ANNALS of the ORADEA UNIVERSITY.
Fascicle of Management and Technological Engineering, Volume VI (XVI), 2007

STATISTICAL ANALYSIS OF THE MACROECONOMIC CHALLENGES RAISED BY THE EVOLUTION OF THE NON-GOVERNMENT CREDIT

Ioana Teodora MEŞTER
University of Oradea, Faculty of Economic Sciences, Universității street no. 1, 410087,
imester@uoradea.ro

Key words: macroeconomics, credit, impulse response function, financial assets

The main potential macroeconomic risks that might arise due to the ongoing increase of the non-government credit are over stimulation of the aggregate demand that might negatively affect the inflation rate; increased negative impact on the current account deficit; the prices of non financial assets might evolve on a non sustainable pattern, the effectiveness of the interest rate channel might decrease with the expansion of the non-governmental credit in foreign currencies. Our paper investigates these aspects that are of major interest for the economic policy makers.

Regarding the effects on inflation through the aggregate demand, the quarterly Inflation Reports, issued by the National Bank of Romania presents it in a comprehensive manner. According to them, a favorable crediting environment (decrease in the interest rates, appreciation of the national currency and considerable participation of the non banking financial institutions in the crediting process through the leasing and consumer credit ones) resulted in an increase in the dynamics of the private credit. Considering the above arguments, the excess in the internal demand generates short term inflationary pressures. However, taking into account that the inflationary process has an important component due to the administered and oil related products' prices, the direct contribution of non-government credit on price dynamics is not a major one. Furthermore, if the increase of the nongovernment credit is caused mainly by the increase in the credits for companies, it might generate medium and long term positive effects on potential GDP, thus helping in the reduction of the inflationary pressures.

In order to increase the efficiency of the monetary policy transmission through the interest rates in the context of euroised balance sheets at financial institutions level, the monetary authority took lately some measures meant to lead to the expansion of the credit in the national currency instead of the one given in foreign one. On the other hand, there are opinions [3] that the efficiency of the interest rate channel in Romania is at a similar level with the ones recorded in other Central and Eastern European Countries, which have less euroised balance sheets. Therefore, the problem might reside in the transmission mechanism of credit institutions' interest rate impulses on aggregate demand.

Thus, the following analysis will focus on the other challenges mentioned earlier, considering their importance for financial stability and the absence of an earlier analysis.

1. THE IMPACT OF NON-GOVERNMENT CREDIT EVOLUTION ON CURRENT ACCOUNT DEFICIT INCREASE

Since the budget deficit decreased substantially lately, the increased current account deficit is attributable mainly to the high aggregate demand in the private sector. If in 2003, the increase in investment had a larger impact than consumption on the evolution of aggregate demand, in 2004 the opposite was true (Chart 1).

Looking at imports' structure the highest proportion is held by investment goods, namely:

(i) machines and mechanical devices (22 percent),
(ii) mineral products (15.85 percent),
(iii) textiles (10.8 percent) and
(iv) transport sector (10 percent).

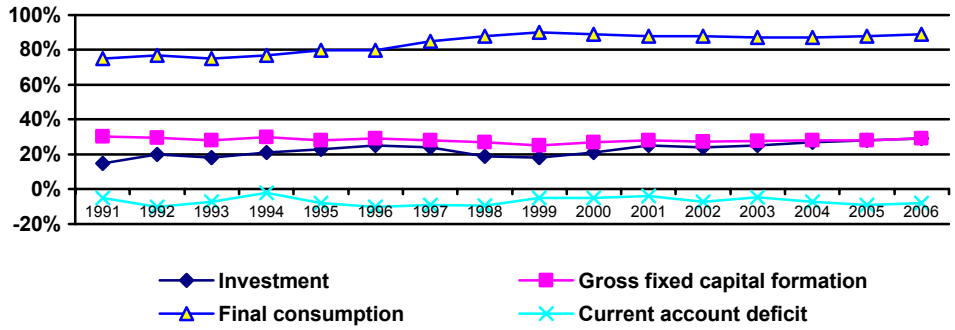

Chart 1. Final consumption, investments and current account deficit (% of GDP): 1991-2006
Source: National Bank of Romania, Occasional Paper no. 4/2006, p.32

The highest dynamics is attributable to transportation sector (growth by 85 percent for 2004/2003 and 63.1 percent for August 2005/August 2004), but it is expected that this sector's growth to decrease in the following years once the internal market demand will be more satisfied with these type of products, the second-hand component will increase and internal supply will act more as a substitute. The growth of imports of capital goods was relatively constant in 2005.

Capital goods represented 0.6 percent while consumption goods accounted for 15 percent of total imports. Comparing the above mentioned evolutions with the ones observed at credit level, it can be seen that growth rate of consumption goods' imports (23.5 percent) is lower than the growth rate of the loans to population (64.5 percent), which might indicate that only part of the increase in loans given to the latter is spent on imports of consumption goods. The idea is confirmed when one looks at absolute values which indicate an increase of imports of consumption goods of RON 293.5 million, compared with RON 6,646.8 million, the growth of the loans to population (out of which more than 70 percent represents consumption oriented credit)

In trying to assess the impact of non-government credit growth on trade balance, the following two series were considered: real imports and real non-government credit for the January 2000-June 2005 period. Both series are stationary according to the used tests. The choice of the optimal lag length in estimating a VAR was done by using Schwarz and Hannan-Quinn criteria, which indicated one period as an optimal lag length.

The Chart 2 shows the impulse response functions for the estimated VAR. The impact on imports lasts for approximately 10 months, but one should consider that after about 3 months the effect becomes statistically insignificant, which shows a relatively weak persistence of the real credit shock on imports. Furthermore, variance decomposition analysis shows a weak effect (although increasing) of credit on imports (Table 1).

The results of the Granger causality test are presented in Table 2. As it can be observed, the null hypothesis (No Granger causality between non-government credit and real imports) cannot be rejected to an acceptable confidence level, while the null hypothesis of no Granger causality between real imports and real non-government credit is rejected at a 10 level. Thus, considering also the possibility of a type I error, it can be implied based on these results that imports Granger cause the real credit. Namely, the real credit is explained by past values of real imports while real imports values are explained by future values of real credit.

Table 1. Variance decomposition for imports

Period	SE	CNG_Real	IMP
1	47895.49	10.8	89.1
2	5807371	14.5	85.4
3	6282763	16.6	83.3
4	6519320	17.7	82.2
5	6641093	18.3	81.6
6	6704717	18.6	81.3
9	6765237	18.9	81.01
10	6770192	19	80.9
11	6772818	19	80.9
12	6774210	19	80.9

Source: Author's calcullus

Table 2. Granger Causality tests between real imports and non – government credit growth

Pairwise Granger Causality tests
Sample: 2000:01 2005:06

Null hypothesis	Obs	F-Statistic	Probability
IMP does not Granger Cause CNG_Real	65	3.42816	0.06886
CNG_Real does not Granger Cause IMP		0.74502	0.39138

Source: Author's calcullus

Although it might seem surprising, the later conclusion can be intuitively explained at economic level through the policy of the importers regarding inventories and their expectations over the future developments of demand (through future values of nongovernment credit). Moreover, measures that will have an impact on future levels of real credit (e.g. the recent measures for limiting the growth of non-government credit) might generate an immediate effect on real imports since firms will anticipate a decrease in the value of the non-government credit and thus could decrease the imports in the current period.

2. THE NATURE OF NON-GOVERNMENT CREDIT GROWTH

Another important issue refers to the recent evolution of the non-government credit: is it a financial deepening process, taking also into account the small weight the non-government credit has on GDP or is there a credit boom taking place, a distinction that is

important to be made since the impact on the financial stability is different, depending on each case.

The literature shows credit booms are associated with banking crises on approximately 75 percent of the cases and with currency crises on 80 percent of the cases. Furthermore, the comeback to normal expansion rates of the non-government credit in the post crisis period is combined with negative deviations of real GDP from its trend. Being the main propagation mechanism for the credit boom phenomena, the financial accelerator is most mentioned. According to this, shocks that affect the assets prices are amplified through balance sheets effects. This is the result of market imperfections that appear due to informational asymmetries, liquidity constraints or institutional problems.

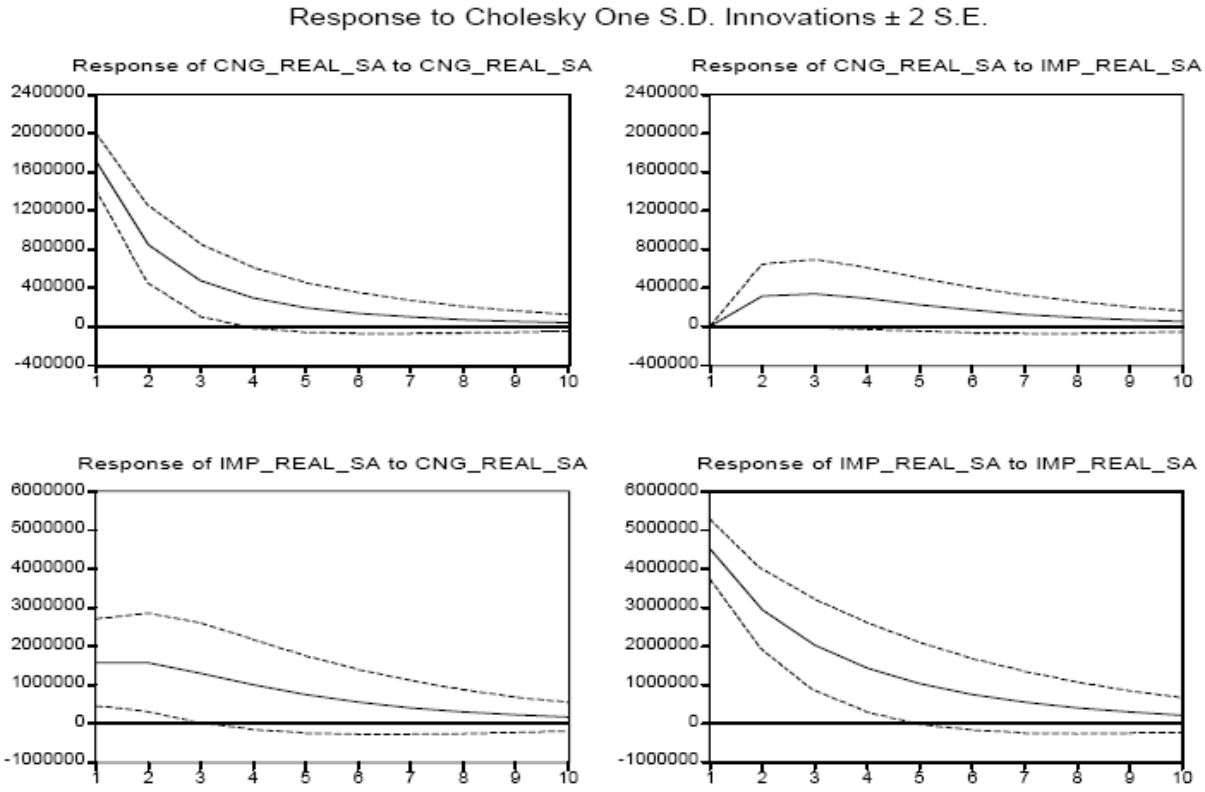

Chart 2. Impulse response functions for a shock on real credit and real imports
Source: Author's calcullus

Moreover, a similar pattern might be due to shocks that affect the prices of the goods and services. Considering that the supply of non tradable goods is less elastic than the one for tradable goods, an increase in the price of first relatively to second category, due to a higher aggregate demand (influenced for example by capital inflows), leads to an increase in the profitability of the firms that sell non tradable goods. More solid balance sheets lead also in this case to higher borrowing capacity and increased leverage. Sudden stops in capital inflows will generate a decrease in the prices of non tradables, the process evolving in this case also backwards (Caballero, Krishnamurthy, [1]).

Therefore, the difference between a credit boom type of process and a financial deepening one becomes very important taking into account the effects it could have on

economy, and considering that the financial deepening process, although it goes together with the economic development process, does not lead to the negative effects mentioned earlier.

As a first way to investigate the (in)existence of a credit boom type process in Romania, the methodology used by IMF was employed. In the mentioned paper, it is considered that the evolution can be considered a credit boom if exceeds the standard deviation of real credit around a trend by a factor of 1.6421. Using a Hodrick Prescott filter and deseasonalised data for the period 1993:01-2006:12, the process taking place now in Romania is not indicated as being a credit boom one, thus the existence of a financial deepening process being more probable. It should be mentioned, that although the procedure has some ad hoc elements (e.g. not using an iterative Hodrick Prescott filter, assuming normal distribution and a 95 percent confidence level, o relatively short series considering the average duration of a credit boom process), it still identifies correctly the credit boom from 1996 and early beginning of 1997, credit boom followed by a severe contraction that came together with the structural reforms from 1997.

Another element one should take into account when trying to asses the current situation is the average duration of such a phenomenon. The study conducted by IMF (2004) on emerging economies for the time interval of 1970-2002 estimates the average duration of a credit boom as being three and a half years, with a standard deviation of one year and a half. Duration is measured as the number of periods, in which the evolution of the real credit is higher than standard deviation around a trend with a factor of one, conditional on the irrespective process as being a credit boom. Thus, for the current situation the duration concept as defined here is irrelevant. Instead, for the process identified earlier as being a credit boom for Romania, applying this methodology results in an estimated duration of one year and a half, namely between October 1995 and March 1997.

The inexistence of a credit boom type of process for Romania is sustained also by the study of Racaru, Copaciu and Lapteacru [2]. The authors show, using a multinomial logit model to estimate the crisis probability for a panel of 20 emerging economies, and data from 1994 to 2006, that the expansion of loans to GDP ratio represents an important factor for determining the crisis probability, together with decreases in the credit for the post crisis periods. For Romania, the average values of credit to GDP ratio for the no crisis period are 29 percent in 2005 and 23.2 percent in 2006. The crisis probability estimated for Romania, at March 2005 moment was just of 3.38 percent and an increase in the growth rate of credit to GDP ratio such that the level of 37.7 percent is reached, determines, ceteris paribus, a crisis probability of just 3.61 percent.

On the other hand, using the result of the IMF [4] study, there are aspects indicating the possibility of a credit boom taking place in Romania. Thus, the existence of a positive correlation between the evolution of the real credit and real effective exchange rate, and negative with the current account balance and domestic savings are aspects that might indicate the existence of such a process taking place (Chart 3).

Furthermore, as it was mentioned in the first chapter, the external borrowing increased its share as a financing source for the domestic banks. This aspect is also characteristic for the construction phase of a credit boom process if it is correlated with an increase in the:

(i) leverage effect and
(ii) relative prices of the firms producing non tradables.

If at price level, there is a relative increase for the non tradables sector when compared with the tradables one (might be also connected with the Balassa-Samuelson effect), the

leverage decreased in the last three years for almost all non tradables sectors, with the exception of financial intermediation firms, schooling and constructions (Table 3). The leverage for the latter sector increased considerably with a possible impact on financial stability if there is a bubble on non financial assets market.

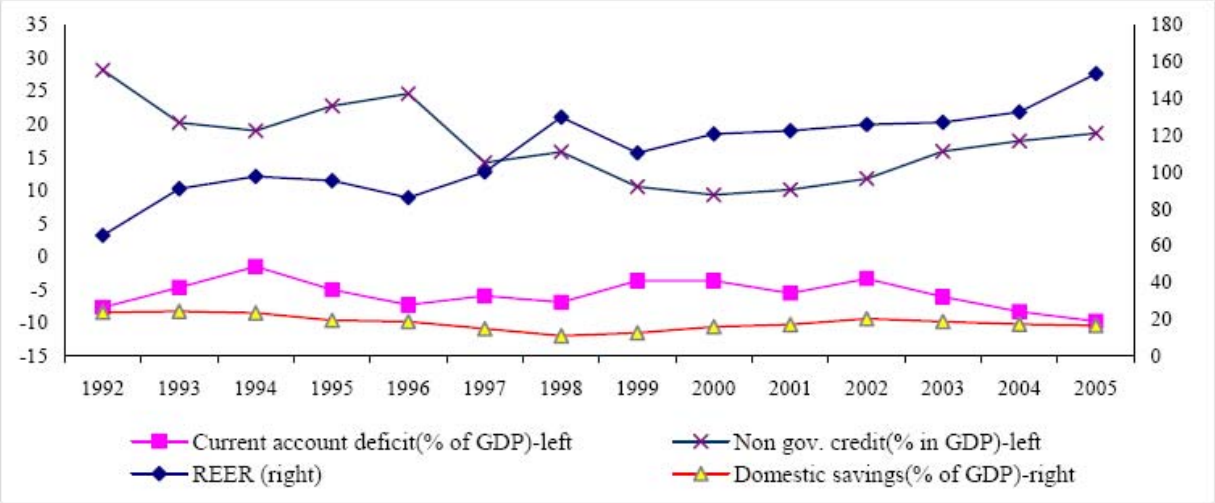

Chart 3. Evolution of the indicators that might signal a credit boom
Source: Economist Intelligence Unit, National Bank of Romania and own calculations

Clear delimiting the current period as being a credit boom or a financial deepening one cannot be done by analyzing also the classic indicators at which one looks for assessing the possibility of facing the later type. For example, the Chart 4 shows the currency over deposits, M1 over M2 and M2 over GDP ratios. It can be observed that he monetization is relatively still at low levels when compared with the developed countries. As for the first two, they are in a slight decrease/increase reflecting the higher confidence in the banking system and the existing financial development potential for this sector.

Concluding, the analysis done here does not allow for a clear identification of the credit growth nature. However, although in reality there are aspects pointing to both of the options, the ones that suggest the existence of a financial deepening process tend to be predominant.

3. IMPACTS ON ASSETS PRICES' EVOLUTION

As mentioned in the second chapter, the non-government credit directed to population was the most dynamics component in the last three years. Having easier access to financing sources, with increasing disposable incomes and optimistic expectations regarding its future trend, an increasing part of the population manifested its demand for houses. Moreover, the European integration process contributed to price increases through the convergence process of the prices. Furthermore, the supply of non-financial assets was unfitted, both as volume and as structure, to satisfy the increased demand. The above-mentioned factors contributed simultaneously to the increase in house prices. However, due to the lack of appropriate statistical data, it is difficult to establish if the credit was the determining factor in the ascending evolution recorded at house price level.

The mortgage loans given during 2000-2005 were concentrating throughout time at population level. This component reached a proportion of 63.83 percent in 2005 in the total mortgage loans compared with only 8.95 percent in 2000 (Chart 5). Other sectors proportions

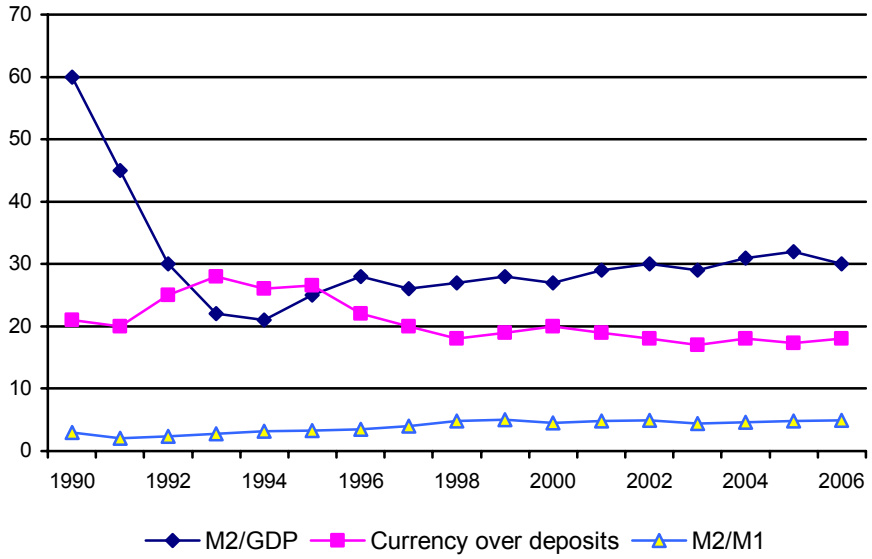

Chart 4. Evolution of the indicators usually used to assess the financial deepening process
Source: National Bank of Romania, Occasional Paper no. 4/2006, p.34

show either a decreasing trend (real estate transactions, hotels and restaurants) or a constant one (construction, tourism agencies' activities). This result might imply that the upward pressures on the prices of commercial real estate are not driven mainly by the expansion of the non-government credit.

The recent intensifying competition at banking sector level on medium and long term loans, mortgage included, resulted in a decrease in interest rates (and consequently lead to a decrease in the debt service), a fact that increased potential demand, especially at household level. Furthermore, the financial accelerator might have led to an increased demand for nonfinancial assets. The increased prices for real estate led on the one side to an increased demand for loans but also to an increased indebtedness potential through the effect on the value of the collateral, on the other side.

As for the supply, the growth rate of the newly built houses was rather slow. Furthermore, the probability that the new houses satisfy the demand of the highest proportion of potential consumers is quite low, considering their average surface (around 150 square meters). However, one element worth being emphasized, regards the dynamics of the equipment loans for construction firms that increased by 40 percent in real terms over the last four years.

However, the demand and supply driven evolutions cannot be used as direct arguments when assessing the probability of a bubble type phenomenon taking place on the real estate market, since it can be argued that the respective evolution reflects just an adjustment to equilibrium. The aspects one should evaluate regard the expectation formation mechanism and their rationality. In this sense, at least for the real estate market the ratio of

prices to incomes (more correctly its deviation from the trend) and the rents to prices ratios could be used to assess the (in) existence of a bubble.

Table 3. Evolution of the leverage effect (debt / equity) for companies belonging to the main economic sectors

Sector	2002	2003	2004	2005
Agriculture	22.83	16.80	8.6	4.5
Fishing	2.82	3.98	6.64	7.5
Mining industry	1.41	1.39	0.48	0.45
Manufacturing	3.01	2.96	2.07	2.01
Energy, gas and water	0.52	0.76	0.75	0.72
Constructions	1.68	1.86	3.61	4.52
Retail trade	6.61	5.88	4.12	3.84
Hotels and restaurants	3.00	3.59	2.08	1.95
Transportation and communication	2.59	2.4	2.2	2.1
Financial intermediation	3.68	3.2	3.82	3.54
Real estate	3.57	3.16	2.21	2.56
Public administration	1.97	1.83	1.85	1.65
Education	1.34	0.47	2.37	1.56
Health and social assistance	9.00	3.86	2.79	1.6

Source: Ministry of Finance, Credit Risk Bureau

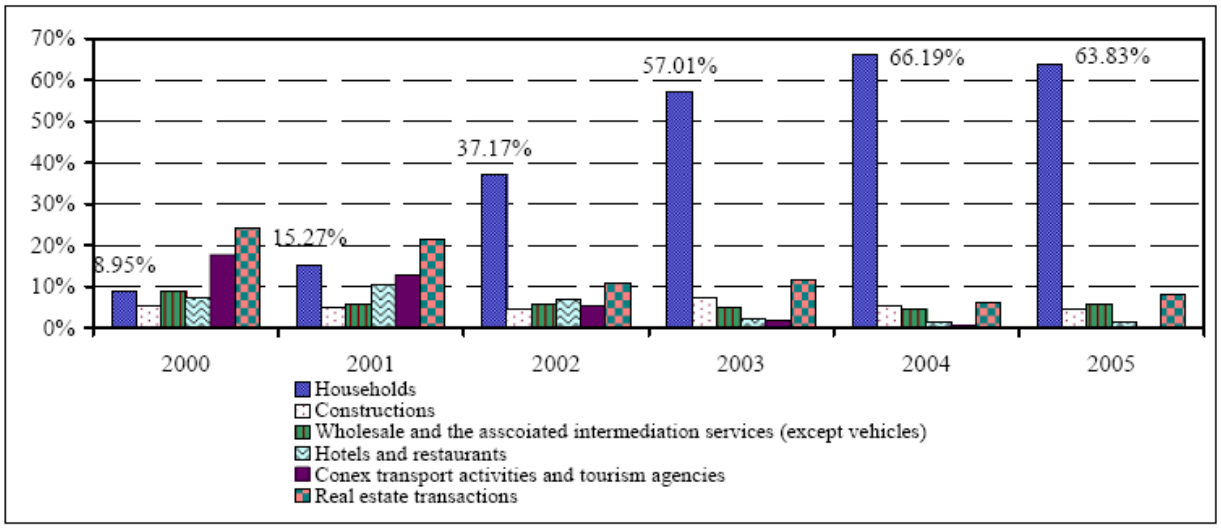

Chart 5. Evolution of the distribution over sectors for mortgage loans (2000-2005)

Source: National Bank of Romania, Occasional Paper no. 4/2006, p.35

As for financial assets, a direct influence of the non-government credit is assumed to be low considering that for Romania margin trading with financial assets and the proportion of loans used to buy shares or bonds are insignificant. An indirect impact might result from the evolution of investment loans that might lead to increased market values for firms, allowing again for an increased potential indebtedness. Nevertheless, as it is shown in Table 3, the relative indebtedness (to own funds) for the Romanian companies decreased, so the possible indirect impact is less probable.

However, the impact of credit on asset prices should be carefully monitored, since an unfavourable evolution will negatively affect the financial stability.

REFERENCES:

[1] Caballero, R. J., Krishnamurthy, A., International and domestic collateral constraints in a model of emerging market crises, Journal of Monetary Economics, Elsevier, vol. 48(3), 2001.

[2] Racaru I., Copaciu M., Lapteacru, I., Early Warning Systems", Occasional Paper No 5, National Bank of Romania, 2006.

[3] Tieman, F. A., Interest Rate Pass-Through in Romania and other Central European Economies, IMF Working Papers 04/211, International Monetary Fund, 2004.

[4] *** - International Monetary Fund, World Economic Outlook, International Monetary Fund, April 2004.

[5] *** - National Bank of Romania, Occasional Paper no. 4/2006.