

## ROMANIAN ECONOMY – THE CHAMPION OF THE EU ECONOMIC CONVERGENCE

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DOI: <https://doi.org/10.36004/nier.cecg.I.2024.18.04>

**Abstract.** *Romanian economy presented a strong degree of resilience in the context of the outbreak of the exogenous shocks at the world level (coronavirus pandemic and the geo-political tensions) and their consequences (including the high level of the inflationary pressures). According to Eurostat database, Romania was one of the few countries with a continuity of the investment flows, including during the pandemic year 2020, despite the unprecedented high level of the uncertainty. At the same time, Romania was the champion of the European economic convergence process over the past decades, as reflected by the dynamics of the GDP/capita at purchasing power standards. This paper employs the Eurostat database and AMECO database and standard economic analysis tools (including the econometric filter Hodrick-Prescott) in order to assess the European economic convergence process of the Romanian economy over the past decades (from 1995 to 2023). According to the results of this analysis Romanian successful economic convergence process was determined by the huge inflows of capital flows with positive impact for the dynamics of the total productivity factor. Furthermore, the results show that at present the YoY pace of the potential output is at the highest level since 2008.*

**Keywords:** *Romanian economy, EU economic convergence, EU enlargement, Hodrick –Prescott*

**JEL:** *F21, F43, O16, O43, O52*

**UDC:** *338(498)*

**Introduction.** After a prolonged period of transition towards the market economy (the last decade of the previous century) Romania started the negotiations to join the European Union in February 2000, following the EU Council of Helsinki in December 1999. These negotiations were ended in December 2004, and Romania signed the EU Treaty of Accession in April 2005 in Luxembourg, turning a member of the EU on 1<sup>st</sup> of January 2007.

In this context, the economic growth and development model of Romania during the past decades was dominated by the forces of the integration within EU, and their consequences. The high levels of the foreign capital inflows (EU funds, direct investments, and remittances) contributed to the significant increase of the investments in Romanian economy. For instance, according to the statistics of

Eurostat the gross fixed capital formation rose by an average annual pace of 4.2% during 2006 – 2023, higher than in EU (1.0%) (Eurostat, 2024).

We point out that the potential of the Romanian economy was discovered by the foreign companies starting the 1990s, when the country signalled the intentions to join the EU. At the same time, there can be noticed the fact that the fixed investments continued to increase in this country in the periods of high level of uncertainty, determined by the outbreak of the coronavirus pandemic (the worst health crisis in the world in more than one century) and of the crisis in Ukraine. The gross fixed capital formation advanced by annual paces of 1.1% in 2020 and 5.9% in 2022, and by 14.4% in 2023 (the strongest pace since 2008), according to Eurostat database (Eurostat, 2024).

The strong dynamic of the fixed investments had spillover effects in the economy, the GDP climbing by an average annual pace of 2.9% in the period 2006 – 2023 in Romania, compared to only 1.1% in EU, as can be noticed in the following figure (Figure 1).

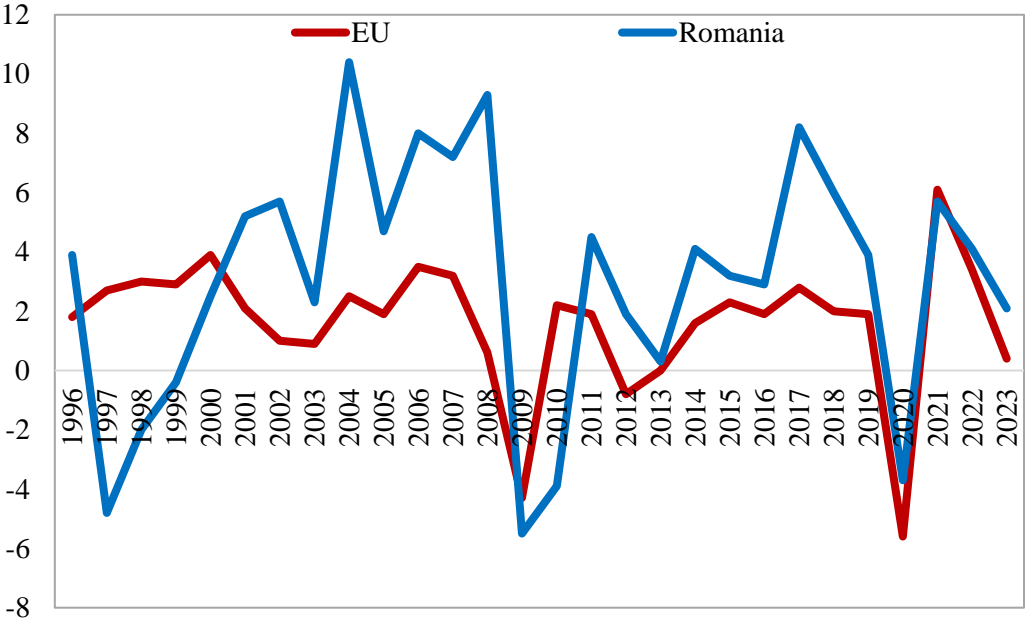


Figure 1. **The annual pace of the GDP – Romania vs. EU (%)**  
*Source: representation of the author based on Eurostat database, 2024*

These positive evolutions were not sufficient to stop the migration of Romanian workforce to the Western Europe economies. Considering the data of the National Institute of Statistics of Romania the population declined by more than 4 million since 1989, an evolution determined by the huge gaps in terms of working and living conditions (Romania vs. Western Europe) (National Institute of Statistics of Romania, NIS, 2024).

In this context, the GDP/capita at purchasing power standards (expressed as percentage of the EU average) rose in Romania from 30.5% in 1995 to 39.6% in

2006 and to 79.3% in 2023, according to Eurostat (Eurostat, 2024). Taking into account the comparative analysis with the other EU countries Romania was the champion of the European economic convergence process over the past decades, given the low level of the starting point, the massive capital inflows, and the large human capital outflows.

This paper assesses the EU economic convergence process of Romania over the past decades, by employing standard econometric tools and the databases of Eurostat and AMECO. The rest of the paper has the following structure: the methodology is briefly described in chapter II; the results are presented and interpreted in chapter III; the conclusions are drawn in the last chapter.

**Methodology.** In this paper we employed the standard Cobb-Douglas production function and the Hodrick-Prescott filter, using the Eurostat and AMECO database (annual data) in order to estimate the contribution of the production factors to the annual pace of the potential output in Romania for the period 1999-2023.

The Cobb-Douglas production function is a standard econometric tool utilised in order to estimate the dynamics of the potential output and of the output gap, and the contribution of the production factors to the annual dynamics of the GDP. The classic Cobb-Douglas production function is expressed in the following relation:

$$Y = L^{\alpha} \times K^{1-\alpha} \times TPF \quad (1.1)$$

in which Y, L, K, TPF and  $\alpha$  represent the GDP, the labour factor, the capital factor, the total productivity factor, and the elasticity of output with respect to labour.

Alternatively, applying logarithms this relation transforms into:

$$Y_t = \alpha \times L_t + (1 - \alpha) \times K_t + TPF_t, \quad (1.2)$$

where  $Y_t$ ,  $L_t$ ,  $K_t$  and  $TPF_t$  represent the dynamics of GDP, labour, capital stock and of the elasticity of output with respect to labour.

As regards the labour factor (L), it was estimated taking into account the following relation:

$$L = \text{labour force} * \text{employment rate} * (1 - \text{unemployment rate}) * \text{average number of working hours} \quad (1.3)$$

For the capital stock the perpetuity method was applied:

$$K_t = K_{t-1} \times (1-d) + GFCF_t, \quad (1.4)$$

in which  $K_t$  is the capital stock in year t, d is the depreciation rate, while  $GFCF_t$  is the gross fixed capital formation of year t.

This analysis considered the capital stock of 1995 as estimated in the paper of Derbyshire, et al. (2010) and an annual depreciation rate of 5%.

Consequently, the total productivity factor was estimated based on the following relation:

$$TFP_t = Y_t - \alpha \times L_t - (1 - \alpha) \times K_t. \quad (1.5)$$

Furthermore, we applied the Hodrick-Prescott filter in order to estimate the trend component for the labour factor and for the total productivity factor.

This is one of the most used econometric methods in order to distinguish between the cyclical and the structural components of the macroeconomic variables.

The simple and transparent method of Hodrick-Prescott is expressed in the following relation (Hodrick-Prescott, 1997):

$$\mathbf{Min} \sum_{t=1}^T (\ln Y_t - \ln Y_t^*)^2 + \lambda \sum_{t=2}^{T-1} ((\ln Y_{t+1}^* - \ln Y_t^*) - (\ln Y_t^* - \ln Y_{t-1}^*))^2 \quad (1.6)$$

in which  $Y_t$ ,  $Y_t^*$  and  $\lambda$  are the GDP, the potential output and the smoothness parameter.

However, we underline the fact that this method does not allow a perfect separation between the cyclical and the structural component of the output, taking into account the leakage effects and the compression effects, as pointed out by Bouthevillain, et al. (2001).

In the current paper a value of 100 was employed for the smoothness parameter, as suggested by Hodrick-Prescott when working with annual data. We considered a value of 0.65 for the elasticity of output in respect to labour, as in the paper of D’Auria, et al. (2010).

The databases used in this analysis were Eurostat and AMECO, annual observations for the period 1999 – 2023.

**Interpretation of the results.** According to the results of the macro-econometric estimates the annual dynamics of the potential output improved in Romania from 3.1% in 1999 to 6.5% in 2008, a record high level, as can be noticed in the Figure 2.

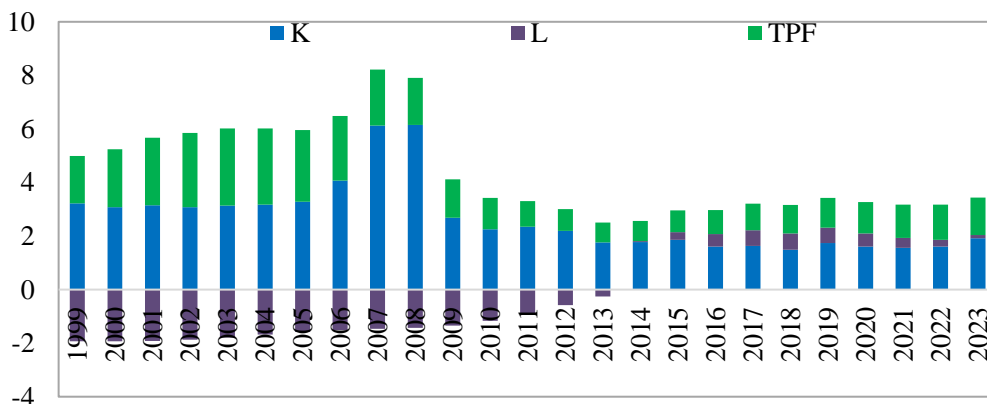


Figure 2. **The contribution of the production factors to the annual pace of the potential output in Romania (percentage points)**

Source: representation of the author based on the results of the macro-econometric estimates, employing the methodology described in the previous chapter, using the databases of Eurostat and AMECO, 2024

This evolution was mainly determined by the strong improvement of the capital component, due to the integration of the country within the European Union. The contribution of the capital to the annual pace of the potential GDP in Romania increased from 3.2 percentage points in 1999 to 6.1 percentage points in 2008, the year when the Great Financial Crisis hit the economy.

Furthermore, the strong foreign investments in Romanian economy at the beginning of the 2000s had a positive impact for the contribution of the total productivity factor to the annual pace of the potential output – up from 1.8 percentage points in 1999 to 2.9 percentage points in 2004.

On the other hand, the labour factor had a negative contribution to the annual dynamics of the potential GDP in the first decade of this century, due to the restructuring of the economy, in the context of the EU integration and to the high level of migration of active population.

The outbreak of the Great Financial Crisis (the worst economic and financial crisis in the world since the end of the Second World War) had a negative impact for the Romanian economy, which was surprised in an overheating mood, with a huge dependence on foreign financing flows. For instance, the annual dynamics of the potential output in Romania deteriorated from 6.5% in 2008 to as low as 2.2% in 2013, as reflected in Figure 2.

This evolution was determined by the significant deterioration of the contribution of the capital factor, given the capital outflows Romania was confronted with starting 2008, after significant capital inflows in the previous years. The contribution of the capital component to the annual pace of the potential GDP deteriorated from the record high level of 6.1 percentage points in 2008 to 1.8 percentage points in 2013. Given the lack of capital (with negative impact for the investments in the economy) and the adjustment of the public wages (by 25%) (in the context of the financing agreement with the international financial institutions) the contribution of the total productivity factor to the annual pace of the potential GDP deteriorated to a record low level of 0.7 percentage points in 2013, as can be noticed in Figure 2.

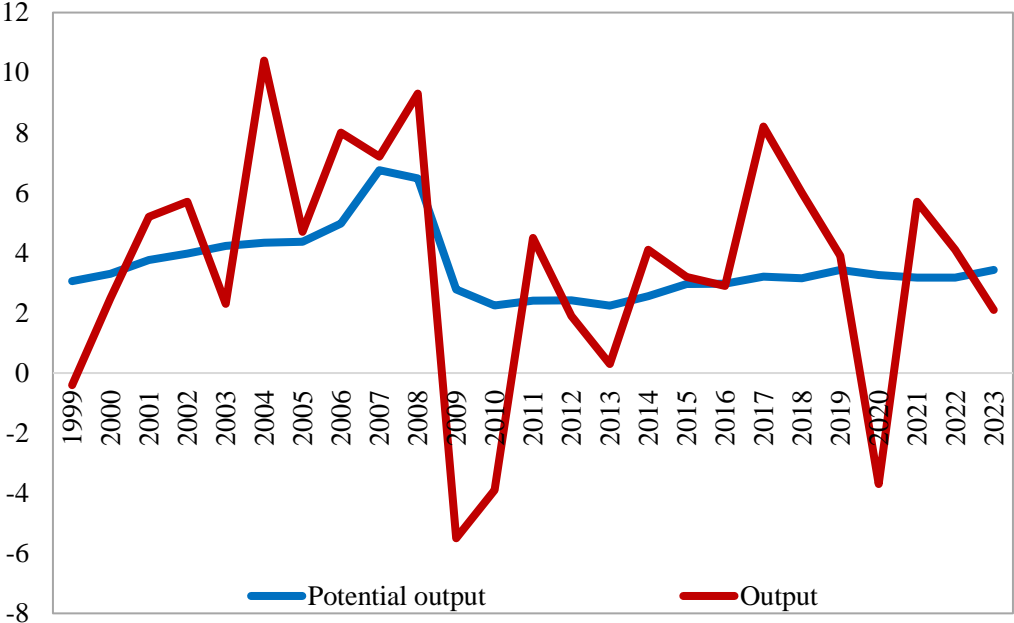
Furthermore, the labour factor continued to have a negative contribution to the annual pace of the potential output in Romania after the outbreak of the Great Financial Crisis, but there can be noticed a gradual improvement. According to the results of the macro-econometric estimates, the annual pace of the potential GDP in Romania initiated an upward trend in 2014 (after more than 5 years of unprecedented tough adjustment), to 3.4% in 2019, the year before the outbreak of the COVID-19 pandemic, as can be noticed from the Figure 3.

However, compared to the pre-crisis economic cycle, this time, in the post-crisis cycle, the improvement of the annual pace of the potential output in Romania was mainly determined by the dynamics of the following components: total productivity and labour. For instance, the contribution of the total productivity factor to the annual dynamics of the potential GDP increased from 0.7 percentage points in 2013 to 1.1 percentage points in 2019, as reflected in Figure 2.

At the same time, the contribution of the labour component to the annual pace of the potential output improved from 0.04 percentage points in 2014 to 0.57 percentage points in 2019, due to the structural reforms implemented in the context of the international financing agreement with International Monetary Fund, World Bank, and European Commission (International Monetary Fund, 2009).

On the other hand, the contribution of the capital factor to the annual dynamics of the potential output in Romania deteriorated from 1.8 percentage points in 2013 to 1.5 percentage points in 2018, given the very prudent attitude in terms of investments across the private sector, which paid a high invoice determined by the adjustments during the Great Financial Crisis.

Romanian economy presented a strong resilience in the context of the outbreak of the coronavirus pandemic in 2020, as reflected by the annual dynamics of the potential output – slightly down from 3.4% in 2019 to 3.3% in 2020 and 3.2% in 2021 and 2022, but up to 3.4% in 2023 (the highest level since 2008, as can be noticed in Figure 3).



**Figure 3. GDP vs. potential GDP in Romania – annual pace (%)**

*Source: representation of the author based on the results of the macro-econometric estimates, employing the methodology described in the previous chapter, using the databases of Eurostat and AMECO, 2024*

This evolution was determined by the contribution of the capital component and total productivity factor, as reflected in Figure 2. For instance, the contribution of the capital component to the annual pace of the potential GDP increased from 1.6 percentage points in 2020 to 1.9 percentage points in 2023, Romania being one of the few countries in the world with a continuity of the investment flows in the pandemic year 2020, when the uncertainty hit a record high level. According to Eurostat database, the gross fixed capital formation climbed by an annual pace of

1.1% in 2020 in Romania, while it contracted by annual dynamics of 4.9% in the European Union, and 5.7% in Euroland (Eurostat, 2024).

Furthermore, the contribution of the total productivity factor to the annual dynamics of the potential output in Romania increased from 1.1 percentage points in 2019 to 1.2 percentage points in 2020, 1.3 percentage points in 2021 and 2022 and 1.4 percentage points in 2023, an evolution determined by the implementation of measures to accelerate the digitalisation process especially in the private sector.

Last, but not least, the contribution of the labour component to the annual pace of the potential GDP maintained in the positive territory, but it deteriorated, from 0.57 percentage points in 2019 to 0.48 percentage points in 2020, 0.37 percentage points in 2021, 0.25 percentage points in 2022 and 0.12 percentage points in 2023, as can be noticed from Figure 2.

**Conclusions.** The results of the econometric analysis point to the improvement of the annual pace of the potential output in Romania in a balanced way following the severe adjustment determined by the outbreak of the Great Financial Crisis. For instance, in 2023 the annual pace of the potential output in Romania was estimated at above 3.4%, the highest level since 2008, when the economy was hit by the first wave of the Great Recession, in the context of the bankruptcy of Lehman Brothers and of the pro-cyclical policies implemented during the electoral year. Furthermore, over the past 10 years all the production factors had a positive contribution to the annual pace of the potential output in Romania, as reflected in Figure 2. In other words, the improvement of the annual pace of the potential output was more balanced than in the pre-crisis cycle, as the private sector learnt the lessons of the Great Financial Crisis and implemented a more prudent attitude in terms of investment policy.

On the other hand, we point out that the deterioration of the annual growth pace of the economic activity and the implementation of an unsustainable income policy in Romania over the past quarters, factors with negative impact for the evolution of the annual pace of the potential output in the coming years.

For instance, according to the estimates of the National Institute of Statistics, the Romanian economy climbed by an annual pace of only 2.1% in 2023 (below its potential, as reflected in Figure 3) and 0.7% during January – June 2024 (National Institute of Statistics, 2024). Last, but not least, Romania continues to be the first country in EU in terms of the levels of twin deficits (budget deficit and current account deficit), a factor that may trigger a significant adjustment in the context of a severe downturn on the global financial markets.

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