

## The credit impact on the economic growth

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**Abstract.** *In the current economic context, ensuring a sustainable and consistent economic growth is required for the reduction of development gaps by comparison the European average. To this end, an important part is played by resuming the economy financing and supporting the investment processes that generate income and jobs. This article aims to test the credit impact on the economic activity, if it is relevant in generating economic growth, as it represents a key factor in supporting the activity, or, on the contrary, if it affects the activity, diminishing its growth rhythm. The literature does not provide a clear answer to these aspects, as the periods taken into account for the analysis are short ones, are not homogenous, the economic conditions under which the crediting processes developed are different and the economy is disturbed by the external shocks and factors, which are difficult to intercept in the model. This article starts from the components within the GDP breakdown, identifies the relationship which is established between these and the credits granted to individuals and legal persons, assesses the credit impact on the economic activity and estimates a possible influence on the GDP.*

**Keywords:** crediting, economic growth, GDP, investment.

**JEL Classification:** E51, O47.

## 1. Introduction

The development of an economy is influenced by the banking sector stability and development level, especially given the fact that the economy financing greatly depends on the crediting activity (around 70% in the EU and approximately 30% in the USA). The financial turbulence surfaced in 2007, generated by the crediting activity, with an excessive risk, towards the applicants with a precarious credit history, that could not have fulfilled the terms for the granting of a standard mortgage credit, and by the complex financial products, have convinced many economists to study the manner by which the economy may be put back on track. Thus, the austerity policies arose, bearing the purpose of fiscally consolidating the economies, given the fact that these were ground by large government deficits and huge external debts. However, the trust of investors and banks within the economy did not return and we entered an actual crediting and economy growth vicious circle. The amplitude of this vicious circle depends on both the causality relation established between the crediting activity and the economic growth, which may be unidirectional or mutual, as well as its intensity.

The purpose of this study is to establish the part of the crediting activity in determining and supporting the economic growth, the main channels by means of which the crediting influences the GDP, the manner in which it should be intervened and the credits that ought to be encouraged in order to generate economic growth.

## 2. Literature review

The relation between the banking sector development and the economic growth has been studied since 1912, as this subject was approached by J. Schumpeter in the book "The Theory of Economic Development". However, this article aims to present studies as recent as possible, for a period as close as possible to the one chosen within this analysis, on the economy instability, the frequent changes produced, as well as for ensuring the comparability of the results obtained.

Koivu (2002) studies the connection between the banking sector and the growth of real GDP in 25 countries in transition, among which Romania, during the 1993-2000 period, using a data panel type of model. Thus, the results show that, in the merging countries, the credits granted to the private sector do not hurry the economic growth, as the causality between them is unclear and the value of credits from the previous period is in a negative relation with the economic growth from the current period. As similar studies are contradicted by these results, the author considers that this fact might be typical for developing economies that undergo an unsustainable growth in the private credits, which might lead to a reduction in the economic growth rhythm.

The same conclusion was reached by Cristea and Drăcea (2010) as well, as they conducted an analysis on the Romanian market during the 2001-2009 period, namely the fact that the economic growth was not encouraged by increasing the private credit, which led to a drop in the GDP growth rates. We believe that we cannot refer to these results, as

they employed the total credit independent variable (the one for individuals was not analysed separately, namely the one for legal persons), which is not homogenous for the chosen period: the inflation oscillates between 3% and 40%, the end of the period shows an economic boom period (2007-2008), as well as a period of financial decline (2009), periods that may be considered outlier and which may distort the analysis results. As a first reason, Cojocaru et al. (2011) proved that there is a positive relation between the credit granted to the private sector and the economic growth, but that the connection disappears during hyperinflation moment, a fact also shown by Rousseau and Wachtel (2002) indicating that the crediting effect is positive and significant only when the inflation is beneath 5-6%, and that the strongest connection is shown during the disinflation periods, when this passes 15-25%, as the financial deepening no longer leads to economic growth. A second reason is given by a study also conducted by Rousseau and Wachtel (2009), proving that this relation is rather unstable, being relevant for certain periods, and that when adding new data, this may disappear altogether. The sudden and excessive financial deepening, specific to the boom periods, may be problematic, even for developed economies, as the banking system weakens and it may cause inflationist pressure. Rousseau and Wachtel (2009) have tested this hypothesis by eliminating the crisis period, resulting that the relation between crediting and the economic growth remains intact in this situation as well. The financial deepening bears a strong impact on the economic growth for as long as a country may avoid the financial crisis. Furthermore, they have shown that the reduction of financing influence on the growth, between 2008 and 2009 appears both in the developed economies and in those undergoing development.

Dudian and Popa (2013) have one of the most recent studies on this subject, conducted on the grounds of the annual data from the 1996-2011 period, from 8 countries from Central and Eastern Europe. The study conclusion is that the economic growth is negatively influenced by the increase in credits for the private sector, granted without delay; however, when its dynamics are employed, the increase in the internal credits for the private sector bear a positive, but reduced impact on the economic growth. At the same time, the authors showed that the variable of non-performing credits has an important and statistically significant influence on the economic growth. Haiss and Kichler (2009), quoted by Dudian and Popa (2013), obtain a positive influence of the private credit on the GDP, only after introducing lags of 1 or 2 years.

All these results show that the study itself is a subjective one, as it greatly depends on external factors that are not included in the model such as: inflation, taxation, level of economic development, quality of economic environment, liquidity on the market of the existence of financial shocks, such as crises. These bring great differences in the results of each study. Despite this, it is important to establish the causality relations between the various crediting components (credits granted to legal persons or individuals, etc.) and the GDP components, in order to deepen the relation between crediting and economic growth.

### 3. Methodology. Econometric analysis

This article propose to analysis the influence of credit on the economic growth, as well identifying the channels through which this is done, by testing the impact that each type of credit has on the GDP components (public consumption, private consumption and gross capital formation). These became, one after another dependent variables tested in relation to the credits granted to individuals (I), legal persons (including non-bank financial institutions (NBF) and non-financial companies (SNF)) or credits granted to the public administration (PA).

The data was obtained from the National Bank of Romania sites and from Eurostat for the period of 2007-2013, quarterly data, accumulating a total number of 28 observations. Seasonally adjusted, nominal data were used, being processed as growth rates in order to ensure the stationarity. Two dummy variables were as well considered: one for the crisis (taking the value 1 after 2008Q4) and another for downgrading the rate of Romania in the period 2008Q1-2009Q4, downgrade given by the rating agency Fitch, being as well the only period after 2000 when rating agencies downgraded it, anticipating as well a negative perspective.

The types of credits used in the analysis as well as the characteristics statistically related to the series are presented in the following table:

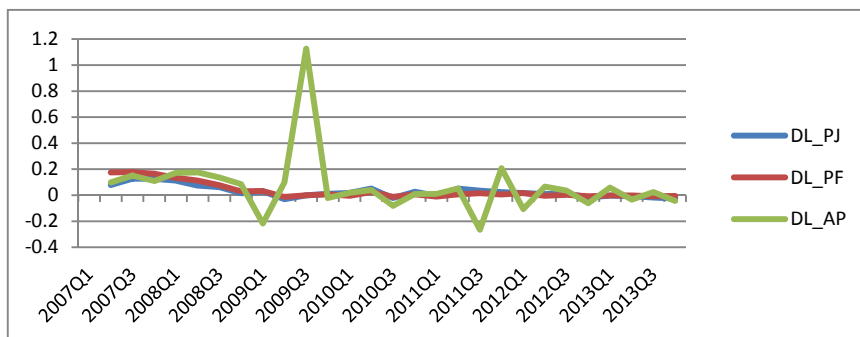
**Table 1.** *Descriptive statistics – types of credits*

	DL_LP	DL_Individuals	DL_PA
Media	0.028	0.034	0.068
Median	0.017	0.006	0.040
Maximum	0.128	0.177	1.126
Minimum	-0.030	-0.013	-0.265
Std deviation	0.045	0.062	0.239
Skewness	0.894	1.453	3.211
Kurtosis	2.942	3.563	15.659

**Source:** National Bank of Romania.

In terms of standard deviation, the most volatile are the credits granted to the public administration, which results as well from the following chart data resulting from the stationary operation.

**Graphic 1.** *Stationary data*



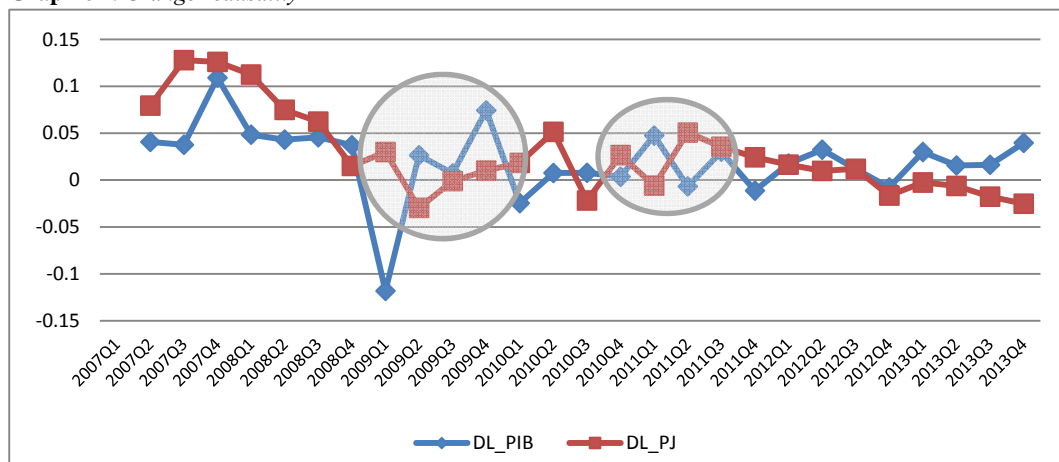
**Source:** National Bank of Romania.

For a better understanding of the connections between the variables the correlation coefficients were calculated, causalities in Granger sense were tested and the optimal number of necessary lags was established in order to obtain the relevant results, following that all these information to be used in regressions.

Regarding the optimal lags number, this oscillates between 1 and 2 lags and was determined according to the information criteria such as Akaike, Schwarz, Hannan-Quinn, Final prediction error, as well as according to the results of the Wald test for exclusion of lags depending on the  $\chi^2$  statistics. In case of GFCF(gross fix capital formation), the optimal number of lags is 1, and in case of the wage bill is 2, which means that effect of the credit influence on the wage bill is lost only after 2 quarters, unlike GFCF where only the last quarter has a significant impact on its current value.

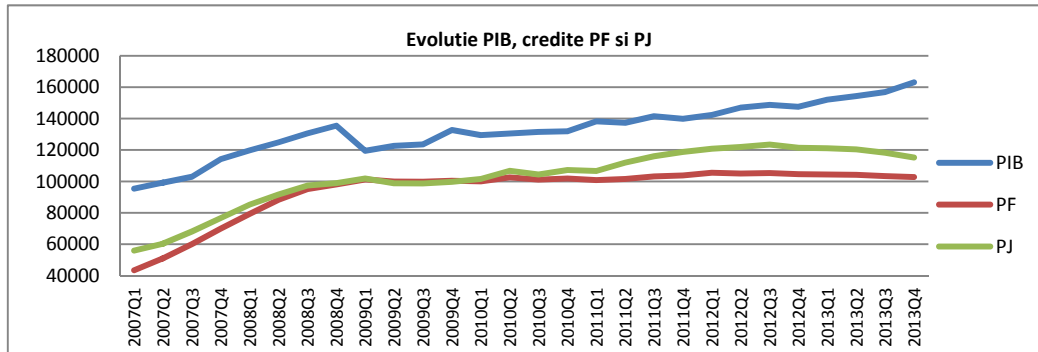
Establishing the causality relations between the components of the crediting activity and the GDP was wanted by a Granger testing. Thus, significant results were obtained for both types of credits (granted to I, or to LP) in connection to GDP. This aspect is presented as well in Graphic 2 where the areas highlighted in the chart best capture this causality. It can be observed that to an increase of credits granted to LP corresponds an increase of the GDP, but delayed with 1 lag, which supports the results of the Granger type causality and based on these results a future evolution of the GDP can be predicted. The regressions to be projected will establish exactly which channels determine this possible influence.

**Graphic 2.** Granger causality



**Source:** National Bank of Romania, Eurostat.

Testing the correlations between the considered variables were obtained the values 0.3975 (*p-value 0.04*) for the correlation between GDP and Individuals and 0.3081 (*p-value 0.118*) for the one between GDP and LP, but the Graphic 3 shows that during the analyzed period the 3 variables have not always evolved in the same direction, which resulted in dividing this period in 3 sub-periods, the results being summarized in Table 2. Of these, is to be mentioned the correlation between the GDP and Individuals during 2009q1-2011q4, a strong and negative correlation between the 2 variables.

**Graphic 3.** Evolution of GDP (PIB), Individual credits (PF), Legal Persons (PJ) credits

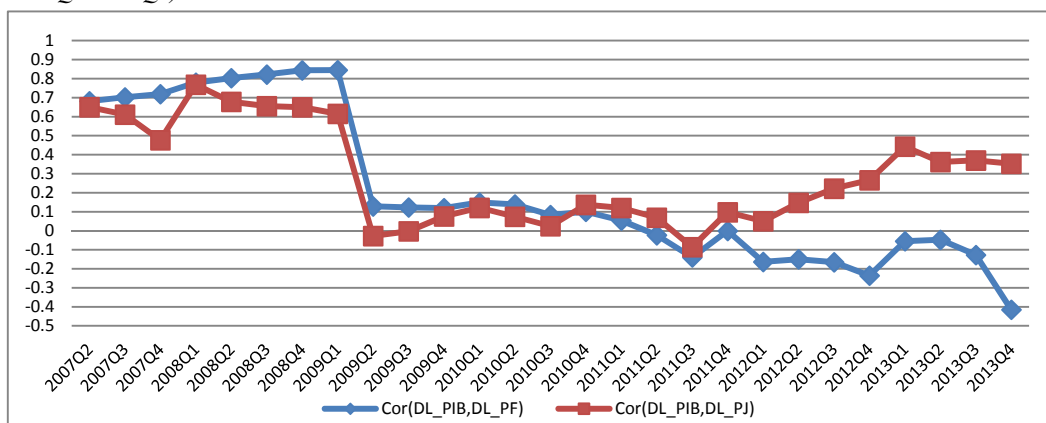
**Source:** National Bank of Romania, Eurostat.

**Table 2.** Sub-period correlations

Period	2007Q1-2008Q4	2009Q1-2011Q4	2012Q1-2013Q4
GDP – Legal persons correlations	0.3285	-0.5127 ( <i>p-value 8.8%</i> )	-0.0183
Period	2007Q1-2008Q4	2009Q1-2012Q2	2012Q3-2013Q4
GDP – Individuals correlations	0.4772	-0.3179	-0.19

**Source:** National Bank of Romania, Eurostat.

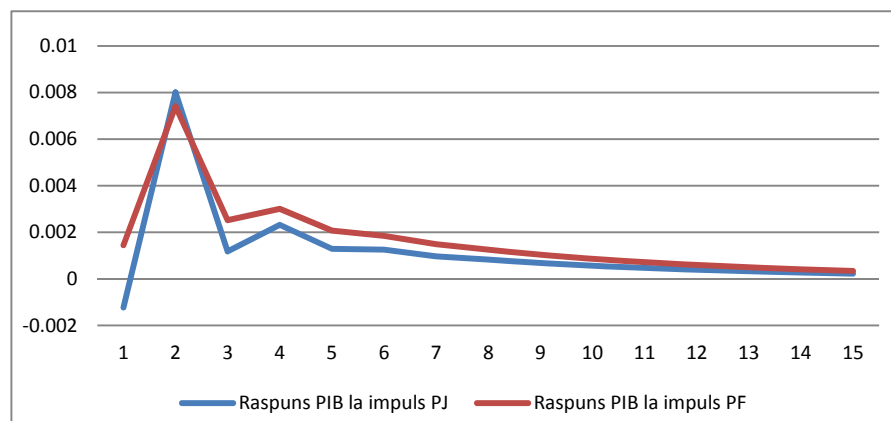
Considering the fact that the analyzed period is not homogeneous, obtaining both positive as well as negative correlations between the variables, dynamic correlations were as well calculated based on a diagonal model VEC(1,1). According to the obtained and presented results in the Graphic 4, the correlation between GDP and crediting is very strong and positive during the boom period (2007-2008), so that during the period of financial collapse (2009-2011) the correlation strives to 0. Note that since 2012, the situation changes, the correlations increase, but in different ways: the correlation between GDP and LP becomes stronger and stronger, tending to the level of the period of economic growth, and the one between GDP and Individuals oscillate in the interval (0;-0.2) not being considered a strong correlation, but in 2013q4 it becomes -0.4.

**Graphic 4.** Dynamic correlations GDP (PIB) – Individuals (PF), GDP (PIB) – Legal Persons (LP) (period 2007Q1-2013Q4)

**Source:** National Bank of Romania, Eurostat.

Not having enough data for highlighting the two cases treating them separately, the regressions will be made for the entire period; however, we expect that the influence of the credit granted to LP on the economic growth to be higher than the one of the credits granted to Individuals, following the stronger correlations obtained between these two variables.

**Graphic 5.** GDP answers to impulses at a crediting level for Individuals (PF), or Legal Persons (PJ)



**Source:** National Bank of Romania, Eurostat.

According to Pesaran and Shin (1998) in case of the Impulse-Response analysis the shocks are orthogonal, they propose a generalized version in which the order of introduction of variables in the VAR model does not matter. Therefore, the Impulse-Response analysis was performed using as a decomposition method: Generalized impulses.

The Impulse-Response analysis (Graphic 6) based on a structural auto-regressive vector, shows that GDP reaction to shocks at the level of the 2 types of credits has approximately the same intensity, and the effects lost after 4-5 periods. Instead, the variance decomposition highlights that a bigger percentage of the GDP variations due to credits granted to Legal Persons (4.671%), compared to 1.669% due to credits granted to individuals.

**Table 3.** GDP version decomposition (%)

Period	Std. error	GDP	LP	Individuals
1	0.037	100.000	0.000	0.000
2	0.039	95.731	3.960	0.309
3	0.039	95.318	4.002	0.680
4	0.039	94.710	4.313	0.977
5	0.039	94.398	4.409	1.192
6	0.039	94.157	4.500	1.343
7	0.039	94.000	4.553	1.447
8	0.039	93.888	4.592	1.520
9	0.039	93.812	4.618	1.570
10	0.039	93.759	4.637	1.604
11	0.039	93.723	4.650	1.628
12	0.039	93.697	4.658	1.645
13	0.039	93.680	4.664	1.656
14	0.039	93.668	4.669	1.664
15	0.039	93.659	4.671	1.669

**Source:** National Bank of Romania, Eurostat.

For a more thorough analysis, I have sought to test and quantify the influence of the different types of credits on the components of the GDP through regressions. The GDP is an extremely broad macroeconomic variable that is influenced by a multitude of factors that cannot be included in the regression, and the regressions between the GDP growth and the types of credits would not have given us more information or would have offered vague or distorted results. Therefore, in order to better capture the effect of crediting certain components of the GDP have been considered variable (using the expenditure or income method) as their influence is known to be positive in relation to the GDP; the impact of crediting on them is calculated and the indirect impact that they could have on economic growth is subsequently estimated.

A criterion proving the reliability of the models is the value of the adjusted  $R^2$ .  $R^2$  shows what percentage of the total variation of the dependent variable is due to the independent variables. Please note that in this case one cannot expect a very high adjusted  $R^2$  because there are many more variables that influence the components of the GDP and the aim of this article is to find a strict link between crediting and economic growth. Thus, the validation of the models will be based on error or coefficient tests.

The results of the regressions between the components of the GDP with credits granted to individuals or legal entities, respectively, are presented in the following two tables:

**Table 4.** *Regressions between the components of the GDP and credits granted to individuals (the percentage related to each component of the GDP has been calculated as the average for the entire considered period)*

Coeff. of credit for individuals	LAG 0	LAG 1	LAG 2	Materiality level	MA	Dummy	DW	Estimated influence on econ. growth
Regression of GFCF	0.6369	-	-	1%	-	downgrade	1.58	0.166
%GDP   26%	-	0.5922	-	1%	-	downgrade	1.75	0.154
Regression of total consumption	0.2604	-	-	1%	MA(1)	-	1.39	0.212
%GDP   81.60%	-	0.2952	-	1%	MA(1)	-	1.74	0.241
	-	-	0.4966	5%	-	downgrade (15% materiality)	2.19	0.405
Regression of private consumption	0.2226	-	-	10%	-	-	2.18	0.145
%GDP   65%	-	0.2437	-	5%	-	-	2.09	0.158
	-	-	0.3609	5%	-	downgrade	1.99	0.235
Regression of total payroll costs	0.5173	-	-	1%	MA(1)	-	1.28	0.197
%GDP   38%	-	0.5787	-	1%	MA(1)	-	1.56	0.220
	-	-	0.6	1%	MA(1)	-	1.82	0.228
Regression of gross operating surplus (EBE)	0.253	-	-	1%	-	downgrade	2.13	0.129
%GDP   51%	-	0.1887	-	5%	-	downgrade	2.04	0.096
	-	-	0.1309	15%	-	downgrade	2.06	0.067

**Source:** National Bank of Romania, Eurostat.



**Table 5.** Regressions between the components of the GDP and credits granted to legal entities (the percentage related to each component of the GDP has been calculated as the average for the entire considered period)

Coeff. of credit for legal entities		LAG 0	LAG 1	LAG 2	Materiality level	MA	Dummy	DW	Estimated influence on econ. growth
Regression of GFCF		0.9868	-	-	1%	-	downgrade	1.78	0.257
% GDP	26%	-	0.7166	-	5%	-	downgrade	1.9	0.186
		-	-	0.7878	1%	MA(2)	downgrade	1.48	0.205
Regression of total consumption		0.5334	-	-	1%	MA(1)	downgrade	1.69	0.435
%GDP	81.6%	-	0.4434	-	1%	MA(1)	downgrade	1.56	0.362
Regression of private consumption		0.2927	-	-	10%	-	-	2.3	0.190
%GDP	65%	-	0.3585	-	5%	-	-	1.97	0.233
		-	0.4419	-	1%	-	downgrade (10% materiality)	2.11	0.287
Regression of: 37% GDP		-	0.4215	-	10%	-	-	1.64	0.156
Regression of total payroll costs		0.7044	-	-	1%	MA(1)	-	1.15	0.268
%GDP	38%	-	0.8608	-	1%	MA(1)	-	1.63	0.327
		-	-	0.8424	1%	MA(1)	-	1.74	0.320
Regression of gross operating surplus (EBE)		0.269	-	-	1%	-	downgrade	1.85	0.137
%GDP	51%	0.2858	-	-	1%	-	downgrade	1.99	0.146
		-	0.1715	-	15%	-	downgrade (15% materiality)	1.76	0.087

**Source:** National Bank of Romania, Eurostat.

In most cases, the delayed independent variable regressions are better in statistical, but also economic terms as the effect on the dependent variable is expected not to take place immediately but with a delay.

In a comparison, the credits granted to legal entities have a greater influence on the GFCF and for longer, and the credits granted to individuals, on consumption, which makes one state that if one wants a sustained economic growth the credits to legal entities should be encouraged because they contribute to increased investment. Although companies reduce their costs this way, such a decision may affect the budget revenues from payroll tax, with an impact on the entire economy. As shown, the total payroll costs directly influence the credits granted to individuals, but very little, thus obtaining a coefficient of 0.055 and an adjusted  $R^2$  of 87%. However, the total payroll costs influence private consumption (coefficient = 0.6, adjusted  $R^2 = 52\%$ ), thereby indirectly influencing the credits granted to individuals and this way contributing to economic growth, which proves the importance of increasing total payroll costs. Another observation is that, drawing up an average of all the estimated influences on economic growth and eliminating regressions with dummy coefficients exceeding the 10% materiality level that could be outliers, the effect of the credits to legal entities on economic growth is 0.25, unlike the one of the credits to individuals, of 0.17. Thus, an increase of the credits to individuals or legal entities, respectively, by 1% will lead to an increase in the rate of growth of the GDP by 0.17pp or 0.25pp, respectively. The credits granted to the public administration, delayed by a lag, also have a positive influence on economic growth, but it is quite small: 0.025pp.

#### 4. Conclusions

This analysis has sought to determine to what extent crediting determines economic growth by indirectly calculating this through the impact of credits (individuals, legal entities, PA) on the various components of the GDP (gross fixed capital formation, public consumption, private consumption, total consumption, export, total payroll costs, gross operating surplus) with the intention of seeing which channel should be specifically exploited to lead to sustained economic growth.

Granger causalities have been tested; dynamic correlations have been calculated using a diagonal VEC(1,1) model; based on VAR the Impulse-Response analysis has been performed and the version of the GDP has been decomposed and eventually regressions have been performed. All these studies converge to the same result: the influence of the credits granted to legal entities is higher than that of credits granted to individuals; the effect lasts longer and encouraging investment will lead to continued growth. Moreover, the impact of the credits granted to legal entities on the various components of the GDP has been observed to be more extensive, which could lead to an increase in the GDP due to increased credits to legal entities.

The results lead to the idea that for the economy it is much better if the banks focus more on credits granted to companies, and less on credits to the people. But banks are reluctant to lend to companies as there is a lower level of debt recovery from companies that become insolvent, and such situations lead to bank policy changes, which prejudices even companies not facing problems.

This relationship between crediting and economic growth is complex and cannot be fully captured by an econometric analysis as there are other external factors, depending on the situation of the economic environment or the degree of development of the economy.

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