4 IMPACT OF MACROECONOMIC AND BANKING INDICATORS ON LENDING RATES - A GLOBAL PERSPECTIVE

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Abstract

The article reflects the analysis of a relevant issue for the post-crisis context: the direct and indirect linkages of factors impacting the interest rate on loans. The first two parts of the research present the post-crisis financial context for the banking business, together with the evolution of interest rates on loans, as well as the relationships among the main macroeconomic indicators. The third part is based on the use of panel Auto Regressive Vector methodology, which identifies the correlations among the macroeconomic indicators that are relevant for the banking business (inflation, unemployment, exchange rate, non-performing loans, lending rates). The global sample selected for analysis comprises 20 countries, spread over three continents, with data collected for a 12-year period (2009 - 2021). Together, these countries account for almost 53% of global GDP (as of 2021). The fourth part highlights the results of the study, considering both short and long-term perspectives, together with other qualitative correlations that add value to the research. The paper concludes with a section including the authors' final remarks.

Keywords: financial crisis, credit interest rate, inflation, unemployment, exchange rate, nonperforming loans
JEL Classification: G21, E4, E5, J6

1. Introduction

An economic crisis has serious economic consequences for economies and societies. It may manifest in various forms such as bank failures, rapid upsurges in inflation or unemployment, stock market crashes, real estate crashes, amplifying the risks for a specific economy, region or at the global level, with serious consequences for economy that do not always lead to recession. The economic crisis is related to banking and financial crisis, as the banking sector represents the most important funding channel, for the economies, all over the world.

The research aims to address the issue of interdependencies among macroeconomic indicators relevant to the banking system in the specific period, due to the complex economic

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environment novelty, and medium and long-term importance for different banking systems, both for the emerging and the developed economies.

One of the strategic concerns, in the context of a crisis (financial, pandemic) and in the post-crisis context, is how to calibrate, develop and deploy an appropriate macroeconomic policy mix, in order to ensure sustainable recovery and future resilience.

According to Cerutti et al. (2017), since the Global Financial Crisis of 2009 the stability of financial markets has become a central concern for policy makers and financiers. Thus, by creating and strengthening appropriate macroprudential frameworks, regulators monitor the build-up of financial imbalances to prevent financial market risks and to reduce the likelihood of new financial crises.

The focus of the paper captures the post-financial crisis framework and the context of the onset of the pandemic crisis. During this period, 2009 - 2021, which represents the time frame for the data used within the empirical study, monetary policy has accommodated and the interest rates converged to 'zero'. Public deficits increased significantly, and the indebtedness of countries increased globally.

Thus, according to authors such as Stiglitz (2018), Borio et al. (2017), Brunnermeier and Koby (2017), loosening monetary policy for a long period of time with too low interest rates leads to a reduction in interest income, which may prevent the transmission of monetary policy.

Lending rates are a particularly important indicator, as the banking industry, especially at the European level, represents the main funding channel for the economy. The relevance of this indicator is emphasized in the context of crises (financial, pandemic), and the ability of authorities to influence these relationships with other indicators, in a favorable manner, represents a sensitive point in any strategic policy mix.

The structure of the economy and the 'main' channel of financing are different in the US as compared to Europe. The policy mix and the results of its implementation are different in the US financial markets, representing the main funding channel for the economy.

The paper examines the nature of the relationships between the lending rate and a set of six selected macroeconomic indicators: inflation, unemployment, exchange rate, nonperforming loans and financial freedom index. Loan interest rates, inflation, exchange rates, unemployment, and the volume of nonperforming loans represent five macroeconomic variables that are essential for any country's economy.

The dynamics of these six indicators provide relevant benchmarks on the evolution of an economy, both in terms of macroeconomic performance and specific risk management. The amplifying role of the nonperforming loans indicator has been highlighted by the post-financial crisis context, considering the zero-bound level of interest rates since the global financial crisis and the context of the pandemic crisis in 2019, both at the individual country level, correlated with the specific economic and financial structure, at regional and global level. The developments and linkages among the six indicators selected for the empirical study reveal that some countries are more vulnerable to sudden changes in the domestic and international economic climate. The transfer and amplification of certain risks have taken place against the backdrop of a fragile economic and financial fabric in the emerging countries, but also due to the high degree of integration of economies on a global scale.

Thus, in the research, special attention will be paid to identifying the nature of the relationships among these variables, on long term, which interfere with a wide range of societal interests, represented by all relevant "actors", namely companies, investors,

authorities, academia, population. The six selected indicators lie at the heart of the monetary, fiscal, and economic policies promoted by the selected countries, as a base for economic and financial macro-stability. The relevance of the research is emphasized by the fact that the selected countries for the empirical study accounted for approximately 53% of global GDP in 2021.

This research extends the literature by using variables of essential importance to any country's economy, studied over an extended period of 12 years in multiple economic contexts (post-global financial crisis period with specific consequences, followed by periods with interest rates close to zero and, at the end of the analyzed period, followed by the beginning of a pandemic crisis of Covid 19).

The contribution of this research to the literature is reflected via studying the relationship among the nonperforming loans, the banking sector, and relevant macroeconomic indicators. Estimating the impact of exogenous shocks of changes induced by Non-Performing Loans (NPL) and the other analyzed variables, on loan interest rates and bank lending, respectively, is reflected in the empirical study, which is in line with the research by Bahruddin et al. (2018) highlighting that on short term the level of non-performing loans increases as a result of the economic situation at that time regardless of whether the interest rate is lower during the financial crisis.

The volume of nonperforming loans has significantly affected the ability of banks to finance the European economy and the global economy. Compared to research in the field by Bahruddin et al. (2018), Badar and Javid (2013), Demertzis and Viegi (2021), on medium to long term, the level of NPLs does not become proportional to the level of lending and interest rates offered by banks, also influenced by the fact that the study includes 20 countries and economies with different degrees of development, but also due to the relationship with the rest of the analyzed indicators.

An important factor behind the substantial increase in nonperforming loan ratios was the financial and economic crisis, which has significantly contributed to the reduction in borrowers' ability to service their debt. The rapid increase in NPL volumes was also influenced, to a large extent, by banks' lending and monitoring policies, and limited capacity to solve NPLs, given the financial, fiscal and lack of specific instruments.

The authorities' response to the problem of nonperforming loans involved development and implementation of policies to combat nonperforming loans, improving supervisory activity and developing new mechanisms and tools.

2. Literature Review

Empirical research on the links between loan interest rates and NPLs is abundant. The financial crisis has been another inflection point from the perspective of expanding this research, in line with the work of several authors such as Khemraj and Pasha (2009), Pullicino (2016), Farhan (2012), Loh Chun Yong et al. (2015), Beck et al. (2013), Louzis et al. (2012). The interest rate of the loan, as an implicit cost of bank lending, influences loan repayment obligations.

Research by Pullicino (2016) found that interest rates do not have a significant impact on the volume of nonperforming loans (NPLs) at commercial banks in the case of Malta, Italy, France, and the UK, but significant only in the case of Spain. However, the interest rate in Spain is negatively related to NPLs.

Research by Khemraj and Pasha (2009) indicates that real GDP and the real effective

exchange rate have a significant impact on the level of nonperforming loans. The study notes the direct relationship between rising interest rates in certain countries and the appreciation of the currencies of those countries.

According to Sam (2014), there is an inverse relationship between the federal funds rate, business confidence, and unemployment. Reduced business confidence and reduced federal funds rate contribute to higher unemployment rates.

Wen and Wu (2014) argue that the bold and decisive fiscal stimulus program was the key for China's economy to recover quickly from the 2008 financial crisis. According to Wright and Rosen (2020), in 2008, China's financial system was a partial solution to the problem of slow global policy implementation. Instead of waiting for government bond sales and fiscal allocations to China's local governments, Beijing instructed banks to lend to local governments and companies, massively, increasing aggregate bank assets in the economy by 50% in the two years between 2008 and 2010 and, thus, kick-starting a boom in infrastructure and real estate construction.

Demertzis and Viegi (2021) find that low interest rates both in the period between the global financial crisis and the pandemic crisis, and before the global financial crisis, were related to decline in productivity. However, productivity decline is at odds with the technological progress that has been made, and the lack of real economic finance will remain an important factor in the downward pressure on interest rates.

The structural factors behind the decline in interest rates are different in the US and the EU. In the case of the US, the most important factor has been the increased market concentration responsible for the reduction in overall demand for capital and, in the case of the EU, the aging population and specific risks. At the EU level, monetary and fiscal policy is predominantly focused on preventing financial fragmentation and taking less risk, as compared to the US monetary and fiscal policies, which focus on stimulating demand.

According to Claessens et.al. (2018), the effects of long-term "zero" interest rates for the European continent undermine capitalization and credit capacity, thus also affecting the stimulation of economic growth. This lower profitability will reduce the ability of financial institutions to raise and attract capital, increasing their vulnerability to shocks and declining market confidence, thereby undermining their ability to support the real economy.

3. Data and Methods

The study aims to contribute to the future formulation of answers to a complex question: do relevant macroeconomic and banking indicators, such as the unemployment rate, the inflation rate, the volume of nonperforming loans, the real exchange rate, influence the lending rate in a given country?

In order to build a suitable framework and contribution, the study proposes three working hypotheses, formulated in the form of questions, including the five selected variables and presented in Table 1:

1. Which of the analyzed indicators influences in a relevant manner the interest rate on granted loans?

2. How do inflation and the volume of nonperforming loans (NPLs) influence the evolution of the interest rate on loans?

3. Which of the indicators included in the survey does not influence in a relevant way the evolution of the interest rate on loans?

In order to find out which of the macroeconomic and banking indicators most influence the interest rate on loans, as well as the relationship between these indicators on short, medium, and long term, we used vector autoregressive distributed lag model, VARDL, and quantile regression models in the empirical study.

The vector error correction model VECM model allows us to understand the interdependencies between multiple time series on short term, but especially on long term between variables that are cointegrated.

Since some of the variables were stationary of order I(0) and others integrated of order I(1), in order to better capture the impact of the independent variables on the short-, medium and long-term interest rate on loans, the ARDL model was used. In addition to the VECM and ARDL models, quantile regression was also used to obtain robustness of results at different points in time over the entire analyzed period.

To test the stationarity of the data series, we used several criteria including: final prediction error - FPE, Akaike information criterion - AIK; Schwarz information criterion -SC, and Hannan-Quinn information criterion - HQ. Thus, after using these criteria, it resulted that the optimal number of lags to be used is 2 - according to LR (sequential modified LR statistical test), FPE (Final prediction error) and AIC (Akaike information criterion) and we continued the estimation of equations based on quantile regression and the relationships between the variables used at different points in time, short, medium and long term by means of VARDL model and variance decomposition.

Twenty countries around the world were selected for the research. These countries are located on three continents, Europe, Asia, and America (North and South), and had different degrees of development. Sixteen European countries were included: Austria, Belgium, Denmark, Germany, the Czech Republic, Greece, Italy, Spain, Romania, Slovakia, Slovenia, Sweden, the United Kingdom, France, Netherlands, Portugal; two countries from the North American continent: the USA and Canada, one country from Asia, China, and one from South America, Brazil.

A mix of quantitative financial instruments was used to capture the evolution, impact and influences of the selected macroeconomic indicators, also relevant for financial-banking activity (unemployment rate, inflation rate, volume of nonperforming loans, real exchange rate, financial freedom index), on the interest rate on loans, both short-term and long-term, in the context between two crises: the financial crisis and the pandemic crisis. Also, in order to better capture the financial conditions during the period under analysis, in addition to the financial indicators mentioned above, we also used two dummy variables: the zero lower bound related to times when interest rates were very close to zero and Covid-19 related to years with the Covid 19 pandemic.

The data is retrieved from the World Bank and TheGlobalEconomy, with records extracted for a 12-year period from 2009 to 2021. From an economic perspective, the selected countries play an important role in the global economy, which was an important element in selection.

The methodology used to verify the research hypotheses included 260 observations and panel data methodology was used for the econometric analysis, using the EVIEWS 12 software. The data series that were included have an annual frequency.

Other relevant argument for the selection of these countries is to ensure comparable data between the chosen countries globally - countries in Eastern Europe, Western Europe, North America, Asia, and South America. Among the countries in the chosen sample, we can highlight the countries with strong banking systems, namely the USA, China, Germany,

France, the UK, whose banking systems are dominant globally. Also, an important aspect in this research is the size of GDP of all countries in the chosen sample, of about 53%.

Subsequently, the characteristics of the variables used were evaluated in order to identify the optimal analysis methodology. Thus, the estimation of the regression model assumed the existence of important characteristics for the data series as well as the testing of specific hypotheses. In order to obtain relevant results, both from economic and statistical perspectives, we chose to analyze the effect on the interest rate on loans as the dependent variable. The variables used in the analysis are shown in Table 1.

Table 1. Variables Used in the Analysis

Variable type	Variable Name	Description
Dependent	Lending interest rate (%) - LIR -	Lending rate is the bank rate that usually meets the short- and medium-term financing needs of the private sector. This rate is normally differentiated according to the creditworthiness of the borrowers and the objectives of the financing.
Independent	Unemployment, total (% of total labor force) - UNEMP -	Unemployment refers to the share of the labor force that is without work, but available for and seeking employment. The definitions of labor force and unemployment differ by country.
	Bank nonperforming loans to total gross loans (%) - NPL -	Bank nonperforming loans to total gross loans are the value of nonperforming loans divided by the total value of the loan portfolio (including nonperforming loans before the deduction of specific loan-loss provisions).
	Inflation, consumer prices (annual %) - INFL_CPI_1 -	Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly.
	Real effective exchange rate index - RERI -	Real effective exchange rate is the nominal effective exchange rate (a measure of the value of a currency against a weighted average of several foreign currencies) divided by a price deflator or index of costs.
	Financial freedom index (0-100) - Finan_freedom_index -	The Financial freedom index evaluates: the extent of government regulation of financial services, the degree of state intervention in banks and other financial firms through direct and indirect ownership, the extent of financial and capital market development, government influence on the allocation of credit and openness to foreign competition.
	Zero lower bound - ZLB -	Is a dummy variable which takes value 1 for lending interest rate values close to zero, and 0 otherwise.
	Years with Covid-19 - COVID_19 -	Is a dummy variable which takes 1 for years with Covid-19 pandemic, and 0 for the rest of the years without Covid-19.

Source: Authors' own calculation based on World Bank data.

4. Results and Discussions

Stationarity was tested for each of the five variables, related to the 20 countries selected for analysis, and it was observed that some of them were not stationary. As a result, for each variable, the first difference was applied. To see the significance of the short and long-term variables, both overall and by country, the cointegration test was used.

Table 2. Autoregressive Distributed Lag (ARDL) Cointegration Test

Dependent Variable: D(LIR)			
Method: ARDL			
Variable	**Coefficient**	**t-Statistic**	**Prob.***
Long Run Equation			
NPL	0.112176	4.837427	0.0000
UNEMP	0.125276	3.100901	0.0024
RERI	-0.047493	-6.559734	0.0000
INFL_CPI_1	0.344433	4.282907	0.0000
Short Run Equation			
COINTEQ01	-0.289241	-4.27124	0.0000
D(NPL)	0.508241	1.44545	0.1510
D(UNEMP)	0.012538	0.087379	0.9305
D(RERI)	0.055638	1.21732	0.2260
D(INFL_CPI_1)	0.091769	1.279831	0.2032
FINAN_FREEDOM_INDEX	0.037611	3.234954	0.0016
COV_19	-0.258182	-1.085214	0.2801
Observations	260		
Root MSE	0.893447		-0.24592
S.D. dependent var	1.913454		1.3376
Akaike info criterion	0.736782		207.544
Schwarz criterion	2.708851		48.2184
Hannan-Quinn criter.	1.52958		
Note: Selected Model: ARDL(1, 1, 1, 1, 1)			

Source: Authors' own calculation based on World Bank and Global Economy data.

Following the application of this test, all the variables used are significant and have a long-term impact on all the countries considered in the sample. The short-term situation is different.

For the long-term coefficients of the VARDL model, the test was based on the Akaike Information Criterion (AIC), as shown in Table 2. Taking into account this criterion (AIC), a significant and negative relationship can be identified for the 5% significance threshold. This

implies that for a 1% increase in NPL, the interest rate on loans will increase by 0.11% and, on short term, also for the 1% increase of NPL, LIR will increase by 0.51%. In the case of a 1% increase in the UNEMP, the interest rate on loans will increase by 0.13%. In terms of the exchange rate, for a 1% increase in the RERI, the interest rate on loans will decrease by 0.05%. Also, with a 1% increase in inflation, the interest rate on loans will go up by 0.34%. Also, for the 1% increase in the financial freedom index, the lending interest rate will increase by 0.04%.

In the following analyzed countries - Austria, Belgium, Germany, Denmark, Italy, Romania, Slovakia, Slovenia, Sweden, United Kingdom, Netherlands, Portugal, China - it may be observed that on short term, all the analyzed variables are insignificant, with probabilities below the 5% threshold.

For the Czech Republic, unemployment has a probability of 22.50%, which reflects that on short term it is not significant. In the case of Greece, it may be noticed that inflation, which has a probability of 35.15%, is insignificant. This means that on short term, inflation does not have a significant impact on the interest rate on loans. In the case of France, both unemployment and inflation have an insignificant impact on the dependent variable interest rate on loans, with probabilities of 8.99% and 5.42%, respectively. In the case of Spain, on short term the impact of the volume of nonperforming loans is insignificant on the interest rate on loans, with a probability of 60.61%, well above the 5% significance threshold.

For the US, the insignificant short-term variable is NPL, with a probability of 48.66%; for Brazil, inflation and unemployment have an insignificant short-term impact with probabilities of 11.19% and 11.99%, respectively. In the case of Canada, as in the case of the US, the short-term NPL volume has no significant impact on the dependent variable loan interest rate, with a probability of 21.48%.

Table 3. Variance Decomposition

Variance Decomposition of LIR:								
Period	**S.E.**	**LIR**	**NPL**	**UNEMP**	**RERI**	**INFL_CPI_1**	**FIN_FRE_IND**	**ZLB**
1	1.893	100	0.000	0.000	0.000	0.000	0.000	0.000
2	2.941	94.027	0.355	1.383	0.251	3.878	0.013	0.093
3	3.613	88.451	1.996	1.828	1.172	5.873	0.309	0.372
4	4.137	83.846	4.460	1.588	1.598	7.552	0.511	0.444
5	4.553	80.942	6.625	1.580	1.683	8.160	0.575	0.436
6	4.912	79.678	8.119	1.427	1.804	7.958	0.568	0.446
7	5.265	78.868	9.250	1.257	1.900	7.735	0.548	0.442
8	5.606	78.282	10.032	1.124	1.964	7.632	0.534	0.431
9	5.930	77.715	10.610	1.017	2.050	7.654	0.525	0.428
10	6.238	77.138	11.102	0.931	2.135	7.749	0.520	0.426
11	6.528	76.618	11.534	0.863	2.208	7.837	0.516	0.424
12	6.803	76.193	11.911	0.801	2.271	7.885	0.512	0.424

Source: Authors' own calculation based on World Bank and Global Economy data.

Variance decomposition (VDC) indicates the level of information each variable has on the other variables in autoregression. (VDC) also determines how much of the variance forecast errors of each variable can be explained by exogenous shocks to the other variables. A variable that can explain most of the evolution by its own shocks thus becomes the most exogenous variable.

As shown in Table 3, for an average time interval of 3-5 years, we notice that the most pronounced impact on the dependent variable, interest rate on loans, have the variables inflation (5.87%), NPL (1.996%) unemployment (1.83%) and real exchange rate (1.17%). Also, for over 5 years, the order of the variables with a more significant impact on the LIR changes, is: inflation (8.16%), NPL (6.62%), real exchange rate (1.68%), followed by unemployment (1.58%).

Following the medium-term analysis, we may see that the impact of inflation contributes to the increase in interest rates on medium term, which also happens on long term, after a period of 12 years, which is in line with research by Christensen and Rudebusch (2019), and Asensio (2019).

Also, an important role is played by the relationship between the volume of nonperforming loans and the interest rate on loans. Thus, high loan rates will contribute to the increase in borrowers' debt, ultimately contributing to loan default. This is in line with theory and research by Bahruddin *et al*. (2018) that higher loan interest rates lead to higher levels of NPLs.

Also, as a result of the monetary policy response, lowering the interest rate on loans contributes to lowering the level of NPLs and increasing the quality of bank loans.

On long term, considering a time horizon of 12 years, it may be identified that the strongest impact on the interest rate on loans (LIR) has its own variable, in a percentage of almost 76%. This result may also reflect the effects of the monetary policy instruments used by the central banks of the selected countries that affect real interest rates. There are also variables with an impact on the dependent variable: NPL (11.91%), inflation (7.89%), real exchange rate (2.27%), unemployment (0.81%).

Reducing the unemployment rate can help companies hire more people, starting with lower interest rates on loans. This will implicitly lead to an increase in the volume of loans granted to companies (Hashima *et al*., 2021).

The remaining independent variables have a smaller direct long-term impact. The impact on the interest rate on loans will be indirect, through the correlations between the analyzed independent variables, which provides the answer to Question 1. In conclusion, the relationship between the nonperforming loans and the interest rate on loans is significant and mutual; a result particularly revealed on medium and long term.

The analysis shows that on short term (according to the selected 3-year interval), when inflation changes by 1%, the interest rate on loans varies by 5.87%. On medium and long term (6 and 12 years) at the same 1% change in inflation, the interest rate on loans varies by 7.96% and 7.89%, respectively. Regarding the 1% change in the volume of nonperforming loans, the interest rate on loans varies by 1.996% on short term, 8.12% for a 6-year period, and 11.9% on long term, which is the answer to Question 2.

Over a medium-time horizon, inflation, exchange rates, nonperforming loan volume and unemployment remain at a low level of direct significance to the interest rate on loans. This result highlights other indirect ways in which the relationships among these macroeconomic indicators might influence interest rates on loans, namely interest rate differentials between domestic and foreign rates, exchange rate volatility, the import channel, and increased

confidence in the market. The answer to Question 3 is given by the indicators of inflation, exchange rate and volume of nonperforming loans, which have a direct impact on the interest rate on loans, which is not significant.

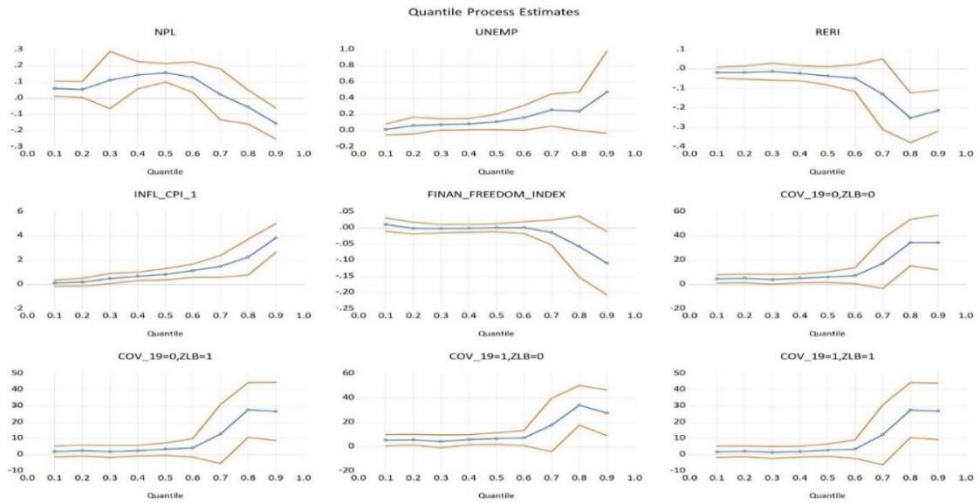
From the perspective of the concern to identify other aspects determined by the study of the relationships of these indicators, which might be the subject of future research to support the economic and monetary policy mix, we notice the opportunity provided by the trading on secondary markets of nonperforming loans and the adaptation of regulations to allow for this approach.

Import policy analysis must be performed in a broader context. It must be linked to the export structure of the country concerned, the ability to integrate imports into exports, the architecture of new value chains, the impact of the pandemic, with the development and adaptation of new financial support mechanisms and instruments, including innovation, technological progress, and orientation toward the new "green" economy.

The results of our empirical research suggest the existence of a co-integrating relationship between inflation and exchange rate for the whole sample of selected countries, and in the long run these two variables evolve together. The obtained results are in line with most previous studies, such as Choudhri and Hakura (2006), Ca'Zorzi *et al*. (2007), Arslaner *et al*. (2014), among many others, and are fully consistent from the viewpoint of theoretical approaches.

From the viewpoint of central bank money creation and liquidity management, we stress the importance of influencing liquidity preference. The indicators do not have a significant influence on the lending rate. The exceptions are the variables inflation, the volume of nonperforming loans, unemployment and the real exchange rate, which have a higher impact on the dependent variable interest rate on loans, according to the application of the methodology and the conduct of the tests, in the empirical study, using the impulse response function, as shown in Figure 1.

Figure 1. Quantile Process Estimates



Source: Authors' own calculation based on World Bank and Global Economy data.

In the quantile regression, we may observe both the impact of the variables in the periods before the low interest rates and the subsequent Covid-19 pandemic years and during these events.

Starting with the NPL volume increased up from third quantile, of 0.11%, to the fifth quantile, becoming, 0.16%, the NPL variable then has a decreasing to negative trend from the 6th quantile, of 0.13%, to the 9th quantile, becoming - 0.16%, being in agreement with Inhoffen *et.al.* (2021), as a result of monetary policies to reduce interest rates as close as possible to zero, thus contributing to the reduction in the NPL volume.

In the case of unemployment, we observe an increasing trend up to the 7th quantile, starting from 0.01% to 0.25%, then it decreases in the 8th quantile to 0.24% and afterwards it returns to the increasing trend in the 9th quantile to 0.48%, which highlights the fact that high unemployment leads to low interest rates on loans.

As for the exchange rate, it had a negative and decreasing trend until the eighth quantile, starting from - 0.02% to - 0.25%, after which from the ninth quantile it started an increasing trend, rising to -0.21% while the trend of the inflation variable was an increasing one throughout the 9th quantile, from 0.1% to 3.8%, thus contributing to the increase in the level of interest rates.

Also taking into account in the analysis both the periods with zero level bound and those related to the years with the Covid-19 pandemic, we may notice the increased impact of the analyzed variables on the dependent variable for all variables as compared to the periods without these economic contexts.

The result of the significant influence on the dependent variable given by the context of that variable itself can be interpreted through the lens of the accommodative monetary policies practiced by central banks during the period under analysis. Interest rates have converged to 'zero'. The literature includes diverse views on the effects of "zero" interest rates on investment (see Demertzis and Viegi (2021) on very low economic growth in Europe and globally). Zero interest rates have not helped to boost savings or use them to stimulate investment. Instruments needed to stimulate investment involve obtaining an adequate return in line with the risks taken. Additionally, the use of monetary policy to stimulate the economy may lead to higher inflation generated by financial assets.

An important point that may support policy choices regarding the analyzed indicators, and which may also reflect certain constraints, is the low interest rates effect that impacted financial markets in the period between the financial crisis and the pandemic crisis, which coincides with the interval selected in the empirical study.

These policy elements are approached in a different manner within the EU and the US economies. The use of savings in hybrid financial products to stimulate investment can be achieved if interest rates rise and allow for a specific return. For the US economy, "zero" interest rates have not been an impediment, as the US financial markets are the main channel for financing the US economy. The functional mechanisms in the US financial markets allow that, when interest rates are very low, financial flows migrate from bonds to equities. In addition, the role of the US dollar as a global reserve currency provides a greater degree of flexibility in deficit financing.

For the European economy, long-term "zero" interest rates might make it easier for inefficient companies to survive, thus creating unsustainable "zombie" companies. Bank profitability is also reduced. Although this policy has been effective in the US, Europe's central banks need to monitor how the nonbanking financial sectors are affected, especially pension funds, which suffer in the context of 'zero' interest rate policies, used on medium to long term.

In terms of answering the fundamental question of this research, from a global perspective, the macroeconomic and banking indicators analyzed influence the interest rate on long-term loans for all countries included in the sample, these findings being also in line with the research of Christensen & Rudebusch (2019). However, this influence is not direct, but it is based on the relationships between these macroeconomic indicators and the accommodative monetary policies that have been practiced by central banks during the specific period. It highlights the significant role of monetary policy, the calibration and selection of specific instruments influencing "prices" in the financial-banking market and, implicitly, the interest rates on loans.

Facilitating the transaction of nonperforming loans, analyzing and implementing measures to reduce countries' dependence on imports, integrating imports into exports, targeting financing to increase the share of value-added exports for the respective economy, developing a new industrial architecture linked with the new technological context should be concerns for creating viable economic policy options (Bahruddin and Masih, 2018).

In order to minimize existing constraints in the economic and financial structure of each country, it is necessary to develop new value chains, new instruments for financial support of production and exports, including technology, research and development programs.

5. Conclusions

Our research analyzed the effects of the interest rate on loans, transmitted through the relevant macro and banking variables: the volume of nonperforming loans (NPL), the real effective exchange rate, the inflation rate and the unemployment rate, and the financial freedom index.

The results of the study indicate that monetary policy together with policy makers play a dominant role in controlling the interest rate on loans, the volume of NPLs and the unemployment rate in the analyzed countries. Thus, reducing the level of NPLs can be done by reducing the interest rate on loans in each country, by trading NPLs on secondary markets, by carefully selecting clients and by improving credit quality management.

The relationship between the interest rate on loans and the level of NPLs over the analyzed period is asymmetric, as a result of the global financial crisis and the pandemic crisis and interest rates close to zero. On short and medium term, regardless of the decision of banks to increase or decrease the level of interest rates on loans, the NPLs will be increasing as a result of the economic shocks that have affected global economies, and keeping interest rates at levels close to zero on long term affects banks' profits.

The research reflects the important role of the unemployment variable, interconnected with all other indicators, for the selected countries. Policies connected to sustainable employment stimulation require particular attention within the policy mix. Design of new jobs, development of specific skills, continuous training of the workforce in line with economic dynamics, and retraining of a large part of the workforce have significant impact in supporting the transition towards a "new" and "green" economy.

The research results reflect the importance of developing a policy mix (monetary, economic, fiscal), adapted to the so-called Lucas critique regarding macroeconomic models, calibrated to the fundamentals of the respective economies. It is very important to focus on countercyclical policies, so that the economy and the financial-banking system of the country concerned can contribute to the adequate accommodation of transitory phenomena and the absorption of shocks.

For future research, the sustainability of banking business represents a priority, as the banking sector is one of the main pillars for financing the economies.

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