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CAUSES OF NON-PAYMENT OF MORTGAGE LOANS: THEORETICAL AND PRACTICAL ASPECTS

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Abstract

Due to the significant share of mortgage loans in the portfolio structure of a large number of commercial banks, monitoring the ability of the household sector to repay debts is very important for financial stability. Since the accumulation of non-performing loans in banks' balance sheets is significantly affected by the fall in real estate prices, the paper will explain the factors that affect the cycles in the real estate market. The purpose of this paper is to show research that deals with the causes of non-performance of mortgage loans and the impact of lending standards on reducing systemic risk. In a period of crisis caused by various government measures to combat the COVID-19 pandemic, adequate lending standards are becoming even more important. Special attention in the paper is paid to the influence of LTV raids, the interest rate at which the loan was approved and the maturity of the loan on the probability of occurrence of default status. The paper provides a basis for further research that would include the extent to which the application of certain lending standards has contributed to the reduction of payment delays in the specific business conditions caused by the current pandemic.

Key words: theory of default, *housing market cycle*, Lending Standards

JEL classification: E32, G01, G21, E44

INTRODUCTION

Given the significant share of mortgage loans in the portfolio structure of a large number of commercial banks, the increase in the share of households that cannot repay overdue debts may have a negative effect on the bank's profit, which may further adversely affect financial stability. Therefore, the aim of the paper is to present research related to the reasons for non-fulfillment of obligations based on mortgage loans and factors that increase the probability of non-payment by households.

The first part of the paper presents two alternative theories of default, the theory of capital and the theory of ability to pay, which define the causes of default on the basis of mortgage loans.

The second part of the paper presents a review of the literature related to examining the impact of macroeconomic variables, including unemployment, economic growth,

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the share of interest in household income, real credit growth and real estate prices, on the inability to collect mortgage claims.

Crashes in the residential real estate market are common causes of banking crises and usually have severe consequences. For that reason, the third part of the paper deals with cycles in the real estate market.

Since numerous empirical evidence suggests that the main cause of serious banking problems is directly related to weak lending standards, the last part of the paper will deal with the impact of LTV raids, often considered one of the most important lending standards, on default rates.

1. ALTERNATIVE THEORIES OF DEFAULT

When determining the probability that there will be a delay in the payment of overdue debts on the basis of mortgage loans (mortgage arrears), two alternative default theories are most often used:

- The equity theory of default
- Ability-to-pay theory.

According to the theory of capital, the probability of non-payment is equal to the probability that the value of the pledged property will be less than the remaining debt on the basis of the mortgage loan. The reason for this may be the growth of annuities on the basis of a mortgage loan due to the growth of interest rates or the fall in residential real estate prices, which leads to the emergence of negative equity.

According to *equity theory*, a borrower may choose not to settle its obligations if its profits exceed the perceived costs of expected sanctions, including access to future sources of financing and its cost. These costs depend not only on the willingness of lenders to file sanctions, but on a range of institutional arrangements that govern the credit market, such as regulations, creditors' rights, and bankruptcy laws. (Jappeli and Pistaferri, 2007) Equity theory is based on the "strategic default" hypothesis, which implies that default occurs when the debtor's capital falls well below a threshold and the debtor decides that the cost of repaying the mortgage outweighs the benefits of continuing to pay and retain housing. In some US states, borrowers have the option of a strategic default ("walk away"), because their liability is limited to the value of the residential property. For this reason, the default due to the weak net position of capital can occur even if the household has no cash flow problems. The second hypothesis implies that default occurs only when the occurrence of negative capital is accompanied by a negative income shock and is known in the literature as the "double trigger" hypothesis.

According to the *ability-to-pay theory*, the debtor will continue to service the mortgage loan as long as he is able to pay periodic annuities, ie as long as his income, reduced by necessary expenses, is sufficient to settle the debt on the basis of the mortgage loan. The probability of non-payment according to this theory is equal to the probability that the debtor's income, reduced by necessary expenses, will fall below the periodic amount of the annuity based on the mortgage loan. The ability to pay theory suggests that the default occurs when individuals are unable to settle current liabilities, while according to the theory of capital, the default occurs after a rational analysis of all future benefits and costs associated with settling or not settling mortgage obligations.

In the next part of the paper, we will review the literature in which testing was performed to what extent equity theory and ability-to-pay theory explain the causes of default.

Jackson and Kasserman (1980) conducted an empirical study based on data from fixed-rate mortgages in the United States. They formally test the differences between these two alternative theories and find that equity theory better explains the causes of default than ability-to-pay theory. In empirical research, they used cross-sectional data of loans approved in 1969. The probability of the default was determined based on three variables:

Duration of the mortgage loan agreement,
Contractual interest rate,

The relationship between the loan and the value of the real estate on which the mortgage was established when approving the loan.

They found that the life of the contract and the loan-to-value ratio (LTV) ratio, which represents the ratio of the value of the mortgage loan to the value of the mortgaged property, were significant and positively related to the probability of default. The interest rate variable is, however, insignificant, which since this variable is most relevant to current cash flow gives preference to equity theory. It should be noted that the predictive power of the model, however, was small and was only 1%, i.e. the included variables are able to explain only 1 percent of the variations in the individual default probability.

Option pricing models applied to housing mortgages have traditionally been interpreted to be the default if borrowers have negative equity. This conclusion stems from the fact that positive capital implies that the debtor can sell the house or apartment, repay the mortgage and keep the difference, which is a better outcome under any circumstances compared to the suspension of loan payments and leaving the house or apartment. However, numerous studies have found that many borrowers with negative capital do not have a default. Foster and Order (1984) came to such results. In their work, they emphasize the importance of transaction costs, which can affect the absence of the expected default. Transaction costs include, among other things, sentimental attachment to home, relocation costs, negative effect on the reputation and loan-ability of the indebted.

Vandell (1995) points out the shortcomings of the option-theoretical mortgage pricing models, which assume that the borrower will decide on a default when the value of the property falls to the level of the mortgage, and includes in his research default transaction costs, solvency and the lender's influence on non-payment through the decision to foreclose.

A study conducted by *Foote, Gerardi, and Willen* (2008) on more than 100,000 Massachusetts homeowners who had negative capital during the early 1990s indicates that less than 10 percent of these homeowners eventually had their home confiscated. This result is fully in line with economic theory, which predicts that from the borrower's perspective, negative capital is a necessary but not a sufficient condition for foreclosure.

Goodstein, Hanouna, Ramirez and Stahel (2017) look at a large sample of mortgage loans in the United States between 2005 and 2009 and prove that the local area delinquency rate is an important factor for strategic defaulters, ie borrowers who, after considering the costs and the benefits decide to take advantage of the bankruptcy option, but not for bankruptcies that result from inability to pay because the borrowers

had no other choice. Their estimates indicate that a local delinquency rate of 1% may increase the probability of strategic or intentional default on credit by 7.25–16.5%.

According to Aron and Muellbauer (2016) the default of the household and at time t , due can occur when the following condition is met:

$$\log(\text{mortgagedebt}_{it}/\text{equity}_{it}) > \tau_{it} \quad (1)$$

where the threshold τ_{it} depends on the expected growth rate of residential real estate prices and on the instability of residential real estate prices.

The default can also occur due to cash flow problems, when the debt service ratio function exceeds the threshold τ_{it} , but the default also depends on the creditworthiness of the household, employment status and expected income growth. Aaron and Muellbauer acknowledge the fact that even when there are cash flow problems, it is unlikely that households with positive net housing equity will default, since, as such, households may have the option of refinancing or sale, thus not allowing to be seized. Therefore, with the possibility of refinancing, combining both of these triggers, the possible default condition is:

$$\begin{aligned} f(\text{debt service ratio}_{it}, \text{ur}_{it}, \text{cs}_{it}, \Delta y_{it}^c) > 0 \\ \text{and } \log(\text{mortgage debt}_{it}/\text{equity}_{it}) > \tau_{it} \end{aligned} \quad (2)$$

where:

ur household unemployment rate,

cs credit score i

Δy represents the expected revenue growth.

It is most likely that the parameter τ_{om} will be negative because significant capital will be required for refinancing, while transaction costs must be covered at the time of sale.

The default in the double trigger model occurs if the first and / or second condition is met.

Gete and Zecchetto (2018) point out that in Ireland and Spain, mortgage debt is not repaid, even after personal bankruptcy. In most European countries, bankruptcy proceedings last for years, and during that time, almost all the income must be used to repay the debt. On the other hand, even if in most US states in theory the borrower's liability is not limited to the value of residential real estate, the difference is rarely settled due to legal obstacles and costs associated with settling the difference between what the debtor owes and what the lender charges from seized property. Mortgage loans that do not have the ability to claim the difference between the value of the debt on the basis of a mortgage loan and the value of residential real estate are more risky for lenders, and are approved at a higher rate.

Research conducted by Ghent and M. Kudlyak (2011) in the United States supports the hypothesis that homeowners in states with laws giving the right to claim the difference between the value of a mortgage and a mortgaged property are less likely to decide on a default. Their results show that some borrowers do not opt for the default when the lender has the right to claim the difference between the value of the mortgage loan and the mortgaged property, which indicates that they are able to continue to pay the mortgages.

Before the law was changed in Nevada, lenders had to sue their debtors to collect the difference between the value of the mortgage loan and the mortgage property. However, the adjudicated amount was limited to less than the difference between the

total debt and the fair market value of the property or the difference between the total debt and the sale price of the seized property. Since the mortgage crisis began in 2007, new laws have been enacted in many U.S. states, including Nevada, to avoid foreclosures. Lee and Oswald (2017) study whether the change in the law affected mortgages for the purchase of residential real estate approved after October 2009 in the state of Nevada. In their research, they found evidence that the supply of mortgages may be lower in countries with “default-friendly” laws, as it is to be expected that lenders who are not entitled to other assets of borrowers late in repaying debt will be reluctant to approve mortgages, especially when the cost of seizure is high and the price at which the seized property can be resold is low. Also, if lenders notice an increase in the probability of default as a result of the abolition of the right to the difference between the value of credit and real estate, they will tighten their lending standards by lending to less risky borrowers, giving less loans or lending at higher mortgage rates, hesitating to approve a mortgage loan, especially when the cost of seizure is high and the price at which the seized property can be resold is low. Also, if lenders notice an increase in the probability of default as a result of the abolition of the right to the difference between the value of credit and real estate, they will tighten their lending standards by lending to less risky borrowers, giving less loans or lending at higher mortgage rates.

Both theories suggest that macroeconomic factors, such as lower housing prices, rising interest rates and higher unemployment, reduce the ability of households to pay their liabilities and may increase the inability to collect receivables on the basis of mortgage loans. Several studies focusing on the causes of default in the case of mortgage loans, which we will list in the next part of the paper, prove the importance of these macroeconomic variables.

2. EXAMINATION OF THE IMPACT OF MACROECONOMIC FACTORS ON THE INABILITY TO COLLECT RECEIVABLES FROM MORTGAGE LOANS

Beck, Jakubik, and Piloiu (2013) point out that the fact, that credit portfolio performance is strongly linked to the economic cycle, is well known and not surprising. Macroeconomic variables such as unemployment, economic growth, the share of interest in household income, real credit growth and real estate prices, etc. have a significant impact on the accumulation of non-performing loans (NPLs) in banks' balance sheets.

High NPL ratio often reduces the bank's ability to operate optimally due to (BIS 2017):

- capital constraints - an increase in NPLs leads to increased capital requirements. Additional capital becomes tied up, while it could otherwise be used for other profitable opportunities, including, for example, further lending;
- reduced profitability - the portfolio of non-performing loans generates less income, and in addition banks have to make additional provisions when the loan becomes problematic, which negatively affects net income.
- increased financing costs - potential investors tend to demand a higher risk premium due to lower expected profits and constrained capital.

The recent financial crisis has highlighted the importance of understanding macroeconomic factors in credit risk management.

Gizycki (2001) examines the overall credit risk variability of Australian banks during the 1990s. As a measure of risk, the ratio of credit losses to the balance of loans in the balance sheet was used. It is shown to what extent this total variability can be explained by the variability of the level of total credit risk of banks over time or by the change in the average credit risk of different banks. In his research, he came to the conclusion that although most of the variability in credit risk and profitability of banks is due to differences in selected business strategies and efficiency of banks, macroeconomic variables strongly affect the risk and profitability of banks.

An empirical model of mortgage arrears developed by Whitley, Windram, and Cox (2004) examines the impact of:

mortgage income gearing (MIGM) -,

unemployment rate,

undrawn equity,

loan-to-value ratio for buyers of the first apartment,

on the proportion of mortgage loans that are delayed in repayment by six months or more in the UK market.

According to the results published in 2004, the indebtedness indicator has the greatest impact on the proportion of mortgage loans with a repayment period of six months or more, while the unemployment rate, the amount of unused capital and the loan-to-value ratio have a significant impact on the dependent variable for first time buyers. In addition, this empirical model suggests that mortgage debts are negatively related to the loan-to-value ratio. One possible explanation for this is the effect of other mortgages, which are usually on lower loan-to-value ratios but have a higher risk.

In a study by *Elul* and a group of authors (2010) based on data from *Lender Processing Services* on loans granted in 2005 and 2006 on the US market, data from the credit bureau (*Equifax*), data from the *Federal Housing Finance Agency* on the house price indexes and data from the *Bureau of Labor Statistics* on unemployment rates, it has been proven that unemployment rates are associated with a higher default risk and are in strong interaction with the combined loan-to-value ratios - CLTV.

Magri and *Pico* (2011) investigate whether and to what extent household credit risk, measured by predicted delinquency, affects the price of mortgage credit in Italy. Their research shows that for mortgage loans approved between 2000 and 2007, an increase in interest rates on mortgage loans by 21 basis points causes an increase in the probability of default by 1%. The authors compare their results with the results of *Edelberg* (2006) estimated in the United States in the late 1990s. *Edelberg* found that in the second half of the 1990s, an increase in interest rates of 38 basis points was associated with an increase in the probability of default of 1%.

Aaron and *Muellbauer* (2016) used the available macro data from 1983 to the first quarter of 2014 to create a model for predicting housing loan foreclosures and mortgage arrears, taking into account institutional and political changes using the latent variables approach. The paper also analyzes the forecast scenarios until the end of 2020.

From the above-mentioned factors that have an impact on delays in payment on the basis of a mortgage loan, in the next part of the paper we will deal with lending standards and cycles in the residential real estate market.

3. CYCLES IN THE RESIDENTIAL REAL ESTATE MARKET

Recent housing market research recognizes the importance of housing market cycles in their prices. Due to certain characteristics, such as supply inelasticity, infrequent trades, opaqueness, short-term financing of construction together with long-term financing of housing purchase, residential real estate markets are essentially prone to cycles of ups and downs (“boom-bust” cycles). (Igan & Loungani, 2012) Real estate market transparency is one of the measures aimed at preventing the emergence of crisis situations. For this reason, Directive 2014/17 / EU of the European Parliament and the Council of February 4th in 2014 on consumer credit agreements relating to immovable property was adopted, requiring Member States, inter alia, to ensure the existence of reliable standards for the valuation of immovable property and their application by authorized persons and a transparent real estate market.

Some of the most severe systemic financial crises have been linked to cycles in real estate markets. As a reason for this impact of the real estate market on financial stability, Hartmann (2015) cites four reasons. The first reason is that construction is an important sector of the real economy because many companies and households own real estate. For this reason, changes in real estate prices can have major economic and social consequences. Another reason is that construction projects or purchases of residential real estate are often financed from loans. As a consequence, a significant drop in real estate prices can lead to negative capital, ie a negative difference between the value of a mortgage loan and the value of mortgaged property. Third, due to high transaction costs, rare tradings and the inability to sell for a short time, the real estate offer tends to adjust slowly, which also affects the pricing process. Fourth, the indivisibility of real estate further complicates the problem of falling prices.

The cycles of the real estate market are influenced by factors on the supply and demand side. Demand-side factors relate to demographic changes, including changes in population caused by migration, income growth, the conditions under which mortgage loans are granted, or tax breaks. Property tax can act as a reinforcing or mitigating factor in the dynamics of housing prices, while the dependence of the country's economy on this type of income can shape policy-making in this area. (European Systemic Risk Board, 2019)

The growth of real estate prices is influenced by, among other things: an increase in disposable income and / or population size; rising costs associated with the purchase of new housing, and falling interest rates.

The sensitivity of real estate prices to changes in interest rates should be higher in countries where the share of mortgage loans placed at variable interest rates is higher. The reason for that is that the expected growth of interest rates on international markets would increase financing costs for debtors who have agreed loans with variable interest rates, which could cause delays in repayment of part of receivables and worsening the quality of the loan portfolio in the banking sector. Campbell and Cocco (2015) in their study concluded that when interest rates and inflation fall to default it occurs more often in the case of fixed rate loans, and conversely when interest rates and inflation rise to default it occurs more often in the case of a variable rate loan.

Since the purchase of apartments is usually financed by mortgage loans, and many potential homeowners are limited in the amount of loans they can get, the loan offer should affect the prices of residential properties.

It has been documented that during all phases of the real estate cycle, there is a link between rising real estate prices and rising mortgage loans on the one hand, and between rising real estate prices and rising investment in construction on the other. The link between rising real estate prices and mortgage credit growth is also confirmed by Cerutti, Claessens, and Laeven (2015) identifying as many as 49 of the 85 real-estate booms related to credit growth. Also, they document that the decline in real estate prices is mainly accompanied by recessions (in the sample, 49 out of 78 real estate price increases ended in recession). Regarding the characteristics of housing finance standards, which will be the subject of the next part of the paper, their analysis shows that the higher the LTV ratio, the higher the probability of a real estate boom, which is also supported by the studies conducted by Crow and others (2011) and Cerutti, Claessens and Laeven (2015).

4. LENDING STANDARDS

An important feature of the financial crisis that began in the summer of 2007 is the growing delay in the payment of overdue mortgage loans. Many different factors contributed to the global financial crisis of 2007-09. One of the key factors is the growth of submarine mortgages in the mid-2000s. Low initial interest rates made mortgage loans seem favorable to many households. However, for a large proportion of debtors on mortgage loans granted in 2006 and 2007, there were delays in the payment of principal and interest or even foreclosure proceedings only a few months later. Demyanyk and Hemert (2011) emphasize that credit quality deteriorated for six consecutive years before the crisis and that securitizers were, to some extent, aware of this. Over time, the average loan-to-value (LTV) ratio grew, as did the share of loans granted with incomplete asset or income documentation. The rapid rise and fall of the mortgage market is reminiscent of the classic lending boom-bust scenario.

The beginning of the crisis was characterized by a decline in residential real estate prices, an increase in arrears in the payment of loans and seizure of residential property, as well as a decrease in the value of mortgage-backed securities. These events initially affected the housing and financial sectors, but their negative effects quickly spread to other sectors of the economy.

The initial shock caused by the increase in mortgage arrears due to falling real estate prices in the US and some European countries was the trigger for a liquidity crisis which, due to complex interconnections and interactions in the financial system, had serious impact on the global economy and financial stability.

Numerous empirical evidence suggests that the main cause of serious banking problems is directly related to weak lending standards. A large number of studies have found a correlation between the default rate and the loan-to-value ratio at origination (OLTV ratio), which is often considered one of the most important lending standards. For this reason, the OLV ratio is used as a macroprudential tool in some countries. An intergovernmental empirical analysis of 49 countries from 2000 to 2010 presented in the IMF report (2011) indicates that macroprudential policy reduces systemic risk, mainly through credit-to-value (LTV) and debt service to income (DTI) measures, or liquidity-related measures (required reserves). Galati & Moessner (2013) point out that there is evidence that macroprudential policy, applied before the last financial crisis, could have positively influenced the turn of events.

The following chart shows the movement of OLTV raids in the period 2000-2016. In the eurozone countries, we can see that this ratio in France is relatively high compared to other countries, which can be explained by the existence of private guarantee schemes. Also, it can be noticed that the aggregate OLTV ratio in the Netherlands increased after the financial crisis and reached its peak in 2013, after which it began to decrease due to the introduction of the upper limit of OLTV in 2012.

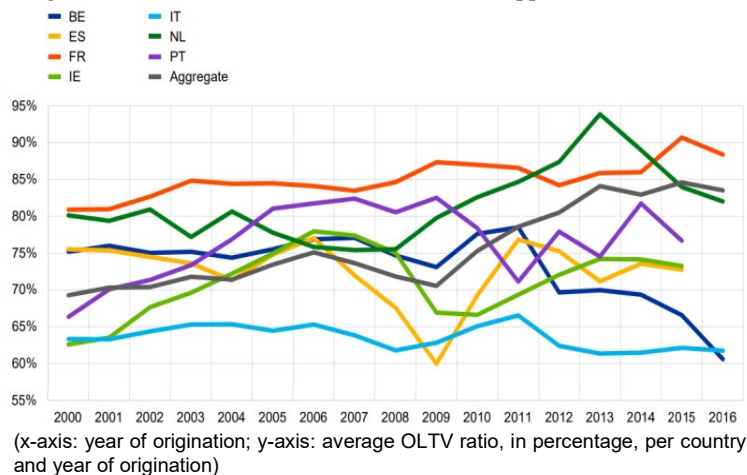


Figure 1. Developments in OLTV by country
 Source: <https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op220~47edfcc84d.en.pdf>

The chart shows sharp declines in total OLTV raids in some countries, and the reason for this is that during the crisis, banks became increasingly risk averse and tightened lending standards. In the period from 2008 to 2009, the largest decrease in OLTV raids could be noticed in Spain and Ireland, which were also the countries in which the prices of residential real estate recorded the largest decline in that period.

Analysis of the data in the observed sample confirmed a strong positive relationship between OLTV raids and default rates in all countries except Spain. Default rates are especially increased for loans with an OLTV ratio above 100% in France, Italy and Portugal. In Belgium, the largest increase in the default rate was recorded for loans whose OLTV ratio ranged from 80 to 100%, while in Ireland loans with an OLTV ratio above 60% have much higher default rates than those below this threshold.

In an article published as part of the Financial Stability Review in 2020, it was shown that the average indicators have changed LTV (Loan-to-value); LTI (Loan-to-income) and LSTI (Loan-service-to-income) in the euro area increased between 2016 and 2018, which indicates the easing of lending standards. The average LTV ratio increased from 80.3% to 81.0%, mainly due to the high average LTV ratio in France (89%), the Netherlands (84%) and Germany (83%) and LSTI from 24.0% to 24.4%, while the average LTI ratio recorded a significant increase from 4.0 to 4.4, which means that the average household in 2018 allocated 40% more annual income for the purchase of residential real estate compared to 2016. Households from the Eurozone in 2018, which took loans for the purchase of a house or apartment, on average provided funds in the amount of 81% of the purchase price through loans, and spent 24.4% of their income on servicing loans.

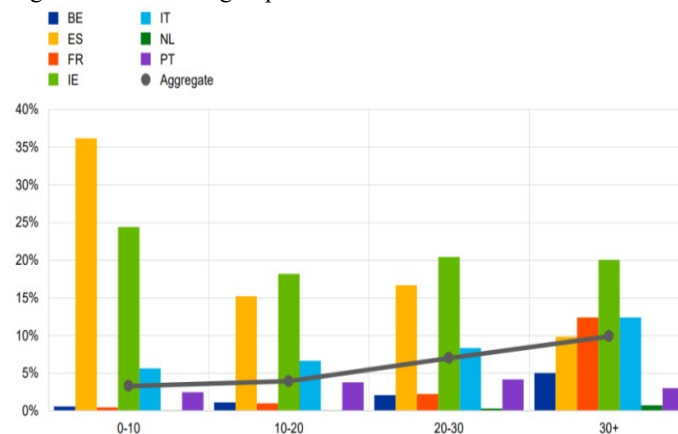
During the period 2016-2018, the average in the eurozone countries LTV rationed varied between 53% and 87%, and averageLTI ratio between 3.1 and 6.7.

The ECB report (2020) shows areas in which it is necessary to improve lending standards for banks operating in the euro area before the crisis caused by the COVID-19 pandemic. The data indicated an increase in risk in housing loan portfolios in some countries over the last few years, which in some cases was not accompanied by the necessary increase in interest margins (spread), thus reducing the ability to make necessary provisions for unexpected losses (ULs). Loans with these characteristics are particularly sensitive to the macro-financial conditions in which banks have been operating since the outbreak of the COVID-19 pandemic.

It should be borne in mind that a high average OLTV ratio does not necessarily imply a loose credit policy by a bank if, for example, national regulations require that loans with a high OLTV ratio must be linked to the existence of a time deposit.

The type of interest rate at which the loan is approved (fixed or flexible) and the maturity of the loan can also have an impact on the default. Borrowers are more likely to face difficulties in paying off their mortgage debt when interest rates are volatile and / or when annuities are higher, as is the case with short-term loans.

Default rates also increase according to the due date. As can be seen in the following chart, this ratio applies to all countries except Ireland and Spain where the highest default rate is in the group with the lowest maturity, which may be related to higher average annuities in the group of loans with short maturities.



(x-axis: maturity buckets in years; y-axis: share of the sample's total original balance originated in a given country being reported as defaulted, per maturity bucket)

Figure 2. Loan default rate, by original maturity bucket

Source: <https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op220~47edfcc84d.en.pdf>

Dimitris Mokas and Rob Nijskens (2019) confirm that short-term loans with variable interest rates can potentially create a large burden and may be associated with increased credit risk. They also point out that loans granted at a time of high growth in a period of weaker lending standards have a higher proportion of defaults.

Stanga, Vlahua and Haana (2017) collected information on mortgage default defaults in 26 countries in the period from 2000 to 2014. They show that longer loan maturities are associated with lower default rates, which may be due to increased

availability of periodic payments. However, this effect corresponds to very long maturities. This indicates that the maturity is associated with lower default rates if it is significantly longer than 26 years, which was the average maturity in the sample. Likewise, average default rates are lower when fixed rate loans are the dominant type of mortgage contracts.

Gaudêncio, Mazany, and Schwarz (2019) show that for eurozone countries, higher LTV i LTI indicators and longer loan maturities increase the likelihood of borrowers defaulting.

Based on the above, we can conclude that lending standards are the key to ensuring financial stability.

CONCLUSION

Numerous authors focus on two hypotheses regarding the reasons why borrowers do not fulfill their obligation on the basis of mortgage loans. Under the "strategic default" hypothesis, non-payment occurs when the debtor's capital falls well below a certain threshold and the debtor decides that the cost of repaying the mortgage outweighs the benefits of continuing to pay and retain the residential property. The second "double trigger" hypothesis implies that default occurs only when the occurrence of negative capital is accompanied by a negative income shock. Comparing the research conducted at different times and in different areas, it can be concluded that the decision not to pay mortgage loans largely depends on whether borrowers have the obligation to settle the differences between the value of debt on a mortgage loan and the value of residential real estate.

Macroeconomic factors that include cyclical variables such as unemployment, economic growth, the share of interest in household income, real credit growth and real estate price movements, etc. have a significant impact on the accumulation of non-performing loans (NPLs) in banks' balance sheets. After the previous financial crisis, special attention was paid to the movements of residential real estate prices, which are becoming a key indicator on the basis of which the state of the economy in the Eurozone is being assessed. It is shown that the growth of real estate prices is primarily influenced by the increase in disposable income and / or population size; rising construction costs and falling interest rates.

The paper shows that weak lending standards can significantly contribute to vulnerabilities in the financial sector. In the years before the global financial crisis, there was a significant easing of lending standards due to rising housing prices. Everything changed with the collapse of the housing market in the United States and the eurozone, and as a result, banks tightened their lending standards.

Given that a number of studies have confirmed that restrictive lending standards can strengthen financial stability by reducing the frequency of defaults, determining the degree of potential increase in LTV, interest rates and maturities that would cause higher payment arrears could be one of the more significant researches on the territory of Northern Macedonia.

REFERENCES

Aron, Janine, and John Muellbauer. 2016. Modeling and forecasting mortgage delinquency and foreclosure in the UK. *Journal of Urban Economics* 94, 32– 53.

- Beck, Roland, Petr Jakubik, and Anamaria PiloIU. 2013. Non-Performing Loans: What Matters in Addition to the Economic Cycle?. *ECB Working Paper* No. 1515
- BIS. 2017. Resolution of Non-performing Loans - Policy Options. *FSI Insights on Policy Implementation* no. 3.
- Campbell, John Y., and João F. Cocco. 2015. A Model of Mortgage Default. *The Journal of Finance*. John Wiley and Sons. <https://doi.org/10.1111/jofi.12252>.
- Cerutti, Eugenio, Jihad Dagher, and Giovanni Dell'Ariccia. 2015. Housing Finance and Real-Estate Booms: A Cross-Country Perspective. *International Monetary Fund*.
- Cerutti, Eugenio., Stijn Claessens, and Luc Laeven. 2015. The Use and Effectiveness of Macroprudential Policies: New Evidence. *IMF Working Paper 15/61*, International Monetary Fund, Washington.
- Crowe, Christopher W., Deniz Egan, Giovanni Dell'Ariccia, and Pau Rabanal. 2011. Policies for Macroprudential Stability: Options to Deal with Real-Estate Booms. *IMF Staff Discussion Note 11/0*. International Monetary Fund, Washington.
- Demyanyk, Yuliya and van Hemert Otto. 2011. Understanding the Subprime Mortgage Crisis. *The Review of Financial Studies* Vol. 24, no. 6, pp. 1848-1880
- ECB. 2020. Trends and risks in credit underwriting standards of significant institutions in the Single Supervisory Mechanism Main findings from the credit underwriting data collection 2019, Available at: https://www.bankingsupervision.europa.eu/ecb/pub/pdf/ssm_creditunderwriting202006~d2a9e3329c.en.pdf
- Edelberg, Wendy. 2006. Risk-based pricing of interest rates for consumer loans. *Journal of Monetary Economics* 53, 2283–2298.
- Elul, Ronel, Nicholas Souleles, Souphala Chomsisengphet, Dennis Glennon and Robert Hunt. 2010. What “triggers” mortgage default?. *American Economic Review* 100 (2), 490-494.
- European Systemic Risk Board. 2019. Vulnerabilities in the residential real estate sectors of the EEA countries, ISBN 978-92-9472-125.
- Foote, Christopher L., Kristopher Gerardi, and Paul S. Willen. 2008. Negative Equity and Foreclosure: Theory and Evidence. *Journal of Urban Economics* 6 (2), 234-245.
- Foster, Chester, and Robert Van Order. 1984. An option based model of mortgage default. *Housing Finance Review* 3, 351-372.
- Galati, Gabriele and Moessner, Richhild. 2013. Macroprudential policy - A literature review. *Journal of Economic Surveys* 27 (5). 846-878.
- Gaudêncio, João, Agnieszka Mazany, and Claudia Schwarz. 2019. The Impact of Lending Standards on Default Rates of Residential Real-Estate Loans. *ECB Occasional Paper* No. 220 (2019); ISBN 978-92-899-3685-9. Available at: <https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op220~47edfcc84d.en.pdf>
- Goethe, Pedro, and Franco Zecchetto. 2018. Mortgage design and slow recoveries. the role of recourse and default. Available at SSRN: <https://ssrn.com/abstract=3082409> or <http://dx.doi.org/10.2139/ssrn.3082409>
- Ghent, Andra C., and Marianna Kudlyak. 2011. Recourse and residential mortgage default: Theory and evidence from US states. *Review of Financial Studies* 24 (9), 3139- 3186.
- Gizycki, Marianne. 2001. The Effect of Macroeconomic Conditions on Banks' Risk and Profitability. *RBA Research Discussion Paper* No 2001-06.

- Goodstein, Ryan, Paul Hanouna, Carlos D. Ramirez and Christof W. Stahel. 2017. Contagion effects in strategic mortgage defaults. *Journal of Financial Intermediation Elsevier* vol. 30 (C), 50–60.
- Hartmann, Philipp. 2015. Real estate markets and macroprudential policy in Europe, *Journal of money, credit and banking: JMCB*. - Malden, Mass. [ua]: Wiley-Blackwell, ISSN 0022-2879, ZDB-ID 218362-6. - Vol. 47.2015, S1, p. 69-80
- Egan Deniz. ABOUT. and Prakash Loungani. 2012 *Global Housing Cycles*, *IMF Working Papers* 12/217, International Monetary Fund.
- International Monetary Fund. 2011. Global financial stability report. Available at <http://www.imf.org/External/Pubs/FT/GFSR/2011/02/index.htm> (last accessed 21 December 2011).
- Jackson, Jerry R., David L. Kaserman. 1980. Default risk on home mortgage loans: a test of competing hypotheses. *The Journal of Risk and Insurance* 47-4, 678-690.
- Jappelli, Tullio and Pistaferri Luigi. 2007. Do people respond to tax incentives? An analysis of the Italian reform of the deductibility of home mortgage interests. *European Economic Review* 51 (2), 247-271.
- Kelly, Jane, Julia Le Blanc, and Reamonn Lydon. 2019. *Pockets of risk in European housing markets: then and now*. *Working Paper Series* No. 2277, ECB.
- Li, Wenli, and Florian Oswald. 2017. Recourse and residential mortgages: The case of Nevada. *Journal of Urban Economics* 101, 1–13.
- Magri, Silvia and Raffaella Pico. 2011. The rise of risk-based pricing of mortgage interest rates in Italy. *Journal of Banking & Finance* 35 (5), 1277–1290.
- Mokas, Dimitris and Nijskens Rob. 2019. Credit risk in commercial real estate bank loans: the role of idiosyncratic versus macro-economic factors, De Nederlandsche Bank Working Paper No. 653.
- Stanga, Irina, Razvan Vlahu and Jakob de Haan. 2017. Mortgage Arrears, Regulation and Institutions: Cross-Country Evidence. De Nederlandsche Bank Working Paper No. 580. Available at SSRN: <https://ssrn.com/abstract=3094242> or <http://dx.doi.org/10.2139/ssrn.3094242>
- Vandell, Kerry D. 1995. How Ruthless is Mortgage Default? A Review and Synthesis of the Evidence. *Journal of Housing Research* 6 (2): 245-264
- Whitley, John, Richard Windram and Prudence Cox. 2004. An empirical model of household arrears. *Bank of England Working Paper* 214.