

Impact of macroeconomic shocks on banking sector loan portfolio. An European approach

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Abstract

Bank solvency is liable to credit risk shocks, as a effect of poor loan portfolio quality. Given the importance of the banking sector in ensuring financial stability, I capture the impact of macroeconomic indicators shocks, which proved to be early warning factors for a loan portfolio quality, using a VAR model. At European level, it has proven to be vulnerable to changes in the dynamics of its own evolution, due to the harmful effects caused by the global financial crisis. The potential political implications concerned the importance of cleaning up the portfolio of non-performing loans, ensuring the recovery of financial intermediation and, economic development.

Keywords: macroprudentiality; NPL; shocks; solvency; VAR

1. Introduction

The last decades have been characterized by the increase of financial and commercial ties between states, by the increase of capital flows between countries. The functioning and integration of international financial markets would not be possible without the fundamental contribution of financial intermediation institutions (banks, stock exchanges, mutual funds, pension funds, etc.), which allow the transfer of capital at international level and which act as an interface between those who need funds and those who have surplus capital.

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Macroprudential policy has become one of the main concerns of the monetary authorities. (IMF, 2018). The quality of the loan portfolio and the cleaning of the non-performing loan balance represented the number one priority on the agenda of the political decision makers, after the propagation of the effects of the global financial crisis, started in the USA in 2007.

Decreasing the loan offer and, implicitly, lowering financial intermediation is a profound and topical issue. In a quote by a representative of ARB, he reminds the importance of financial intermediation: "The development of the economy without credit is like a sportsman's desire to achieve world performance in the face of no training".

A PWC study for Romania highlights the problem of reducing financial intermediation, registering a level below 25% (2019), much lower than Poland and the Czech Republic (52%) and Bulgaria (51%), with 1/3 compared to the level registered 8 years ago, as a result of cleaning up the balance sheet of bad loans, being considered "best practice".

Among the factors that led to the decrease of financial intermediation were: the volatility of the legislative framework, the precarious situation of SMEs, entrepreneurship. The lack of banking discipline also reflected in the fact that in the last 50 years there were 50 new laws in the banking area, of which 5 were declared unconstitutional by the Constitutional Court.

As solutions to increase the degree of financial intermediation (non-governmental credit / GDP), banks need: legislative predictability (important for investors), capital, liquidity, clients with good credit. Among the consequences of the decrease of financial intermediation I mention: the reduction of the net wealth and the deepening of the differences between social classes, because the credit reduces the gaps, the increase of the migration.

Also, it is envisaged to diminish the effects of contagion between countries, through a unification of financial ties between states. Thus, the Banking Union, the Capital Markets Union come as a solution in order to facilitate the financial transactions between countries, as well as to strengthen the financial stability at global, but especially regional level. The paper is structured into four parts. The following two parts capture the description of the methodology and the expected results. The article concludes by presenting its own conclusions.

2. Methodology and data

The present paper aims to capture the effect of some macroeconomic indicators, which describe an overall tendency of the evolution of the loan portfolio quality, such as: consumer prices index (annual%) - CPI; total unemployment (% of total labor force) - UNE; GD

growth (annual%) - GDP; trade - (% of GDP) - TRA; current account balance (% of GDP) - CAB; real effective exchange rate variation (%) - RER. In view of capturing an overall tendency of the loan portfolio quality, I used as an endogenous variable, nonperforming loans to total gross loans (NPL) (%).

In the elaboration of the study I used data series with annual frequency, for a period of 10 years from the date of the outbreak of the financial crisis (2007). The included countries refer to: Romania, Bulgaria, Hungary, Poland, Czech Republic, Austria, Belgium, Cyprus, Croatia, Denmark, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Netherlands, United Kingdom.

Data were collected from the World bank database and Federal Reserve Bank of St. Louis and proved to be stationary level, being surprised their annual percentage evolution. The importance and the reason for choosing the data lies in their history of anticipating the deterioration of the quality of the loan portfolio. Thus, in order to study the impact of macroeconomic factors on the volume of non-performing loans, used as a proxy for the loan portfolio, I use a Vector Autoregression Model (VAR) in order to determine the systems formed by time series and to capture the effects of random shocks on the variables within the system. The rest of the regressors represent the explained and expected evolution of the variable, modeled according to the other variables in the system, as well as its past values (Holtz-Eakin, 1988). For capture the relative importance of external shocks in order to explain the evolution of the volume of non-performing loans, I used the impulse-response functions.

3. Interpretation of results

In order to estimate the model it is necessary to specify the number of autoregressive terms ("lags"). In this sense, using the informational criteria, shown in the table below (Table 1), I identified 2 as the optimal number of lags, the model being stable because the roots of the characteristic polynomial are subunit. (Stock, 2001) (Figure 1).

Table 1. The optimal number of lags selected by each criterion

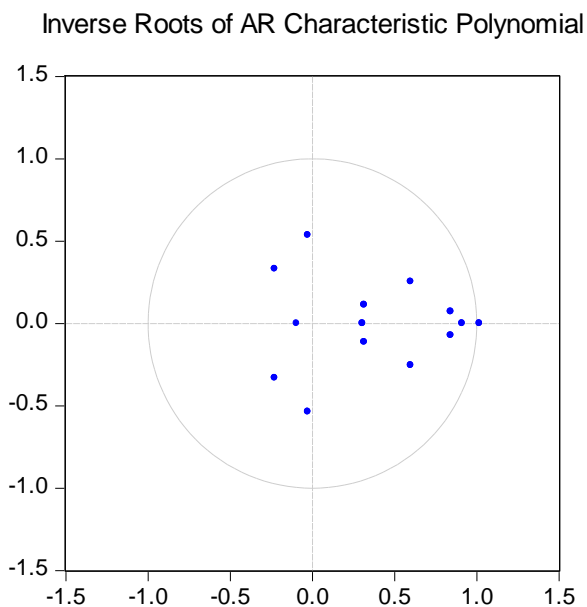
Lag	LogL	LR	FPE	AIC	SC	HQ
1	2123.456	1492.653	5.73e-25	-35.95576	-34.61910*	-35.41321
2	2225.091	176.7560	2.31e-25*	-36.87114	-34.36490	-35.85387*
3	2258.038	53.28824	3.13e-25	-36.59196	-32.91614	-35.09996
4	2314.586	84.57634	2.87e-25	-36.72323	-31.87783	-34.75651
5	2365.724	70.25850	2.98e-25	-36.76041	-30.74543	-34.31896

LR: sequential modified LR test statistic (each test at 5% level), FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion, HQ: Hannan-Quinn information criterion

Source: own contributions

The table above describes the results obtained from the successive addition of lags until the optimal number is obtained. Thus, the Akaike information criterion favors a single-lag model, and the Final prediction error and Hannan-Quinn information criterion indicates the number 2 as the appropriate number of lags within the described model.

Figure 1. The roots of the polynomial



Source: own contributions

Subsequently, I estimated the recursive VAR model, from which I eliminated the terms whose coefficients are very small, or whose standard error is very high, thus reducing their statistical significance. The simplified equation becomes:

$$NPL = 0.3512 * CPI(-1) - 0.2861 * CPI(-2) + 0.2848 * UNE(-1) - 0.046 * GDP(-1) + 0.0156 * TRA(-2) + 0.1611 * CAB(-1) - 0.0437 * RER(-1)$$

The results of the processed regression indicate the first conclusions regarding the dynamics of the endogenous variable. One of the most important determining factors in the estimated model is the consumer price index. The inverse link between the inflation rate and the volume of non-performing loans can be argued by the fact that borrowers are favored in case of inflation, because they will repay the bank the credit in the currency with less purchasing power. Thus, a decrease in inflation will erode the nominal value of the debt more slowly, which will determine the maintenance of the debt service share in the disposable income at a relatively constant level compared to the decreasing level of this indicator, registered in a more pronounced inflationary environment. On the other hand, during the first lag, from an econometric point of view, the dynamics of the volume of non-performing loans is sensitive to the variation of prices.

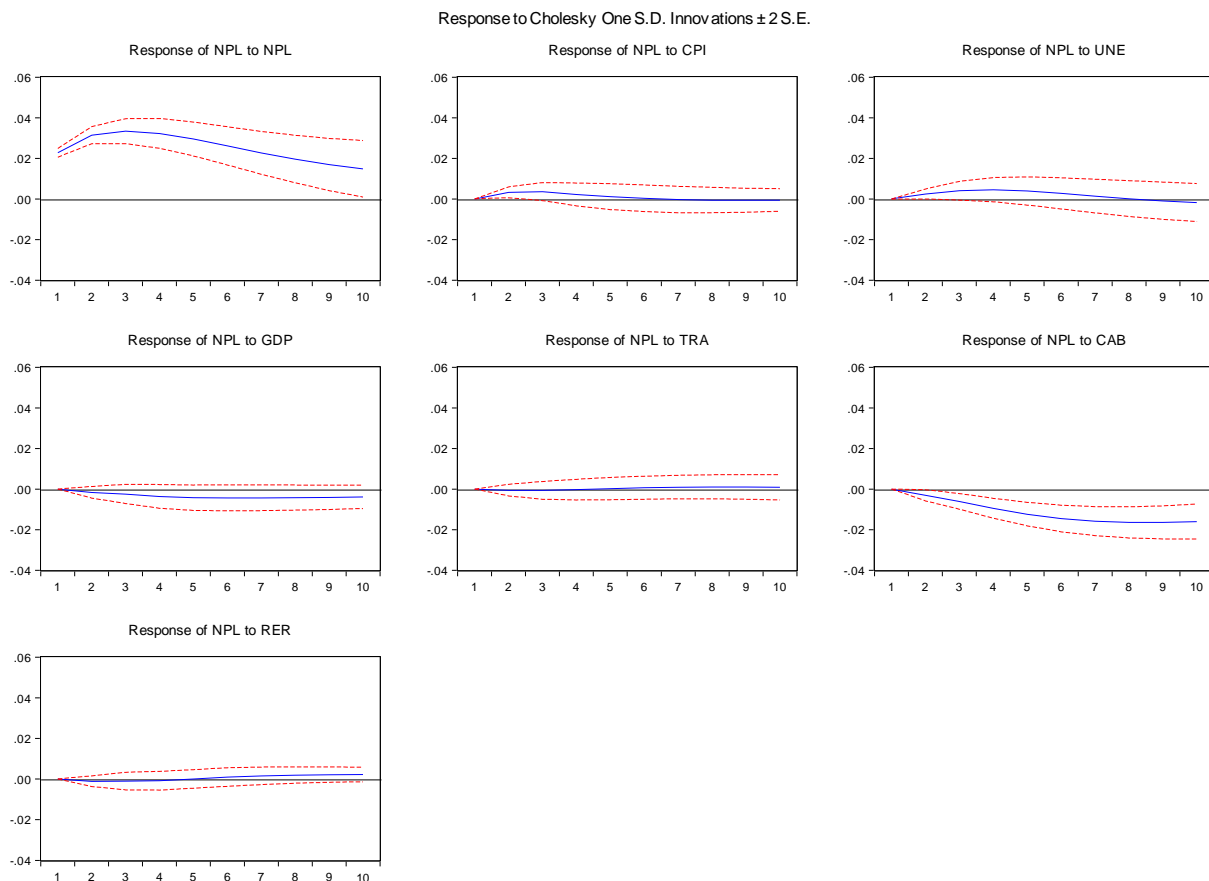
The direct relation between the level of the unemployment rate and the volume of the non-performing loans has its justification in the economic reality by the fact that the inability to pay the debtors can be accounted for by the decrease or the cancellation of the available

income, as the consequence of the increase of the unemployment, which attracts a change in the same sense of the the volume of non-performing loans.

Therefore, the higher the loan maturities, the more likely it is that the borrowers will not take into account the evolution of interest rates and unemployment, in the medium and long term.

Economic growth may be associated with a high level of inflation. Thus, I can consider that the volume of non-performing loans shows significant increases, following the restrictive monetary-fiscal policies, as can be seen in the figure below:

Figure 2. Impulse-response functions



Source: own contributions

Both the dynamics of the transactions and the balance of the current account have a positive impact on the volume of non-performing loans, especially in the light of the evolution of the exchange rate, the effect of the transactions being relatively delayed (lag 2).

The volatility of the exchange rate is very important from the perspective of the repayment capacity of the borrowers, especially when it comes to the national currency. In case of depreciation or sharpening of the national currency, the monetary authorities will show their influence especially on the interest rates, by increasing or reducing them. In the case where the loans are expressed in foreign currency, the influence is manifested by increasing or decreasing the level of the clients' rates converted into the national currency, implying an increase or decrease of the receipts in the national currency, in other words, a direct impact on the banks profitability.

4. Conclusions

The estimated results refer to capture those macroeconomic indicators, which have indicated over time influences on the loan portfolio quality.

The indicators used in the analysis have surprised an overall tendency, noting, in particular, the past values of the dynamics of the volume of non-performing loans, which print a positive influence on the present value, there being inertia in its evolution.

The potential political implications target the importance of cleaning up the portfolio of non-performing loans in order to increase financial intermediation and, consequently, to encourage investments.

The impact indicators impact helps the monetary authorities in making strategies more efficient, contributing to the economic growth.

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