MACROECONOMIC FACTORS OF NON-PERFORMING LOANS IN COMMERCIAL BANKS

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Abstract. *This article presents an analysis of macroeconomic factors and their impact on the percentage of non-performing loans (NPLs) in commercial banks of the EU countries. This problem is relevant because in recent years many EU countries had the economic downturns that can be visible in the main macroeconomic indicators. Also, banks have met the growth of non-performing loans when the debtors were not able to meet their financial obligations. The Basel III Agreement notes the necessity to consider the economic conditions of a country when assessing the credit risk of loan applicants. The results of this research can be useful for banks, because the main relations between macroeconomics and non-performing loans have been revealed. Since 2009, Lithuania has one of the highest NPL percentage in the EU, and the meaningful impact of economic deterioration on the debtors' ability to repay debts to banks has been proven. The same situation was ascertained in other EU countries with imperfect economic conditions. Conversely, it has been estimated that banking systems in the EU countries with developed economies are not very sensitive to the business cycle fluctuations. So, in Lithuanian banks, when managing credit risk, the consideration of economic conditions is very important.*

Key words: *banks, credit risk, macroeconomics, non-performing loans*

Introduction

Banks are very important constituents in the financial system of countries and play a fundamental role in the global economy. Therefore, if the financial system does not work properly, its problems have a strong impact on the whole economy. For this reason, policymakers, regulators, academics and practitioners pay close attention to the soundness and stability of this sector in every country (Rodriguez-Moreno, Pena, 2013). The activity of banks is constantly influenced by different factors that cause different types of risks. So, the risk management is a major concern for all banks. According to Al-Jarrah (2012), the sources of risks-facing financial institutions can be divided into two main categories: systematic and non-systematic. The systematic risk factors have a strong impact on all financial institutions in the market, and the sources of systematic risk are related to variables that are beyond the bank's control. The non-systematic sources of risk vary and are related partly to bank-specific variables. One of the current problems that banks

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face is the growth of non-performing loans (NPLs). The causes of this malfunction can be related to the systematic and non-systematic factors, such as macro imbalances and other negative externalities, correlated loss exposures, asset bubbles, risk management quality, etc.

The aim of this research was to find the relations between the amount of non-performing loans in commercial banks and the changes of macroeconomic conditions in the EU countries. The first chapter is intended for the scientific literature review related to the problem. The second chapter describes the empirical research methodology. The third chapter analyzes the recent years' non-performing loans problem in Lithuania and other EU countries. The fourth chapter presents the macroeconomic context of non-performing loan growth in Lithuania. The main macroeconomic indicators related to business, households and the public sector, the financial results of banks and their loan portfolio statistics are analyzed. In the fifth chapter, the relation between non-performing loans and macroeconomic factors in other EU countries is estimated.

The results of this research can improve the credit risk management in banks, allow to understand the impact of economic cycles on the amount of non-performing loans in banks, help to foresee the oncoming possible crises in banking systems that slow down the whole economic growth of a country, to lower the risk of significant failures in loan portfolios.

1. Literature review

First and foremost, the amount of non-performing loans in banks depends on the ability of the bank to assess loan applicants' credit risk which is generally measured using the probability of default (PD), loss given default (LGD), and exposure at default (EAD). The contemporary risk management practice emphasizes and promotes the use of credit risk assessment models for various asset classes of bank's credit portfolio for automation of the loan approval process. By employing process automation, the bank's staff costs are reduced, the loan approval process is simplified, speeded up, and more control on the approval decision-making process is attained (Nikolic, Zarkic-Joksimovic, Stojanovski, Joksimovic, 2013). If a bank finances only applicants with a low risk level, the possibility of NPLs is accordingly low. But there is a problem that the credit risk level of a debtor in future can change, and it is often related to strong systemic events that negatively impact the financial markets and the economy in general (Patro, Qi, Sun, 2013). Fiordelisi and Marques-Ibanez (2013) have found that systemic risk is significantly higher in the banking sector than in the other industry sectors. The dependencies in the banking sector are mostly driven by common factors, whereas in other sectors they are generally driven by idiosyncratic factors. Also, having accurate data for credit risk assessment may require to check its timeliness regarding the changes of economic conditions that may

result in a lower accuracy, completeness or consistency (Moges, Dejaeger, Lemahieu, Baesens, 2013).

In the credit risk assessment process, usually the risk of a loan is mostly determined by the individual factors related to a loan applicant, and a less number of macroeconomic factors is used to explain it. In environments with a lower macroeconomic risk, the weight of idiosyncratic risk is higher, and therefore the role of the financial indicators of loan applicants in decision-making is more important. When the financial condition of many debtors is acceptable and the macroeconomic factors are not considered enough, occasions for a credit boom arise. Kero (2013) has shown that credit booms are some of the best indicators of a financial crisis in financial markets, and they can significantly reduce the financial stability. It is now well accepted that macroeconomic risk is central for understanding credit risk and capital structure decisions. Specifically, defaults are more likely during a recession when they are particularly costly and harder to bear.

To understand the impact of macroeconomic downturn on the credit risk and NPLs problem, several reasons in scientific literature were estimated. Bucher, Dietrich and Hauck (2013) confirm that the macroeconomic policy plays an important role in the financial stability of banks and the economy. The performance of banks in an economic downturn is thus improved only if the real economy is stabilized, to which a credible macro policy can make an important contribution. The bank stability and the dynamics of credit are related to banks' internal and external funding problems, for which an important driver is the business cycle. In a downturn, internal funding sources dry up as existing loans generate only small cash flows and may even cause a highly restricted lending. External funding is hampered as the funding liquidity of new loans is low in a weak environment with a risky outlook. Bank stability and credit growth then depend on the relative importance of these effects (Bucher, Dietrich, Hauck, 2013).

Gaiotti (2013) also argues that credit market distress has its most extreme effects in a business cycle downturn. The dynamics of the credit cycle is related to the business cycle: the deeper in recession the economy, the stronger disincentive lending accelerator effect in banks. This can be explained by the circimstance that an important source for bank liquidity is the timely collection of loans and their corresponding interest income. This implies minimizing the default loan rates. In an economic downturn, high default loan rates seriously affect loan collections, and this lessens banks' ability to lend and thus increases the cost of borrowing (Berrios, 2013). In addition, the economic uncertainty about the solvency of other borrowers similarly increases the incidence of a tightened lending policy, irrespective of the loan applicant's condition. The debtors' defaults in times of economic distress can therefore propagate into a default by solvent borrowers that cannot obtain credits and expand their business (Trautmann, Vlahu, 2013). Conversely, the model of Arnold, Wagner and Wertermann (2013) implies that companies

with a high portion of expansion options tend to be riskier in general and at the same time particularly sensitive to the macroeconomic risk. They are not only more volatile, but also have a higher propensity to default in bad times than firms with a low portion of expansion options. Analyzing the problems in banking systems, Jimenez, Lopez and Saurina (2013) have also found that bank ownership must be taken into account. The more concentrated national banking systems are subject to a lower probability of a systemic banking crisis and hence are more stable. The national banks are less prone to systemic crises because they are not engaged for their private shareholders to earn more profit. A longer term focus avoids the search for rapid earnings and share prices' growth fueled by high risk decision making.

To ensure the banking system's functioning, the Basel Committee on Banking Supervision adopted a range of guidelines which promote raising the bank stability and safety, stressing the importance of own capital as a risk coverage. The new capital requirements imposed under Basel III require banks to increase their capital ratios; the new capital rules will involve lower levels of financial leverage, since banks are called upon to hold a larger amount of equity for a given amount of assets (Biase, D'Apolito, 2012). The new concepts introduced by Basel III are those of capital conversion buffer and countercyclical capital buffer. The capital conversion buffer ensures that banks are able to absorb losses without breaching the minimum capital requirement and are able to carry on business even in a downturn without deleveraging. The countercyclical capital buffer is a pre-emptive measure that requires banks to build up capital gradually as imbalances in the credit market develop (Jayadev, 2013). The studies have shown that the higher capital and liquidity standards are likely to reduce not just the probability but also the severity of banking crises (Kudinska, Konovalova, 2012).

The literature review confirms that macroeconomic factors are very important determinants of debtors' credit risk together with NPLs in banks. This prompts to implement the further statistical analysis to ascertain the relations between macroeconomics and NPLs in the EU.

2. Research methodology

The empirical research consists of three parts. First, the amount of non-performing loans in Lithuania and other EU countries has been analyzed with ascertain the magnitude of the NPLs problem in these countries. Second, the recent macroeconomic changes in Lithuanian economy were have been interrelated to the NPLs growth problem in the commercial banks. Third, the impact of macroeconomic changes on the amount of NPLs in other EU countries has been analyzed.

The main banks' indicators used in this research are the banks' consolidated loan portfolio, non-performing loans, interest revenue, net profit and provisions. The Lithuanian

macroeconomic changes were assessed by GDP, exports, the number of bankrupted the companies, compensation of employees, the consumption expenditures of households, and the unemployment rate. Also, the Lithuanian central government revenue, expenditures and debt have been analyzed. Analyzing the statistical data of the EU countries, the relative macroeconomic indicators per one inhabitant were used.

The statistical data of the World Bank, EUROSTAT, Statistics Lithuania, Bank of Lithuania, Lithuanian Ministry of Finance and Department of Enterprise Bankruptcy Management were used in this research.

3. Non-performing loans: problem in Lithuania and the EU countries

Statistical data of the World Bank show that since 2009 a very significant growth of average bank non-performing loans (NPLs) to total gross loans in EU countries has been observed.

In 2001–2008, the NPLs rate was stable in the range 2.15–2.95%, but after this period the average increase rate of non-performing loans was 1.76% yearly. Particularly, a more negative situation was in Lithuania where the proportion of non-performing loans in 2009 increased by 14.7% and reached 19.3%. This high rate with slight fluctuations remained until 2012 (Fig. 1).

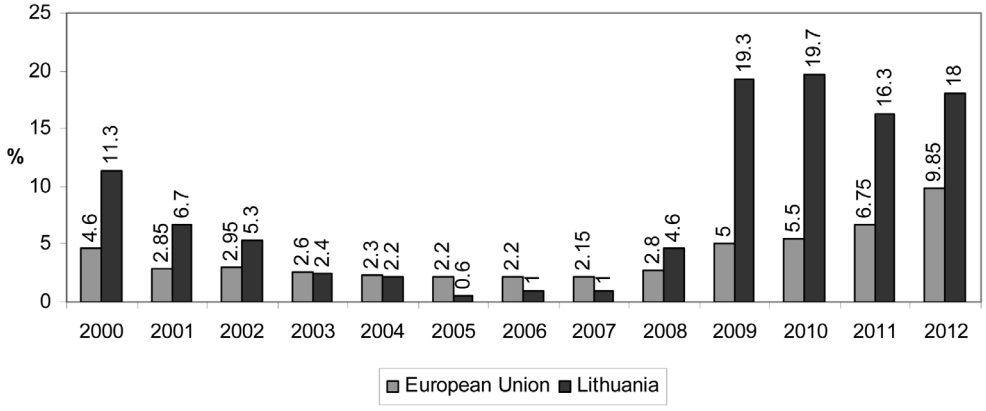

FIG. 1. **Bank non-performing loans to total gross loans (%), (World Bank, 2014)**

The proportion of non-performing loans in the EU countries is different, so these countries were classified into four groups highlighting the countries that meet the deepest problems in their commercial banking systems. The period 2009–2011 was analyzed because a significant growth of the average NPLs was observed. The data of 2012 were not included into the analysis, because the World Bank has not published the statistical indicators of some EU countries. To form the groups of low, medium, high, and very high NPLs percentage having countries, the quartiles of these rates were calculated (Table 1).

TABLE 1. **The quartiles of non-performing loans to total gross loans in EU (%)**

Year	Min	1st Q	2nd Q	3rd Q	Max
2009	0.6	3.3	4.8	7.2	19.3
2010	0.3	3.6	5.4	9.3	19.7
2011	0.4	3.35	6	12.6	16.3

The EU countries were classified according to these criteria:

- Low NPLs percentage group: Min – 1st quartile.
- Lower medium NPLs percentage group: 1st quartile – 2nd quartile.
- Higher medium NPLs percentage group: 2nd quartile – 3rd quartile.
- High NPLs percentage group: 3rd quartile – Max (Table 2).

TABLE 2. **Groups of the EU countries according to non-performing loans in banks**

Percentage of NPLs	2009	2010	2011
Low	BE, LU, NL, AT, FI, SE	BE, DE, LU, NL, AT, FI, SE	BE, DE, LU, NL, AT, FI, SE
Lower medium	CZ, DK, DE, ES, FR, CY, UK	DK, ES, FR, PT, UK	CZ, DK, EE, FR, SK, UK
Higher medium	BG, EE, HU, MT, PT, SI, SK	CZ, EE, IE, CY, MT, PL, SI, SK	ES, IT, CY, MT, PL, PT, SI
High	IE, IT, LV, LT, PL, RO, GR	BG, IT, LV, LT, HU, RO, GR	BG, IE, LV, LT, HU, RO, GR

The ranks were attributed to the countries to ascertain those with the deepest problem of NPLs and the best situation in banking systems. The rank scale is: 1 – low, 2 – lower medium, 3 – higher medium, 4 – high. The EU countries were sorted according to the sum of a country's ranks (Table 3).

TABLE 3. **The sorted countries according to ranks**

Country	BE	LU	NL	AT	SE	FI	DE	DK	FR	UK	CZ	ES	PT	CY
Rank sum	3	3	3	3	3	3	4	6	6	6	7	7	8	8
Country	EE	SK	SI	MT	PL	IT	HU	IE	BG	LV	LT	RO	GR	–
Rank sum	8	8	9	9	10	11	11	11	11	12	12	12	12	–

If years 2009–2011 a country remained in the low NPLs group, the sum of ranks is 3. Otherwise, if a coutry in all years was classified into the high NPLs group, the maximum sum of ranks is 12. The ranking results allow to conclude that countries with the least percentage of non-performing loans in commercial banks are Belgium, Luxembourg, the Netherlands, Austria, Sweden, and Finland. The countries with a very high percentage of NPLs are Latvia, Lithuania, Romania, and Greece. So, Lithuania is one of the countries in the EU that has the most serious problems with NPLs in the banking sector. The further analysis aims at estimating the main factors that have caused this negatively enlarged indicator.

Generally, the main factors of the high NPLs proportion in commercial banks can be:

- Inappropriate credit risk management quality in commercial banks.
- Irresponsible borrowing.
- Economic downturn in a country.

The proper credit risk management in banks has a very important impact on the quantity of non-performing loans. Banks can develop their internal credit risk assessment models that analyze the financial and other data of loan applicants. The main target of data analysis results is the correctly assessed default probability that reflects the risk of a debtor's possible insolvency. Also, the credit policy in banks determines the ease to obtain a credit, changing the acceptability of the credit risk level. Aiming to earn more profit from loans, interest income, banks can be motivated to lend more money if they do not exceed the safe levels of the central bank regulation. Especially this can be observed in the period of economic growth when the financial ratios of companies and personal incomes of inhabitants are higher.

The other problem is the irresponsible borrowing of the inhabitants that have a limited financial sophistication. The excessive expectations of the future income without understanding the basic consistent patterns in the economy can cause serious financial problems in households. The slump of personal income and the decreasing market value of assets (often real estate) financed by the bank can lead to the situation in which the takeover of assets from debtors cannot redeem all their debts. Due to the inability of many loan applicants to make a responsible decision, the cental bank regulative instruments for commercial banks play an important role in reducing the problem of non-performing loans.

This research aims to assess the impact of macroeconomic changes on the proportion of NPLs in banks. It can be hypothesized that when a country has a strong economy, macroeconomic stability or growth, it is more easy for banks to assess the credit risk. If the companies work in a stable business environment, the risk of the financial condition deterioration is less. Also, the households can plan their income more safely and manage the personal finance efficiently. When the economic environment worsens, the finance management of banks' debtors is more complicated. So, the further statistical analysis will try to confirm this hypothesis by statistical indicators.

4. The macroeconomic context of non-performing loans in Lithuania

The highest consolidated loan portfolio of commercial banks for residents of Lithuania was in 2008. In this year, the total loans of all debtors were 21,370 billion EUR (Table 4).

TABLE 4. **The loan portfolio of commercial banks in Lithuania (billion EUR) (Bank of Lithuania, 2014)**

	2007	2008	2009	2010	2011	2012
Total	18.201	21.370	19.844	19.183	18.437	18.823
Business loans	8.974	10.370	9.429	8.514	7.938	8.123
Households loans	7.252	8.746	8.368	7.922	7.565	7.421
Other loans	1.975	2.254	2.047	2.746	2.933	3.279

However, in 2009–2011, the loan portfolio had a tendency to decrease. The most significant changes occurred in 2009 when the total loans decreased by 7.14% as compared with 2008. In 2012, the total loan portfolio was by 11.9% less than the highest value in 2008. The business loans portfolio in 2008–2012 decreased by 21.7%. The amount of household loans in this period decreased by 15.2%. This fact can be explained by the loan portfolio as the assets in banks' balance-sheet accounting peculiarities. In case of a company's bankruptcy, the not repaid debt after the bankruptcy process is added to the loss in the income statement, and in the banks' balance-sheets of future periods these debts cannnot be seen, whereas the not repaid households' loans in case of household's insolvency remain in the bank's balance-sheet for the future periods. The opposite situation was in other loans which in 2009 also decreased by 9.2%, but until 2012 this type of the loan portfolio increased by 45.5% versus 2008. The other loan portfolio consists of credits for the government, state and municipal enterprises, and financial institutions.

In 2005–2008, the annual amount of new business and households loans was growing on average by 24.7% yearly (Fig. 2), but since 2009 in all years the lending of new loans in Lithuanian banks was restricted. The amount of new loans in 2012 was only 34.7% as compared with 2008.

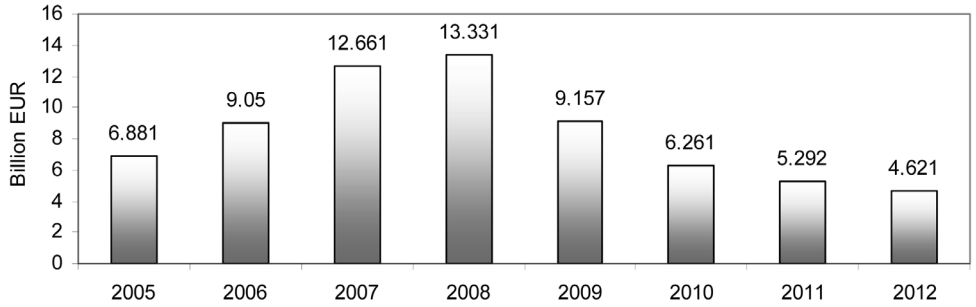

FIG. 2. **New business and household loans in Lithuania (Bank of Lithuania, 2014)**

When the problem of the vhigh proportion of non-performing loans in Lithuanian commercial banks arose, their financial condition significantly disimproved. In 2009, the loan interest revenue of banks decreased by 16.8% (from 1301 to 1083 millions EUR). Until 2012, the average decrease of the loan interest revenue was 191,8 millions EUR yearly. So, in 2012 the loan interest revenue was only 41.0% compared to the revenue of 2008. Also, the period 2009–2010 for Lithuanian banks was loss-making, because the consolidated net profit was –1 063 millions EUR and –80 millions EUR, respeetively. Managing the credit porfolio in case of a debtor's default, banks must form the provisions depending on the term that a debtor is late to meet the financial obligations. In 2009, the provisions in banks' income statement significantly increased and reached 40,4

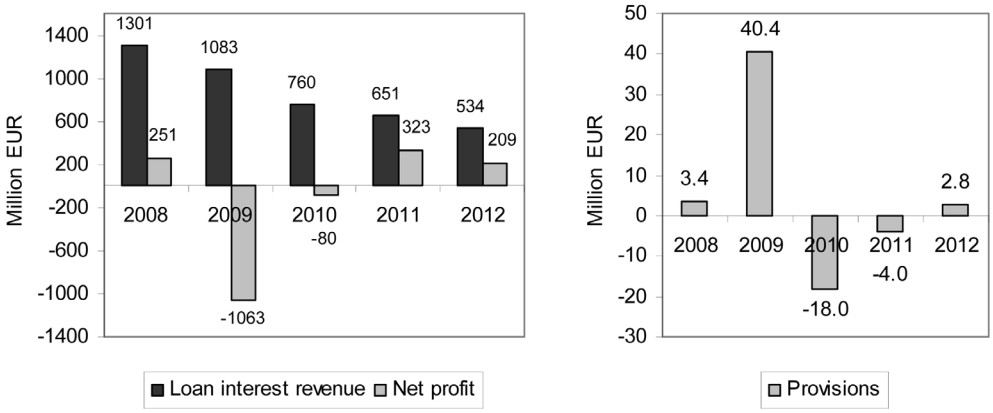

FIG. 3. **Loan interest revenue, net profit and provisions in Lithuanian banks (Bank of Lithuania, 2014)**

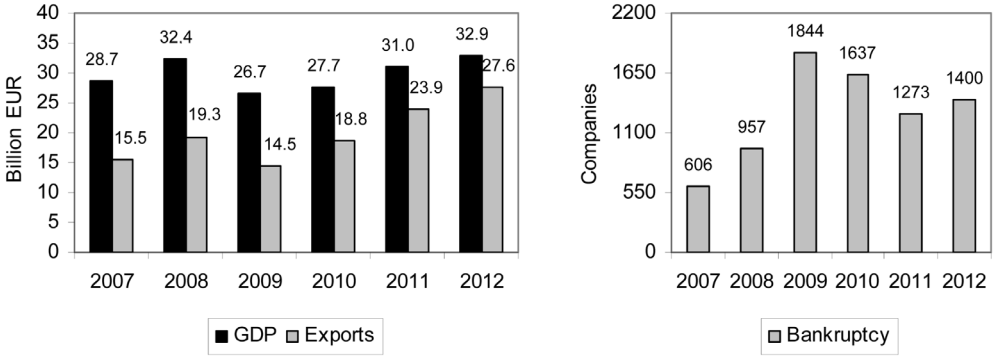

FIG. 4. **GDP, exports and the number of bankrupted companies in Lithuania (EUROSTAT, Statistics Lithuania, 2014)**

millions EUR. In the next two years, the situation improved, but in 2012 this indicator was also higher than 0 (Fig. 3).

To estimate changes of the Lithuanian economic environment in the last years, seven indicators were selected: gross domestic product (GDP), exports, compensation of employees, final consumption expenditures of households, unemployment rate, the number of bankrupted companies, and government expeditures.

The graphs of GDP, exports and the number of bankrupted companies show fluctuations of the business cycle and the 2009 year's downturn in the Lithuanian economy. In 2009, the GDP was lower by 17.6%, exports decreased by 24.9%. The number of bankrupted companies increased by 92.7% (Fig. 4). These unfavourable macroeconomic conditions undoubtedly caused the limited ability of companies to meet their financial obligations to banks.

The households' economic indicators also reflect the decline in their ability to repay debts. The growing employment and wages (Fig. 5) until 2008 stimulated consumption and borrowing when part of the households' expenses were financed by banks. So, in the peak point of 2008, the aggregated compensation of employees was 14.4 billion EUR, and the consumption expenditures of households reached 21.2 billion EUR. The annual bank loan portfolio increment was the highest in this year and reached 13.3 billion EUR (Fig. 2).

After this period, a significant deterioration of households' financial condition in 2009–2010 took place (Fig. 5).

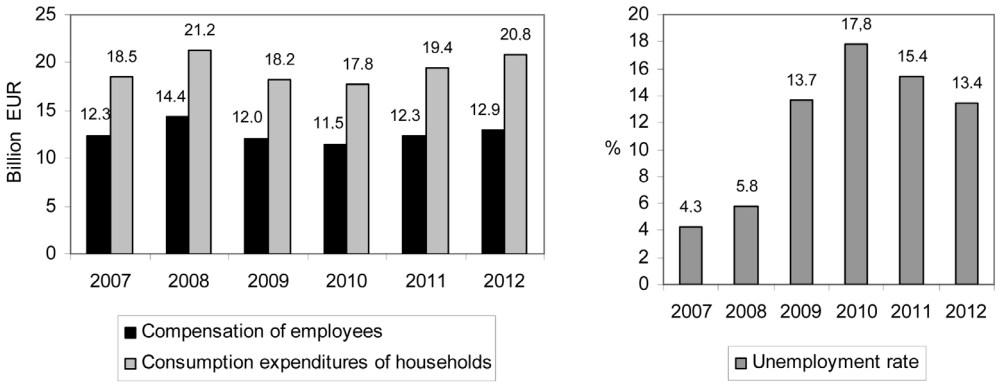

FIG. 5. **Compensation of employees, consumption expenditures of households and unemployment rate in Lithuania (EUROSTAT, Statistics Lithuania, 2014)**

The compensation of employees in 2010 decreased by 20.1%, and the consumption expenditures of households decreased by 16% compared to the year 2008. A very big problem was the rise of unemployment rate, which in 2010 reached 17.8%. As compared with 2007, the unemployment rate of this year was 4.1 times higher. This business cycle fall effect had a negative impact on the households in Lithuania, which suddenly met the lack of financial resources after a short period of economic growth and reasonless expectations.

The 2009 year's growth of non-performing loans in commercial banks is also related to the worsened economic indicators of the public sector. In 2003–2008, the Lithuanian central government revenue increased on average by 15.9% yearly and in 2008 reached 9751.9 million EUR. In this period, the central government expenditures were also similar, so Lithuania had a balanced budget. But in 2009 the revenue decreased by 16.4% (to 8156.4 million (EUR). This fall in the revenue caused the necessary stopping of expenditure growth. The central government expenditures in 2009–2012 were stable (at 10 268.5–10 456.5 million (EUR). The highest budget deficit (2231 million EUR) was noted in 2009, but due to the regenerative revenue in 2012 the deficit was only 837.9

million EUR. Since 2009, the worsened economy is also visible in the statistics of the central government debt. In 2003–2008, the average annual debt growth was 7.1%, but in 2009–2012 the debt increased on average by 28% yearly (Fig. 6). So, a large part of government expenses are financed by loans not earning sufficient revenue inside the country. The stopped growth of central government expenditures reduced the income of business enterprises and households, partly disimproving their financial condition and solvency.

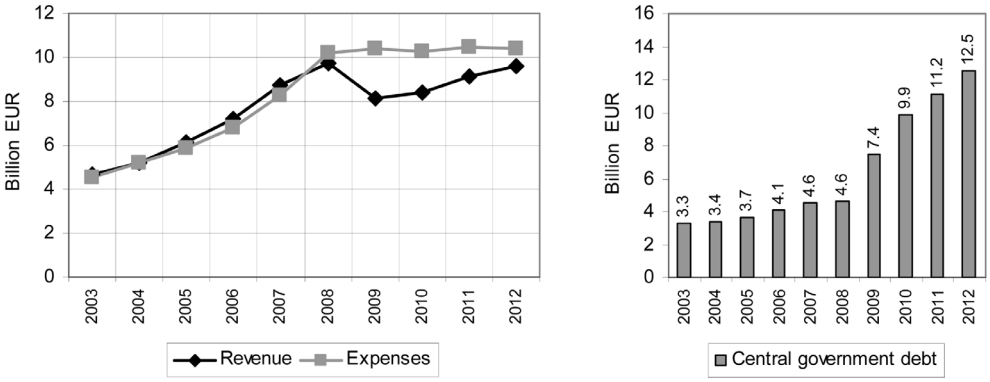

FIG. 6. **Lithuanian central government revenue, expenses and debt (Lithuanian Ministry of Finance, 2014)**

The economic downturn and the high number of bankrupted companies increased the doubtful claims of banks and other creditors. In 2008, the claims of creditors with mortgage increased by 18.1%, while in 2009 these claims increased by 68% and afterwards the average increase rate in 2009–2012 was 31.9% yearly. The 2009 year's increase of banks' claims without mortgage was also very high – 69.6%, versus 9.2% in 2008. The repaid debts to creditors with mortgage in the companies' bankruptcy process was 22.0–24.2% in 2007–2008, but in 2009–2010 this percentage decreased to 13.9–18.9%. The situation is worse in the statistics of repaid debts to banks without mortgage, where this proportion in 2007–2008 was only 5.0–5.3%, and in the economic downturn it decreased to 2.2–3.1% (Table 5).

The ascertained changes of non-performing loans and banks' consolidated financial data in different phases of the business cycle indicate the evident dependence between them. The impact of macroeconomic factors on the debtors' ability to repay debts in Lithuania is very strong. The understanding of this dependence and the analysis of macroeconomic indicators can help banks to manage credit risk more effectively.

The further analysis aims to answer the question: are these relations between macroeconomic factors and non-performing loans a problem typical in all EU countries, or maybe there are some differences?

TABLE 5. **The claims of creditors in bankrupted companies (since 1993 to the end of a year), (Department of Enterprise Bankruptcy Management, 2014)**

	Unit	2007	2008	2009	2010	2011	2012
Creditors' claims with mortgage	mln EUR	640.1	756.2	1270.3	1760.6	2107.9	2290.9
Banks' claims without mortgage	mln EUR	206.5	225.6	382.6	539.3	587.6	630.5
Repaid debts for creditors with mortgage	mln EUR	140.8	183.0	240.4	245.6	386.1	518.4
	%	22.0	24.2	18.9	13.9	18.3	22.6
Repaid debts for banks without mortgage	mln EUR	11.0	11.3	11.9	11.9	18.0	20.9
	%	5.3	5.0	3.1	2.2	3.1	3.3

5. The interdependence of macroeconomic factors and NPLs in EU countries

Analyzing the period 2008–2011, the EU countries with the highest growth of non-performing loans were selected (Table 6). The highest growth was observed in Lithuania in 2009 when the proportion of NPLs increased by 14.7% (DNPL) to 19.3% (NPL). The relation of this growth to the deterioration of the Lithuanian economy was substantiated in the previous chapter, so the further analysis looks for a similar situation in other EU countries. The very high growth of NPLs [3.5%; 12.2%] in 2009 was also observed in Latvia, Romania, Hungary, and Poland. In 2010, the NPLs increased by 5.5% in the Bulgarian banking system. In 2011, the most significant NPLs growth [3.6%; 7.5%] was obserwed in Ireland, Greece, Cyprus, and Slovenia.

TABLE 6**. The most significant growth of non-performing loans (%)**

No.	Country	Year	ΔNPL	NPL		No.	Country	Year	ΔNPL	NPL
1.	LT	2009	+14.7	19.3		6.	GR	2011	+4	14.4
2.	LV	2009	+12.2	14.3		7.	CY	2011	+4	9.6
3.	IE	2011	+7.5	16.1		8.	HU	2009	+3,7	6.7
4.	BG	2010	+5.5	11.9		9.	SI	2011	+3,6	11.8
5.	RO	2009	+5.1	7.9		10.	PL	2009	+3,5	7.9

Table 6 shows different countries with their most significant growth of NPLs in one year. This growth is undoubtedly related to the problem of a high NPLs percentage in these countries in 2009–2011. According to Tables 2 and 3, Lithuania, Latvia, Romania, and Greece were classified into the high percentage of NPLs in all three years, and their ranks are the lowest least (12). The rank 11 was attributed to Ireland, Bulgaria, and Hungary. because these countries two years were classified in the high NPLs group and pne year in the higher medium NPLs group (Table 2). To Cyprus, Slovenia, and Poland, ranks 8, 9 and 10 were attributed, so in general these countries did not meet the highest problems of non-performing loans in the EU.

At this step, the analysis results allowed to form two groups of EU countries according to the percentage of non-performing loans and their growth rate:

- the least NPLs percentage and its growth rate: Belgium, Luxembourg, Netherlands, Austria, Finland, and Sweden (group A);
- the highest NPLs percentage and its growth rate: Lithuania, Latvia, Romania, and Greece (group B).

TABLE 7. **The average and minimal macroeconomic indicators in groups A and B**

Economic indicator	Group A		Group B	
	m	Min	m	Min
GDP (EUR / 1 inhabitant)	44 434.0	33 878.9	11 456.5	6 555.9
EXP (EUR / 1 inhabitant)	43 649.6	14 462.9	5 808.5	2 622.1
COE (EUR / 1 inhabitant)	22 606.1	17 764.6	4 211.6	2 397.7
CEH (EUR / 1 inhabitant)	20 253.4	16 335.2	7 663.9	4 092.6
UNE (%)	6.3	8.0 (Max)*	14.9	24.3 (Max)*
CEG (EUR / 1 inhabitant)	10 068.5	6 941.1	1 949.1	1 029.5

* The worst unemployment rate is the highest, contrary to other rates in the table.

The differences of macroeconomic indicators in these groups of the year 2012 whose latest statistical data are available were compared in Table 7. The averages (m) were calculated and the minimal values (Min) of six macroeconomic rates were found. The first two rates are related to business activity in the countries – GDP and exports (EXP). The average GDP per one inhabitant in group A is higher 3.9 times and exports 7.5 times than in group B. The second three rates are related to the income of inhabitants – compensation of employees (COE), consumption expenditures of households (CEH), and unemployment rate (UNE). The average compensation of employees in group A is higher 5.4 times and the consumption expenditures of households 2.6 times. The average unemployment rate in group A is lower by 8.6%. The last rate in Table 7 is the final consumption expenditure of general government (CEG) as one of the public finance indicators. This average rate in group A is 5.2 times higher.

Despite the fact that in group B most problems with non-performing loans in 2012 were faced by Lithuania (18%), the economic indicators of Romania were the worst, except the unemployment rate which was the highest in Greece. In 2012, the percentage of NPLs in Greece was 17.2%, in Romania 16.8%, and in Latvia 11%. These results confirm that the macroeconomic strength of a country is a very important factor of the NPLs problem in commercial banks. The banking systems of EU countries with imperfect macroeconomic conditions suffer far more from the debtors that are unable to meet their financial obligations. So, the hypothesis of Chapter 3 is confirmed.

The analysis of macroeconomic indicators in groups A and B allowed to ascertain their differences in contrasting countries. The group A has the lowest NPLs percentage and growth rate, and group B has the highest NPL values. Also, a similar analysis was

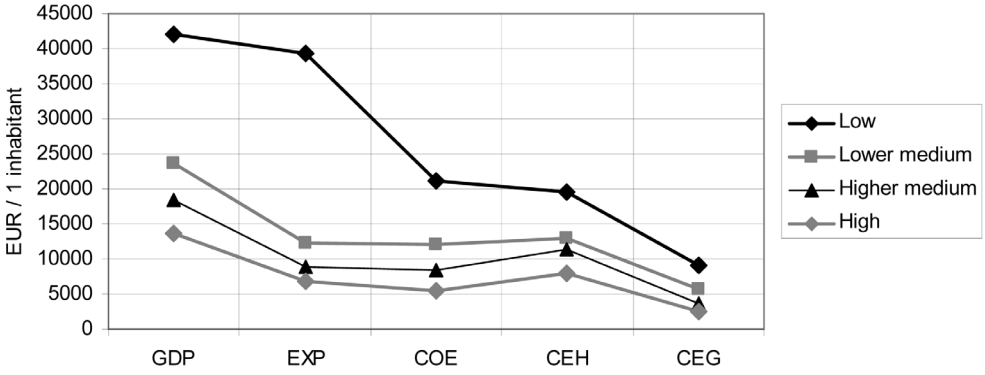

FIG. 7. **The average macroeconomic indicators in four groups of EU countries (2011)**

accomplished for four classes of countries classified in Table 2: the low, lower medium, higher medium and high percentage of NPLs. The macroeconomic indicators of the year 2012 in some EU countries' statistics was not available, so data of year 2011 were analyzed. The graph of average macroeconomic rates in these four groups is shown in Fig. 7. The lines of GDP, exports (EXP), compensation of employees (COE), consumption expenditures of households (CEH) and final consumption expenditure of general government (CEG) in this graph do not intersect. The gradually worsening macroeconomic indicators are typical, together with the increasing percentage of non-performing loans, in commercial banks. So, this gradation of indicators also confirms the hypothesis that deteriorative macroeconomic conditions in a country significantly stimulate an increase of NPLs.

The most significant changes of NPLs, related to the changes of six macroeconomic indicators for 1 inhabitant (except unemployment) in the EU countries, are shown in Table 8.

In the analyzed 15 cases with the most significant growth of NPLs, the average increase of this rate is 5.7%. The attendant circumstances of this NPL increase are the average decrease of GDP by 6%, exports by 3.1%, compensation of employees by 7.4%, consumption expenditures of households by 6.4%, consumption expenditures of general government by 5.4%, and the average growth of unemployment rate in a country by 3.3% (Average 1 in Table 8). In most cases, when the percentage of NPL grows (in 46.67% of cases analyzed), all 6 macroeconomic indicators in a country deteriorate (Fig. 8). In 13.33% of cases five macroeconomic indicators and in 6.67 of cases two, three and four indicators deteriorated. Conversely, in 20% of analyzed cases, only one indicator disimproved, and for five indicators an improvement occurred observed. This situation was in countries that met the NPL growth repeatedly: Romania and Bulgaria in 2010, Ireland and Hungary in 2011. These cases in Table 8 are marked with asterisks (*). This fact can be explained by the business cycle effect when the economy recovers after

TABLE 8. **Changes of NPLs and macroeconomic indicators per one inhabitant (%)**

Country	Year	ΔNPLs	ΔGDP	ΔEXP	ΔCOE	ΔCEH	ΔUNE	ΔCEG
LT	2009	+14.7	-17.0	-24.6	-15.19	-13.4	+8.3	-5.5
LV	2009	+12.2	-18.0	-16.4	-24.6	-19.4	+9.8	-20.0
IE*	2011	+7.5	+2.4	+5.3	-1.7	-0.2	+0.8	-2.1
IE	2009	+6.4	-11.2	-3.9	-10.3	-13.2	+5.6	-4.7
BG*	2010	+5.5	+3.8	+25.5	+5.6	+3.2	+3.5	+3.4
RO	2009	+5.1	-14.6	-14.1	-17.6	-18.2	+1.1	-6.5
RO*	2010	+4.0	+5.9	+22.6	-5.3	+8.9	+0.4	-6.8
GR	2011	+4.0	-4.6	+7.5	-7.5	-3.0	+5.1	-10.0
CY	2011	+4.0	+0.2	+4.0	+0.5	+2.2	+1.6	+0.4
BG	2009	+3.9	-0.7	-19.0	+6.5	-5.5	+1.2	-2.5
HU	2009	+3.7	-13.3	-17.6	-13.4	-12.8	+2.2	-10.0
HU*	2011	+3.6	+3.1	+11.0	+2.5	+3.5	-0.3	-1.3
SI	2011	+3.6	+1.7	+11.2	-0.7	+2.4	+0.9	+2.1
PL	2009	+3.5	-14.5	-15.5	-15.5	-15.2	+1.0	-14.5
EE	2009	+3.3	-13.8	-22.6	-13.0	-15.1	+8.3	-2.8
Average 1	-	+5.7	-6.0	-3.1	-7.4	-6.4	+3.3	-5.4
Average 2	-	+5.9	-9.6	-10.1	-10.1	-10.1	+4.1	-6.7

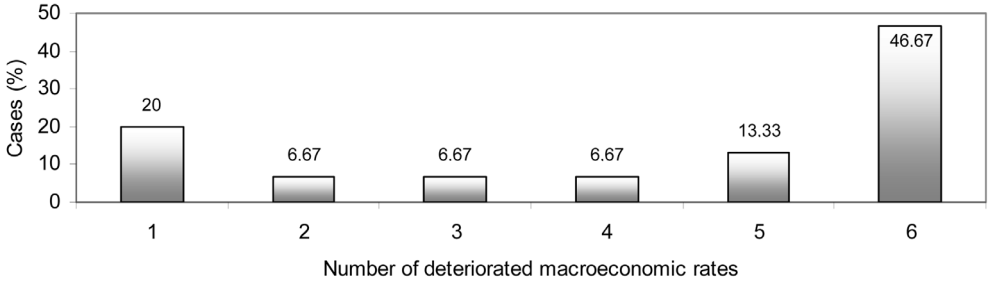

FIG. 8. **The number of deteriorated macroeconomic rates in case of NPLs growth**

one or two years, but the NPLs continue growing as a consequence of the previous sharp downturn of a country's economy. To identify the main effects of economic downturn on the NPL growth, these cases were eliminated from the calculation of second averages for the macroeconomic rate changes (Average 2 in Table 8). Now, it may be concluded that the most significant NPL growth in the EU countries is related to the average decrease of GDP by 9.6%, exports, compensation of employees and consumption expenditures of households by 10.1%, consumption expenditures of general government by 6.7%, and the average increase of unemployment rate by 4.1%.

The research has confirmed that countries with a low NPLs growth have strong economies. It is also necessary to ascertain whether the downturns in the these countries in the analyzed period or low NPLs are due to their economic stability.

TABLE 9. **Changes of macroeconomic indicators (2009) per one inhabitant in group A (%)**

Country	ΔGDP	ΔEXP	ΔCOE	ΔCEH	ΔUNE	ΔCEG	Negative
BE	-2.4	-14.8	-0.0	-1.0	+0.9	+4.2	5
LU	-6.7	-16.8	+0.6	-2.3	+0.2	+6.2	4
NL	-4.0	-13.7	+0.8	-3,0	+0.6	+6.9	4
AT	-2.7	-17.9	+0.4	+0.9	+1.0	+3.0	3
FI	-7.6	-26.4	-1.5	-2.0	+1.8	+3.4	5
SE	-12.9	-22.0	-11.1	-8.5	+2.1	-7.5	6
Average	-6.1	-18.6	-1.8	-2.7	+1.1	+2.7	-

According to Table 8, a downturn was observed mostly in 2009, so an analysis of group A countries' macroeconomic indicators of this year was accomplished. The change rates of the same six economic indicators (GDP, exports, compensation of employees, consumption expenditures of households, consumption expenditures of general government per one inhabitant, and unemployment rate) were calculated in Table 9 for Belgium, Luxembourg, the Netherlands, Austria, Finland, and Sweden.

The obtained results allow to maintain that a downturn of the business cycle occurred also in the EU countries with the highest economic rates, but this decline was noticeably less. Only exports of group A countries in 2009 decreased by 18.6%, and this decline is higher by 8.5% as compared with countries that showed the highest NPL growth (Table 8). The other indicators in group A deteriorated less: the GDP decreased by 6.1%, the compensation of employees by 1.8%, consumption expenditures of households by 2.7%, and the average unemployment rate increased by 1.1%. The greatest difference is noted in the consumption expenditures of general government. The governments of countries with imperfect macroeconomic rates in economic downturn reduced these expenditures on average by 6.7% (Table 8), while the governments of countries with strong economies were able to increase these expenditures on average by 2.7% (Table 9) and thus help to stabilize their economies. In general, the economic downturn in group A countries is also evident, because more than half of the analyzed macroeconomic rates showed negative changes (column Negative in Table 9). Thus, banks of the EU countries with the highest economic rates in the downturn of the business cycle are at a considerably lower risk to meet the problem of growing sudden non-performing loans.

Conclusions

This research deals with the current banking problem of non-performing loans which have shown a significant growth in the EU banks since 2009. The situation in Lithuania was particularly complicated, because the proportion of NPLs increased by 14.7% and reached 19.3%. This growth was the highest in the EU. It caused a significant deterioration of the financial condition of commercial banks. The insolvent debtors, the declining

loan interest revenue and loss-making activity of banks necessitated to limit the borrowing to new loan applicants and reduced the loan portfolio. As the health of the commercial banking system is highly important for a country's financial system and economic processes, understanding the reasons for such situations is very important for bankers. Thus, the results of this research allow to show how macroeconomic changes in a country influence the amount of non-performing loans in its commercial banks.

The proportion of non-performing loans in the EU countries was different, so these countries have been classified into four groups according to the depth of NPL problems (countries having a low, medium, high, and very high NPL percentage). In the whole period under analysis, Lithuania together with Latvia, Romania and Greece belonged to countries with a very high percentage of NPLs. Thus, Lithuania is one of the EU countries that currently have the most serious problems with NPLs in their banking sector.

The analysis of Lithuanian macroeconomic indicators has proven the tight dependency of non-performing loans on changes of the economic environment in the country. The deterioration in GDP, exports, compensation of employees, final consumption expenditures of households, unemployment rate, the number of bankrupted companies and government expeditures highly increased the percentage of NPLs in Lithuanian banks. These business, economic indicators related to households and public finance may be considered as very important determinants of banks' loan portfolio credit risk level changes. The ability of debtors to repay credits is very sensitive to the business cycle fluctuations in Lithuania. The economic downturn and the high number of bankrupted companies increased the doubtful claims not only of banks but also of other creditors.

The analysis results of the EU countries' NPLs and macroeconomic indicators confirm that the macroeconomic strength of a country is a very important factor reducing the NPL problem in commercial banks. Banks in the EU countries with imperfect macroeconomic conditions meet asignificantly higher proportion of debtors not able to repay credits. Also, the research has proven that the gradually worsening six macroeconomic indicators analyzed together with the increasing NPL percentage are typical in banking systems. The observed economic downturn in the EU countries with the highest economic rates in the period under analysis was noticeably less. Banks in these countries, in case of the business cycle fall, are at a considerably lower risk of meeting the problem of a significant NPL growthas compared withthe countries whose economic indicators are low.

The general conclusion is that in managing the credit risk the macroeconomic factors are very important, especially in countries with developing economies. Implementing the Basel III, requirements the credit risk assessment process in commerial banks must include the evaluation of macroeconomic conditions. Uderstanding the interrelation between macroeconomic indicators and non-performing loans can help banks to manage credit risk more effectively.

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