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## EVALUATION OF RELATIONSHIP BETWEEN BANKS LENDING ACTIVITIES AND THE ECONOMIES IN BALTIC COUNTRIES

**Keywords:** banks, credit, households, lending activities, non-financial corporations, Granger causality.

**J E L Classification:** E51, F43.

**Abstract:** Banks are financial institutions that are part of each country financial system. One of the banks' core businesses is lending activity, which includes the lending activity to households, non-financial corporations and other financial institutions. Before the financial crisis until 2007 year in all the Baltic countries amounts of loans have a tendency to increase and its impact to economy become even more important. The analysis of scientific literature showed that there are different opinions concerning the relationship between banks' lending activities (credits) and the economies. Some researchers argue that lending activities have a positive impact on country economic growth, others state that its impact is opposite – economies have a positive impact on lending activities, while the others claim that there is no relationship between mentioned variables. The performed research showed that there are strong and medium

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strengths positive linear relationships between lending activities and GDP in all the Baltic countries. Granger causality test showed that with one period lag, GDP affects household loans variations in Latvia and with two periods of lags, GDP has an impact on the volume of loans to non-financial corporations. While in Lithuania and Estonia the relationship, assessing one and two number of lags, between lending activities and economies was not found.

## ■■■ INTRODUCTION

Banks are an important part of each country's financial system. During few years bank services are used by almost every person, their scales of operations are highly increasing and expanding. Lending activity is one of the most important features that distinguish commercial banks from other financial and non-financial organizations. Commercial banks' lending activity helps to improve efficiency and rational distribution of resources between the various entities. Due to increased banks' lending activities volumes more attention is paid to their impact on the national economies. Lending activities can be defined as the variation in the volume of loans and usually the main sectors which are classified in lending are non-financial corporations and households sectors. Gross domestic product (GDP) is related to the country's economic activity, the country's gross domestic product is an indicator that reveals the country's economic situation and its trends. In scientific literature there are plenty of studies that analyses the relationship between lending and economic activities. It was investigated by such authors as: Yakubu and Affoi (2014), Mamman and Hashim (2014), Ugoani (2013), Murty, Sailaja and Demissie (2012), Were, Nzomoi and Rutto (2012), Korkmaz (2015) and the others. Their studies have shown that the relationship between credit and economic activities exists in different countries. However, despite the conducted studies related to lending activities and economic relations, to find studies that carry out these dependencies assessment in the Baltic countries is difficult. In 2005-2006 years lending volumes significantly increased in all three Baltic countries, so their importance to the economy, their economic growth has become very important. The aim of this article is to evaluate the relationship between banks' lending activities and economies in the Baltic countries. The object of the article is banks' lending activity. Article describes the theoretical aspect concerning the relationship between lending activities and economies. The analysis of loans volumes and economic changes in the Baltic countries is performed. Determination of relationship between loans volumes and the Baltic countries economies is conducted.

### LITERATURE REVIEW

Banks are an important part of each financial system, affecting the entire country's economic situation. Commercial banks perform resources accumulation and redistribution functions between businesses, households, public institutions and other financial institutions. One of the most important activities of commercial banks is lending, this activity can be considered as active business basis, because it helps commercial banks to earn their main income. The growth of volumes of bank operations and volumes of loans and their quantities, lending activities influence to the entire country's economic situation is increasing.

Bank lending activities impact on the country's economic growth is widely considered in the scientific literature. Yakubu and Affoi (2014), Mamman and Hashim (2014), Onuorah and Ozurumba (2013) examined the impact of commercial banks credit to Nigerian economic growth. All these studies revealed that banks credit had a significant positive impact on Nigeria's economic growth. Ugoani (2013) states that between bank credit and economic growth is a significant connection and bank loans influence also social infrastructure. Banks credit contributes to the development of trade and industry and leads the country's economic growth of welfare.

Lakstutiene, Krusinskas and Platenkoviene (2011), analyzing the economic cycle and the credit scale interaction in Lithuania, found that household loans correspond to the changes in GDP with 1 period (quarter) lag and that changes in total loans amount and loans to non-financial corporations react with GDP at the same time. The examination of changes in industrial production, as an indicator of the economic cycle, correlation analysis showed that the relationship between the volumes of credit is stronger than in the case of GDP. Murty, Sailaja and Demissia (2012) study showed that bank lending has a significant positive impact on real GDP growth per worker. This effect occurs within internal capital accumulation and efficient allocation of resources in the country. Study also revealed that domestic capital can be used as a tool to increase the productivity per employee and thus promoting economic growth in the long term. Consequently the authors emphasize that the follow-up studies should include and perform Granger causality test between financial indicators and economic growth. According to Oluitan (2012), there is a link between economic growth and financial development variables, so the country needs to ensure that the financial system mediate between supply and demand issues related to export finance. Ramanauskas (2005) empirical studies have also shown that

the banks' total credit growth has a positive impact on economic growth in the country.

Gozgor (2015) examined the causal relationship between economic growth and domestic credit in the context of economic globalization. He examined 58 developed and developing countries data from 1970 to 2010 years. Studies have shown that high positive causal relationship is not just between economic globalization and economic growth, but domestic credit affects economic growth in seven developing countries. It was also found that not only economic globalization has a positive one direction causal link between domestic credits, but economic growth has a positive effect on domestic credit in 5 developed and 10 developing countries. According to Iqbal, Ahmad and Hussain (2012) research, savings and private sector credit have a significant impact on economic growth in Pakistan. The authors argue that the credit distribution in different private sectors also has a significant impact on economic growth. Korkmaz (2015) exploring the relationship between banks and credit growth, has found that domestic credits developed by banking sector have an impact on economic growth in 10 European Union countries. Were, Nzomoi and Rutto (2012) use sectorial indicators, examined the link between access to credit and sectorial economic performance (GDP) in Kenya. The empirical results show that credit has a positive impact on the sector GDP. However, this level of exposure is lower when the other factors (such as labor or past economic performance) in sectors are controlled.

However in the scientific literature it can be found opposite statements. Krishnankutty (2011) examined the bank credits impact to economic growth in northeastern India in different segments: rural, suburban and urban. The study showed that overall banking credits do not have impact to the economic growth in northeastern India, but the results showed that there is a visible potential growth in the future. Leitão (2012) analyzed the link between economic growth and bank lending in all European Union countries (EU-27) from 1990 to 2010 years period. Econometric studies have shown that the banks' lending activities do not promote the country's economic growth and credit growth may lead to weakness in the banking system, contributing to the financial crisis induction. Takáts and Uppér (2013) suggest that bank lending to the private sector and economic growth basically are uncorrelated factors. This result is adequate for most developed economies recovering from the financial crisis. Cetin (2016) studies have shown that private sector credit has a negative and significant impact on economic growth in 14 of the Islamic Conference mem-

bers over the analysis period of 1990-2009 years. It was also established that domestic credit to the private sector also has a negative impact on Turkey's economic growth. Koivu (2002) found that the volume of bank credit allocated to the private sector also does not contribute to economic growth in transition economies.

Many authors' studies have confirmed the link between credit and economic activity around the world; in most cases it was found that lending activities have a positive impact on economic growth of the countries. However, there are studies claiming that the banks' lending activities do not promote the country's economic growth and that following factors are basically uncorrelated indicators. Due to the different results of the author, it is important to determine the connection between lending activities and economies in the Baltic countries.

#### **THE RESEARCH METHODOLOGY AND THE COURSE OF THE RESEARCH PROCESS**

Data for the research about the volumes of lending in the Baltic countries were used from the Bank of Lithuania (2014), the Bank of Latvia (2015) and the Bank of Estonia (2014). Data of GDP volumes were used from Eurostat database (2015). All the analyzed data are quarterly. The study examines the relationship between banks' lending activities (non-financial institutions and households loans amounts) and GDP volumes, but does not examine impact of other factors to GDP volumes. The analyzed period covers 2005–2013 years, because not all data for 2014 year can be found. In order to determine the relationship between lending activities and economies, the correlation coefficients are calculated and their significance is tested. One of the correlation coefficient is a Pearson correlation coefficient which evaluates strength of the linear relationship and is calculated by the following formula (Boguslauskas et al. 2009):

$$r_{xy} = \frac{\overline{xy} - \bar{x} \bar{y}}{S_x \cdot S_y}$$

where:

$\overline{xy}$  – the average of two variables multiplication;

$\bar{x}$ ,  $\bar{y}$  – respective variable average;

$S_x$ ,  $S_y$  – respective variable standard deviation.

However, in the scientific literature it can be found that the lending activities and economies do not change at the same time and the backwardness be-

tween these indicators exists (Lakstutiene, Krusinskas & Platenkoviene 2011; Murty, Sailaja & Demissie 2012). Therefore, in order to determine whether there is a lag in the Baltic countries between these variables, Granger causality test will be used for the study. The Granger causality test shows how much of the current can be explained by past values of and then to see whether adding lagged values of  $x$  can improve the explanation. It is said that is Granger-caused by  $x$  if  $x$  helps to predict  $y$ , or equivalently if the coefficients on the lagged's are statistically significant.

This test indicates which variable is determined by another variable and indicates whether the backwardness exists in the variables. In this test the Eviews program performs bivariate regressions analysis:

$$y_t = \alpha_0 + \alpha_1 y_{t-1} + \dots + \alpha_l y_{t-l} + \beta_1 x_{t-1} + \dots + \beta_l x_{t-l} + \epsilon_t$$

$$x_t = \alpha_0 + \alpha_1 x_{t-1} + \dots + \alpha_l x_{t-l} + \beta_1 y_{t-1} + \dots + \beta_l y_{t-l} + u_t$$

Calculated and found statistical significance F Wald statistics is a general hypothesis of:

$$\beta_1 = \beta_2 = \dots = \beta_l = 0$$

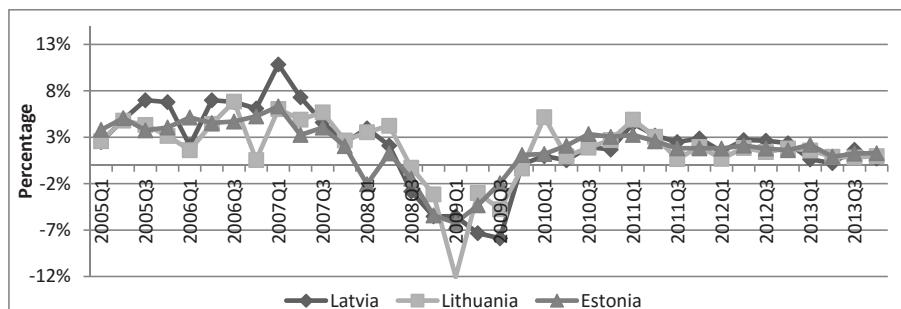
The first regressions the null hypothesis is that X does not Granger cause y variation and the second regression, the Y does not Granger cause X variation. However, Granger causality test is one of the time-series models, and data used in it should be stationary. Stationary can be checked by a number of criteria, but in this case the selected criterion is augmented Dickey-Fuller test. When calculating this criterion Eviews program performs ADF test and submits its results. The analysis used 0.05 confidence level. The research methods are: systematic literature analysis, logical comparative and generalization analysis, correlation analysis and Granger causality method.

#### **BANKS' LENDING ACTIVITIES AND THE ECONOMIES RELATIONSHIP EVALUATION IN BALTIC COUNTRIES**

Changes in the country's GDP are a very important indicator that reveals the country's economic situation and its trends (Jasiene & Capskas 2008). The variation of nominal GDP percent change in the Baltic countries during the 2005–

–2013 years is presented in Figure 1. In the analyzed GDP the seasonal influence is eliminated and it is estimated by number of working days, the GDP is at current prices.

**Figure 1.** GDP percentage change in the Baltic countries for 2005-2013 years, percentage



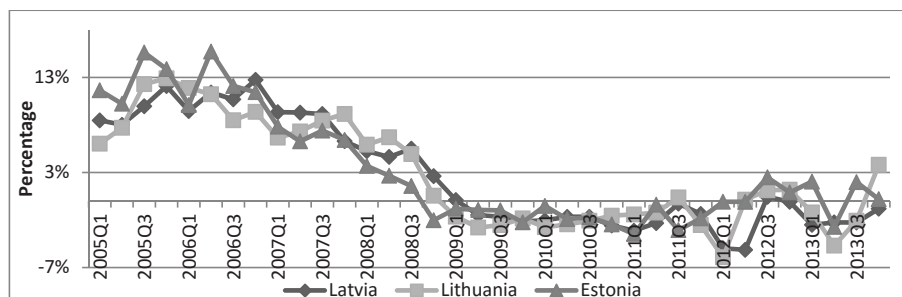
Source: created by authors on the base of Eurostat database (2015) data.

Analyzing the GDP indicator changes in the Baltic countries it is seen that the entire analyzed period it had a tendency to grow, with the exception of a crisis in 2008–2009, when the index decline was recorded in the Baltic countries. Mostly economic crisis has affected Latvian GDP volume, compared 2008 year to 2010 year, GDP in Latvia fell by 23.55 percent, when in Lithuania 14.22 percent and in Estonia 15.02 percent. However, since 2010 until the end of 2013 GDP volumes have a tendency to grow in all Baltic countries. After the economic crisis Lithuania managed to recover firstly, comparing the volume of GDP in the first quarter of 2010 with the fourth quarter of 2009, GDP volume has increased by 5.17 per cent., when in Latvia respectively only 0.98 percent. Comparing absolute GDP amounts during 2005–2013 years the largest GDP volumes were in Lithuania, Latvia by the volume of the GDP was the second of the Baltic countries, and lowest GDP throughout the analyzed period was established in Estonia.

In order to determine the volume of lending activities in the Baltic countries there will be examined loans stocks volumes in euros, distinguishing households and non-financial corporations. The loan amount covers loans granted to residents and non-residents, including loans granted in various currencies – the total amount of loans granted to households and non-financial corporations.

Non-financial corporations are private and public entities whose main activity is not financial intermediation activities but the production of goods and non-financial services in order to earn a profit. Household sector includes individuals or groups of individuals (Methodological Notes 2014). Figure 2 illustrates non-financial corporate loan volume changes in the Baltic countries.

**Figure 2.** The total amount of loans to non-financial corporations changes in Baltic countries for 2005–2013, percentage



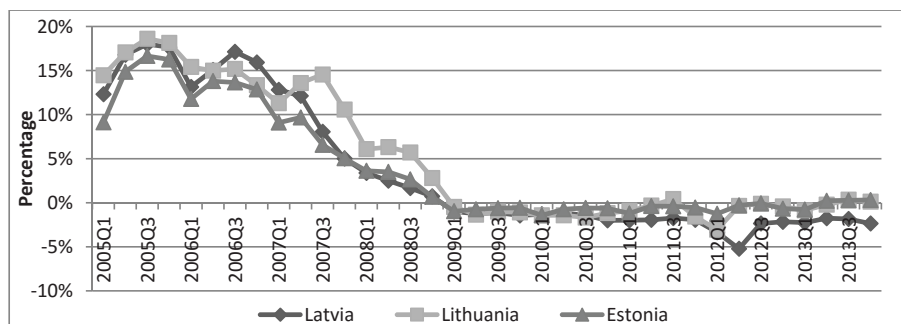
Source: created by authors on the base of Bank of Lithuania (2014), the Bank of Latvia (2015) and the Bank of Estonia (2014) data.

According to the overall amount of loans to non-financial corporations, the most part in analyzed 2005–2013 years period, the amount of loans granted in Latvia were the biggest and the smallest volume of the respective loans from the Baltic countries were in Estonia. The largest non-financial corporate loan volume growth was recorded in 2005–2006 years in all the Baltic countries, when the average loan volume changes over the quarter was 12.59 percent in Estonia, in Latvia - 10.36 percent., while in Lithuania - 9.99 percent. However, there were such cases, when during 2005–2006 years; in one quarter volume of loans to non-financial corporations in Estonia grew by 15.72 percent, in Latvia - 12.75 percent and in Lithuania – 12.91 percent. These drastic loan growths were determined by situation of economic improvement in the Baltic countries, which encouraged non-financial corporations to expand their business by incurring liabilities to banks. In 2009 the economic crisis affected the Baltic countries economies, the total amount of non-financial corporations loans began to decline. The largest decreases of loans amount in the Baltic countries were recorded in 2010–2012, when within one quarter volume of loans in Estonia declined by -3.47 percent, in Latvia decreased by -5.13 percent and in Lithuania fell -5.92 percent. Evaluating overall loan volume change over the period



of 2010 first quarter to 2012 second quarter, loan volumes had decreased very significantly, in Latvia -20.94 percent, in Lithuania fell -15.60 percent and in Estonia the volume of loans to non-financial corporations decreased by -14.10. These loans changes were involved with corporations financial position deterioration associated to economic crisis, which did not encourage firms to take on new liabilities to banks. Also, almost all banks have tightened terms of loans and credit lines to enterprises, tighten requirements for collateral. The changes of household loans in the Baltic countries during the period of 2005-2013 years are presented in Figure 3.

**Figure 3.** The total amount of loans to households changes in Baltic countries for 2005–2013, percentage



Source: created by authors on the base of Bank of Lithuania (2014), the Bank of Latvia (2015) and the Bank of Estonia (2014) data.

Examining the total amount of household loans it can be seen that most of the analyzed period, largest amount of loans was in Latvia, but in recent 2011–2013 years mostly loans to household were given in Lithuania. The biggest growth in household loans in the Baltic countries was recorded before a crisis in 2005–2006, when volume of loans in a quarter grew at an average of 15.76 percent in Latvia, 15.90 percent in Lithuania and 13.62 percent in Estonia. The significant growth in loans to household continued in Lithuania in 2007 (every quarter grew at average 12.5 percent.), but in Latvia and Estonia, the loan growth in 2007 year was slower. These changes can be explained by economic growth in countries, preferential bank loan terms, which led that almost every household was able to get a loan from the bank. However economic crisis started in 2009 affected the volumes of loans not only to non-financial corporations,

but also to household. During the period of 2009–2012 years, volume of loans granted to household in a quarter have average decreased by -1.94 percent in Latvia, by -1.03 percent in Lithuania and by -0.69 percent in Estonia. It may be associated to the economic crisis, the household labor loss, inability to meet its debt liabilities, as well as the rise in interest rates (compared to their pre-crisis level). After all these household and non-financial corporations inability to repay the loans, banks have also tighten risk assessment of the borrower's financial condition requirements.

To sum up, the economic crisis has affected both non-financial corporations and household volumes of loans, the downturn of lending volume started in all the Baltic countries. Although since 2010 the economic growth was recorded in all the Baltic countries, both non-financial corporations' and households' amounts of stock loans had a tendency to decline.

In order to determine whether the banks credit activities and economies are linked with linear relationship and what exactly the strength of their relationship is, the correlation analysis was used. Table 1 shows the calculated linear correlation coefficients between the Baltic countries GDP and non-financial corporations and households lending volumes.

**Table 1.** The linear correlation between lending activities and economies (GDP) in Baltic countries

Country	Non-financial corporations		Households		$t_{critical}$
	Correlation coefficient	$t_{observed}$	Correlation coefficient	$t_{observed}$	
Lithuania (GDP)	0.6368	4.8162	0.7492	6.5957	2.029
Latvia (GDP)	0.6237	4.6524	0.6609	5.1346	
Estonia (GDP)	0.6394	4.8487	0.7068	5.8259	

Source: created by authors.

Calculated correlation coefficients showed that in all three Baltic countries between economies and non-financial corporations lending activities medium positive strength dependencies exist, because all correlation coefficients were greater than 0.5. Among households lending activities and economies in Lithuania and Estonia strong positive dependencies exist (correlation coefficients are higher than 0.7) and in Latvia respectively medium strength pos-

itive relationship. All correlation coefficients are significant, because their  $t_{\text{observed}} > t_{\text{critical}}$ , their calculated t-test values are greater than determined t-critical value. Thus, the obtained results show that the lending and economic activities in all the Baltic countries have linear medium and strong positive relationships.

However, in scientific literature it is argued that between lending activities and economies the lag exist, these indicators do not change at the same time. Also the correlation coefficient does not indicate which variable is independent and which depends on the other change. Therefore, in order to evaluate these aspects and according to other researches Granger causality test was selected. Granger method assumes linear time-series model and in order to adapt this method the data must be stationary. The stationary of data was checked by Augmented Dickey-Fuller test. The test showed that absolute GDP and loan amounts sizes data are not stationary. Therefore, the data of GDP volumes and the amounts of loans were calculated as the 1st order differences. With new data the augmented Dickey-Fuller stationary test was performed, but the parts of the data were still not stationary, so the data were transformed as 2nd order differences. Summarized stationary test results with the 2nd order differences data are presented in Table 2.

**Table 2.** Stationary test results by augmented Dickey-Fuller test with 2nd order differences data

Null Hypothesis: X has a unit root	GDP		Non-financial corporations		Households	
	t-Statistic	p-Value	t-Statistic	p-Value	t-Statistic	p-Value
Lithuania	-7.9613	0.0000	-4.5047	0.0011	-5.1349	0.0002
Latvia	-5.4198	0.0001	-5.4764	0.0001	-4.0887	0.0032
Estonia	-5.7469	0.0000	-9.0637	0.0000	-5.3088	0.0001

Source: created by authors.

As all the calculated p-Values are less than 0.05, the null hypothesis should be rejected, which means that all data are stationary and Granger causality test could be performed. Performing the Granger causality test in all the cases, x is identified as appropriate country GDP, and Y is households' or non-financial corporations' loans. There was used 2nd order differences data of GDP and loan volume, separately assessing the relationship between non-financial corpora-

tions and GDP, and between households and GDP indicators. Obtained results using the Granger method in the Baltic countries, where delays (lags) number is 1 (in this case a quarter) are presented in Table 3.

**Table 3.** Granger causality test results between lending activities and economies in Baltic countries, when the number of lags is 1

Number of lags	1	Non-financial corporations		Households		
Null Hypothesis	Observations	F-Statistic	p-Value	F-Statistic	p-Value	
X does not Granger Cause Y	34	1.5564	0.2215	3.9824	0.0548	Lithuania
Y does not Granger Cause X		1.5730	0.2192	0.0924	0.7632	
X does not Granger Cause Y		2.8806	0.0997	5.4447	<b>0.0263</b>	Latvia
Y does not Granger Cause X		0.0053	0.9425	0.4966	0.4863	
X does not Granger Cause Y		0.8940	0.3517	3.5883	0.0675	Estonia
Y does not Granger Cause X		0.0319	0.8595	1.5624	0.2207	

Source: created by authors.

Calculated p-values in Lithuania of both non-financial corporations and households were higher than 0.05, so all the null hypothesis should be adopted, which means that at one period lag lending activities and economy in Lithuania does not affect each other. The same situation is in Estonia, the p-Values are higher than 0.05, which means that between lending activities and economy the relationship evaluating one period of lag does not exist. Identified p-Value between non-financial corporations' loans and GDP showed that in Latvia dependence between these indicators does not exist. But the relationship between the economy and household credit activity in Latvia was confirmed, as the estimated p-Value was  $0.026 < 0.05$ , this means that the null hypothesis should be rejected. Therefore the GDP affects household loans volume in Latvia with one period lag, which means that the GDP changes affects the volume of household loans the next quarter in Latvia.

The obtained results when number of lag from 1 period is change to 2 periods (in this case half-year) are presented in Table 4. In Estonia and Lithuania cases when the number of lags is 2, estimated p-Values were higher than 0.05,

which means that in all cases the relationships between lending activities and economies with two periods of lags does not exist. In Latvia when the number of lags is two, there was found that between GDP and loans to non-financial corporations the relationship exists, because the estimated p-Value  $0.015 < 0.05$ , so the null hypothesis is rejected. This means that GDP with two periods of lags, influence the volume of loans to non-financial corporations in Latvia. With a lag of two periods the relationship between GDP and household loans in Latvia was not found, because the estimated p-Value was greater than 0.05.

**Table 4.** Granger causality test results between lending activities and economies in Baltic countries, when the number of lags is 2

Number of lags	2	Non-financial corporations		Households		
Null Hypothesis	Observations	F-Statistic	p-Value	F-Statistic	p-Value	
X does not Granger Cause Y	33	2.5447	0.0965	1.9647	0.1591	Lithuania
Y does not Granger Cause X		1.1001	0.3468	0.4164	0.6634	
X does not Granger Cause Y		4.9292	<b>0.0147</b>	2.4598	0.1037	Latvia
Y does not Granger Cause X		0.2087	0.8129	0.6555	0.5270	
X does not Granger Cause Y		0.4958	0.6143	1.4545	0.2506	Estonia
Y does not Granger Cause X		0.2106	0.8114	1.4665	0.2479	

Source : created by authors.

### FINAL REMARKS AND CONCLUSIONS

Theoretical bank lending activities and economies relationship analysis has shown that many authors' studies have confirmed the relationship between lending activities and economies in the various countries of the world. The majority of scientific studies have shown that lending activities have a positive impact on economic growth, but some authors have found the opposite connection – that economic growth has a positive impact on domestic credits. However, there are studies which found out that the lending activities of the banks do not contribute to the country's economic growth.

Lending activities (non-financial corporations and households volume of loans) and the economies (gross domestic product) trends during the 2005–2013 years were similar in all three Baltic countries. The largest growth of loans amount was identified in the pre-crisis period of 2005–2006 years. The economic crisis has affected both households and non-financial corporation loan volumes; they started to decline in all the Baltic countries. However in 2010–2012 years the gross domestic product volume tended to rise in all the Baltic countries, but households and non-financial corporations' volumes of loans had a tendency to decline. This can be attributed to conditions tightening which were adopted, banks have tightened lending conditions for businesses, tightened risk and the borrower's financial condition assessment requirements, so to both households and non-financial corporations it was more difficult to get a loan.

Correlation analysis showed that the credit activities and economies in all the Baltic countries have moderate or strong positive linear relationships, but stronger dependence in all countries was identified among household loans and GDP, than the volume of loans to non-financial corporations and GDP. Granger causality test showed that with one period lag the relationship between household lending activities and GDP is only in Latvia – GDP affects household loans variation in Latvia. With two periods of lags, GDP has an impact on the volume of loans to non-financial corporations, but only in Latvia. The relationship between credit activities and economies, with one period and two periods of lags, was not found in Lithuania and Estonia. These results indicate that in order to predict the Latvian households and non-financial corporate lending volumes, it is possible to use the data of GDP.

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