risks. It is worth noting that the negative correlation is more pronounced for medium-risk and high-risk banks. The reason is the fact that these banks are finding it more difficult to build up further disproportionate risks. As a result, they find it even more difficult than their colleagues from banks with low risks to place liquidity on the credit market. As a result, their net liquidity increases disproportionately.

Overall, banks are increasingly shorting liquidity. This is positive for the liquidity ratios LCR, NSFR and survival period. Initially, more liquid funds also means lower liquidity risks. However, two clearly negative developments can be observed as a result of this shorting of liquidity: The maturity transformation is significantly increased in the long maturity range. In addition, a mismanagement of the inclusion of the European liquidity ratios in combination with the weak earnings of the banks leads to a disproportionate investment by the banks in high-risk bonds from the EU and thus actually to a further build-up of liquidity risks, which are not perceived in a structured manner by the banking supervisory authority. Both do not directly affect the liquidity risks. However, the increased maturity transformation harbors an earnings risk in the event of rising interest rates. And shrinking earnings lead to falling liquidity again. In addition, credit risks are built up as a result of banks investing disproportionately in high-risk bonds. Their potential default thus also indirectly leads to liquidity risks.

4 Discussion

Jakovicka, 2018 goes on to explain that banks are unable to accommodate the excess liquidity in the market as loans. As a result, the key figure customer deposits to total liabilities decreases. Drehmann & Nikolaou, 2013 show that the effect is particularly noticeable in the lending of loans with terms of more than 5 years, which exacerbates the effect of increasing risks.

The author comes to the same conclusions when analyzing the LCR and the excess liquidity. Liquidity is increasingly being built up on paper, which apparently reduces liquidity risks. In fact, all external sources and the author are of the opinion that the structure of the maturity transformation builds up massive risks, which can materialize in the event of an interest rate rise, as we are currently experiencing. As the author shows on the basis of the net liquidity, this risk increases for banks with already high credit risks, since they are even more difficult to channel the excess liquidity into the market.

The external source analysis by d'Avernas, et al., 2019 and Demiralp, et al., 2017 also shows increasing risks in the proprietary trading portfolio. An increase in government bonds from Greece, Italy, Portugal and Spain can be observed here. The reason for this is the disproportionate preference given to these bonds when calculating the LCR. Here, too, liquidity risks will build up in the background, so they will be disguised. The author cannot contribute his own data analysis for this, as there is no raw data from the ECB.

A limitation of the study is that the aggregated data of all ECB member banks is very rough. Individual countries may have different risks because national banking regulators apply stricter standards. There is also a high degree of heterogeneity within the states in terms of the banks' business models and banks' risk tolerance.

In addition, the actual liquidity risks from the emerging maturity transformation and the overweighting of countries with weaker credit ratings can only be predicted in the event of a rise in interest rates. There is no historical data for comparison as there has never been a period of negative interest rates in the EU.

Nevertheless, the study has the potential to evaluate and name risks that are building up in the background. Further dedicated research based on different countries and bank business models would be very interesting.

Conclusion

The hypothesis as to whether the ECB's NIRP leads to significantly higher liquidity risks cannot therefore be confirmed using statistical measurement methods. The liquidity of the banks has increased with the increasingly negative deposit facility rate and is evidently showing us increasingly decreasing liquidity risks.

However, it must be stated that the liquidity risks are actually increasing far beyond the measurement by the banking supervisory authority. This fact cannot be ignored and should question the effectiveness of the control of the current measurement methods.

Literature

- [1] d'AVERNAS, Adrien, VANDEWEYER, Quentin and PARIES, Matthieu Durracq. Unconventional Monetary Policy and Funding Liquidity Risk. *Social Science Research Network*. 2019, pp. 1-54. ISSN 0378-4266.
- [2] CHEN, Wei-Da, CHEN, Yehning and HUANG, Shu-Chun. Liquidity risk and bank performance during financial crises. *Journal of Financial Stability*. Vol. 56, 2008. pp. 1-24. ISSN 1572-3089.
- [3] DEMIRALP, Selva, EISENSCHMIDT, Jens and VLASSOPOULOS, Thomas. Negative interest rates, excess liquidity and bank business models: Banks' reaction to

- unconventional monetary policy in the euro area. (L. I. Economics, Ed.) *Econstar Working Paper*. No. 1708, 2017.
- [4] DREHMANN, Matthias and NIKOLAU, Kleopatra. Funding liquidity risk: Definition and measurement. *Journal of Banking & Finance*. Vol. 37, 2013. pp. 2173-2182. ISSN 0378-4266.
- [5] EUROPEAN BANKING AUTHORITY (EBA). New Bank Liquidity Rules: Dangers Ahead - A Position Paper by EBA's Banking Stakeholder Group. *European Banking Authority (EBA)*. [online]. June 2021. [cit. 2022-10-03]. Available at: https://www.eba.europa.eu/sites/default/files/documents/10180/807776/e2086633-7538-4e2e-ad2e-11c78a61c3c8/20121002_BSG_Liquidity_Paper_incl_amendment.pdf?retry=1
- [6] EUROPEAN CENTRAL BANK (ECB). Liquidity Risk Concepts - Definitions and Interactions. *Working Paper Series - No. 1008*. [online] 2009. [cit. 2022-10-03]. Available at: <https://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1008.pdf>
- [7] EUROPEAN CENTRAL BANK (ECB). Monetary policy decisions. *Euroepan central bank*. [online]. 2021. [cit. 2021-12-20]. Available at: <https://www.ecb.europa.eu/press/pressconf/shared/pdf/ecb.ds211216.en.pdf>
- [8] EUROPEAN CENTRAL BANK (ECB). Asset purchase programmes. *Euroepan central bank*. [online]. 2021. [cit. 2021-12-20]. Available at: <https://www.ecb.europa.eu/mopo/implement/app/html/index.en.html>
- [9] ECB STATISTICAL DATA WAREHOUSE. Balance of payments. *ECB Statistical Data Warehouse*. [online]. 2021. [cit. 2021-08-12] Available at: https://www.ecb.europa.eu/stats/balance_of_payments_and_external/eer/html/index.en.html
- [10] GALLETTA, Simona and MAZZU, Sebastiano. Liquidity Risk Drivers and Bank Business Models. (MDPI, ed.) *Risks*. 2019. pp. 1-14. ISSN 2227-9091.
- [11] GUERRA, Pedro, CASTELLI, Mauro and CORTE-REAL, Nadine. Machine learning for liquidity risk modelling: A supervisory perspective. *Economic Analysis and Policy*. Vol. 74, 2022. pp. 175-187. ISSN 0313-5926.
- [12] HELLWIG, Martin. Liquidity Provision, Banking, and the Allocation of Interest Rate Risk. *European Economic Review*. Vol. 38, issue 7, 1994. pp. 1363-1389. ISSN 0014-2921.
- [13] JAKOVICKA, Julia. Overview of the activities of the Money Market and Money and Liquidity Division. *European Central Bank Frankfurt, Germany*. [online]. 2018. [cit. 2022-10-03]. Available at: https://www.ecb.europa.eu/pub/conferences/shared/pdf/20180709_ecb_central_banking_seminar/2018-07-12_Overview_of_the_activities_of_the_Money_Market_and_Liquidity_Division_-_Jakovicka.pdf
- [14] SALEH, Isam and AFIFA, Malik Abu. The effect of credit risk, liquidity risk and bank capital on bank profitability: Evidence from an emerging market. *Cogent Economics & Finance*. 2020. pp. 1-18. ISSN 2332-2039.

Contact

Tobias Bücher
University of Finance and Administration
Rathausplatz 5B
65205 Wiesbaden
Germany
t.buecher@gmx.de