Article

Sustainable Economic Growth Support through Credit Transmission Channel and Financial Stability: In the Context of the COVID-19 Pandemic

Deimantė Teresienė *, Greta Keliuotytė-Staniulėnienė and Rasa Kanapickienė

Finance Department, Faculty of Economics and Business Administration, Vilnius University, LT-10223 Vilnius, Lithuania; greta.keliuotyte-staniuleniene@evaf.vu.lt (G.K.-S.); rasa.kanapickiene@evaf.vu.lt (R.K.)
* Correspondence: deimante.teresiene@evaf.vu.lt

Abstract: All countries worldwide faced the COVID-19 pandemic and had to take actions to lower the economic shock. Financial authorities play an especially significant role in economics and can help to manage the negative consequences. This article focuses on the European central bank monetary policy and actions taken for COVID-19 risk management. This research aims to identify the significant factors influencing the long-term loans for enterprises' credit conditions in a forward-looking approach and determine the impact of the spread of COVID-19 pandemic on banking sector credit risk, financial distress, lending growth, and financial soundness indicators. This research is focused on the credit transmission channel and the role of the Pandemic Emergency Purchase Program in different countries of the euro area. To reach the main goal, panel data regression models are used. Our findings showed that the banks' risk tolerance is a principal factor influencing long-term loan credit standards. We also identified that the spread of the COVID-19 pandemic has a statistically significant negative effect on banking sector credit risk, financial distress, banking sector profitability, and solvency. Furthermore, after analyzing the euro area banking sector, we found that liquidity increased. Hence, it means that banks have enough funds to support sustainable economic growth, but on the other side, commercial banks do not want to take credit risk because of their risk tolerance. Our research findings show the mixed effect of the COVID-19 pandemic on financial stability: while the overall financial distress decreased and banking sector liquidity increased, the profitability and solvency decreased some extent.

Keywords: credit transmission channel; financial stability; monetary policy

1. Introduction

European and national financial authorities have taken lots of complicated decisions to lower the negative impact of COVID-19 on the financial sector and to support sustainable economic growth. The European Central Bank (ECB) plays a key role in the European financial system because by making monetary policy decisions, this institution can have a strong impact not only on the financial system but it also can influence the tendencies of economic growth. The first step made by ECB for COVID-19 risks management was on 12 March 2020. Then followed the next steps, which were bigger and had the intention to make a much stronger influence on the finance system. The Pandemic Emergency Purchase Program (PEPP) was announced on 18 March 2020, and it was a great tool to help to encourage loans to businesses and households to support production and to lower the possibility of higher unemployment. Macroprudential authorities

(central banks and banking supervisors) (MA) have decided to reduce capital requirements to support financial institutions in such a complicated situation. Some MA at the same time have reduced countercyclical capital buffer and other macroprudential buffers.

The credit transmission channel is particularly important for supporting sustainable economic growth, especially in crisis periods. The COVID-19 pandemic had a strong negative effect on the business segment and households as well. The need for funds for enterprises increased a lot. Commercial banks' role became even more important as they have tools for lending and supporting the economy in such difficult periods. Analyzing the credit transmission channel, we must identify the interaction between the central bank's monetary policy decisions and the credit transmission channel. Simultaneously, for the identification of commercial banks' ability to support sustainable economic growth, it is essential to identify the impact of the COVID-19 pandemic on credit risk, financial distress, lending growth, and financial soundness indicators.

The role of the credit channel in economics is analyzed using different points of view. From explaining the main process of credit channel, comparing it among different financial institutions or countries [1–16], to lending supply, credit standards, and credit frictions during periods of crisis and different shocks [17–22].

Some authors analyze monetary policy transmission mechanism and the impact of real economic activity on it [23–25] while other in opposite way having a different approach try to identify how an increase in credit supply can affect the real economy [26].

Occhino, in his 2020 research, analyzed the quantitative easing (QE) and direct lending response to the COVID-19 pandemic in the case of the US. He identified that QE in the period of COVID-19 had less effect compared to the 2008 crisis [27]. We support those findings in the euro area case, too, although we use different transmission channels and tools for the measurement of effects and interactions. Urbschat and Watzka. analyzed QE in the euro area in 2020, but this research was focused on asset price channels [28]. Other authors focus more on the bank risk-taking channel, macroprudential policy with financing behavior, and different measurements of financial stability [29–33].

Overall, there is a lack of scientific papers analyzing the COVID-19 environment and its impact on credit supply through the monetary policy transmission mechanism and banking sector financial stability in the euro area. This paper adds value to the literature analyzing the effect of COVID-19 on lending supply through the monetary policy credit transmission channel and evaluation of banking sector financial stability. The novelty of this research is that we consider sustainable economic growth ideas using two primary mediators of the financial system—central banks and commercial banks—and consider the forward-looking approach of long-term loan credit standards for enterprises as a source for sustainable economic growth. A forward-looking approach functions as a leading economic indicator, giving the opportunity to have a better forecast about the future tendencies. Such an approach helps to take timely strategic decisions and ensure sustainable growth.

The main goal of this research is to identify the most significant factors influencing the long-term loans for enterprises credit conditions in a forward-looking approach in the context of the COVID-19 pandemic and to determine the impact of the spread of the COVID-19 pandemic on banking sector credit risk, financial distress, lending growth, and financial soundness indicators.

Our findings showed that the banks' risk tolerance is the most vital factor influencing long-term loan credit standards. So, it means that it is difficult for central banks to support the sustainable growth of economics using the credit transmission channel as a tool in monetary policy transmission mechanism. We also identified that the spread of the COVID-19 pandemic has a statistically significant negative effect on banking sector credit risk, financial distress, lending growth, banking sector profitability, and solvency. Nevertheless, after analyzing the euro area banking sector, we found that during the same period, the commercial banks' liquidity increased, so it means that banks have enough

funds to support sustainable economic growth, but on the other side, commercial banks do not want to take credit risk because of their risk tolerance.

Special attention in our research was focused on the Pandemic Emergency Purchase Program (PEPP) in different euro area countries and bank lending conditions.

To reach the primary goal of the research and get statistically significant findings, the panel data regression models were used.

This article consists of a literature review where the main findings related to the topic are presented, and then, we describe the methodological issues and results. Finally, we offer the main findings and conclusions of the research and give insights for further developments.

2. Literature Review

Financial stability can be defined as follows: (i) the absence of significant fluctuations [34]; (ii) the absence of crisis [35]; (iii) through analysis of the effect of financial stability on macroeconomic conditions [36]; and (iv) using the broad concept of financial stability as closely interrelated to money and the real economy as well as fiscal policy [37]. As it is stated by Gnan (2012), there is a complex interrelationship between financial, fiscal, political, and economic instability—instability in one area may cause instability in another and vice versa [38]. Tumpel-Gugerell (2006) has also proved the existence of an interrelation between the stability of the financial system, financial development, certain forms of financial integration, and economic growth [39].

For example, the recent global crisis of 2008, which began with instabilities in financial markets and institutions, has consequently triggered an economic recession, and the decisions made by national authorities have weakened public finances (fiscal sustainability) and caused a fiscal crisis in the eurozone. Consequently, fiscal unsustainability destabilized sovereign bond markets as well as banks in several countries. Fiscal consolidations, which were necessary to reduce the vulnerability of public finance, led to political instability, further worsening expectations in financial markets. Under such circumstances, financial instability has further increased [40].

A lot of different authors indicate that the COVID-19 crisis differs a lot, comparing it with the Great Recession. Parisi (2020) pointed out that the US economic situation was especially good at the beginning of 2020 and continued to grow in lots of sectors until a pandemic attacked the economy [41]. However, despite a substantial shock to the economy, the negative effect was lower compared with other crises because the situation started to improve quicker comparing with earlier downturns. Gene Phillips and Mark Adelson (2020) also agree that the COVID-19 pandemic is different comparing the 2008–2009 financial crisis because it affected most businesses, while the financial crisis was related more to the housing sector and financial institutions [42].

Frank E. Nothaft (2020) made similar conclusions comparing to the previous authors and pointed out that the real estate market experienced a strong decline in March, comparing with the numbers one year ago [43]. However, the most interesting point was that this market rebounded quite quickly. At present, the real estate market is heavily supported by quantitative easing (QE) and extremely low-interest rates. At the same time, there is a high probability of credit risk increase if unemployment continues to grow and businesses remains closed for a longer time.

Dana Kisel'áková et al. (2020) tried to identify how changes in monetary policy can affect economic sustainability and tendencies in finance [44]. The authors focused on financial markets, gross domestic product (GDP) growth, the demand for goods and services, and the labor market as well but did not analyze the COVID-19 pandemic period and the effect of PEPP and other tools taken by the ECB.

Pinshi (2020) analyzed monetary policy in the context of COVID-19 uncertainty and stressed that "uncertainty reduces the ability of the central bank to influence the economy and control inflation" [45]. Efraim Benmelech and Nitzan Tzur-Ilan (2020) paid attention that different countries met the COVID-19 pandemic having different stances regarding

monetary policy [46]. So, various central banks did not have equal opportunities to add value in crisis risk management. Those countries that had incredibly low or even negative interest rates were forced to concentrate more on unconventional monetary policy tools.

Macroeconomic uncertainty and monetary policy responses were analyzed by Sarker (2020), who pointed out that monetary authorities should use liquidity and credit support tools to pay more attention to sectors contributing to GDP growth the most [47]. However, reaching such a goal is quite complicated, because different countries have different composites of GDP. Such an idea can be implemented only at the national level but not at a broader level, such as the euro area.

Gonzalez-Paramo states that the main objective of financial stability policy is crisis prevention, not the elimination of the consequences [10]. It is important to note that in recent decades, financial systems have become more sensitive to systemic events; moreover, financial stability is threatened by diverse types of risks—both endogenous and exogenous. For example, as it is stated by Bauer and Granziera (2016), the extent of vulnerability to financial stability, inter alia, depends on private sector leverage [48]. Other traditional sources of financial system vulnerability are related to "maturity and risks transformation, as well as the price of risk procyclicality" [49]. As it is stated by Ziolo et al. (2019), though traditionally financial systems are focused primarily on the economic security of transactions, the increasing importance of non-financial factors highlights the role of environmental, social, and governance (ESG) risk [50].

Similarly, the current situation suggests that threats to financial stability, in addition to those already mentioned, may also arise from health crises such as the COVID-19 pandemic. The COVID-19 pandemic as the exogenous shock has raised the need for a wide range of constraining measures, which in turn has triggered the slowdown in economic activity [51]. The pandemic caused large demand-side and supply-side shocks (Reinders et al., 2020), deteriorating the conditions of the private corporate sector, which in turn poses significant risks to the banking sector and hence financial stability [52].

As with previous crises, this COVID-19-incurred crisis is related to a certain degree of financial uncertainty. As is stated by Jackson and Schwarz (2020), while the crisis of 2008 was related to uncertainty in mortgage loan markets, in the current crisis, the uncertainty is related to the duration of the economic turndown [53]. Boot et al. (2020) also agree that the main threats to financial stability today arise from the global economic downturn and associated problems in the corporate sector, not from financial markets, and they may cause liquidity problems in the financial sector [54].

Giese and Haldane (2020) compared the global financial crisis (2008) and the COVID-19 pandemic from the perspective of financial stability and pointed out that the banking sector is now much more resilient and can help address the economic consequences of the pandemic [35]. This is what, based on the broad definition of financial stability, a stable financial system should perform [55]

The authors argue that COVID-19 can play and has already played a role in financial systems as an exogenous shock and systemic event [53]. Similarly, Adrian and Natalucci state that the financial systems have already been significantly affected by COVID-19, with prices of risk assets falling, liquidity decreasing, and borrowing costs rising [56]. Whereas the COVID-19 pandemic has clearly affected the overall world economic condition as well as various sectors of the economy, the scientific research of this effect has recently emerged, though the empirical analysis is still quite limited [52,53,56–62].

For example, Korzeb and Niedziolka (2020) analyzed the resistance of commercial banks to the crisis induced by COVID-19 and used indicators such as capital adequacy, liquidity level, profitability, etc., for that assessment [61].

Ito (2020) used the premium of sovereign credit default swaps as the measure of stress caused by COVID-19 to the financial system and found out that the COVID-19 pandemic is followed by certain signs of financial instability, together with concerns about the sustainability of public finance [57].

Tokic (2020) argued that eventually, the COVID-19 pandemic causes such financial consequences as an increase in inflation and interest rate [59]. Viorica (2020) also identified potential disruptions in international financing together with declining export demand, which may particularly affect low and middle-income countries [60]. Barua and Barua (2020) agree that the development of the country together with the architecture of the banking sector may determine the severity of the impact [63]. They state that the significant threats to the banking sector that arise are primarily related to the increases of default rate.

Davies (2020) forecasts that an economic downturn caused by the COVID-19 pandemic will increase the debt burden for both governments and the corporate sector, which can lead to huge losses on loan portfolios in the banking sector [51]. A similar conclusion is made by Eich et al. (2020), stating that in the absence of proper response, the crisis caused by the COVID-19 pandemic could have devastating effects on banking systems in European countries. Unfortunately, these predictions have already materialized to some extent [64]. For example, Reinders et al. (2020) analyzed the effect that the COVID-19 pandemic had on corporate loan portfolios of euro area banks and concluded that the losses to these banks could exceed 1 trillion euros [52].

3. Data and Research Methodologies

This research consists of 2 stages. In Stage 1 (described in Section 3.1), the main factors of credit channel are identified. In Stage 2 (described in Section 3.2), the impact of the spread of the COVID-19 pandemic on the financial stability of eurozone countries is estimated.

In order to achieve the main goal of the paper, in our research, we formulate the following hypotheses:

Hypothesis 1 (H1). *Easing monetary policy adds value to sustainable economic growth by supporting credit channels and increasing lending supply using a tool of easing credit conditions.*

Hypothesis 2 (H2). *The spread of the COVID-19 pandemic has increased credit and systemic risks of the commercial banking sector in the eurozone.*

Hypothesis 3 (H3). *The spread of the COVID-19 pandemic has increased the financial distress of the commercial banking sector in the eurozone countries.*

Hypothesis 4 (H4). *The spread of the COVID-19 pandemic has had a negative impact on the commercial banking sector lending supply in the eurozone countries.*

Hypothesis 5 (H5). *COVID-19 has a negative impact on the financial soundness of commercial banking sectors in the eurozone countries.*

It is important to emphasize that there are numerous methods for assessment of the stability of the financial system and its comprising part—the banking sector (related both to a single-variable and multiple-variable approach) (for example, [61,65–68]. Nevertheless, as it is stated by Schinasi (2004), due to its complexity and multifaceted nature, financial stability cannot be estimated by a single target indicator [37]. For this reason, in our research, the assessment of the impact of the spread of the COVID-19 pandemic is based on multiple indicators. These indicators are related to risks, overall financial distress, lending supply, and financial soundness of the commercial banking sector and are reflected in Hypotheses 1–5. We provide a more detailed discussion of the hypotheses as well as the research methods used to test them in Sections 3.1 and 3.2.

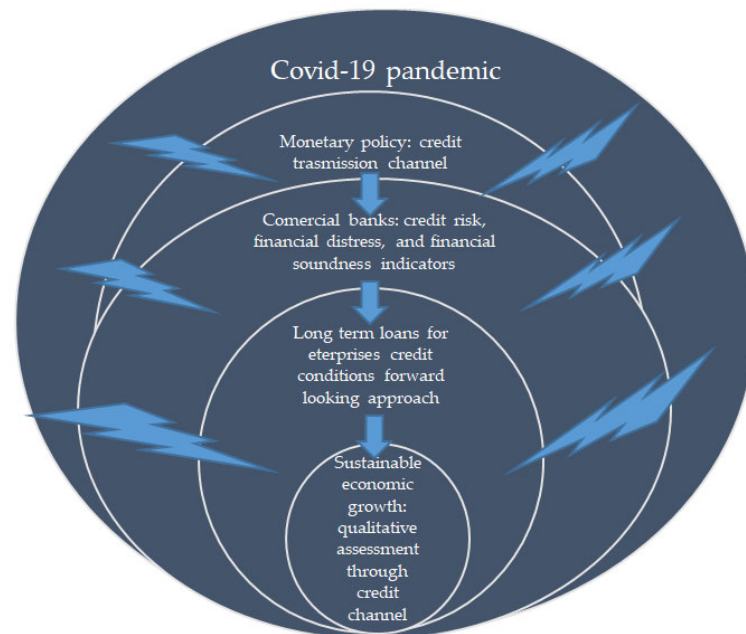The main idea of our research methodology is explained in Figure 1.

Figure 1. Framework of the research.

In this research, we try to identify the impact of COVID-19 on different economical tranches through various channels. We use quantitative and qualitative assessments.

3.1. Panel Data Regression for Credit Channel Factors

In order to test Hypothesis 1 and to identify the biggest factors influencing the long-term loans for enterprises credit conditions in a forward-looking approach in the context of the COVID-19 pandemic, we use panel data regression models.

Panel data regression can be defined as follows:

$$Y_{it} = a + bX_{it} + \varepsilon_{it} \tag{1}$$

where Y—dependent variable, X—independent variable, a, b—coefficients, i, t—indices for individuals and time, and ε—error term.

We use panel data analysis using three diverse ways: an independently pooled ordinary least squares (OLS) regression model, fixed-effects model, and random-effects model.

The first model of the independently pooled OLS regression model assumes that all sections of data are homogeneous, and it means that all data sections are treated evenly. Dataset observations do not have unique characteristics, and there are no universal effects in a period.

After creating an independently pooled OLS regression model, we apply it to our dataset fixed-effects model. This model allows us to value heterogeneity among different datasets considering that each cross-section can have its own intercept. However, this model indicates that the intercept remains at the same level during all the periods. At the same time, the error term in this model varies non-stochastically per each set of data and time. The fixed-effects model has unique attributes of individuals. Those attributes do not vary across time, and at the same time, we can identify a higher correlation with independent variables. So, in this model, the parameters are fixed alternatively, and the group means are fixed as well.

The last step of the panel data regression is to choose the right model from those mentioned above. For the right choice, we use a probability value and make the final decision using the decision criterion. For hypothesis testing, we use the Wald test.

To identify the main factors having the biggest impact on long-term loans for enterprises credit conditions, quarterly data of bank lending surveys were used. The period was from 2015 Q2 until 2020 Q4. The period was taken from 2015 Q2 because of data consistency, as different countries had joined the euro area but not at the same time.

Forty different variables were used related to collateral requirements (CR), long-term loans (LTL), margin on average loans (MOAL), impact of bank's risk tolerance (IBRT), and short-term loans (STL).

All the variables used in this research for panel data regression models are described in Appendix A. In this research, two different approaches are used: backward-looking (BWL) and forward-looking (FWL). The analysis covers large enterprises (LE) and small and medium-sized enterprises (SME). We also use loan supply (LS) and loan demand (LD) parameters.

Long-term loans, forward-looking three months, credit standards (CS), loan supply (LS), and the diffusion index (DI) were selected as the dependent variables.

3.2. Methodology for Assessment of the COVID-19 Pandemic Impact on Financial Stability

In the second stage of this research, Hypotheses 2–5 are tested, and the impact of the spread of the COVID-19 pandemic on risks, financial distress, and financial soundness of the banking sector in the euro area countries is estimated. Given the limited availability and timeliness of data necessary to assess the level of financial stability, this stage of the research is in turn divided into several steps according to the frequency of the data used.

In Step I, in order to test Hypothesis 2 and to find out whether the spread of the COVID-19 pandemic has increased credit and systemic risks of the commercial banking sector in the eurozone, the relationship between the spread of the COVID-19 pandemic and the overall financial stability situation in the euro area is being assessed.

The spread of the COVID-19 pandemic in this step is measured by the following: (i) total number of COVID-19 cases confirmed in the euro area (TCe); (ii) number of new COVID-19 cases reported daily in the euro area (NCe); and (iii) the number of total cases per million population in the euro area (TCperMe) (independent variables).

The state of financial stability (in the perspective of banking sector vulnerabilities or risks—credit and systemic) in this step is assessed by the following: (i) credit risk premium measured by the level ITRX EUR CDSI GEN 5Y Corp index (ITRXCDI) (retrieved from Bloomberg) and (ii) systemic risk measured by the simultaneous default probability of two or more large banks (DP) (percent, ECB data) (dependent variables). The analysis is carried out applying the methods of correlation and linear bivariate regression analysis on daily (5-day week) data from 1 January 2020 to 31 October 2020 (202 observations).

In Step II, in order to test Hypotheses 3 and 4, and to find out whether the spread of the COVID-19 pandemic has increased the financial distress, decreased the lending growth, and increased the lending margins of the commercial banking sector in the eurozone countries, we assessed the relationship between the spread of the COVID-19 pandemic and selected country-level financial stress and banking sector lending indicators.

The spread of the COVID-19 pandemic in this step is measured by (i) the total number of COVID-19 cases confirmed in the country (TC$_i$); (ii) the number of new COVID-19 cases reported per month in the country (NC$_i$); and (iii) the number of total cases per million population in the country (TCperM$_i$) (independent variables).

The level of financial stress in this step is measured by the index of financial distress, which is based on equity, bond, and foreign exchange market information (FDI$_i$) (pure number, ECB data), and the banking sector lending is measured by (i) the annual growth of new loans provided by the banking sector to businesses and households (LG$_i$) (percent, ECB data); (ii) the lending margin on new loans to businesses and households (MN$_i$) (percent, ECB data); and (iii) the lending margin on outstanding loans to businesses and households (MO$_i$) (percent, ECB data) (dependent variables). Here, i = 1 to 19 and corresponds to the country of the euro area (see country codes in Appendix B).

The analysis is carried out applying the method of panel (pooled data) regression models on monthly data from 2020 January to 2020 October. Considering 19 euro-area countries and 10 periods, the unbalanced panel consists of 190 observations. According to the logic sequence discussed in Section 3.1, the independent pooled OLS, fixed effects, and random effects models are created for each pair of independent and dependent variables. Using the results of Wald and Hausman tests, the most appropriate model for each pair of variables is selected.

Finally, in Step III, in order to test Hypothesis 5 and to find out whether the spread of the COVID-19 pandemic has negatively affected the financial soundness of the commercial banking sector in the eurozone countries, the impact of the COVID-19 pandemic on country-level financial soundness indicators is analyzed [68].

Taking in mind data availability, specific core and encouraged financial soundness indicators for the banking sector (deposit takers), provided by the International Monetary Fund (IMF), are selected for further research: (i) regulatory capital and risk weighted assets ratio (R/CA_i); (ii) regulatory Tier I capital and risk weighted assets ratio (RT/CA_i); (iii) difference between non-performing loans and provisions to capital (NLP_i); (iv) non-performing loans and total loans ratio (NP/TL_i); (v) return on assets (ROA_i); (vi) return on equity (ROE_i); (vii) interest margin and gross income ratio (IM/GI_i); (viii) non-interest expenses and gross income ratio (NE/GI_i); (ix) liquid assets and total assets ratio (LA/TA_i); (x) liquid assets to short-term liabilities ratio (LA/SL_i); (xi) capital and assets ratio (C/A_i); (xii) large exposures and capital ratio (LE/C_i); (xiii) spread between reference lending and deposit rates (LDS_i); and customer loans and total loans ratio (xiv) (CL/TL_i) (IMF data).

Given that the data available is quarterly and the most recent data are limited to the 2nd or 3rd quarter of 2020, only a limited number of methods can be implemented to evaluate this impact. Firstly, the normality of the data distribution is assessed using the Shapiro–Wilk test (null hypothesis—data are normally distributed, alternative hypothesis—data are not normally distributed; null hypothesis is rejected if p is lower than 0.05). Secondly, in the case of the normal distribution of the sample, the paired samples t-test is used in order to test the difference between two paired samples, i.e., to find out whether the financial soundness indicators differ significantly between the period before the spread of COVID-19 (quarter 2019Q4) and the period of the spread of COVID-19 (quarter 2020Q3 or 2020Q2 for certain countries, depending on data availability) (null hypothesis—there is no difference, alternative hypothesis—there is a difference between financial soundness indicators; null hypothesis is rejected if p is lower than 0.05).

4. Results and Discussion

4.1. Participation in PEPP in Different Euro Area Countries

The ECB started to support the banking sector in response to COVID-19 on the 12th of March. The first step was made by expanding the existing asset purchase program by 120 billion EUR. The next step appeared quite soon on the 18th of March when a new program was started. A new program was called the Pandemic Emergency Purchase Program (PEPP), and the starting amount of it was 750 billion EUR. A bit later, the 4th of June, the latter program was expanded by 600 billion EUR. So, the total amount of PEPP became 1350 billion EUR.

So, it is remarkably interesting to see how those mentioned measures helped to reach a goal to lower the negative effects of the COVID-19 pandemic and helped to support the financial sector in different euro are countries.

In addition, it is important to analyze how monetary policy support can help commercial banks give loans to the business sector and household. National central bank participation in the PEPP program depends on key capital.

As our research is focused on a credit channel, we decided to analyze how different countries participate in PEPP as an additional source of funding for commercial banks.

Firstly, for this purpose, we use some clusters to identify how the PEPP program is implemented in different value segments.

In Table 1, we have the results of 19 euro-area countries and supranational participating in PEPP. Net purchases are the difference between the acquisition costs of all made purchases and the redeemed par amounts. Table 1 indicates that 85% of all participants according to cumulative net purchases (the last data included in the analysis were the end of November 2020) belong to the first cluster, and it means that the amount of cumulative net purchases is just up to 50,000 EUR millions. So, as we have four clusters of book value, we must point to those three participants. The most active members in the PEPP program and at the same time outliers having in mind just cumulative net purchases are Germany (160,619 EUR millions), Italy (118,169 EUR millions), and Spain (77,128 EUR millions).

Table 1. Cumulative net purchases as at end—November 2020.

Value	Count	Percent	Cumulative Count	Cumulative Percent
[0, 50,000)	17	85.00	17	85.00
[50,000, 100,000)	1	5.00	18	90.00
[100,000, 150,000)	1	5.00	19	95.00
[150,000, 200,000)	1	5.00	20	100.00
Total	20	100.00	20	100.00

Table 2 indicates the main information about the public sector securities holdings according to the remaining weighted average maturity (WAM) in years. So, looking at the data, we can see that the biggest concentration of purchases is in the maturity bucket from 6 to 10 years. In the long end of the public sector securities curve with a remaining maturity of ten years and more, we have only 15% of all holdings of the public sector. In addition, we would like to point out that shorter-term public sector securities are not actively participating in PEPP because the concentration in a sector up to 6 years is just 10%, and we have just 2 participants in this bucket (Netherlands and Germany). There are three outliers in the bucket of the longest remaining weighted average maturity of public sector securities, and they are Lithuania (WAM 11.78 years), Austria (WAM 10.93 years), and Cyprus (WAM 10.86 years).

Table 2. Current weighted average maturity (WAM) of public sector securities holdings under the Pandemic Emergency Purchase Program (PEPP).

Value	Count	Percent	Cumulative Count	Cumulative Percent
[4, 6)	2	10.00	2	10.00
[6, 8)	7	35.00	9	45.00
[8, 10)	8	40.00	17	85.00
[10, 12)	3	15.00	20	100.00
Total	20	100.00	20	100.00

The WAM of the eligible universe of public sector securities under the PEPP program as of the end of November 2020 can be called quite diversified because of five different maturity buckets and not so much concentrated distribution (Table 3). However, if we compare this information of the WAM of the eligible universe with the current WAM, then we will see some differences.

Table 3. WAM of eligible universe of public sector securities under the PEPP program as of the end of November 2020.

Value	Count	Percent	Cumulative Count	Cumulative Percent
[6, 7)	5	25.00	5	25.00
[7, 8)	6	30.00	11	55.00
[8, 9)	3	15.00	14	70.00
[9, 10)	4	20.00	18	90.00
[10, 11)	2	10.00	20	100.00
Total	20	100.00	20	100.00

The last quarter of 2020 in the euro area is very complicated because of the rapid spread of the COVID-19 pandemic. Participants in PEPP were not very active, because 80% of all net purchases reached only up to 10,000 EUR million (Table 4). The most active countries during the period of intensive growth of pandemic were Germany (35,571 EUR million), France (27,573 EUR million), Italy (22,927 EUR million), and Spain (16,099 EUR million).

Finally, we present all the results of PEPP in different countries in Figure 2 and can conclude that some countries are not very active in participating in PEPP. That means that this monetary policy tranche is not reaching the credit channel and is not supporting sustainable economic growth as much as it could.

Table 4. Net purchases October–November 2020.

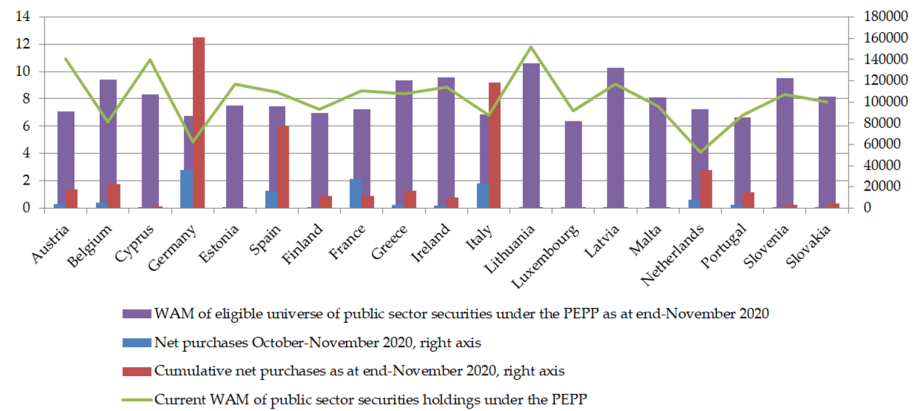| Value	Count	Percent	Cumulative Count	Cumulative Percent
[0, 10,000)	16	80.00	16	80.00
[10,000, 20,000)	1	5.00	17	85.00
[20,000, 30,000)	2	10.00	19	95.00
[30,000, 40,000)	1	5.00	20	100.00
Total	20	100.00	20	100.00

Figure 2. PEPP in different countries of the euro area, Book value as of the end of November 2020 (EUR millions).

4.2. Valuation of Tendencies of Loans to Enterprises

Lately, data show that credit standards for loans to enterprises (SMEs—small and medium, LE—large enterprises) during the third quarter tightened quite significantly if we are analyzing data at the regional level. However, if we look at the country level, we can identify different tendencies in some countries. The most interesting fact is that ECB encourages commercial banks to give loans in order to fund business, but at the same time, commercial banks trying to avoid credit risk are tightening credit standards for SMEs and LE. The biggest euro area countries such as Germany, Spain, and France decided to apply stricter credit standards for business, while Italy left the same policy of credit standards compared with the second quarter.

Below, we can see the tendencies of long-term loans (LTL), impact of bank's risk tolerance (IBRT), margin on average loans (MOAL), impact of bank's risk tolerance (IBRT) and short-term loans (STL), and collateral requirements (CR) in different euro area countries (see Appendix B for country codes).

Figure 3 shows that regarding credit standards for long-term loans, in a backward-looking approach during the third quarter of 2020, the most banks tightened credit standards for long-term loans in Slovakia, Portugal, and the Netherlands. However, in the same period, we have only three countries where commercial banks decided to ease credit standards for long-term loans for enterprises, and those countries were Italy, Spain, and Malta. Finland and Greece remained at the same level of credit standards, and all other countries tightened credit channel conditions.

Taking into account a forward-looking approach, we identified that the only country that planned to ease credit standards for long-term loans for enterprises was Germany. Greece, Italy, Estonia, Malta, Finland, and Slovenia decided not to make any changes, while all other euro area countries in the near future decided to tighten credit standards even more. The largest portion of commercial banks willing to tighten credit standards until the end of the year was in the Netherlands, Luxembourg, and Portugal.

Demand for long-term loans to enterprises remained robust in most euro-area countries.
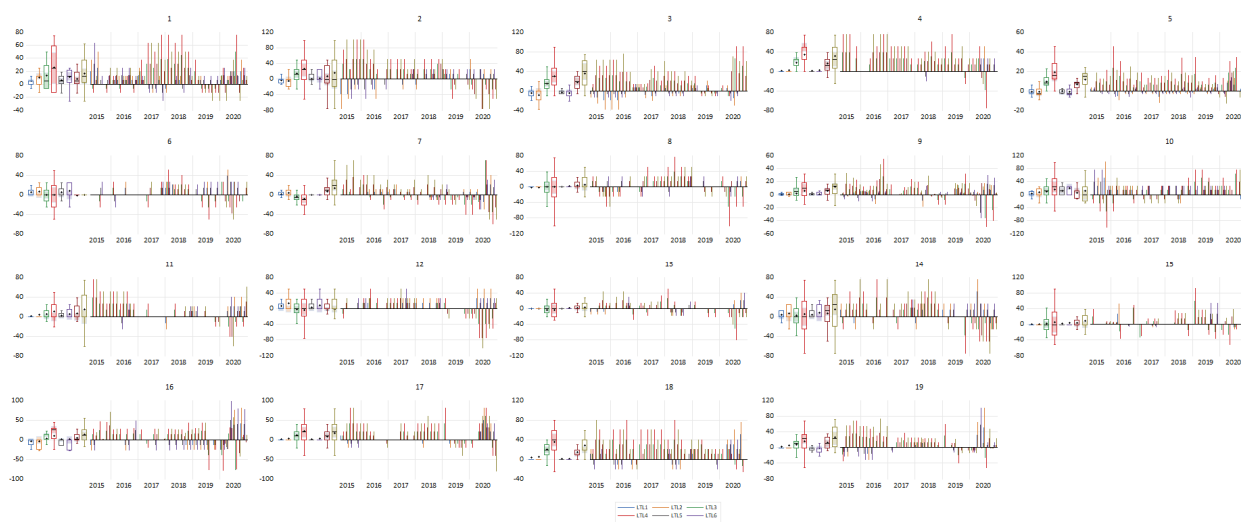
Figure 3. Long-term loans.

The impact of a bank's risk tolerance as a tightening factor for credit standards increased in euro-area countries (see Figure 4). We analyze this factor using two segments of enterprises: large enterprises and SMEs. For large enterprises, the IBRT increased in all euro-area countries except Finland and Italy in the backward-looking approach, while in the forward-looking approach, we have noticed that the role of risk tolerance decreased in Slovakia, Estonia, and Latvia. However, for SMEs, risk tolerance as an impact factor for credit standards in forward-looking approaches decreased only in Slovakia and Latvia, while in Estonia, it remained unchanged. Risk tolerance remained a very important factor in the forward-looking approach for SMEs in Slovenia and Portugal.
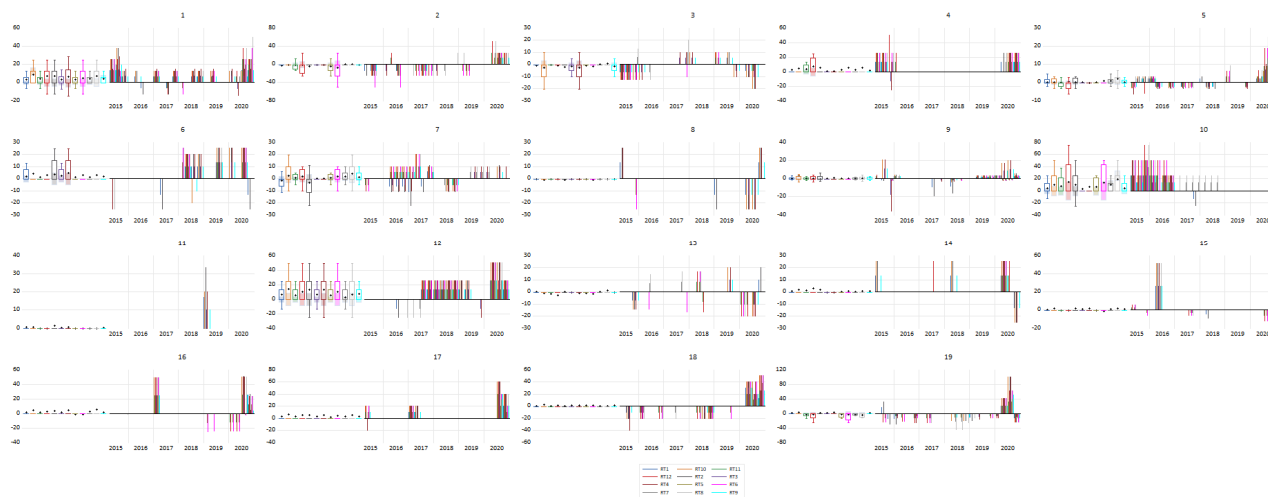
Figure 4. Impact of bank's risk tolerance.

Margins on average loans to firms tightened slightly in Q3 2020, while margins on riskier loans continued to tighten more strongly (Figure 5). In the backward-looking approach, the strongest tightening for large enterprises were fixed in Finland, Portugal, and Luxembourg, while easing conditions were in Malta, Greece, Italy, and France. Having the same approach for SMEs, the situation was very similar, and the only difference was that more countries decided to lower the MOAL, and they were Estonia

and Slovakia. In the forward-looking approach for LE, we have easing tendencies in Greece, Estonia, Lithuania, Italy, and France. While for SMEs we have a very mixed view and would like to point to Austria, Luxembourg, and Belgium whose banks are planning to increase the MOAL for SMEs.
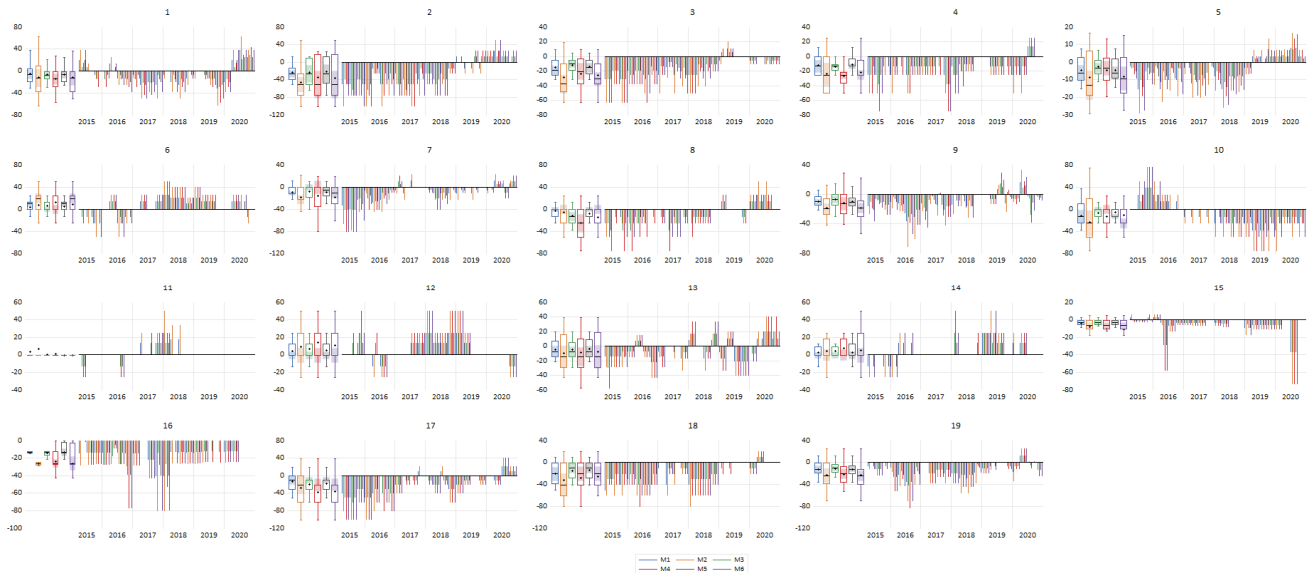
Figure 5. Margins on average loans.

After analyzing the data related to short-term loans (Figure 6), we have noticed a decline in demand, but at the same time, we saw the credit standards tightening process in the euro area.

Figure 6. Short-term loans.

Banks' collateral requirements for loans to firms increased significantly (Figure 7), reflecting concerns about firms' business outlook.

Figure 7. Banks' collateral requirements.

So overall, we see that the credit channel is not supporting business in the COVID-19 environment. For further research, it would be interesting to analyze some countries that supported the business by that credit channel but having more data after the start of the COVID-19 pandemic. It would be interesting to analyze business data and the impact of credit channels on their financial results and various financial ratios.

4.3. Pool Data Regression Models' Application for Euro-Area Credit Market

After pool data analysis of 40 different variables in 19 euro-area countries, we excluded some variables that were insignificant after the first iteration of pool data regression and continued to work with statistically significant variables.

Using variables that were related to collateral requirements, long-term loans, margin on average loans, the impact of bank's risk tolerance, short-term loans, we calculated common coefficients. All the variables that were significant after the second iteration of the pooled OLS regression model, we grouped into positive and negative factors (Tables 5 and 6). We ranked all those all factors inside every group by the main influence on the dependent variable.

Table 5. Positive factors.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.223	0.0578	38.460	0
RT11	3.152	0.235	13.428	0
RT10	2.100	0.122	17.275	0
RT3	1.796	0.173	10.361	0
STL5	1.557	0.035	44.207	0
CR3	1.097	0.272	4.032	0.0001
RT6	1.002	0.077	12.960	0
CR6	0.945	0.137	6.880	0
RT1	0.821	0.110	7.465	0

RT8	0.426	0.043	9.795	0
M5	0.414	0.023	17.701	0
LTL2	0.373	0.022	16.799	0
STL7	0.289	0.009	29.957	0
STL1	0.252	0.034	7.417	0
LTL3	0.137	0.011	12.180	0
STL4	0.084	0.007	11.777	0
M2	0.074	0.013	5.719	0

Table 6. Negative factors.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RT9	−4.261	0.239	−17.847	0
RT5	−2.108	0.152	−13.855	0
CR5	−1.763	0.271	−6.515	0
RT12	−1.533	0.118	−12.992	0
RT4	−0.905	0.089	−10.113	0
CR4	−0.656	0.138	−4.762	0
RT7	−0.612	0.084	−7.264	0
LTL1	−0.565	0.042	−13.586	0
RT2	−0.395	0.057	−6.992	0
STL6	−0.371	0.018	−20.153	0
M1	−0.242	0.024	−10.019	0
STL2	−0.179	0.019	−9.298	0
STL8	−0.168	0.006	−28.802	0
M6	−0.146	0.013	−11.680	0
STL3	−0.106	0.012	−8.675	0
LTL4	−0.090	0.006	−14.232	0

From Tables 6 and 7, we see positive and negative factors having a statistically significant effect on long-term loans credit standards with a forward-looking approach. Positive factors show that the biggest influence on long-term loans for enterprises comes from the impact of the bank's risk tolerance, having a backward-looking approach on credit terms and conditions (CTC) explaining loan supply. Our results show that the impact of other bank's risk tolerance indicators has a significant role in explaining long-term loan credit standards as well. So, we have high coefficients regarding the impact of IBRT, BWL three months, CS, LS net percentage (frequency of tightened minus that of eased or reverse) and IBRT, SME, BWL three months, CS, LS diffusion index.

Our findings show that some factors of IBRT at the same time can be negative factors that have an influence on the credit standards easing process. The strongest negative effect is seen in the position of IBRT, BWL, three months, CS, LS DI.

The results of pooled OLS regression are shown in Table 7.

Table 7. Results of pooled ordinary least squares (OLS) regression.

Root MSE	5.342964	R-squared	0.694426
Mean dependent var	2.468650	Adjusted R-squared	0.693865
S.D. dependent var	9.665766	S.E. of regression	5.348014
Akaike info criterion	6.193214	Sum squared resid	499006.1
Schwarz criterion	6.207880	Log likelihood	−54095.69
Hannan-Quinn criter.	6.198044	F-statistic	1239.025
Durbin-Watson stat	1.820454	Prob(F-statistic)	0.000000

After pooled OLS regression using the same dataset, we applied a fixed effect panel regression model. We had 19 cross-sections and 437 observations. The results are shown in Table 8.

Table 8. Results of fixed effect panel regression model.

Effects Specification			
Cross-Section Fixed (Dummy Variables)			
Root MSE	5.133577	R-squared	0.717907
Mean dependent var	2.468650	Adjusted R-squared	0.683824
S.D. dependent var	9.676568	S.E. of regression	5.441091
Akaike info criterion	6.329162	Sum squared resid	11516.53
Schwarz criterion	6.777301	Log likelihood	-1334.922
Hannan-Quinn criter.	6.506003	F-statistic	21.06335
Durbin-Watson stat	1.995636	Prob(F-statistic)	0.000000

The fixed-effect panel regression model better suits credit channel explanation, as R-squared is 72% and it is higher comparing the pooled OLS regression case. The actual and fitted results of the model are shown in Figure 8.
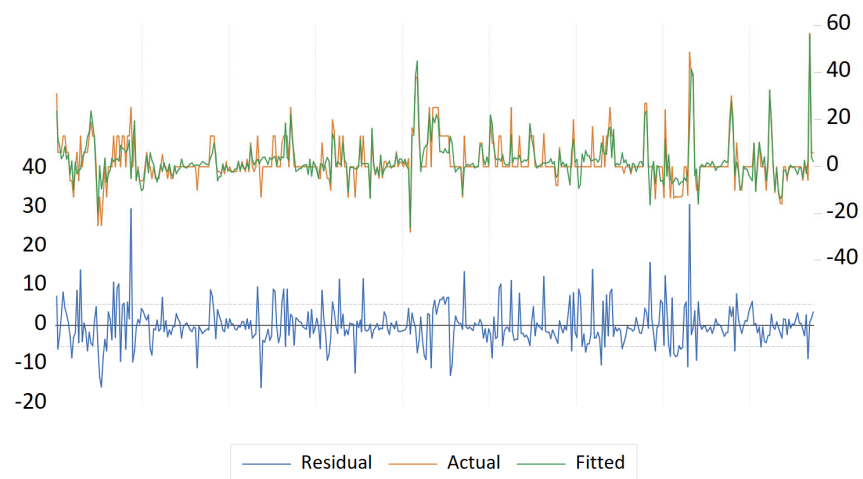
Figure 8. Actual and fitted results.

To identify which model is the right model between the two, we use the Wald test. Then, we have two hypotheses:

H_0 A pooled OLS regression model is appropriate (all dummy variables equal zero).

H_1 A fixed-effect model is appropriate (all dummy variables do not equal zero).

The results of the Wald test showed that we have to reject the null hypothesis and confirm that the fixed effect model is more suitable for credit channel modeling.

We reject our hypothesis: H1—easing monetary policy adds value to sustainable economic growth by supporting credit channels and increasing lending supply using a tool of easing credit conditions. The main argument is that the credit channel mainly depends on the commercial banks' risk tolerance and not on the efforts of monetary policy.

4.4. Assessment of Euro Area Financial Stability in the Face of the COVID-19 Pandemic

Furthermore, the impact of the spread of the COVID-19 pandemic on financial stability in the euro-area countries is estimated, and Hypotheses 2–5 are being tested according to the sequence described in Section 3.2.

Step 1. Firstly, in order to test Hypothesis 2, we assessed the relationship between the COVID-19 related variables and risk premiums and default probabilities in the euro area based on daily aggregated euro-area data. The descriptive statistics of selected dependent (ITRXCDI and DP) and independent (COVID-19 related) variables are provided in Table 9.

Table 9. Summary of descriptive statistics of dependent and independent variables (daily) of the model of COVID-19 effect on financial stability in the euro area.

Variable	ITRXCDI	DP	TCe	NCe	TCperMe
Mean	68.345	2.938	1,181,452	20,855.94	2824.766
Median	62.982	2.715	1,069,676	70,653.500	2481.808
Maximum	138.549	5.690	4,978,723	241412.0	12,957.80
Minimum	41.277	1.640	0.000	0.0000	0.0000
Std. Dev.	19.601	0.887	1,034,022	35,098.13	2571.426
Skewness	0.982	0.717	1.340	3.2028	1.5351
Kurtosis	3.628	2.701	5.134	15.0996	5.9922
Jarque-Bera	31.868	18.081	98.778	1577.544	154.691
Probability	0.000	0.0001	0.000	0.000	0.000
Observations	180	202	202	202	202

Note: ITRXCDI = ITRX EUR CDSI GEN 5Y Corp index; DP = simultaneous default probability of two or more large banks (DP); TCe = total number of COVID-19 cases confirmed in the euro area; NCe = the number of new COVID-19 cases reported daily in the euro area; TCperMe = the number of total cases per million population in the euro area.

The results of correlation analysis (Table 10) show the following:

- Two of three selected COVID-19 related variables (the total number of COVID-19 cases reported (TCe) and the number of total cases of COVID-19 per million population in Euro area (TCperMe)) are significantly related to the changes in level ITRX EUR CDSI GEN 5Y Corp index and the probability of simultaneous default of two more large banks in the euro area;

- Both of the previously mentioned variables (TCe and TCperMe) proved to have a statistically significant negative relationship with variables measuring the risk premiums and large banks default probability in the euro area, i.e., although surprisingly, in the presence of COVID-19 spread, risk premiums and default probability decreased;
- It is worth mentioning that the comparative dynamic analysis of ITRXCDI and DP shows that these variables demonstrated a sharp increase in March and April (see Appendix C) and a sufficiently steady decline in subsequent months.

Table 10. Correlation between dependent and independent variables (daily) of the model of COVID-19 effect on financial stability in the euro area.

Variable	Correlation	Probability	Correlation	Probability	Correlation	Probability
	TCe		NCe		TCperMe	
ITRXCDI	−0.235	0.002 *	0.094	0.208 ***	−0.259	0.001 *
DP	−0.179	0.016 **	0.052	0.487 ***	−0.204	0.006 *

Note: ITRXCDI = ITRX EUR CDSI GEN 5Y Corp index; DP = simultaneous default probability of two or more large banks (DP); TCe = total number of COVID-19 cases confirmed in the euro area; NCe = the number of new COVID-19 cases reported daily in the euro area; TCperMe = the number of total cases per million population in the euro area. * 99% c.l., ** 95% c.l, *** insignificant.

To get a better view of the COVID-19 effect of financial stability in the euro area, the bivariate regression models are constructed (see Table 11).

Table 11. Bivariate regression models of COVID-19 effect on financial stability in the euro area (based on aggregated daily data).

		Independent Variable	
		ITRXCDI	DP
TCe	Model constant	74.864	3.205
	Coefficient	-7.23×10^{-6}	-2.26×10^{-7}
	t-value	−3.231	−3.865
	p-statistics	0.002 *	0.0002 *
	R squared	0.056	0.069
	Observations	108	202
NeC	Model constant	66.788	3.015
	Coefficient	0.0001	-3.60×10^{-6}
	t-value	1.264	−2.081
	p-statistics	0.208 ***	0.039 **
	R squared	0.009	0.021
	Observations	108	202
TCperMe	Model constant	75.428	3.203
	Coefficient	−0.003	-9.36×10^{-5}
	t-value	−3.569	−3.991
	p-statistics	0.001 *	0.0001 *

R squared		0.067	0.074
Observations		180	202

Note: ITRXCDI = ITRX EUR CDSI GEN 5Y Corp index; DP = simultaneous default probability of two or more large banks (DP); TCe = total number of COVID-19 cases confirmed in the euro area; NCe = the number of new COVID-19 cases reported daily in the euro area; TCperMe = the number of total cases per million population in euro area. * 99% c.l., ** 95% c.l, *** insignificant.

Based on the results of Table 12 (t-value, p statistics, and R squared), the following can be concluded:

- Two variables (TCe and TCperMe) proved to have a statistically significant negative impact on the level ITRX EUR CDSI GEN 5Y Corp index (ITRXCDI);
- All three COVID-19 related variables appeared to have a statistically significant negative impact on the default probability of large banks (DP);

R-squared of all models constructed (Table 11) are very low, and this suggests that both credit risk and systemic risk dynamics are much better explained by other variables that are not related to COVID-19. Despite that, the results still allow us to make certain assumptions regarding the relationship between the dependent and independent variables analyzed, which essentially is the purpose of this analysis. As one of the directions of future research, the inclusion of additional control variables in the model should be considered in the light of these results, possibly allowing to increase the explanatory power of the model.

Thus, given that decreasing values of index and default probability reflect increasing financial stability, it can be concluded that from this part of the analysis that we cannot identify the negative impact of the COVID-19 pandemic on the financial stability of the euro area. Taking into account the results discussed above, we can conclude that Hypothesis 2 can not be supported; i.e., the results of this research do not indicate the unambiguous and longer-lasting impact on credit and systemic risks of the commercial banking sector in the eurozone in the face of the COVID-19 pandemic.

Step 2. In we second step, in order to test Hypotheses 3 and 4, we evaluate the impact of COVID-19-related variables (showing monthly spread of the COVID-19 pandemic) on financial distress indicator as well as on banking sector lending indicators (growth and margins) based on country-level monthly data. Descriptive statistics of these variables are provided in Table 12.

Table 12. Summary of descriptive statistics of dependent and independent variables (monthly) of the model of COVID-19 effect on financial stability in the euro-area countries.

	FDI_i	LG_i	MO_i	MN_i	TC_i	NC_i	$TCperM_i$
Mean	0.155	2.595	1.978	1.801	72,840.38	19,524.02	3365.660
Median	0.131	4.076	2.036	1.627	4421.500	1047.000	1536.675
Maximum	0.484	61.086	4.338	3.640	1,412,709.00	416,490.0	37,035.70
Minimum	0.051	−24.308	0.268	−0.150	0.000	0.000	0.000
St. deviation	0.092	11.964	0.926	0.697	177,606.00	58,825.31	5123.041
Skewness	1.353	0.284	0.412	0.185	4.528	4.643	3.192
Kurtosis	4.547	5.129	2.821	2.624	28.443	25.835	16.317
Jarque–Bera	72.880	38.459	5.619	2.200	5773.792	4810.614	1726.620
Probability	0.000	0.000	0.000	0.333	0.000	0.000	0.000

Observations	180	190	190	190	190	190	190

Note: FDI$_i$ = index of financial distress, based on equity, bond, and foreign exchange market information; LG$_i$ = annual growth of new loans provided by the banking sector to businesses and households; MO$_i$ = lending margin on outstanding loans to businesses and households; MN$_i$ = lending margin on new loans to businesses and households; TC$_i$ = total number of COVID-19 cases confirmed in the country; NC$_i$ = number of new COVID-19 cases reported per month in the country; TCperM$_i$ = the number of total cases per million population in the country.

The results of correlation analysis (Table 13) show the following:

- There is a statistically significant relationship between the total number of COVID-19 cases in euro-area countries (TC$_i$) and all four dependent variables (FDI$_i$, LG$_i$, MO$_i$, and MN$_i$);
- Interestingly, the relationship with the financial distress index, as well as with lending margins on both outstanding and new loans to businesses and households, is inverse, while the relationship between total COVID-19 cases and growth of banking sector lending is direct, showing that, on average, the banking sector lending growth increases in the face of COVID-19 pandemic;
- The results of correlation analysis also show that the number of new COVID-19 cases (NC$_i$) is statistically significantly related to the financial distress index and lending margins on the new loans (inversely in both cases);
- The total number of COVID-19 cases per million population (TCperM$_i$) is statistically significantly related to the financial distress index as well as to lending margins on the outstanding loans (inversely in both cases).

Table 13. Correlation between dependent and independent variables (monthly country level) of the model of COVID-19 effect on financial stability in the euro-area countries.

Variable	Correlation	Probability	Correlation	Probability	Correlation	Probability
	TC$_i$		NC$_i$		TCperM$_i$	
FDI$_i$	−0.193	0.009 *	−0.149	0.046 **	−0.302	0.000 *
LG$_i$	0.192	0.010 *	0.052	0.485 ***	−0.069	0.352 ***
MO$_i$	−0.284	0.0001 *	−0.124	0.097 ***	−0.102	0.010 *
MN$_i$	−0.252	0.001 *	−0.169	0.023 **	−0.136	0.068 ***

Note: FDI$_i$ = index of financial distress, based on equity, bond, and foreign exchange market information; LG$_i$ = annual growth of new loans provided by the banking sector to businesses and households; MO$_i$ = lending margin on outstanding loans to businesses and households; MN$_i$ = lending margin on new loans to businesses and households; TC$_i$ = total number of COVID-19 cases confirmed in the country; NC$_i$ = number of new COVID-19 cases reported per month in the country; TCperM$_i$ = the number of total cases per million population in the country.* 99% c.l., ** 95% c.l, *** insignificant.

Seeking to assess the effect of the COVID-19 pandemic quantitatively on selected indicators, bivariate panel regression analysis is conducted. Table 14 shows the results of bivariate panel assessment of COVID-19 impact on financial distress and lending growth and margins in the euro area based on monthly county-level data.

It is important to note that for each pair of dependent and independent variables, three different panel data models are constructed, although Table 14 represents only the most appropriate model (pooled data OLS, fixed effects, or random effects), selected based on Wald and Hausman tests (the results of which are also represented in Table 14).

Based on the results of Table 14 (t-value, p statistics, and R), the following can be concluded:

- The total number of COVID-19 cases reported (TCi) appeared to have a statistically significant negative effect on the financial distress index (FDIi) in eurozone countries (OLS model) and a statistically significant positive effect on the lending margin on new loans for businesses and households (MNi) (fixed effects model);
- The number of new monthly cases of COVID-19 reported (NCi) proved to have a statistically significant effect on only one of four dependent variables—financial distress index (FDIi), and this effect is of a negative nature (random-effects model);
- The total number of COVID-19 cases reported per million population (TCperMi) seemed to have a statistically significant negative effect on the financial distress index (FDIi) (fixed-effect models).
- Interestingly, the COVID-19 pandemic impact on financial distress in eurozone countries is of an inverse nature, meaning that increasing COVID-19 variables are related to the decrease of financial distress in eurozone countries. As in the case of banking sector risks, the effect on financial distress was short-lived and, most likely, it reduced by monetary policy and other economic policy measures.

Whereas the fixed effect models are dominant in this analysis, i.e., models with fixed effects have better statistical characteristics (see Table 14), which allows assuming that there are some differences between countries in terms of the structure of banking sectors and the financial system as a whole. It also can be assumed that these differences are of a constant rather than a variable nature; i.e., the differences are more determined by the characteristics of the state's financial system than by some random external factors, such as the COVID-19 pandemic. The analysis of these country-specific differences could be one of the directions for our future research.

Table 14. Bivariate panel regression models of COVID-19 effect on financial stability in the euro area (based on monthly country-level data).

		Independent Variable			
		FDI$_i$	**LG$_i$**	**MO$_i$**	**MN$_i$**
TC$_i$	C	0.163	2.3253	1.979	1.786
	Coefficient	-1.09×10^{-7}	3.70×10^{-6}	-2.39×10^{-8}	2.00×10^{-7}
	t-value	-2.807	0.8612	-0.514	1.976
	p-statistics	0.006 *	0.3902 ***	0.608 ***	0.049 **
	R squared	0.042	0.0039	0.992	0.929
	Observations	180	190	190	190
	Wald test	$F(17.161) = 1.625$ $p = 0.063(c)$	$F(18.170) = 10.743$ $p = 0.000$ (f)	$F(18.170) = 1026.312$ $p = 0.000$ (f)	$F(18.170) = 116.697$ $p = 0.000$ (f)
	Hausman test	$\text{Chi-Sq.}(1) = 1.743$ $p = 0.187$ (r)	$\text{Chi-Sq.}(1) = 2.027$ $p = 0.155$ (r)	$\text{Chi-Sq.}(1) = 4.499$ $p = 0.034$ (f)	$\text{Chi-Sq.}(1) = 5.687$ $p = 0.017$ (f)
	F-statistics	7.844	0.738	1059.745	118.713
	DW	1.237	0.227	0.668	1.442
NC$_i$	C	0.159	2.599	1.977	1.798
	Coefficient	-2.34×10^{-7}	-2.23×10^{-7}	1.42×10^{-8}	1.47×10^{-7}
	t-value	-2.015	-0.018	0.109	0.516
	p-statistics	0.045 **	0.985 ***	0.913 ***	0.607 ***

	R squared	0.022	0.0001	0.0001	0.001
	Observations	180	190	190	190
	Wald test	F(17.161) = 1.427	F(18.170) = 11.377	F(18.170) = 1098.851	F(18.170) = 118.705
		$p = 0.129$(c)	$p = 0.000$ (f)	$p = 0.000$(f)	$p = 0.000$(f)
	Hausman test	Chi−Sq.(1) = 0.116	Chi−Sq.(1) = 0.359	Chi−Sq.(1) = 1.097	Chi−Sq.(1) = 2.664
		$p = 0.734$ (r)	$p = 0.549$ (r)	$p = 0.295$(r)	$p = 0.103$ (r)
	F-stat	4.080	0.0003	0.012	0.608
	DW	1.230	0.225	0.611	1.267
TCperM$_i$	C	0.175	2.707	1.972	1.782
	Coefficient	-5.70×10^{-6}	-3.33×10^{-5}	1.72×10^{-6}	5.52×10^{-6}
	t-value	−4.519	−0.249	1.211	1.777
	p-statistics	0.000 *	0.803 ***	0.228 ***	0.077 ***
	R squared	0.102	0.0003	0.992	0.016
	Observations	180	190	190	190
	Wald test	F(17.161) = 1.805	F(18.170) = 11.341	F(18.170) = 1083.876	F(18.170) = 122.521
		$p = 0.031$(f)	$p = 0.000$(f)	$p = 0.000$(f)	$p = 0.000$ (f)
	Hausman test	Chi−Sq.(1) = 2.161	Chi−Sq.(1) = 0.469	Chi−Sq.(1) = 4.234	Chi−Sq.(1) = 3.239
		$p = 0.142$(r)	$p = 0.493$ (r)	$p = 0.039$ (f)	$p = 0.072$ (r)
	F-statistics	20.287	0.062	1067.292	3.120
	DW	1.337	0.225	0.669	1.289

Note: C = model constant; FDI$_i$ = index of financial distress, based on equity, bond, and foreign exchange market information; LG$_i$ = annual growth of new loans provided by the banking sector to businesses and households; MO$_i$ = lending margin on outstanding loans to businesses and households; MN$_i$ = lending margin on new loans to businesses and households; TC$_i$ = total number of COVID-19 cases confirmed in the country; NC$_i$ = number of new COVID-19 cases reported per month in the country; TCperM$_i$ = the number of total cases per million population in the country; c = invariant constant (OLS) panel model is the most appropriate; f = fixed effects panel model is the most appropriate; r = random effects panel model is the most appropriate. * 99% c.l., ** 95% c.l, ***insignificant.

As in the previous case (Step 1), the R squared value of the models that showed a statistically significant effect is quite small, so it cannot be stated that the explanatory power of these models is high. On the other hand, no statistically significant effect is observed in models with high explanatory power (high R squared). However, it should be noted that even models with low explanatory power allow making assumptions regarding the nature and direction of the relationship between the variables, which essentially is the purpose of this analysis.

For the reasons discussed above and in view of the results, we can conclude that Hypothesis 3 can not be accepted; i.e., the results of this research do not indicate the unambiguous and longer-lasting impact on financial distress in the eurozone countries in the face of the COVID-19 pandemic.

The results of our research allow us to conclude that Hypothesis 4 can not be accepted because the impact of the spread of the COVID-19 pandemic on the banking sector lending growth appeared to be statistically insignificant, and the impact on lending margins appeared to be mixed.

Step 3. Finally, in step 3, in order to test Hypothesis 5, we use country-level data of the latest three to four quarters to find out whether the onset of the COVID-19 pandemic has led to significant changes in financial soundness indicators in the euro-area countries.

First, the normality of sample distributions is assessed using the Shapiro–Wilk test. As it can be seen from Appendix D, in the case of all 14 financial soundness indicators, the sample is normally distributed (p is greater than 0.05), so the parametric paired samples t-test can be applied to evaluate the difference of indicators means.

The results of paired samples *T*-test (Appendix E) revealed the following:

- Nine of 14 financial soundness indicators demonstrated a statistically significant change in value during the period analyzed (in at least one pair of periods);
- On the one hand, banking sectors of euro-area countries experienced the decrease of (i) profitability (expressed as return on assets and return on equity), (ii) solvency, and resiliency (expressed as capital to assets ratio), during the period of 2019 Q4–2020 Q3;
- The decrease of non-interest expenses and gross income ratio was statistically significant only during the period 2019 Q4–2020 Q2; in subsequent periods, significant change is no longer observed;
- On the other hand, banking sectors of euro-area countries experienced a statistically significant increase of (i) the liquidity (expressed as liquid assets and total assets ratio and liquid assets to short-term liabilities ratio) during the period 2019 Q4–2020 Q3.
- The statistically significant increase of regulatory capital (expressed as regulatory capital and risk-weighted assets ratio and regulatory Tier I capital and risk-weighted assets ratio) is observed in recent quarters.

The results of the research allow concluding that Hypothesis 5 can be accepted only conditionally, as some of the financial soundness indicators have declined and some have increased, possibly revealing the effect of the monetary measures mobilized to improve the situation in the financial sector.

To conclude, the results of this research conditionally confirm Hypothesis 5, while Hypotheses 2, 3, and 4 cannot be confirmed. On the one hand, the COVID-19 pandemic has inevitably affected the real sector of the economy, and in turn, certain indicators of the financial sector; on the other hand, a very wide range of monetary measures are aimed at improving the situation in the financial sector. Given the limited data series and complex nature of influencing factors, it is still difficult enough to unambiguously assess the impact that the COVID-19 pandemic has already had and will continue to have on financial stability. It can be concluded that empirical evidence on the impact of COVID-19 on financial stability from a short-term perspective is still mixed and requires further analysis from a longer-term perspective.

Limitations and implications for future research. The most significant limitation of this study is related to the availability of data and the complexity of the relationship between financial stability, monetary policy, and the real economy. Although all possible data access possibilities were exploited, this research is still based on a quite limited data series. This allows evaluating the impact of the spread of the COVID-19 pandemic on lending supply and financial stability in the eurozone in a short time perspective. To assess the long-term impact, as well as the possibly lagging effect of monetary policy measures, the research needs to be continued as soon as the longer-term data are available. It would also be valuable to analyze the impact of the spread of the COVID-19 pandemic at different timeframes. All of this could be the directions for extending our research in the future.

5. Conclusions

After the analysis of the Pandemic Emergency Purchase Program (PEPP) and euro-area banking sector credit channel, we can conclude the following:

- PEPP is a non-standard monetary policy tool created to minimize risks posed by the COVID-19 pandemic to the monetary policy transmission channels and the euro area's economic growth. This program was initiated in March 2020 as a part of an asset purchase program of private and public sector securities. The program will continue depending on the COVID-19 pandemic situation and will end not earlier than March 2022. The principal payments of securities purchased under the program will be reinvested at least until the end of 2023. So, the banking sector will have support from monetary policy for a longer time and could support business through the credit channel.
- The ECB tries to protect credit supply and encourages commercial banks to give loans, but commercial banks do not want to take credit risk and do not actively participate in PEPP.
- Despite the pandemic situation, banks must support business with government or central banks' help, but the reality is different: banks tightened credit standards in most countries of the euro area.
- Banks' collateral requirements for short-term and long-term loans to firms increased significantly, reflecting concerns about firms' business outlook.
- Long-term loan credit standards can mostly be explained by the impact of bank's risk tolerance, so ECB cannot manage this, as banks are afraid to take credit risk because they had good lessons during the 2008–2009 financial crisis. From the methodological side, we conclude that from panel data regression models, the fixed-effect model suits better for credit channel explanation.
- Finally, we think that at this stage, monetary policy has limited tools and possibilities to support business and the economy during the COVID-19 pandemic and add value to sustainable economic growth through the credit transmission channel.

Even though that empirical evidence on the impact of the COVID-19 pandemic on financial stability from a short-term perspective is still mixed and requires further analysis from a longer-term perspective, the results of our research suggest the following:

- COVID-19 related variables proved to have a statistically significant negative impact on the level ITRX EUR CDSI GEN 5Y Corp index and on the probability of the simultaneous default of several large banks in the euro area, so it can be stated that the results of this research do not indicate the unambiguous and longer-lasting impact on credit and systemic risks of the commercial banking sector in the eurozone in the face of the COVID-19 pandemic
- The spread of the COVID-19 pandemic has had a statistically significant negative effect on the financial distress index in the eurozone countries, which means that the results of this research does not reveal the unambiguous and longer-lasting impact on financial distress in the eurozone countries in the face of the COVID-19 pandemic.
- The results of the research revealed that the impact of the spread of the COVID-19 pandemic on banking sector lending growth is statistically insignificant, while the impact on lending margins is mixed.
- The results of the research have also revealed that the impact of the spread of COVID-19 pandemic on the financial soundness of banking sectors in the euro zone countries is twofold: on the one hand, banking sector profitability and solvency decreased during the period analyzed; on the other hand, an increase in liquidity is observed over the same period.
- The absence of an unequivocal negative effect of the COVID-19 pandemic on the financial sector may indicate the impact of widespread monetary policy measures.

Author Contributions: Conceptualisation, R.K., D.T., G.K.-S.; methodology, D.T., G.K.-S.; software, D.T.; G.K.-S.; formal analysis, D.T., G.K.-S.; investigation, D.T., G.K.-S.; data curation, D.T., G.S; writing—original draft preparation, D.T., G.K.-S.; writing—review and editing, D.T., G.S, R.K.; visualisation, D.T., G.K.-S.; supervision, R.K. All authors have read and agreed to the published version of the manuscript.

Institutional Review Board Statement: Not Applicable.

Informed Consent Statement: Not Applicable.

Data Availability Statement: Restrictions apply to the availability of these data. Data are available from the authors with permission.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. Description of variables.

Variable Notation	Variable Explanation
CR1	CR, LE, BWL three months, CTC, LS, DI (Collateral requirements, Large enterprises, Backward-looking three months, Credit terms and conditions, Loan supply, Diffusion index)
CR2	CR, LE, BWL three months, CTC, LS, Net percentage (frequency of tightened minus that of eased or reverse) (Collateral requirements, Large enterprises, Backward-looking three months, Credit terms and conditions, Loan supply, Net percentage (frequency of tightened minus that of eased or reverse))
CR3	CR, SME, BWL three months, CTC, LS, DI (Collateral requirements, Small and medium-sized enterprises, Backward-looking three months, Credit terms and conditions, Loan supply, Diffusion index)
CR4	CR, SME, BWL three months, CTC, LS, Net percentage (frequency of tightened minus that of eased or reverse) (Collateral requirements, Small and medium-sized enterprises, Backward-looking three months, Credit terms and conditions, Loan supply, Net percentage (frequency of tightened minus that of eased or reverse))
CR5	CR, BWL three months, CTC, LS, DI (Collateral requirements, Backward-looking three months, Credit terms and conditions, Loan supply, Diffusion index)
CR6	CR, BWL three months, CTC, LS, Net percentage (frequency of tightened minus that of eased or reverse) (Collateral requirements, Backward-looking three months, Credit terms and conditions, Loan supply, Net percentage (frequency of tightened minus that of eased or reverse))
LTL1	LTL, BWL three months, CS, LS, DI (Long-term loans, Backward-looking three months, Credit standards, Loan supply, Diffusion index)
LTL2	LTL, BWL three months, CS, LS, Net percentage (frequency of tightened minus that of eased or reverse) (Long-term loans, Backward-looking three months, Credit standards, Loan supply, Net percentage (frequency of tightened minus that of eased or reverse))
LTL3	LTL, BWL three months, LD, DI (Long-term loans, Backward-looking three months, Loan demand, Diffusion index)

LTL4	LTL, BWL three months, LD, Net percentage (frequency of tightened minus that of eased or reverse) (Long-term loans, Backward-looking three months, Loan demand, Net percentage (frequency of tightened minus that of eased or reverse))
LTL5	LTL, FWL three months, CS, LS, DI (Long-term loans, Forward-looking three months, Credit standards, Loan supply, Diffusion index)
LTL6	LTL, FWL three months, CS, LS, Net percentage (frequency of tightened minus that of eased or reverse) (Long-term loans, Forward-looking three months, Credit standards, Loan supply, Net percentage (frequency of tightened minus that of eased or reverse))
LTL7	LTL, FWL three months, LD, DI (Long-term loans, Forward-looking three months, Loan demand, Diffusion index)
LTL8	LTL, FWL three months, LD, Net percentage (frequency of tightened minus that of eased or reverse) (Long-term loans, Forward-looking three months, Loan demand, Net percentage (frequency of tightened minus that of eased or reverse))
M1	MOAL, LE, BWL three months, CTC, LS, DI (Margin on average loans, Large enterprises, Backward-looking three months, Credit terms and conditions, Loan supply, Diffusion index)
M2	MOAL, LE, BWL three months, CTC, LS, Net percentage (frequency of tightened minus that of eased or reverse) (Margin on average loans, Large enterprises, Backward-looking three months, Credit terms and conditions, Loan supply, Net percentage (frequency of tightened minus that of eased or reverse))
M3	MOAL, SME, BWL three months, CTC, LS, DI (Margin on average loans, Small and medium-sized enterprises, Backward-looking three months, Credit terms and conditions, Loan supply, Diffusion index)
M4	MOAL, SME, BWL three months, CTC, LS, Net percentage (frequency of tightened minus that of eased or reverse) (Margin on average loans, Small and medium-sized enterprises, Backward-looking three months, Credit terms and conditions, Loan supply, Net percentage (frequency of tightened minus that of eased or reverse))
M5	MOAL, BWL three months, CTC, LS, DI (Margin on average loans, Backward-looking three months, Credit terms and conditions, Loan supply, Diffusion index)
M6	MOAL, BWL three months, CTC, LS, Net percentage (frequency of tightened minus that of eased or reverse) (Margin on average loans, Backward-looking three months, Credit terms and conditions, Loan supply, Net percentage (frequency of tightened minus that of eased or reverse))
RT1	IBRT, LE, BWL three months, CS, LS, DI (Impact of bank's risk tolerance, Large enterprises, Backward-looking three months, Credit standards, Loan supply, Diffusion index)
RT2	IBRT, LE, BWL three months, CS, LS, Net percentage (frequency of tightened minus that of eased or reverse) (Impact of bank's risk tolerance,

		Large enterprises, Backward-looking three months, Credit standards, Loan supply, Net percentage (frequency of tightened minus that of eased or reverse))
	RT3	IBRT, SME, BWL three months, CS, LS, DI (Impact of bank's risk tolerance, Small and medium-sized enterprises, Backward-looking three months, Credit standards, Loan supply, Diffusion index)
	RT4	IBRT, SME, BWL three months, CS, LS, Net percentage (frequency of tightened minus that of eased or reverse) (Impact of bank's risk tolerance, Small and medium-sized enterprises, Backward-looking three months, Credit standards, Loan supply, Net percentage (frequency of tightened minus that of eased or reverse))
	RT5	IBRT, BWL three months, MOAL, LS, DI (Impact of bank's risk tolerance, Backward-looking three months, Margins on average loans, Loan supply, Diffusion index)
	RT6	IBRT, BWL three months, MOAL, LS, Net percentage (frequency of tightened minus that of eased or reverse) (Impact of bank's risk tolerance, Backward-looking three months, Margins on average loans, Loan supply, Net percentage (frequency of tightened minus that of eased or reverse))
	RT7	IBRT, BWL three months, Margins on riskier loans, LS, DI (Impact of bank's risk tolerance, Backward-looking three months, Margins on riskier loans, Loan supply, Diffusion index)
	RT8	IBRT, BWL three months, Margins on riskier loans, LS, Net percentage (frequency of tightened minus that of eased or reverse) (Impact of bank's risk tolerance, Backward-looking three months, Margins on riskier loans, Loan supply, Net percentage (frequency of tightened minus that of eased or reverse))
	RT9	IBRT, BWL three months, CS, LS, DI (Impact of bank's risk tolerance, Backward-looking three months, Credit standards, Loan supply, Diffusion index)
	RT10	IBRT, BWL three months, CS, LS, Net percentage (frequency of tightened minus that of eased or reverse) (Impact of bank's risk tolerance, Backward-looking three months, Credit standards, Loan supply, Net percentage (frequency of tightened minus that of eased or reverse))
	RT11	IBRT, BWL three months, CTC, LS, DI (Impact of bank's risk tolerance, Backward-looking three months, Credit terms and conditions, Loan supply, Diffusion index)
	RT12	IBRT, BWL three months, CTC, LS, Net percentage (frequency of tightened minus that of eased or reverse) (Impact of bank's risk tolerance, Backward-looking three months, Credit terms and conditions, Loan supply, Net percentage (frequency of tightened minus that of eased or reverse))
	STL1	STL, BWL three months, CS, LS, DI (Short-term loans, Backward-looking three months, Credit standards, Loan supply, Diffusion index)
	STL2	STL, BWL three months, CS, LS, Net percentage (frequency of tightened minus that of eased or reverse) (Short-term loans, Backward-looking three

		months, Credit standards, Loan supply, Net percentage (frequency of tightened minus that of eased or reverse))
	STL3	STL, BWL three months, LD, DI (Short-term loans, Backward-looking three months, Loan demand, Diffusion index)
	STL4	STL, BWL three months, LD, Net percentage (frequency of tightened minus that of eased or reverse) (Short-term loans, Backward-looking three months, Loan demand, Net percentage (frequency of tightened minus that of eased or reverse))
	STL5	STL, FWL three months, CS, LS, DI (Short-term loans, Forward-looking three months, Credit standards, Loan supply, Diffusion index)
	STL6	STL, FWL three months, CS, LS, Net percentage (frequency of tightened minus that of eased or reverse) (Short-term loans, Forward-looking three months, Credit standards, Loan supply, Net percentage (frequency of tightened minus that of eased or reverse))
	STL7	STL, FWL three months, LD, DI (Short-term loans, Forward-looking three months, Loan demand, Diffusion index)
	STL8	STL, FWL three months, LD, Net percentage (frequency of tightened minus that of eased or reverse) (Short-term loans, Forward-looking three months, Loan demand, Net percentage (frequency of tightened minus that of eased or reverse))

Appendix B

Table A2. Country Codes.

Country Code	Country
1	Austria
2	Belgium
3	Italy
4	Cyprus
5	Germany
6	Estonia
7	Spain
8	Finland
9	France
10	Greece
11	Ireland
12	Lithuania
13	Luxembourg
14	Latvia
15	Malta
16	Netherlands
17	Portugal
18	Slovenia
19	Slovakia

Appendix C
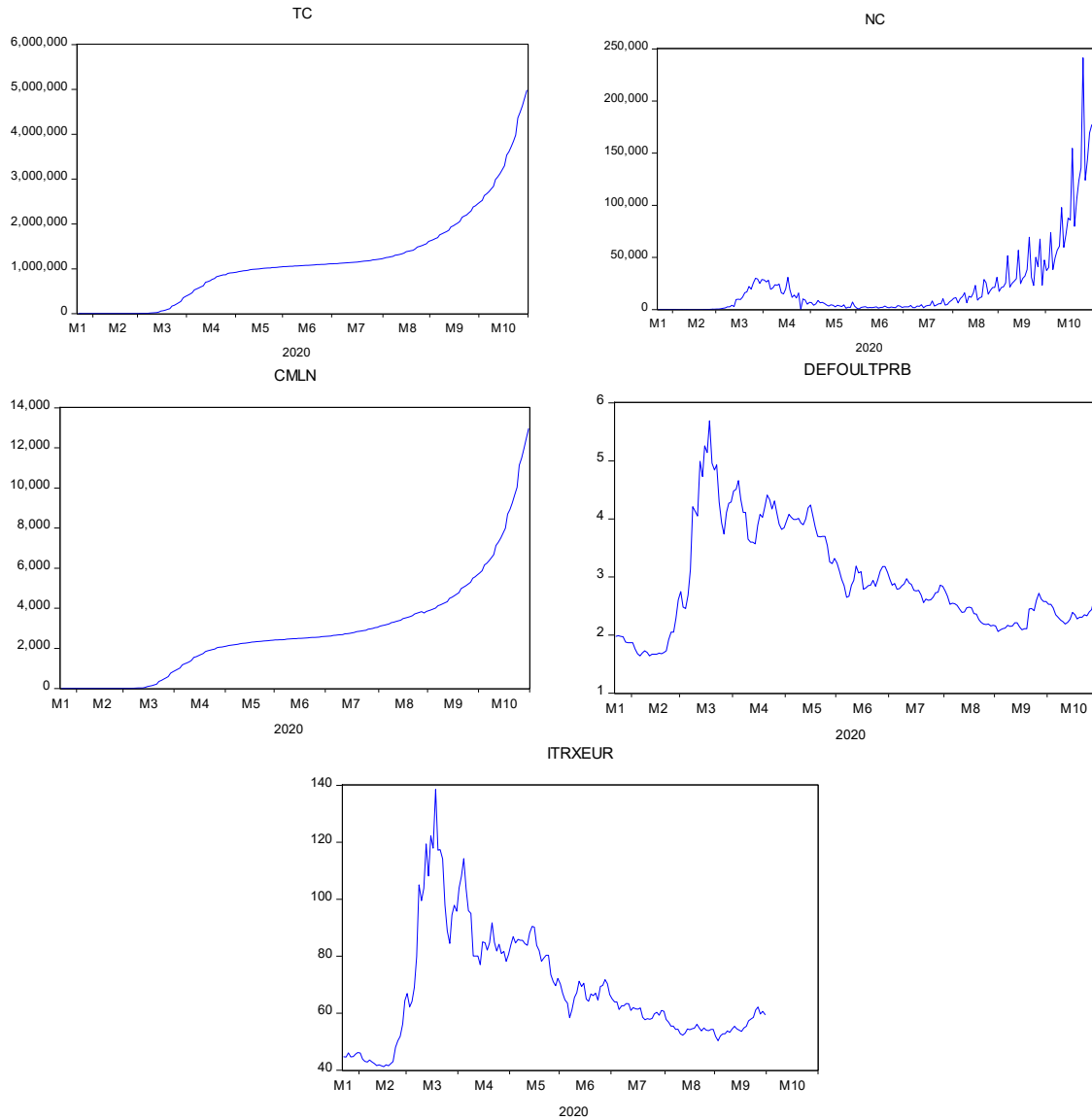
Figure A1. Dynamics of COVID-19 related variables and selected financial stability indicators (based on aggregated daily data), 01 January 2020–31 October 2020. Note: ITRXEUR = ITRX EUR CDSI GEN 5Y Corp index; DEFOULTPRB = simultaneous default probability of two or more large banks (DP); TC = total number of COVID-19 cases confirmed in the euro area; NC = the number of new COVID-19 cases reported daily in the euro area; TCMLN = the number of total cases per million population in euro area. M1 = January; M2 = February; M3 = March; M4 = April; M5 = May; M6 = June; M7 = July; M8 = August; M9 = September; M10 = October.

Appendix D

Table A3. Summary of descriptive statistics of selected financial soundness indicators (quarterly country level data) in countries in the euro area and Shapiro–Wilk test for distribution normality.

Variable	Period	Observations	Mean	St. Deviation	Shapiro–Wilk	
					Statistic	***p***
R/CA_i	2019 Q4	19	19.795	2.625	0.884	0.356 *
	2020 Q1	18	19.844	2.887	0.914	0.503 *
	2020 Q2	17	19.912	2.742	0.897	0.416 *
	2020 Q3	4	20.125	3.998	0.842	0.201 *
RT/CA_i	2019 Q4	19	18.026	2.852	0.871	0.303 *
	2020 Q1	18	18.306	3.349	0.892	0.392 *
	2020 Q2	17	17.971	3.052	0.877	0.328 *
	2020 Q3	4	18.450	4.769	0.833	0.175 *
NLP_i	2019 Q4	19	22.700	30.649	0.986	0.936 *
	2020 Q1	18	21.839	32.162	0.998	0.992 *
	2020 Q2	17	21.518	28.667	0.998	0.994 *
	2020 Q3	4	5.350	3.563	0.966	0.814 *
NP/TL_i	2019 Q4	19	6.0842	8.715	0.905	0.456 *
	2020 Q1	18	6.150	8.294	0.907	0.467 *
	2020 Q2	17	6.159	9.160	0.909	0.475 *
	2020 Q3	4	1.875	1.875	0.922	0.551 *
ROA_i	2019 Q4	19	1.537	3.641	0.783	0.075 *
	2020 Q1	18	1.339	3.741	0.953	0.734 *
	2020 Q2	17	1.200	4.025	0.990	0.957 *
	2020 Q3	4	0.500	0.627	0.972	0.855 *
ROE_i	2019 Q4	19	8.353	3.961	0.830	0.167 *
	2020 Q1	18	5.539	6.212	0.959	0.775 *
	2020 Q2	17	3.188	7.148	0.820	0.144 *
	2020 Q3	4	3.050	3.959	0.923	0.551 *
IM/GI_i	2019 Q4	19	51.021	13.708	0.999	0.997 *
	2020 Q1	18	52.028	16.739	0.160	0.160 *
	2020 Q2	17	53.224	14.876	0.142	0.142 *

	2020 Q3	4	62.150	2.453	0.800	0.800 *
NE/GI$_i$	2019 Q4	19	64.547	13.711	0.972	0.577 *
	2020 Q1	18	64.450	18.004	0.979	0.895 *
	2020 Q2	17	59.494	14.979	0.899	0.428 *
	2020 Q3	4	59.650	4.901	0.913	0.496 *
LA/TA$_i$	2019 Q4	19	25.353	12.793	0.828	0.163 *
	2020 Q1	18	26.383	13.731	0.862	0.267 *
	2020 Q2	17	26.382	10.678	0.822	0.148 *
	2020 Q3	4	23.225	4.332	0.809	0.119 *
LA/SL$_i$	2019 Q4	19	45.753	32.019	0.834	0.178 *
	2020 Q1	18	43.322	30.453	0.813	0.128 *
	2020 Q2	17	49.282	33.643	0.810	0.120 *
	2020 Q3	4	45.475	23.032	0.826	0.157 *
C/A$_i$	2019 Q4	19	8.558	2.119	0.869	0.411 *
	2020 Q1	18	8.367	2.088	0.930	0.595 *
	2020 Q2	17	7.953	2.054	0.937	0.638 *
	2020 Q3	4	8.900	2.157	0.925	0.567 *
LE/C$_i$	2019 Q4	19	55.705	76.299	0.881	0.342 *
	2020 Q1	18	47.939	64.031	0.886	0.365 *
	2020 Q2	16	44.406	50.890	0.880	0.449 *
	2020 Q3	4	25.625	18.788	0.879	0.334 *
LDS$_i$	2019 Q4	12	204.192	132.082	0.966	0.648 *
	2020 Q1	10	227.050	119.715	0.971	0.672 *
	2020 Q2	9	215.697	122.571	0.963	0.628 *
	2020 Q3	3	146.400	99.837	0.962	0.623 *
CL/TL$_i$	2019 Q4	16	90.088	16.172	0.769	0.057 *
	2020 Q1	15	90.419	18.129	0.841	0.199 *
	2020 Q2	13	95.031	20.628	0.935	0.626 *
	2020 Q3	4	92.500	13.680	0.965	0.811 *

Note**:** R/CA$_i$ = regulatory capital and risk weighted assets ratio; RT/CA$_i$ = regulatory Tier I capital and risk weighted assets ratio; NLP$_i$ = difference between non-performing loans and provisions to capital; NP/TL$_i$ = non-performing loans and total loans ratio; ROA$_i$ = return on assets; ROE$_i$ = return on equity; IM/GI$_i$ = interest margin and gross income ratio; NE/GI$_i$ = non-interest expenses

and gross income ratio; LA/TA$_i$ = liquid assets and total assets ratio; LA/SL$_i$ = liquid assets to short-term liabilities ratio; C/A$_i$ = capital and assets ratio; LE/C$_i$ = large exposures and capital ratio; LDS$_i$ = spread between reference lending and deposit rates; CL/TL$_i$ = customer loans and total loans ratio. * sample is normally distributed.

Appendix E

Table A4. Paired samples t-test for comparison of selected financial soundness indicators in the euro-area countries in periods 2019Q4 and 2020Q1, 2020Q2, 2020Q3.

The Difference of Indicators Means		Paired Differences							
		Mean.	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig.
	Pair				Lower	Upper			
R/CA$_i$	Pair I	0.094	1.292	0.305	−0.548	0.737	0.310	17	0.760 **
	Pair II	−0.353	0.764	0.185	−0.746	0.039	−1.904	16	0.075 **
	Pair III	−0.675	0.499	0.248	−1.469	0.119	−2.705	3	0.074 **
	Pair IV	−0.563	0.631	0.158	−0.899	−0.226	−3.564	15	0.003 *
	Pair V	−0.650	0.387	0.194	−1.266	−0.034	−3.357	3	0.044 *
	Pair VI	−0.100	0.294	0.147	−0.568	0.368	−0.679	3	0.546 **
RT/CA$_i$	Pair I	−0.106	1.342	0.316	−0.773	0.562	−0.334	17	0.743 **
	Pair II	−0.271	0.802	0.195	−0.683	0.142	−1.391	16	0.183 **
	Pair III	−0.575	0.499	0.249	−1.369	0.219	−2.304	3	0.105 **
	Pair IV	−0.275	0.629	0.157	−0.611	0.061	−1.747	15	0.101 **
	Pair V	−0.575	0.320	0.160	−1.084	−0.066	−3.592	3	0.037 *
	Pair VI	−0.050	0.311	0.155	−0.545	0.445	−0.322	3	0.769 **
NLP$_i$	Pair I	0.482	2.347	0.569	−0.724	1.689	0.847	16	0.409 **
	Pair II	2.219	4.787	1.197	−0.332	4.769	1.854	15	0.084 **
	Pair III	1.000	0.931	0.465	−0.481	2.481	2.148	3	0.121 **
	Pair IV	2.207	5.208	1.345	−0.678	5.091	1.641	14	0.123 **
	Pair V	0.575	0.427	0.214	−0.105	1.255	2.692	3	0.074 **
	Pair VI	0.475	0.350	0.175	−0.082	1.032	2.714	3	0.073 **
NP/TL$_i$	Pair I	−0.129	1.547	0.375	−0.925	0.666	−0.345	16	0.735 **
	Pair II	0.331	1.313	0.328	−0.368	1.031	1.009	15	0.329 **
	Pair III	0.150	0.129	0.065	−0.055	0.355	2.324	3	0.103 **
	Pair IV	0.553	1.699	0.439	−0.388	1.495	1.261	14	0.228 **
	Pair V	0.100	0.082	0.041	−0.029	0.229	2.449	3	0.092 **
	Pair VI	0.075	0.050	0.025	−0.005	0.155	3.000	3	0.058 **
ROA$_i$	Pair I	0.253	0.420	0.102	0.037	0.469	2.483	16	0.024*
	Pair II	0.494	0.433	0.108	0.263	0.724	4.564	15	0.000 *
	Pair III	0.350	0.332	0.166	−0.178	0.878	2.111	3	0.125 **
	Pair IV	0.233	0.324	0.084	0.054	0.413	2.786	14	0.015 *
	Pair V	0.025	0.330	0.165	−0.501	0.551	0.151	3	0.889 **
	Pair VI	0.253	0.420	0.102	0.037	0.469	2.483	16	0.024 *
ROE$_i$	Pair I	3.147	4.443	1.077	0.863	5.431	2.921	16	0.010 *
	Pair II	5.738	3.996	0.999	3.608	7.867	5.744	15	0.000 *
	Pair III	5.300	3.004	1.502	0.519	10.081	3.528	3	0.039 *
	Pair IV	2.507	3.184	0.822	0.743	4.269	3.049	14	0.009 *
	Pair V	1.000	4.586	2.293	−6.297	8.297	0.436	3	0.692 **
	Pair VI	3.147	4.442	1.077	0.863	5.431	2.921	16	0.010 *
IM/GI$_i$	Pair I	−0.923	8.187	1.986	−5.133	3.286	−0.465	16	0.648 **

	Pair								
	Pair II	−0.638	6.943	1.736	−4.337	3.062	−0.367	15	0.719 **
	Pair III	−2.100	5.531	2.766	−10.901	6.701	−0.759	3	0.503 **
	Pair IV	0.067	5.738	1.482	−3.111	3.244	0.045	14	0.965 **
	Pair V	1.925	15.121	7.561	−22.136	25.986	0.255	3	0.815 **
	Pair VI	−3.375	9.096	4.548	−17.848	11.098	−0.742	3	0.512 **
NE/GI$_i$	Pair I	0.018	9.312	2.258	−4.769	4.805	0.008	16	0.994 **
	Pair II	4.156	6.816	1.704	0.524	7.788	2.439	15	0.028 *
	Pair III	1.700	7.193	3.596	−9.745	13.145	0.473	3	0.669 **
	Pair IV	4.267	6.244	1.612	0.809	7.725	2.646	14	0.019 *
	Pair V	3.175	14.919	7.459	−20.564	26.914	0.426	3	0.699 **
	Pair VI	−3.575	9.604	4.802	−18.857	11.707	−0.744	3	0.511 **
LA/TA$_i$	Pair I	−0.182	1.469	0.356	−0.938	0.573	−0.512	16	0.616 **
	Pair II	−2.125	2.146	0.537	−3.269	−0.981	−3.961	15	0.001 *
	Pair III	−3.600	0.983	0.492	−5.164	−2.036	−7.323	3	0.005 *
	Pair IV	−1.960	1.299	0.335	−2.679	−1.241	−5.845	14	0.000 *
	Pair V	−2.975	0.263	0.132	−3.393	−2.557	−22.624	3	0.000 *
	Pair VI	−0.700	0.439	0.219	−1.399	−0.0003	−3.184	3	0.050 *
LA/SL$_i$	Pair I	−0.182	1.469	0.357	−0.938	0.573	−0.512	16	0.616 **
	Pair II	−2.125	2.146	0.537	−3.269	−0.981	−3.961	15	0.001 *
	Pair III	−3.600	0.983	0.492	−5.164	−2.036	−7.323	3	0.005 *
	Pair IV	−1.960	1.299	0.336	−2.679	−1.241	−5.845	14	0.000 *
	Pair V	−2.975	0.263	0.132	−3.393	−2.557	−22.624	3	0.000 *
	Pair VI	−0.700	0.439	0.219	−1.399	−0.0003	−3.184	3	0.050 *
C/A$_i$	Pair I	0.294	0.456	0.107	0.068	0.521	2.742	17	0.014 *
	Pair II	0.606	0.419	0.102	0.390	0.821	5.962	16	0.000 *
	Pair III	0.600	0.408	0.204	−0.049	1.249	2.939	3	0.061 **
	Pair IV	0.275	0.272	0.068	0.130	0.419	4.044	15	0.001 *
	Pair V	0.550	0.311	0.155	0.055	1.045	3.538	3	0.038 *
	Pair VI	−0.025	0.150	0.075	−0.264	0.214	−0.333	3	0.761 **
LE/C$_i$	Pair I	−1.627	10.588	3.193	−8.741	5.486	−0.510	10	0.621 **
	Pair II	−3.750	8.775	2.775	−10.027	2.527	−1.351	9	0.210 **
	Pair III	1.250	3.465	2.450	−29.880	32.380	0.510	1	0.700 **
	Pair IV	0.011	7.305	2.435	−5.604	5.626	0.005	8	0.996 **
	Pair V	0.750	1.061	0.750	−8.779	10.279	1.000	1	0.500 **
	Pair VI	2.600	2.546	1.800	−20.271	25.471	1.444	1	0.386 **
LDS$_i$	Pair I	4.010	7.394	2.338	−1.279	9.299	1.715	9	0.120 **
	Pair II	4.211	6.379	2.126	−0.692	9.114	1.981	8	0.083 **
	Pair III	7.067	6.900	3.984	−10.074	24.208	1.774	2	0.218 **
	Pair IV	2.111	2.816	0.939	−0.053	4.276	2.249	8	0.055 **
	Pair V	5.233	4.131	2.385	−5.028	15.495	2.194	2	0.159 **
	Pair VI	2.133	0.808	0.467	0.125	4.141	4.571	2	0.045 *
CL/TL$_i$	Pair I	−0.331	5.528	1.382	−3.277	2.615	−0.240	15	0.814 **
	Pair II	−3.650	13.364	3.858	−12.141	4.841	−0.946	11	0.364 **
	Pair III	−0.200	7.199	3.599	−11.656	11.256	−0.056	3	0.959 **
	Pair IV	−3.243	7.415	2.141	−7.953	1.469	−1.514	11	0.158 **
	Pair V	−1.550	6.259	3.129	−11.509	8.409	−0.495	3	0.654 **
	Pair VI	−0.225	1.559	0.779	−2.705	2.255	−0.289	3	0.792 **

Note: R/CA$_i$ = regulatory capital and risk weighted assets ratio; RT/CA$_i$ = regulatory Tier I capital and risk weighted assets ratio; NLP$_i$ = difference between non-performing loans and provisions to capital; NP/TL$_i$ = non-performing loans and total loans ratio; ROA$_i$ = return on assets; ROE$_i$ = return on equity; IM/GI$_i$ = interest margin and gross income ratio; NE/GI$_i$ =

non-interest expenses and gross income ratio; LA/TA$_i$ = liquid assets and total assets ratio; LA/SL$_i$ = liquid assets to short-term liabilities ratio; C/A$_i$ = capital and assets ratio; LE/C$_i$ = large exposures and capital ratio; LDS$_i$ = spread between reference lending and deposit rates; CL/TL$_i$ = customer loans and total loans ratio; Pair I = 2019 Q4–2020 Q1; Pair II = 2019 Q4–2020 Q2; Pair III—2019 Q4–2020 Q3; Pair VI—2020 Q1–2020 Q2; Pair V—2020 Q1–2020 Q3; Pair VI—2020 Q2–2020 Q3. * difference is significant; ** difference is insignificant.

References

1. Baziki, S.B.; Capacioglu, T. *Bank Lending and Maturity: The Anatomy of the Transmission of Monetary Policy*; Central bank of Turkey: Ankara, Turkey, 2020.
2. Black, L.K.; Rosen, R.J. *How the Credit Channel Works: Differentiating the Bank Lending Channel and the Balance Sheet Channel*; Working Paper Series, WP-07-13; Federal Reserve Bank of Chicago: Chicago, IL, USA, 2007.
3. Bottero, M.; Lenzu, S.; Mezzanotti, F. Sovereign debt exposure and the bank lending channel: Impact on credit supply and the real economy. *J. Int. Econ.* **2020**, *126*, 103328.
4. Caporale, G.M.; Çatık, A.N.; Helmi, M.H.; Ali, F.M.; Tajik, M. The bank lending channel in the Malaysian Islamic and conventional banking system. *Glob. Financ. J.* **2020**, *45*, 100478, doi:10.1016/j.gfj.2019.100478
5. Chirinos-Leañez, A.M.; Pagliacci, C. *Credit Supply in Venezuela: A Non-Conventional Bank Lending Channel?*; Inter-American Development Bank: Washington, DC, USA, 2017; p. 8256.
6. Ciccarelli, M.; Maddaloni, A.; Peydró, J.L. *Trusting the Bankers a New Look at the Credit Channel of Monetary Policy*; Elsevier: Amsterdam, The Netherlands, 2010.
7. Elliott, D.; Meisenzahl, R.R.; Peydro, J.-L.; Turner, B.C. Nonbanks, Banks, and Monetary Policy: U.S. Loan-Level Evidence since the 1990s. *SSRN Electron. J.* **2019**, 14989, doi:10.2139/ssrn.3475427.
8. Filardo, A.J.; Siklos, P.L. The cross-border credit channel and lending standards surveys. *J. Int. Financ. Mark. Inst. Money* **2020**, *67*, 101206, doi:10.1016/j.intfin.2020.101206.
9. Fisera, B.; Kotlebova, J. Expansionary monetary policy and bank lending: the case of new Euro Area member states. *Int. J. Monet. Econ. Financ.* **2020**, *13*, 383–416.
10. Gonzalez, R.B. *Monetary Policy Surprises and Employment: Evidence from Matched Bank-Firm Loan Data on the Bank Lending-Channel*; Research Department Working Papers Series; Central Bank of Brazil: Brasilia, Brazil, 2020; p. 518.
11. Greenwald, D.L.; Krainer, J.; Paul, P. *The Credit Line Channel*; Federal Reserve Bank of San Francisco Working Paper 2020-26; Federal Reserve Bank of San Francisco: San Francisco, CA, USA, 2020; doi:10.24148/wp2020-26.
12. Ivashina, V.; Laeven, L.; Moral-Benito, E. *Loan Types and the Bank Lending Channel*; CEPR Discussion Paper; Banco de España: Madrid, Spain, 2020; pp. 1–55.
13. Lane, P.R. Monetary Policy in a Pandemic: Ensuring Favourable Financing Conditions. Available online: https://www.ecb.europa.eu/press/key/date/2020/html/ecb.sp201126~c5c1036327.en.html (accessed on 16 December 2020).
14. Zhang, M.; Zhang, Y. *Monetary Stimulus Policy in China: The Bank Credit Channel*; Working Papers 2001; Department of Economics, University of Windsor: Windsor, ON, Canada, 2020.
15. Naiborhu, E.D. The lending channel of monetary policy in Indonesia. *J. Asian Econ.* **2020**, *67*, 101175, doi:10.1016/j.asieco.2020.101175.
16. Saibal, G. Bank Lending and Monetary Transmission: Does Politics Matter? *J. Quant. Econ.* **2020**, *18*, 359–381.
17. Bergant, K.; Grigoli, F.; Hansen, N.J.; Sandri, D. *Dampening Global Financial Shocks: Can Macroprudential Regulation Help (More than Capital Controls)?*; IMF Working Paper No. 20/106; IMF: Washington, DC, USA, 2020.
18. Duquerroy, A.; Mazet-Sonilhac, C. Funding Shock: How Will the Investment of Large French Firms Be Affected? Available online: https://publications.banque-france.fr/en/funding-shock-how-will-investment-large-french-firms-be-affected (accessed on 9 December 2020).
19. Endrész, M. *The Bank Lending Channel during Financial Turmoil*; Central Bank of Hungary: Budapest, Hungary, 2020.
20. Hsieh, M.-F.; Lee, C.-C. Foreign bank lending during a crisis: The impact of financial regulations. *Econ. Syst.* **2020**, *44*, doi:10.1016/j.ecosys.2020.100791.
21. Kehoe, P.J.; Lopez, P.; Midrigan, V.; Pastorino, E. *On the Importance of Household versus Firm Credit Frictions in the Great Recession*; Federal Reserve Bank of Cleveland Working Papers, No. 20-28; Federal Reserve Bank of Cleveland: Cleveland, OH, USA, 2020.
22. Diao, X. Do the Capital Requirements Affect the Effectiveness of Monetary Policy from the Credit Channel? *J. Appl. Financ. Bank.* **2020**, *10*, 1–6.
23. Maruyama, Y. *A Model of Monetary Transmission Mechanism*; Center for Open Science: Charlottesville, VA, USA, 2020.
24. Ons, M. *The Impact of Real Economic Activity on the Effectiveness of Monetary Policy Transmission: The Case of Tunisia*; IHEID Working Papers, No. 12-2020; Graduate Institute of International and Development Studies: Geneva, Switzerland, 2020.
25. Rashid, A.; Hassan, M.K.; Shah, M.A.R. On the role of Islamic and conventional banks in the monetary policy transmission in Malaysia: Do size and liquidity matter? *Res. Int. Bus. Finance* **2020**, *52*, 101123, doi:10.1016/j.ribaf.2019.101123.
26. Mian, A.; Sufi, A.; Verner, E. How Does Credit Supply Expansion Affect the Real Economy? The Productive Capacity and Household Demand Channels. *J. Finance* **2020**, *75*, 949–994, doi:10.1111/jofi.12869.
27. Occhino, F. Quantitative Easing and Direct Lending in Response to the COVID-19 Crisis. *SSRN Electron. J.* **2020**, 202029, doi:10.2139/ssrn.3717958.

28. Urbschat, F.; Watzka, S. Quantitative easing in the Euro Area—An event study approach. *Q. Rev. Econ. Financ*. **2020**, *77*, 14–36.
29. Al Dhaheri, A.; Nobanee, H. Financial Stability and Sustainable Finance: A Mini-Review. *SSRN Electron. J.* **2020**, doi:10.2139/ssrn.3538328.
30. Dang, V.D. The conditioning role of performance on the bank risk-taking channel of monetary policy: Evidence from a multiple-tool regime. *Res. Int. Bus. Finance* **2020**, *54*, 101301, doi:10.1016/j.ribaf.2020.101301.
31. Foglia, M.; Cartone, A.; Fiorelli, C. Structural Differences in the Eurozone: Measuring Financial Stability by FCI. *Macroecon. Dyn.* **2018**, *24*, 69–92, doi:10.1017/s1365100518000329.
32. Kawamoto, T.; Matsuda, T.; Takahashi, K.; Tamanyu, Y. *Bank Risk Taking and Financial Stability: Evidence from Japan's Loan Market*; Bank of Japan Working Paper Series, 20-E-1; Bank of Japan: Tokyo, Japan, 2020.
33. Zulkhibri, M.; Rizky Prima Sakti, M. Macroprudential policy and financing behaviour in emerging markets: Bank-level evidence from Indonesian dual banking. *Afro-Asian J. Financ. Account.* **2020**, *10*, 514–536.
34. Das, U.S.; Surti, J.; Ahmed, F.; Papaioannou, M.G.; Pedras, G. *Managing Public Debt and its Financial Stability Implications*; IMF Working Papers; International Monetary Fund: Washington, DC, USA, 2010; doi:10.5089/9781455210879.001.
35. Giese, J.; Haldane, A. COVID-19 and the financial system: A tale of two crises. *Oxf. Rev. Econ. Policy* **2020**, *36*, S200–S214, doi:10.1093/oxrep/graa035.
36. ECB. Progress Towards a Framework for Financial Stability Assessment. Speech by José-Manuel González-Páramo, Member of the Executive Board. ECB, OECD World Forum on "Statistics, Knowledge and Policy," 28 June 2007. Available online: http://www.ecb.int/press/key/date/2007/html/sp070628.en.html#fnid4 (accessed on 12 June 2020).
37. Schinasi, Garry, J. Defining Financial Stability (October 2004). IMF Working Paper No. 04/187. Available online: https://ssrn.com/abstract=879012 (accessed on 9 December 2020).
38. Gnan, E. The Interaction of Political, Fiscal and Financial Stability: Lessons from the Crisis. Main Findings from the 2012 SUERF Annual Lecture and Joint/OeNB Workshop in Vienna 2012. Available online: http://imap.suerf.org/download/nl/0712.pdf (accessed om 24 June 2020).
39. Tumpel-Gugerell, G. European Integration and the Financial System. In Proceedings of the Third Conference of the Monetary Stability Foundation: Chalenges to the Financial System Ageing and Low Growth, Frankfurt am Main, Germany, 6–7 July 2006. Available online: http://www.bundesbank.de/vfz/vfz_ konferenzen_2006.en.php#monetary (accessed on 8 May 2020).
40. Cecchetti, S. *Fiscal Policy and Its Implications for Monetary and Financial Stability*; BIS Papers, No.59; Bank for International Settlements: Basel, Switzerland. 2011; pp. 1–5.
41. Parisi, F. But This Time IS Different—COVID Recession. *J. Struct. Finance* **2020**, *26*, 63–70, doi:10.3905/jsf.2020.1.113.
42. Phillips, G.; Adelson, M. PERSPECTIVES: CLO Credit Ratings Gone Awry. *J. Struct. Finance* **2020**, *26*, 10–17, doi:10.3905/jsf.2020.1.106.
43. Nothaft, F.E. The Pandemic's Effect on the Housing Market and Mortgage Delinquency. *J. Struct. Finance* **2020**, *26*, 41–51, doi:10.3905/jsf.2020.1.112.
44. Kiseľáková, D.; Filip, P.; Onuferová, E.; Valentiny, T. The Impact of Monetary Policies on the Sustainable Economic and Financial Development in the Euro Area Countries. *Sustainability* **2020**, *12*, 9367, doi:10.3390/su12229367.
45. Pinshi, C.P. Monetary Policy, Uncertainty and COVID-19. *J. Appl. Econ. Sci.* **2020**, *3*, 579–593, doi:10.14505/jaes.v15.3(69).07.
46. Benmelech, E.; Tzur-Ilan, N. The Determinants of Fiscal and Monetary Policies During the COVID-19 Crisis. *SSRN Electron. J.* **2020**, 27461, doi:10.2139/ssrn.3634549.
47. Sarker, P.K. COVID Crisis: Fiscal, Monetary and Macro-financial Policy Responses. *SSRN Electron. J.* **2020**, *XXVII*, 41–45, doi:10.2139/ssrn.3601524.
48. Bauer, G.H.; Granziera, E. Monetary Policy, Private Debt and Financial Stability Risks. *SSRN Electron. J.* **2016**, 2869044, doi:10.2139/ssrn.2869044.
49. Healey, J.; Mosser, P.; Rosen, K.; Tache, A. The Future of Financial Stability and Cyber Risk. The Brookings Institution Cybersecurity Project, 1–18 October 2018. Available online: https://www.brookings.edu/research/the-future-of-financial-stability-and-cyber-risk/ (accessed on 9 December 2020).
50. Ziolo, M.; Filipiak, B.Z.; Bąk, I.; Cheba, K. How to Design More Sustainable Financial Systems: The Roles of Environmental, Social, and Governance Factors in the Decision-Making Process. *Sustainability* **2019**, *11*, 5604, doi:10.3390/su11205604.
51. Davies, H. The $19,000 Question: How Will the Economic Consequences of the Coronavirus Pandemic Affect the Financial System? *Glob. Perspect.* **2020**, *1*, doi:10.1525/gp.2020.14171.
52. Reinders, H.J.; Schoenmaker, D.; Van Dijk, M.A. *Is COVID-19 a Treat to Financial Stability in Europe?*; CEPR Discussion Paper DP14922; Centre for Economic Policy Research: London, UK, 2020.
53. Jackson, H.E.; Schwarcz, S.L. Protecting Financial Stability: Lessons from the Coronavirus Pandemic. *SSRN Electron. J.* **2020**, doi:10.2139/ssrn.3644417.
54. Boot, A.; Carletti, E.; Haselman, R.; Kotz, H.; Krahnen, J.P.; Pelizzon, L.; Schaeffer, S.; Subrahmanyam, M. *The Coronavirus and Financial Stability*; SAFE Policy Letter No. 78; SAFE: Frankfurt am Main, Germany, 2020.
55. Haldane, A.; Saporta, V.; Hall, S.; Tanaka, M. Financial Stability and Macroeconomic Models; In *Financial Stability Review*; Bank of England: London, UK, 2004.
56. Adrian, T.; Natalucci, F. Covid-19 Crisis Poses Threat to Financial Stability. *International Monetary Fund Blog*, 14 April 2020. Available online: https://blogs.imf.org/2020/04/14/covid-19-crisis-poses-threat-to-financial-stability/ (accessed on 15 November 2020).

57. Ito, T. Impact of the coronavirus pandemic crisis on the financial system in the eurozone. *J. Corp. Acc. Finance* **2020**, *31*, 15–20, doi:10.1002/jcaf.22466.

58. Disemadi, H.S.; Shaleh, A.I. Banking credit restructuring policy amid COVID-19 pandemic in Indonesia. *J. Inov. Èkon.* **2020**, *5*, 63–70, doi:10.22219/jiko.v5i3.11790.

59. Tokic, D. Long-term consequences of the 2020 coronavirus pandemics: Historical global-macro context. *J. Corp. Account. Finance* **2020**, *31*, 9–14, doi:10.1002/jcaf.22448.

60. Lopotenco, V. The Financial System Challenges of the Republic of Moldova in the Pandemic COVID 19 Context. *Int. J. Innov. Technol. Econ.* **2020**, *4*, 1–5, doi:10.31435/rsglobal_ijite/30092020/7170.

61. Korzeb, Z.; Niedziółka, P. Resistance of commercial banks to the crisis caused by the COVID-19 pandemic: The case of Poland. *Equilibrium* **2020**, *15*, 205–234, doi:10.24136/eq.2020.010.

62. Lo, Y.-W. Impact of Covid-19 on Interest Rates. *J. Asian Multicult. Res. Econ. Manag. Study* **2020**, *1*, 7–11, doi:10.47616/jamrems.v1i1.7.

63. Barua, B.; Barua, S. COVID-19 implications for banks: evidence from an emerging economy. *SN Bus. Econ.* **2021**, *1*, 1–28, doi:10.1007/s43546-020-00013-w.

64. Eich, F.; Kuspert, T.; Schulz, P. The Corona Crisis and the Stability of the European Banking Sector. A Repeat of the Great Financial Crisis? Bertelsmann Stiftung Repair and Prepare Strengthening Europe 2020. Available online: https://www.bertelsmann-stiftung.de/en/publications/publication/did/the-corona-crisis-and-the-stability-of-the-european-banking-sector-all (accessed on 21 April 2020).

65. Albulescu, C.T. Assessing Romanian Financial Sector Stability: The Importance of the International Economic Climate. MPRA Paper 16581. 2008. Available online: http://mpra.ub.unimuenchen.de/16581/1/MPRA_paper_16581.pdf (accessed on 1 November 2020).

66. Nelson, W.R.; Perli, R. Selected Indicators of Financial Stability. In Proceedings of the 4th Joint Central Bank Research Conference on Risk Measurement and Systemic Risk, 2005; pp. 343–365. Available online: http://www.ecb.de/pub/pdf/other/riskmeasurement andsystemicrisk200 704en.pdf#page=344 (accessed on 12 November 2020).

67. Gray, D.; Merton, R.; Bodie, Z. *New Framework for Measuring and Managing Macrofinancial Risk and Financial Stability*; Working Paper 13607; National Bureau of Economic Research: Cambridge, MA, USA, 2007; doi:10.3386/w13607.

68. Financial Soundness Indicators and the IMF. 2019. Available online: https://www.imf.org/external/np/sta/fsi/eng/fsi.htm (accessed 9 December 2020).