The impact of the Great Recession on the Romanian economy

Andrei Rădulescu [1]

Romanian economy has been strongly affected by the waves of the worst global financial and economic crisis of the past decades. The "sudden stop" of the foreign capital flows during 2008 determined a severe and prolonged macroeconomic adjustment process.

This paper estimates the consequences of the Great Recession on the Romanian economy in terms of the potential output. I employ the Hodrick-Prescott filter and the Cobb-Douglas methodology in order to estimate the structural and cyclical components of the GDP for the period 1997-2011. According to the results, the potential GDP deteriorated severely since 2008 (the rhythm declined towards the lowest level since the early 2000s). In other words, the gain of potential output during the last years of the Great Moderation was lost during the years of the Great Recession.

Consequently, the recovery of the potential output and the relaunch of the real economic convergence process towards Europe are important medium-term challenges for the Romanian economy. The improvement of the investment climate, the implementation of structural reforms, the prioritization of the Research and Development represent important measures in order to attain sustainable growth on the medium – run.

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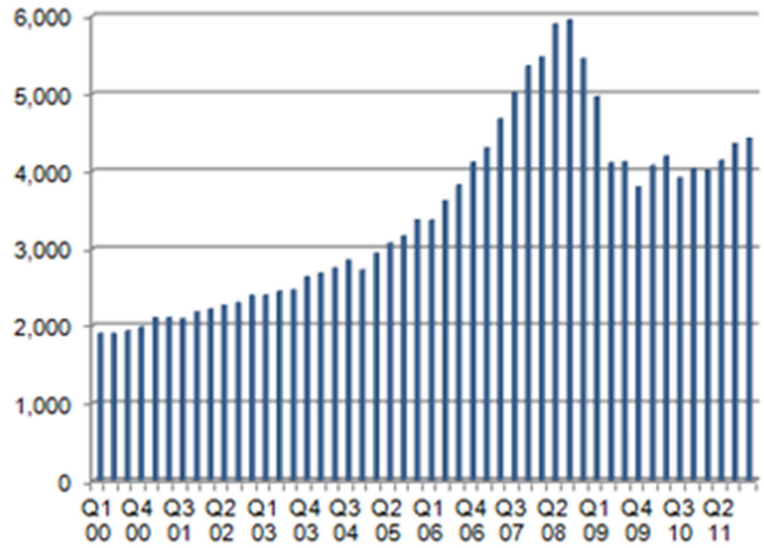
Introduction

The Romanian economy is confronted with the waves of the Great Recession – the worst global financial and economic crisis since the end of the World War II. During the first wave of the crisis (the autumn of 2008), the "sudden stop" of the foreign capital flows determined a severe and prolonged macroeconomic adjustment process for the domestic economy, which encountered in an overheating position: a current account deficit above 10% of GDP during 2006-2008 and a pro-cyclical fiscal policy (budget deficit higher than 3% of GDP during 2007-2008).

The capital investments contracted severely during several quarters. At present, gross fixed capital formation is 25% lower compared to the pre-crisis level (figure 1). The decline of investments resulted in a deterioration of labor markets conditions: the depreciation of human capital, the youth being the most affected category – an unemployment rate above 20%. Consequently, the potential output declined severely over the past years.

Figure 1

Gross fixed capital formation (EUR, mil.)



Source: Eurostat

On the other hand, the fiscal consolidation process started in 2010 is far from over. Romania signed the Fiscal Compact at the beginning of 2012. According to the spirit of the Fiscal Treaty Romania has to balance the public finances. This adjustment constitutes an important challenge in the medium run, as during the first market economy business cycle (2000-2008) Romania registered an annual average structural budget deficit higher than 3% of GDP.

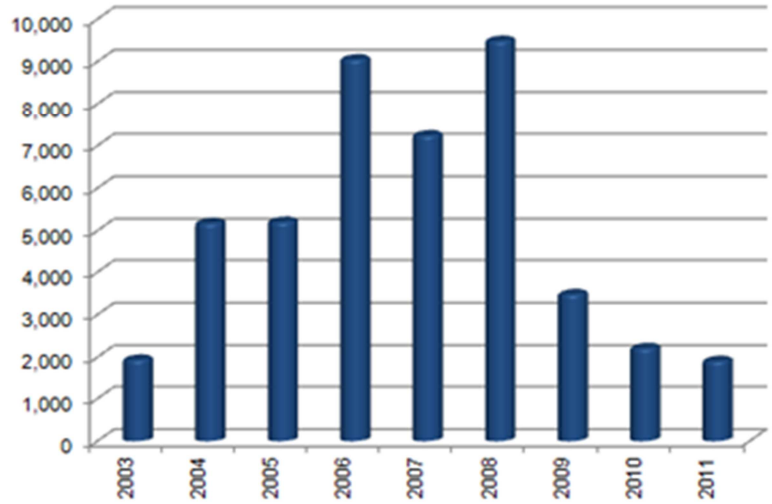
This paper estimates the evolution of the potential output in Romania during the period 1997-2011, by employing the Hodrick-Prescott methodology. I also employ the Cobb-Douglas production function, on data from the Eurostat (annual) in order to estimate the contributions to the evolution of potential output of capital, labor and total factor productivity.

According to the results, the Romanian economy potential output declined to the lowest level since the early 2000s. This unfavorable evolution was mainly determined by the severe decline of capital investments after the first wave of the Great Recession hit the economy, with negative consequences for the evolution of total factor productivity.

This result is normal, as the small, open economy of Romania is highly dependent on foreign capital flows. At the end of the 1990s/beginning of the 2000s the strongly underdeveloped economy (but with important potential) became a target for the foreign investors (as can be noticed in the figure 2). They were looking for unprecedented opportunities in a country with a stabilized macroeconomic climate (after the IMF adjustment Program) and with European integration perspectives. The underdeveloped state, the dimension of the market and the privatizations were among the main factors that made Romania attractive for foreign investments one decade ago.

Figure 2

Foreign Direct Investments (EUR, mil.)



Source: Central Bank of Romania

Another important result of the analysis regards the negative contribution of labor to the formation of the rhythm of the potential GDP. This result should not surprise, given the downward trend of labor input during the period 1997-2011, as the economy passed through the severe adjustment from a state-economy towards a market economy. Also, the massive migration of active population, the high weight of informal economy and the low labor participation rate are important factors that determined the unfavorable contribution of labor input to the evolution of potential GDP.
The rest of the paper has the following structure: chapter II shortly describes the methodology employed; the main empirical results are presented in the third chapter; the macroeconomic policy recommendations and the concluding remarks are drawn in the last chapter.

Methodology
The literature mentions several methods of determining the potential output. For instance, Brandner *et al* (1998) distinguishes among the OECD approach, the IMF approach and the European Union approach. I will shortly describe in what consists each of them.
The OECD distinguishes between the values added by the private sector and by the government sector, with the potential output obtained as the sum of these components. In this approach, the value added of the private sector is estimated from a Cobb-Douglas production function, under the following form:

$$Y_t = \alpha N_t + (1-\alpha)K_t + U_t \qquad (2.1),$$

where Y_t represents the logarithms of the value added of the private sector, N_t represents the logarithm of the labour input, K_t represents the logarithm of the capital stock, α represents the elasticity of output

with respect to labour and U_t represents the error term, seen as the total factor productivity.
Then, the potential output of the private sector is obtained from the following relation:

$$\mathbf{Y_t^* = \alpha N_t^* + (1-\alpha)K_t + U_t^*} \qquad \mathbf{(2.2)}$$

where Y_t* represents the potential output of the private sector, N_t* represents the potential labour supply (NAIRU), K_t represents the capital stock and U_t* represents the trend rate of the productivity factor (obtained by applying the Hodrick-Prescott filter). Then, the potential output of the economy is obtained by adding the potential output of the government sector to the business sector potential output.
The IMF approach does not apply a uniform method in computing potential output across the member countries. In some cases the institution recurs to the Cobb-Douglas production function, approximating the elasticity of output with respect to labor (the coefficient α) with the level of wage to GDP ratio. In other cases, IMF estimates the potential output employing pure statistical methods.
The European Union has its own method of determining potential output, different from the approaches of the OECD and IMF. According to Brandner *et al* (1998), the approach of the European Union for estimating the output gap consists of directly applying the Hodrick-Prescott filter to real output, thus distinguishing between a cyclical component and a trend component ($Y_t = Y_t^* + Y_t^c$). Mathematically, the following relation determines the cyclical component:

$$\text{Min}\sum_{t=1}^{T}(Y_t - Y_t^*)^2 + \lambda\sum_{t=2}^{T-1}((Y_{t+1}^* - Y_t^*) - (Y_t^* - Y_{t-1}^*))^2 \qquad (2.3)$$

where Y_t represents output, Y_t^* represents the trend of output, λ is a measure of smoothness, so that the lower the value of this parameter, the closer potential output follows actual output. In the extreme case when $\lambda = 0$, then the trend would equal actual output. Hodrick and Prescott (1997) suggest a value of 1600 when working with quarterly data and 100 for annual data. However, some other contributions in the literature suggest the use of other values for λ.

Bouthevillain *et al* (2001) evidence some studies where the value chosen for this parameter is 400 for annual data. On the other hand, they mention other contributions where for a value of 1600 for quarterly data corresponds to a value of 6 to 8 for annual data.

There does not exist any ideal filter for the decomposition of output into trend and cycle. According to Bouthevillain *et al* (2001), the Hodrick-Prescott filter presents the advantages of simplicity and transparency, which explain the fact that it has been one of the most widely employed filters in the analysis of the macroeconomic series. Two problems they mention are the compression and the leakage effects.

The compression effects might appear, as a consequence of the fact that "the cycles that should belong to the cyclical component" are not completely included in the cycle, and thus the "variability of the cyclical component is underestimated". These effects have impact in the assessment of the public finances because of the volatility of trends and also might make it difficult to determine the expansionary fiscal policies especially during the boom periods as "they potentially suggest an overall positive assessment of fiscal policies".

The leakage effects consist of the fact that "cycles that should belong to the trend are not in fact included in the latter" and consequently the "variability of the trend is underestimated". These effects have impact on the fiscal stance during the downward periods.

Beyond this, they do not take into account possible "jumps in productivity growth". In the case of the Hodrick-Prescott filter, the

magnitude of these effects depends on the choice of λ. According to these authors, the compression effects diminish with the increase of the value of λ. Pointing to the trade-off between the two effects, they conclude that the lower the value of λ, the lower the leakage effects. In fact, choosing the value of λ while applying the Hodrick-Prescott filter, one should take into account the costs of these effects and weight them.

In this paper I employed both the Hodrick-Prescott filter and the Cobb-Douglas production function in order to estimate the evolution of potential output in Romania.

In what regards the Hodrick-Prescott filter I used annual observations of real GDP growth from the Eurostat Database, for the period 1997-2011. In order to overcome the "end point" problem, I extended the data series to 2013 (for 2012 and 2013 I used the forecasts of the European Commission). I considered a value of 100 for the parameter λ.

On the other hand, I also employed the Cobb-Douglas approach in order to determine the potential output. I started from the relation (2.1): $Y_t = \alpha N_t + (1-\alpha)K_t + U_t$. In order to estimate the potential GDP (Y^*_t), I determined the trend components of N_t, K_t and U_t (N^*_t, K^*_t and U^*_t) by directly applying the Hodrick-Prescott methodology.

I define labor input as labor force multiplied by labor participation rate (annual data from Eurostat Database for the period 1997-2011).

In what regards the Capital Stock, I applied the Perpetual Inventory Method (PMI), expressed by the following formula:

$$K_{stock\ t} = K_{stock\ t-1} * (1-d) + I_t \qquad (2.4),$$

where d is the depreciation ratio and I_t represents the Gross Fixed Capital Formation.

I considered the initial capital stock of 1996, as estimated by Derbyshire *et al* (2010) and an annual depreciation ratio of 5%. The

annual Gross Fixed Capital Formation was considered from the Eurostat Database.

The Total Factor Productivity trend was estimated by applying the Hodrick-Prescott filter to the U_t series, variable determined as $U_t = Y_t - \alpha * N_t - (1-\alpha) * K_t$.

I considered an α of 0.65, the long-term value for the Romanian economy, as estimated by Dobrescu (2006, 2009).

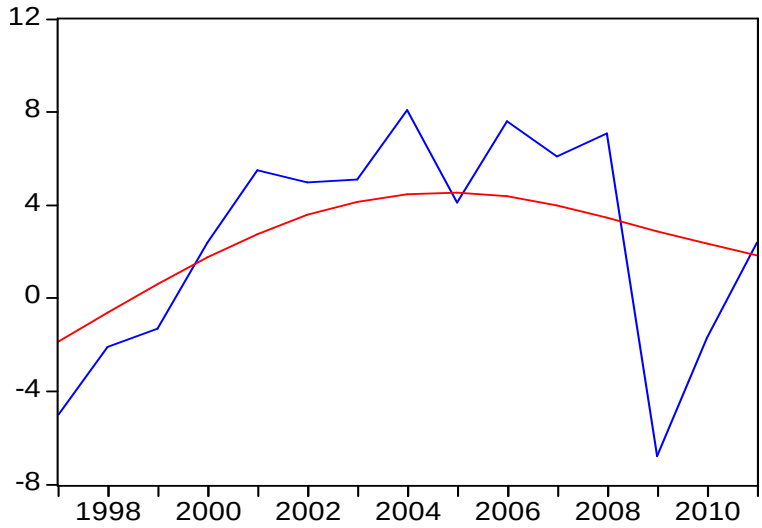
There are several difficulties in applying the Cobb-Douglas production function in order to estimate the potential output for the Romanian economy. Among them, one can mention: the downward trend of labor input during the analyzed period, determined by the restructuring of the economy during the transition process towards a market economy; the migration of active population (including the *brain-drain* phenomenon); the high level of *unobservable* economy.

Empirical Results

According to the results of the estimations, the potential GDP deteriorated severely in Romania since the first wave of the Great Recession hit the economy. As can be noticed on the figure 3, the Romanian potential GDP rhythm declined from above 4% in 2007 to less than 2% in 2011 (Hodrick-Prescott method) (the lowest level since the early 2000s). Similar results are obtained with the Cobb-Douglas approach.

Figure 3

GDP vs. Potential GDP (%, y/y) (Hodrick-Prescott)

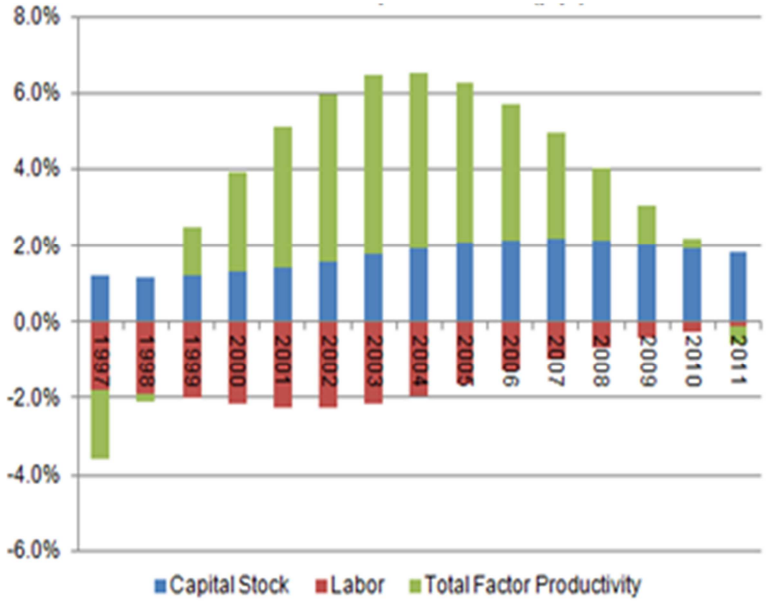


Source: Econometric estimates by applying the Hodrick-Prescott method on the Eurostat data

This second method allows distinguishing between the contributions of the factors to the formation of the rhythm of potential GDP (figure 4). There can be noticed the contribution of capital stock (an annual average of 1.7 p.p. during the period 1997-2011). The contribution of this factor accelerated during the period 2000-2008 (to 2.2 p.p.), given the massive investments flows in the economy (especially foreign investments): gross fixed capital formation presented an annual average of EUR 13 bn during this period.

Figure 4

Contributions to the potential GDP (p.p.)



Source: Econometric estimates by applying the Cobb-Douglas method on the Eurostat data

On the other hand, the contribution of labor to the formation of the rhythm of the potential output was negative during the analyzed period. This evolution should not surprise, given the structural changes of the economy with impact on labor markets (massive restructuring in the context of privatizations, but also the outflows of active population to the Western Europe countries). However, there must be mentioned the fact that the negative contribution of the labor factor diminished during the analyzed period to almost 0 p.p. in 2011. This evolution can be justified either by the massive restructuring of the labor markets during the first decade of market economy in Romania (after 2000), but also by some labor markets reforms implemented in 2011, especially in terms of primary market.

Overall, the most important contribution to the formation of the rhythm of the potential GDP belongs to the total factor productivity (on average almost 4 p.p. during the period 2000-2008). This should not represent a surprise, given the inflows of capital and the structural changes at the labor market level. However, one can notice the *pro-cyclical* evolution of the total productivity factor: acceleration during the boom years and deceleration during the crisis years. As can be noticed in the figure 4, the contribution of this factor to the evolution of the potential GDP turned negative in 2011.

The arrival of the Great Recession surprised the Romanian economy in an overheating situation (a current account deficit above 10% of GDP, a pro-cyclical fiscal policy). The increase of risk aversion in the international capital markets determined outflows of capital from emerging markets, the most affected being those with severe macroeconomic disequilibria. In this context, the risk premium in Romania touched record levels, with immediate negative consequences for investments. For instance, the gross capital formation declined from around EUR 6 bn during Q3 2008 to less than EUR 4.5 bn during Q4 2011. This evolution expresses the severe decline of Foreign Direct Investments (for three consecutive years 2009, 2010 and 2011) to the lowest level since the beginning of the 2000s. In this context, the contribution of capital stock to the formation of the potential output diminished to 1.9 p.p. in 2011, the lowest level since 2005.

The unfavorable evolution of capital investments over the past years affected the total factor productivity. From a positive contribution of almost 4.7 p.p. in 2003 it only contributed with 0.2 p.p. in 2010. And the contribution of this factor turned negative in 2011 (-0.5 p.p.).

On the other hand, the contribution of labor to the evolution of potential GDP improved during the years of the Great Recession (the negative contribution diminished). This evolution may express either the fact that the massive restructuring was realized by the end of the

Great Moderation, but also the implementation of some labor markets reform during 2011, or the measures employed to counter the *informal* economy.

Concluding Remarks

There can be drawn several interesting conclusions from this analysis. On the one hand, the Great Recession determined the decline of the Romanian potential GDP to the lowest level since early 2000s. In other words, the rapid economic growth during the pre-crisis years did not have a sustainable path. In fact, this growth was determined by massive capital investments, with positive impact for total productivity factor. However, an important part of these investments were directed to non-tradable sectors (real estate, for instance). On the other hand, the investment policy of the private sector was not accompanied by a similar attitude from the government (for instance in terms of public infrastructure, that continues to be a drag on the economy). More than this, the investors in Romania had a short-run attitude (looking for rapid high margins). At the same time, the massive capital inflows before the crisis did not result in an increase of the number of workers or of the labor participation rate.

This dependence of the Romanian economy on the foreign capital investment turned dangerous, as the economy accumulated huge imbalances before the crisis. The Great Recession changed the direction of the foreign flows and the domestic capital did not have the force to substitute the exit of foreign capital.

At present the economy struggles between cycles, facing the second recession since 2008. The foreign capital continues to bypass Romania, the state has no financial power to invest, the rate of absorption of EU structural funds is very low and the domestic private capital has no force, know-how or long term vision to invest.

Concluding, this analysis allows issuing some macroeconomic policy recommendations for Romania, important especially in the context of

the project to join the Euro Area. In order to present a good performance within the Monetary Union, Romanian economy must restart the real economic convergence process towards the European average. Otherwise, the country risks turning into a permanent asymmetric shock in the European Union.

A sustainable real economic convergence is dependent on the implementation of supply side policies – the structural reforms. These reforms should mainly address the labor markets: to encourage the process of jobs creation and the increase of the labor participation rate. Some reforms were implemented in 2011 (the New Labor Code). However, these are not sufficient, as they do treat the primary labor market, but not the secondary market. At the same time, one short-term measure to stimulate the jobs creation would be the reduction of labor taxation.

At the same time, in order to be competitive in the long-run, there must be implemented active policies for developing skills, such as an increase of the investments in Research & Development and Education. Such measures would be consistent with the Europe 2020 Strategy.

However, the performance of labor markets is dependent on the investments in the real economy. Unfortunately, Romanian economy proved dependent on the foreign capital flows. In order to counter this dependence, there must be implemented policies to stimulate the domestic capital. In such a context, the development of the domestic stock exchange should be a top priority for the macroeconomic policymakers.

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