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# CONTRIBUTION OF THE CREDIT ACTIVITY TO THE FINANCIAL DE/STABILIZATION PROCESS - THE CASE OF CENTRAL AND EASTERN EUROPEAN COUNTRIES

## Abstract

*The subject of this paper is the way how credit activity in Central and Eastern European Countries contributes to the financial de/stabilization process. The basic purpose of this paper is through assessment of the sustainability of credit growth to emphasize the crucial role of the quality of the banking sector's financial functions performance in the direction of providing financial stability. In the focus of interest are episodes of booms and busts, which are typical for the financial markets, but also observed in case of credit distribution. Phases of investor euphoria are followed by sudden surges in risk aversion, as the excessive credit growth is followed by collapse of the loans that are less profitable than expected. The 2007 subprime crisis in the US is a typical case in point, as it basically stems from an excess credit distribution to insolvent lenders. The same pattern was reproduced in many countries at the same time, or with some lag. Two types of approach will be used in this paper in order to identify a behavior pattern that may be specific to countries from Central and Eastern Europe especially in the period before and after 2007 financial crisis. The first is the statistical approach, based on deviations of the Credit/GDP ratio series from their long term trend. The second is the econometric approach based on using an error correction model in order to explain the level of credit activity as a function of economic fundamentals in the case of Macedonia.*

*Key words: banking sector, financial stability, financial crisis, market capitalization, credit growth, credit booms, credit busts, non-performing loans*

## 1. Introduction

Empirical literature suggests that enormously increased activity of banks, which is usually demonstrated through credit booms is often followed by financial crises. Credit booms are generally identified as a key factor behind financial crises, in particular in the emerging countries. This strong credit growth could have been due to the catching-up process but could also have been excessive, as a precondition for the credit crunch that followed the crisis in 2008-2009. In this view, the severe financial crisis that hit some of the Central and Eastern European countries (CEECs) in 2009 could be attributed to previous excesses. Therefore, an important question is whether the credit growth had been in excess in the CEECs in the years preceding the 2008-2009 financial crisis.

Two types of approach are used in economic literature to identify credit booms. The first is a purely statistical approach, based on deviations of credit series from their long-term trend, such as in Gourinchas et al. (2001), Tornell and Westermann (2002), IMF (2004) and Sa (2006). The second is econometric and seeks to explain the level of credit or credit growth as a function of economic fundamentals (Cotarelli et al. (2005), Boissay et al. (2005), Egert et al. (2006), Kiss et al. (2006)).

The excessiveness of credit is assessed by applying a number of methods. First, there is considered  the gap between the current credit and its long-term trend and there are identified some signs of credit booms in CEECs. Second, by making econometric estimations an assessment is made of the "normal" growth of credit in Macedonia with regard to fundamentals.

The rest of the paper is organized as follows. Section 2 compares the credit/GDP ratio with its long-term trend. Beyond a certain threshold, positive deviations are classified as credit booms. In Section 3, there is made astatistical analysis as well as econometric estimates of the credit/GDP ratio relative to the macroeconomic variables in Macedonia.

### 2. Assessing the excessiveness of credit activity in CEECS

Assessing the excessiveness of credit is specific, especially in the case of the CEECS, because of their particular economic situation. As they are meant to catch up rapidly with the previous EU members, their levels of capital, productivity and income are converging towards those of advanced countries.  Hence, the strong credit growth that was observed in the CEECs may have been part of a normal catching-up process. At the start of transition, between 1991 and 1993, the existing credit stock was eliminated by hyperinflation in some countries (in particular Poland and the Baltic States). Then, during the stabilisation phase, the pace of financial liberalisation and financial deepening steadily picked up. For instance (Chart 1), in 1997, the level of credit stock of these economies was still very low in percentage of GDP: less than 20% in the Baltic States, Poland, Macedonia and Bosnia and Hercegovina (compared with, for example, 139% in Cypros, 102% in Austria, 105% in Netherlands and 110% in Germany in the same period).

**Chart 1: Indicator Credit/GDP (%) in CEECs and EU-15**
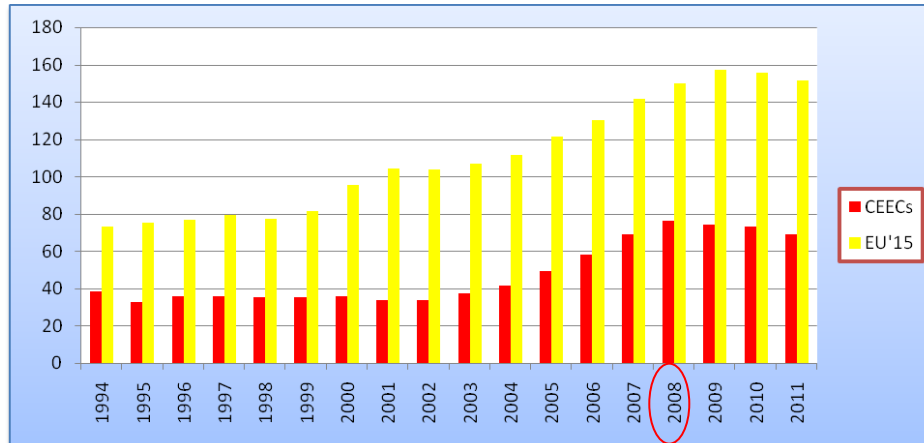


Source: Author's calculations

The strong credit growth results with the highest level of credit stock in percentage of GDP of these economies in 2008. The comparison between levels of the credit stock in percentage of GDP of these economies in 2008 with those in 1997 is shown in the Graph.

**Chart 2: The indicator Credit/GDP in 2008 compared to 1997 in CEECs**
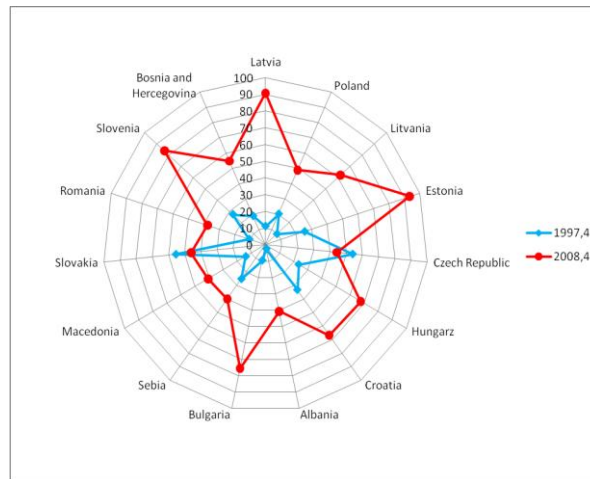


Source: Author's calculations

The Chart 2 shows that the value of the indicator Credit/GDP in 2008 compared to 1997 significantly increased. This is a fact even for the Czech Republic and Slovakia

where the indicator credits / GDP has smaller values in 2008 than in 1997. In this period credit activity increased 2, 4 times in Czech Republic and 1, 6 times in Slovakia, while GDP was growing faster, showing 3 times increased value for Czech Republic and 2 times increased value in Slovakia..

The Chart 3 shows the trend of the Credit/GDP indicator in the CEECs in the period from the 1997 to the third quarter of the 2012. Although the crisis was clearly triggered from abroad by the global financial turmoil, its severity is likely to have overwhelmed the mere contagion effects, especially in the Baltic States. In those latter countries, credit was soaring by 40% to 60% a year in 2006-2007, and subsequently dried up in 2009. Most other CEECs followed the same pattern, although with less extreme variations.

**Chart 3: Indicator Credit/GDP (%) in CEECs**
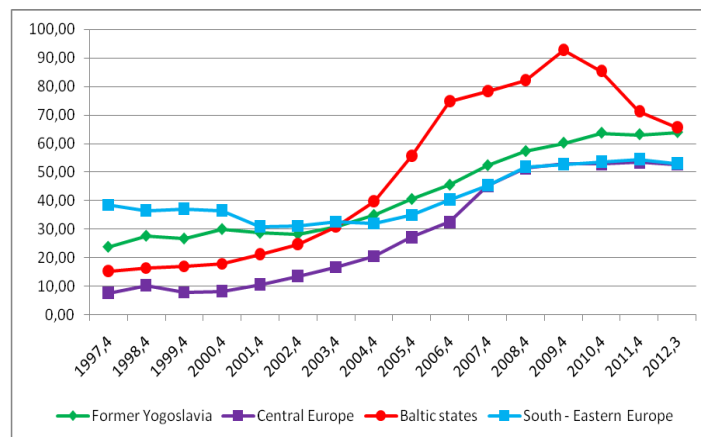


Source: Author's calculations

### 2.1 Statistical types of approach

This article applies statistical types of approach using a sample of emerging countries, with a view to identifying a behaviour pattern that may be specific to countries of Eastern and Central Europe.

In the statistical approach, possible thresholds and indicators are tested in order to define the credit boom periods. First, there is determined the equilibrium level of the credit/GDP ratio corresponding to the fundamentals in the sample as a whole. If the credit/GDP ratio has not yet reached its estimated equilibrium level in CEECs, the rapid credit growth may stem from the catching-up process. Credit growth is then explained as a function of deviations of the credit/GDP ratio from its equilibrium level, estimated in the previous stage, and other macroeconomic variables such as the growth of GDP per capita.

A simple statistical approach provides an opportunity to obtain certain information and warnings, and draw some conclusions. However, these findings need to be further tested and validated by applying more complex models and methods.

Analyzed sample contains 16 Central and Eastern European emerging countries with growing economies: 6 Former Yugoslavian countries (Macedonia, Serbia, Montenegro, Bosnia and Herzegovina, Croatia and Slovenia), 3 countries from the Baltic Region (Latvia, Lithuania and Estonia), 4 countries from Southeast Europe (Slovakia, Czech Republic, Poland and Hungary) and other 3 countries mainly from Central Europe (Romania, Bulgaria and Albania). Data is quarterly and refers to the period of 16 years starting from the first quarter of 1997 and ending with the third quarter of 2012. Exception to this is Montenegro, where the analysis starts from the first quarter of 2002.

Hodrick − Prescott filtering method is used for calculating the long- term trend of the Credit/GDP indicator. The time series are decomposed into their long-run and short-run components. If the credit indicator significantly exceeds its long term trend at a certain period, this can be considered to signal a credit boom. Periods of credit boom are determined by deviations of the indicator from the long-term trend over a certain threshold. Credit boom periods are usually estimated by using data for a group of countries labeled as $i = 1, ..., n$, for the time period $t = 1, ..., T$. The most relevant indicator is the Credit/GDP ratioa as a percentage marked as $c,i,t$ which is: $c_{i,t} = C_{i,t}/Y_{i,t}$ where $C_{i,t}$ denotes the outstanding stocks of loans and $Y_{i,t}$ denotes GDP in country i at date t. Long-term trend denoted $\underline{c}\, k,i,t$ for $k=1,2$ is usually estimated by Hodrick − Prescott filter. The deviation from the long run trend is equal to the difference between the indicator and its trend: $e\, k,i,t = c\, k,i,t - \underline{c}\, k,i,t$. A credit boom is identified at period t in country i only if the deviation $ek,i,t$ exceeds a certain threshold $Sk,i$, i.e. if $ek,i,t > Sk,i$. According to this, if the threshold is higher, than rarer are the cases of credit booms. The thresholds are calculated for each country separately as a multiple of the standard deviation of credit fluctuation around the trend: *Sk,i = aσk,I, where σk,I* denotes the standard deviation of the credit fluctuation around the trend for country i and a is an arbitrarily chosen coefficient. This approach is applied by IMF, through setting the coefficient a at 1,75 giving it a value of arbitrary coefficient of 1.75. According to this, a credit boom is defined as credit growth that exceeds its long-term trend by 1.75 times the standard deviation of the fluctuation around the trend. By analogy to the way of defining periods of boom, the credit busts are defined as the contraction of credit, which is below the long term trend of 1.75 times the standard deviation of the fluctuations around the trend.

### 2.1.1   Results

The following is interpretation of the results obtained from the HP filter for the deviation of the Credit / GDP indicator from its long-term trend. It is important to make a distinction between the expansion of credit activity (upward movement of the Credit / GDP indicator) and credit booms or between credit contraction (downward movements of the Credit / GDP indicator) and credit busts. The only expansion that is above and contraction which is below the specified threshold are interpreted as a credit boom or credit bust. The focus of attention is the period around the financial crisis in 2007. Presented results are only for countries with detected credit boom or credit bust.

However, of particular importance is the fact that credit volume is not analyzed separately, but in relation to GDP.

**Table 1: Periods of credit booms and credit busts identified in CEECs with HP filter**

|  | credit booms | credit busts |
|---|---|---|
| **Baltic states** | | |
| Latvia | 2006 - q4; 2007-q1, q2 | 2012 - q2, q3 |
| Litvania | 2009 - q3,q4 | 2012 - q1, q2, q3 |
| Estonia | 2009 - q3,q4 | 2012 - q2, q3 |
| **South – Eastern Europe** | | |
| Slovakia | - | - |
| Czech Republic | - | - |
| Poland | 2008 - q3,q4 | - |
| Hungary | 2008 -q4; 2009-q1 | 2012 - q2, q3 |
| **Central Europe** | | |
| Romania | - | - |
| Bulgaria | 2008 - q2,q3 | - |
| Albania | 2008 - q3,q4 | - |
| **Former Yugoslavia** | | |
| Macedonia | - | - |
| Serbia | - | - |
| Montenegro | 2007 - q4; 2008 - q3 | 2010-q4; 2011-q1,q2,q3,q4 |
| Bosnia and Hercegovina | - | - |
| Croatia | - | - |
| Slovenia | - | - |

Source: Author's calculations

In the analyzed period in all countries, as a result of the financial crisis, after several years of continuous growth, the credit/GDP indicator trend was interrupted. This resulted in slower growth or reduction of the credit volume with different dynamics in the analyzed countries. But the credit boom was founded in 8, and the bust in 5 countries of the analyzed sample. Table 1 gives an overview of the established credit booms and busts.

### 2.1.2    Discussion of the results

Now, the obtained results will be used in order to identify a behavior pattern that may be specific to countries from the Central and Eastern Europe especially in the period before and after 2007 financial crises. In most of the analyzed countries there can be seen the following path which moves Credit /GDP indicator i.e. rapid growth which is largely due to the normal "catching-up" process asgreater investment opportunity and

easier access to sources for financing the credit activity become available. In addition, in comparison to developed countries, the initial level of credit stock is very low.

It can be said that in CEECs the effects of the crisis were felt with some delay as when the global financial crisis started, lending activity in these countries was still growing at a fast rate. First, credit growth rate and GDP growth rate started decreasing and GDP growth slowing faster than credit growth. In this period, the indicator Credit/GDP indicator is above the long-term trend or exceeds the threshold in the countries where a credit boom is detected. In the same period, the direction of the trend of non-performing loans is changed. After several year of decline, there begins first slow and later rapid growth of non-performing loans (Chart 4).

**Chart 4: Non-performing loans (%) in CEECs**
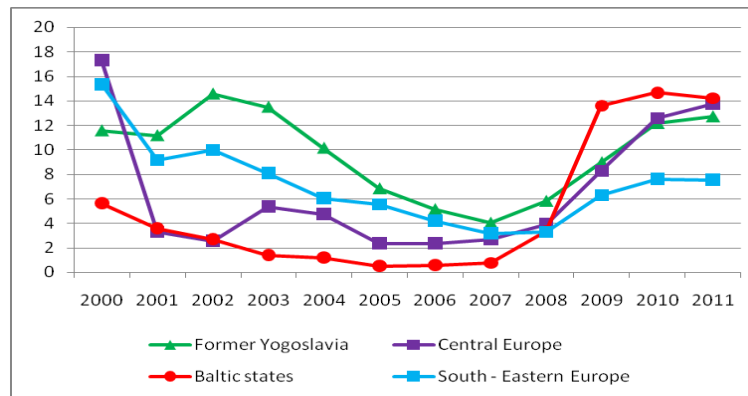


Source: Author's calculations

These non-performing loans appeared as a consequence of the strong credit expansion when the quality of the credit portfolio and importance of compliance with bank credit policies and procedures were less treated. Moreover, the deteriorating indicators of profitability (ROE and ROA) and indicators of efficiency (Overhead costs and Net interest margin), as well as the limited opportunities for using international sources for financing the credit activity are key reasons that lead to a strong deceleration of the credit growth rate. Central banks are more focused on stability and liquidity as the operating directions of the commercial banks. As a result, the Credit /GDP indicator is below the long-term trend or is below the threshold in the countries in which credit busts are detected.

3. **Econometric estimates of the credit/GDP ratio relative to macroeconomic variables in Macedonia**

In this section a statistical analysis is made of both the long-term trend of Credit / GDP indicator and of the econometric estimates of this indicator relative to macroeconomic variables in Macedonia.

### 3.1 The long-term trend of Credit / GDP indicator in Macedonia

As in most countries in transition, in the post-transition period, the credit market in Macedonia is relatively inactive. However, as important factors contributing to such dynamics in the field of private sector lending may indicate the following:

- a low level of bank deposits, which means a small domestic credit potential;
- gradual restructuring of the real sector of the economy, thus following difficulties about finding quality borrowers and quality investment projects;
- prudent policy banks, in terms of inherited and acquired "bad" loan portfolio;
- a low level of bank deposits, which means small domestic credit potential;
- gradual restructuring of the real sector of the economy, thus following difficulties about finding quality borrowers and quality investment projects;
- prudent policy banks, in terms of inherited and acquired "bad" loan portfolio;
- restructuring and consolidation of the banks, which needed time for setting adequate new credit policies and procedures and adequate lending process; a low level of bank deposits, which means small domestic credit potential;
- gradual restructuring of the real sector of the economy, thus following difficulties about finding quality borrowers and quality investment projects;
- banks' high lending interest rates;
- inadequately defined legal framework, mainly in terms of speed and efficiency in the implementation of the collateral;
- Uncertainty as a characteristic of the post-transition period as well as the uncertainty generated by several shocks of non-economic character.

**Graph 5. CRED/GDP indicator (%) - deviations from the long-term trend by HP filter**
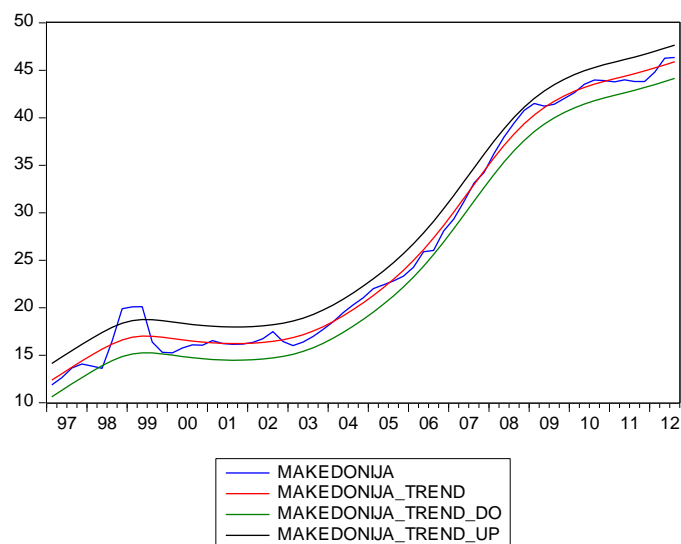
All these factors result in the maintenance of the share of the total private credit in an extremely low level until 1998, when some positive developments are registered. But the 1999 Kosovo crisis and the crisis in 2001 appropriately reflects on lending. The decreasing in both private sector consumption and investment results in reduced supply and demand for loans. The overcoming of the negative consequences of the crisis and the stabilization of macroeconomic conditions contributes to the start of a growing trend of private sector lending by banks. In the period (2003-2008) rapid credit growth in the banking sector is registrated The Credit/ GDP indicator increased by 2.5 times (from 16.45% in 2002 to 40.78% in 2008). During this period, the absolute amount of credit provided to the private sector increased by 4 times, and the average annual growth was about 30%. The strong credit growth in this period was due to the impact of the following factors:

- an increase in banks' credit potential through expansion of the deposit base and increased opportunities for financing credit activity with attractive foreign credit lines;
- increased attractiveness of credit arising from the diversified offer of credit products (diversification of the types of loans and the conditions for their use);
- A higher degree of competition in the banking system arising from the entry of foreign capital into banks that can be seen through the narrowing of interest margins of banks, as well as promoting corporate governance. During this period, the main objective of banks is achieving increased volume of loan portfolio, profits and providing greater market share.

In 2009, credit activity in Macedonia is slowed down as a result of the following factors: the effects of the global financial crisis and reduced activity of national economy, the slower growth of deposits, the limited sources for financing the credit activity with foreign credit lines, course of tightened monetary policy, as well as increased banks precaution in loans approval process. In the upcoming period, banks have redirected to the following main goals: stability and liquidity, as well as maintaining a quality loan portfolio. In 2011, there is a slight increase in credit activity in terms of a more stable macroeconomic environment, improved expectations, growth of bank deposits and reduced rates on treasury bills. Furthermore, as a result of the debt crisis in the euro zone and uncertainty for the recovery of domestic economic activity, in the 2012, lending slowed down, and the quality of the loan portfolio deteriorated. Quality has become an important determinant of funding when making decisions for loans approval, f and Banks took stronger actions to improve credit risk management system.

### 3.2 "Normal" growth of credit in Macedonia with regard to fundamentals

A simple statistical approach provides an opportunity to obtain certain information and warnings, and draw some conclusions. However, these findings need to be further tested and validated by applying more complex models and methods. The econometric approach seeks to explain the level of credit as a function of economic fundamentals.

CRED indicator measures the activity of the banking sector and represents the relationship between bank credit and GDP. Credit/GDP ratio is calculated as a function

of certain fundamental variables and the "normal value" of this ratio is assessed. For this purpose, VECM Vector Error Corection model is used. The model is set as follows:

$$\log(\text{CREDt}) = \alpha_0 + \sum_{m=1}^{M}\left(\alpha_m X_{m,t}\right) + \varepsilon_t$$

where CRED is Credit/GDP ratio for time t, $\alpha_0$ denotes a constant, $\alpha_m$ for m = 1,..,M denote M coefficients, $X_{m,t}$ represents economic fundamental variables and $\varepsilon_t$ the residuals of the equation.

### 3.2.1 Specification of the fundamentals

**GDP per capita (GDP)** is a fundamental economic variable that indicates the level of development of a country. It is expected to move in the same direction with approved loans and acceleration in the rate of GDP growth to increase credit activity of the banks, as well as slowing or negative GDP growth rate to reduce the credit volume. In this research as a measure of credit activity Credit / GDP indicator is used. Hence, it is expected that GDP growth will influence the reduction of the value of the Credit / GDP indicator. As a result, for GDP variable a negative sign is expectedd.

**National Bank main interest rate (RATE).** The interest rate on treasury bills is the basic interest rate, which determines the direction of monetary policy of the NBRM. If the main interest rates are high, banks prefer their assets to be held in highly liquid and safe securities rather than lent. Credit supply is limited and the lending rates are high. Hence, the interest rate on treasury bills is in inverse relation to the credit activity. However, a positive sign could be found if the monetary authorities react to the excessive credit growth by raising the main interest rates.

**Market Capitalization (MC).** This indicator is the ratio between the value of the shares traded in the market (calculated as the product between the share price of listed companies and their number in the specific day) and GDP. On one hand, higher market capitalization indicates the increased value of the property of the companies and the higher value of the collateral as a basis for increased lending. Hence, a positive sign is expected. However, if the market financing is considered as an alternative source of corporate financing and if market financing influences bank financing complementary and substitutionaly, than negative sign is expected.

**Unemployment rate (UNIMP).** This indicator is the ratio between the unemployed and the total working population in a particular economy. Its value is in inverse relation to the credit activity.

**Foreign direct investments (FDI).** This indicator shows the amount of foreign direct investment as a percentage of GDP in an economy. FDI are often recognized as the basis for further completion of the investments that would be financed through domestic bank loans. If foreign direct investments represent investments in

infrastructure, they could be the basis for starting new domestic investments that would be financed with domestic bank loans. In addition, foreign direct investments would reduce a rate of unemployment and increase credit-worthy population. That is why a positive relationship between this variable and the indicator Loans / GDP is expected.

**Openness to trade (TRADE).** Trade openness indicator represents the sum of exports and imports in the country as a percentage of GDP. Credit activity of the banks rises with the increase of export and import arrangements in the economy. Hence, the indicator TRADE is proportionally associated with bank loans.

Assuming credit market equilibrium in the credit market, the econometric model to be estimated is expressed as follows:

$$\ln CRED_t = \beta_0 + \beta_1 \cdot \ln GDP_t + \beta_2 \cdot \ln MC_t + \beta_3 \cdot \ln DEP_t + \beta_4 \cdot \ln FDI_t + \beta_5 \cdot \ln UNIMP_t + \beta_6 \cdot \ln RATE_t + \beta_7 \cdot \ln TRADE_t + \varepsilon_t$$

Used quarterly data for the above eight variables in the period from the first quarter of 1997 to the third quarter of 2012 in the Republic of Macedonia. In this model the NBRM's main interest rate is treated as an exogenous variable because the determination of this rate is subject to regulatory decision making. According to initial test for stationarity, the variable TRADE is not stationary and with the first-order differentiation cannot be stationary with a significance level of 1%. For these reasons, the variable TRADE is excluded from subsequent analyzes. Thus, the equation for regression model gets the following form:

$$\ln CRED_t = \beta_0 + \beta_1 \cdot \ln GDP_t + \beta_2 \cdot \ln MC_t + \beta_3 \cdot \ln DEP_t + \beta_4 \cdot \ln FDI_t + \beta_5 \cdot \ln UNIMP_t + \beta_6 \cdot \ln RATE_t + \varepsilon_t$$

### 3.2.2 Presentation of the results

The following table is presentation of Augmented Dickey Fuller results:

**Table 2: Results of the unit root test (level of significance of 1%)**

| Variable | Augmented Dickey Fuller |
|----------|-------------------------|
| ln(CRED) | I(1) |
| ln (GDP) | I(1) |
| ln (MC) | I(1) |
| ln (DEP) | I(1) |
| ln (FDI) | I(0) |
| ln (UNIMP) | I(1) |
| ln (RATE) | I(1) |

Estimation continues with the evaluation of the VECM model in accordance with the previously presented equation. In the Table 4, long term relations and their significance between credit indicator and the fundamentals are represented.

**Table 3. Estimation of the model cointegration equitation**

| Variable | Coefficient | t-statistic |
|---|---|---|
| ln (GDP) | -0.1251844 | -14.3338* |
| ln (MC) | -0.00486007 | -2.44842** |
| ln (DEP) | 0.09378221 | 10.3958* |
| ln (FDI) | 0.00403195 | 2.32441** |
| ln (UNIMP) | -0.00273466 | -6.26273* |
| ln (RATE) | -0.00046446 | -5.52611* |
| ECM | -0.00037436 | -7.40693* |
| Note: *means level of significance of 1%,** means level of significance of 5%,*** means level of significance of 10%, | | |

According to the presented results in Table 3, the GDP variable is highly significantly corelatated with the Credit/GDP indicator with negative sign, which shows that if the GDP grew by 1 percent, the value of CRED/GDP will be reduced on average for 0.1251844 percentages, assuming all other factors remain unchanged. It indicates that GDP growth causes a reduction in CRED, which is in accordance with the initial expectations. For market capitalization, there isobtained a negative and significant long-term relation, which indicates that if capitalization increased by 1 percent, then the value of CRED on average will drop to 0.00486 percent, assuming all other factors remain unchanged. It indicates that loans and capitalization are in inverse relation the expectations of which are in accordance with the initials. Long-term parameter of the deposits is positive and highly significant showing that if deposits increase by 1 percent, then the loans will increase on average for 0.0937821 percent, assuming all other factors remain unchanged. FDI parameter is positive and significant showing that if the FDI increase by 1 percent, then CRED on average will increase by 0.004%, assuming that all other factors remain unchanged. This suggests that the increase in foreign direct investment causes a positive reaction to credit activity. Unemployment is negative and there is the significant long-term parameter which shows that if the unemployment rate increased by 1 percent, loans will be reduced on average by 0.002 percent, assuming all other factors remain unchanged. This shows that the increase in unemployment causes a negative reaction of the loans. NBRM's main interest rate CB is negative and there is a significant long-term parameter, and it shows that if the rate of treasury bills increased by 1 percent, then the loans will decrease on average 0.0004 percentage. This confirms the inverse relationship between the lending banks and the interest rate on treasury bills.

The speed of adjustment is statistically highly significant and suggests that the variables will be adapted to the long run equilibrium for 26.7 quarters. This implies that the initially caused imbalance in the variable will be removed for a period of 6.7 year.

## 4. CONLUSIONS

In its first section this paper applies statistical types of approach using a sample of emerging countries, with a view to identify a behaviour pattern that may be specific to countries of Eastern and Central Europe.

Hodrick – Prescott filtering method is used for calculating the long- term trend of the Credit/GDP indicator.

The time series are decomposed into their long-run and short-run components. If the credit indicator significantly exceeds its long term trend at a certain period, this can be considered to signal a credit boom.  Periods of credit boom are determined by deviations of the indicator from the long-term trend over a certain threshold. In the analyzed period in all countries, as a result of the financial crisis, after several years of continuous growth, the credit/GDP indicator trend is interrupted. This resulted in slower growth or reduction of the credit volume with different dynamics in the analyzed countries. But the credit boom was founded in 8 (Estonia, Latvia, Litvania, Albania, Bulgaria, Polska, Montenegro, Hungary), and the bust in 5 countries ((Estonia, Latvia, Litvania, Montenegro, Hungary) of the analyzed sample.

The obtained results are used in order to identify a behavior pattern that may be specific to countries from the Central and Eastern Europe, especially in the period before and after 2007 financial crises. In most of the analyzed countries there can be seen the following path which moves Credit /GDP indicator i.e. rapid growth which is largely due to the normal "catching-up" process as greater investment opportunity and easier access to sources for financing the credit activity become  available. In addition, in comparison to developed countries, the initial level of credit stock is very low. It can be said that in CEECs the effects of the crisis were felt with some delay as when the global financial crisis started, lending activity in these countries was still growing at a fast rate. First, credit growth rate and GDP growth rate started decreasing and GDP growth started slowing down faster than the credit growth. In this period, the indicator Credit/GDP indicator is above the long-term trend or exceeds the threshold in the countries where a credit boom is detected. In the same period, the direction of the trend of non-performing loans is changed. After several year of decline, there  begins first slow and later rapid growth of non-performing loans. These non-performing loans appeared as a consequence of the strong credit expansion when the quality of the credit portfolio and importance of expectation of bank credit policies and procedures were less treated. Moreover, the deteriorating indicators of profitability (ROE and ROA) and indicators of efficiency (Overhead costs and Net interest margin), as well as the limited opportunities for using international sources for financing the credit activity are key reasons that lead to a strong deceleration of the credit growth rate. Central banks are more focused on stability and liquidity as the operating directions of the commercial banks. As a result, the Credit /GDP indicator is below the long-term trend or is below the threshold in the countries in which are detected credit busts.

In Section 2, the statistical analysis of  the long-term trend of Credit / GDP indicator as well as the econometric estimates of this indicator relative to macroeconomic variables

in Macedoniaare made. According to the statistical analysis, the credit/GDP indicator follows the similar pattern specified for the most CEECs, even credit booms and busts were not detected. In econometric estimation Credit/GDP ratio is calculated as a function of certain fundamental variables (GDP, market capitalization, foreign direct investments, NBRM main interest rate, unemployment, deposits etc.) and the "normal value" of this ratio is assessed. For this purpose, VECM Vector Error Correction model is used. According to the obtained results, long term parameters for GDP, unemployment, deposits and main interest rates are highly significant related to do Credit / GDP indicator. The speed of adjustment is statistically highly significant and suggests that the variables will be adapted to the long run equilibrium for 26.7 quarters. This implies that initially caused imbalance in the variable Credit / GDP will be removed for a period of 6.7 years.

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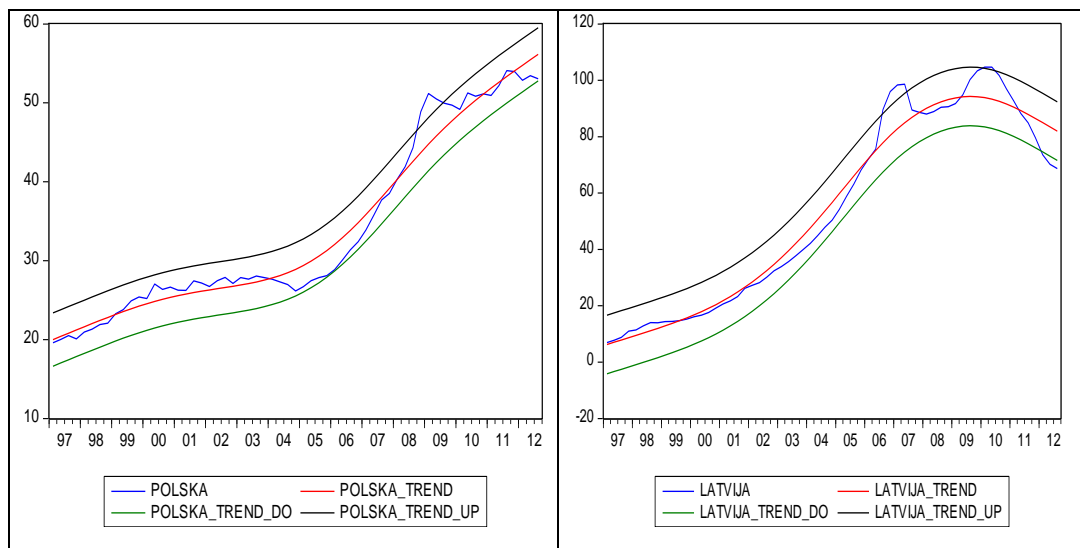Sendeniz, i., Levent A. and Aydogan, K. (2008) "*Interdependence of the banking sector and the real sector: evidence from OECD countries*", Aplied Economics 40, 749-764, Faculty of Business Administration, Bilent University, Ankara, Turkey;

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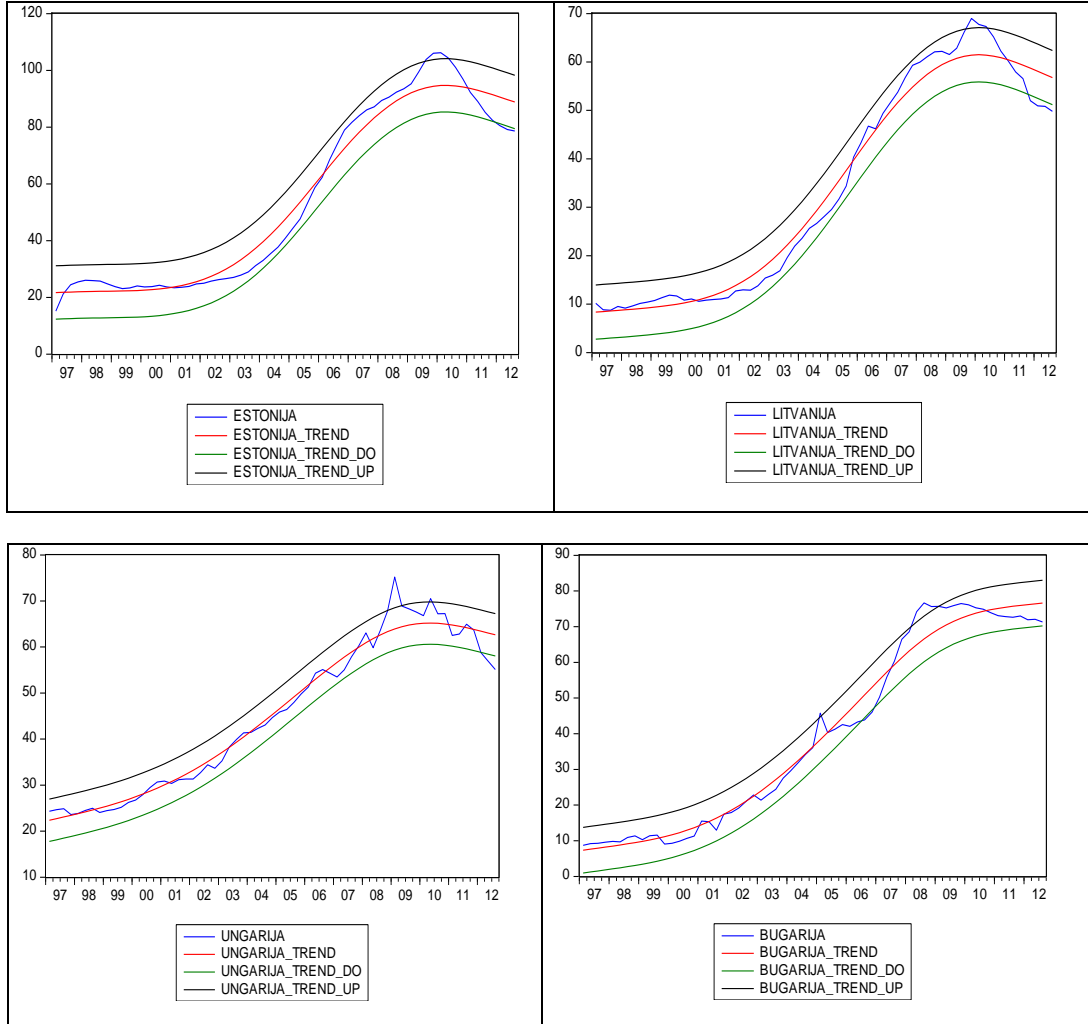
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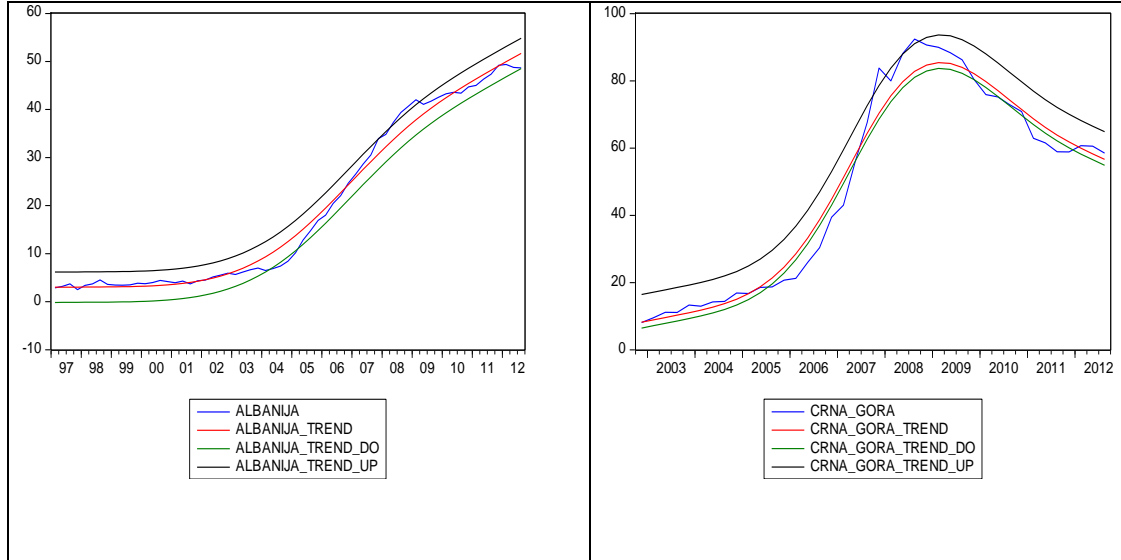**Appendix: Credit/GDP indicator for the CEECs with detected booms and busts (observed value, long term trend and thresholds)**