

Drivers Of Long-Term Convergence. Focus On Romania

MANUELA UNGURU

Senior Research Fellow, Ph.D.

Institute for World Economy

Department New Drivers of Economic Development

13, Calea 13 Septembrie, Bucharest

ROMANIA

m.unguru@gmail.com

RAZVAN VOINESCU

Senior Research Fellow

Institute for World Economy

Department New Drivers of Economic Development

13, Calea 13 Septembrie, Bucharest

ROMANIA

razvanvoinescu@gmail.com

Abstract: - With initial low levels of income per capita, a declining population and relatively modest economic growth rates, there are little prospects of diminishing the gap between Romania and the EU countries. Nevertheless, in the long term, convergence is expected. The question then arises, “What are the drivers and their likely potential to boost economic growth and the catching-up process?”

This paper presents shortly the theoretical background of economic convergence and then focuses on the assessment of possible paths of Romania’s convergence towards the EU. Based on the existing long-term macroeconomic projections and the assessment of the possible future developments of the drivers of economic growth, we have built three scenarios of economic convergence, highlighting the possible timespan of convergence. We have employed growth accounting methods to decompose output growth rate into production factors’ contributions (capital and labour) and total factor productivity.

Key-Words: - economic growth, long term projections, technological change, beta convergence, sigma convergence

JEL Classification: - O11, O47

Introduction

Economic growth has been one of the main concerns of development economics. Empirical analyses have tried to identify growth similarities and differences both in terms of speed and amplitude among various economies and groups of economies worldwide. The subject is also of particular interest for the EU policies that rely on and have the objective of speeding up economic convergence between Member States, usually measured by GDP per capita in PPS¹. At the EU level, an additional policy interest in the convergence processes stems from the negative impact of the recent crisis on GDP growth across Member States. As Dobrinsky and Havlik (2014) highlight, economic convergence within the EU is far from being uniform both across New Member States² and within the rest of the EU and such heterogeneity has been further deepened by the recent crisis.

¹Purchasing power standard (PPS) is the technical term used by Eurostat for the common currency in which national accounts aggregates are expressed when adjusted for price level differences using the purchasing power parities (PPPs). Thus, PPPs can be interpreted as the exchange rate of the PPS against the euro.

²Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia joined the EU in 2004, Bulgaria and Romania in 2007 and Croatia in 2013.

Romania's current gap in GDP/capita is 46 pp if compared to either EU27 or EU28. The long-term projections on macroeconomic developments in Romania vary from pessimistic in the European Commission's study to very optimistic in the national studies:

- The Ageing Report: European Commission (2012). "The 2012 Ageing Report. Economic and Budgetary Projections for the 27 EU Member States (2010- 2060)". *European Economy* 2/2012

- Long term module of Dobrescu macromodel, in Corina Saman and Bianca Pauna eds. (2013) "Building Blocks in Modeling a Market Economy – Dobrescu Macromodel of Romania". *Nova Publishing Inc., New York*. "Chapter 6: Long-term forecast", Florin-Marius Pavelescu

- MECC (2013) "Ministry of Environment and Climate Change. Romania's 2013 Report for the Assessment of Projected Progress under Decision no. 280/2004/EC of the European Parliament and of the Council Concerning a Mechanism for Monitoring Community Greenhouse Gas Emissions and for Implementing the Kyoto Protocol". Paper commissioned to ISPE.

The goal of the paper is twofold: to reveal the potential contribution of the drivers of economic growth to the real convergence and to simulate the timeline for catching-up process, under various assumptions for GDP/capita growth rates.

The remainder of the paper is structured as follows: Section 2 presents the theoretical framework for assessing convergence, while Section 3 contains empirical investigations on Romania's long-term convergence. Based on the long-term projections on Romania, we have built three scenarios of real convergence to the EU, assessing the possible contribution of various drivers of growth. We have employed growth accounting method, the output growth rate being decomposed into production factors' contributions (capital and labour) and total factor productivity. Section 4 highlights the main findings drawn from the analysis.

1. Theoretical framework for assessing convergence

Real economic convergence between economies (at country or regional level) generally refers to the decreasing distance between the development levels of the economies under assessment or the closing of the existing gap between the welfare levels of such economies. Neoclassical (exogenous) growth theories predict that convergence processes occur between open economies. In other words, real per capita GDPs of the countries converge towards their individual steady state or their common steady state, irrespective of their initial start. However, more recent (endogenous) growth theoretical developments also allow room for economic divergence between countries, taking into account the variable impact of different drivers of economic growth such as: increasing returns on human capital, or foreign trade and foreign direct investments that can facilitate technological levelling between economies, provided that barriers between economic flows are gradually removed and economies become more and more integrated.

A comprehensive analysis of the evolution of different concepts of convergence in economic theory has been conducted in Nazrul Islam (2003), out of which we highlight in what follows a couple of ideas.

The theoretical debate on convergence definition originates in Robert Solow's (1970) work on growth theory. The main goal of Solow's endeavour was to demonstrate that economies could generally achieve stable dynamic equilibria as production factors can be substituted with each other. Irrespective of the initial endowment of an economy with capital, diminishing returns to capital and factor substitution allow an economy to *converge* towards its uniquely determined equilibrium. As Islam (2003) points out, convergence was first identified as a rather *within country* than an *across countries* phenomenon.

The across countries convergence may, in turn, refer to *growth rate convergence* or *income level convergence*. No matter what indicator is taken into consideration, neoclassical growth theory assumptions have to be adjusted in order to accommodate across country convergence. Namely, technological progress is required to be: i) generated without costs incurred, ii) available without payment for its benefits and iii) equally available for various countries. As a result, economies will converge in terms of growth rates. Adding the assumption that economies are characterised by identical specification of the production function will lead to the result of *converging income levels* across countries.

One important theoretical distinction in the convergence literature is between β - and σ -convergence. β -Convergence theory is built upon the assumption that *capital exhibit diminishing returns*. In other words, the lower the capital endowment, the higher the marginal productivity of capital. Conversely, countries with higher levels of capital endowment will experience lower marginal productivities of capital. *At the same investment rate*, countries with low capital endowment will tend to grow faster than those with higher capital endowments.

The *negative correlation between (initial) capital endowment and growth rate* is reflected in regressions employed in empirical research by the β coefficient and the convergence process is known as β -convergence.

Other researchers have argued that convergence should be regarded in relation to the *dispersion of income (or growth rates)* between economies and that a negative β coefficient is not automatically conducive to a reduction in such income dispersion. This approach led to the development of the σ -convergence concept, where σ also stands for standard deviation of income levels across countries. However, β -convergence is a prerequisite of σ -convergence and this justifies the body of empirical research that has employed the β -convergence model.

Conceptually, other relevant distinction related to convergence is that between *unconditional* and *conditional* convergence. According to initial Solow-Swan model further developed by Mankiw, Romer, and Weil (1992) and Barro and Sala-i-Martin (1995), the *steady-state income level* (y^*) of an economy towards which it converges depends on: i) *the initial level of total factor productivity* (A_0), ii) *technological progress growth rate* (g), iii) *labour growth rate*, (n), iv) *investment rate* (s), v) *depreciation rate*, (δ), and vi) *elasticity of output with respect to capital* (α), as follows:

$$y^* = A_0 e^{gt} \left[\frac{s}{(n+g+\delta)} \right]^{\frac{\alpha}{(1-\alpha)}} \quad (1)$$

All six explanatory variables can be combined in a vector, X . If vector X is identical for all economies under assessment, *unconditional or absolute convergence* occurs between economies (β coefficient, above mentioned, would take negative values).

Conditional convergence, on the other hand refers to the hypothesis that various economies display different steady-states and different explanatory variables (or country specific vector X) have to be included in the model in order to control for such differences. The unique equilibrium in the standard neoclassical growth theory evolves into a multitude of equilibria in the conditional convergence theory.

Conditional convergence is also closely related to the *club convergence* concept, initially coined by Baumol (1986) and further developed by Durlauf and Johnson (1995) and Galor (1996). As mentioned above, *unconditional convergence* of various economies reflects the process of economic convergence towards a unique, common to all steady-state whereas *conditional convergence* models a reality in which economies converge towards multiple equilibria. The final convergence outcome depends for each economy on the initial state and other variables. A group of economies or a club may display convergence processes towards a common steady-state provided that they more than less enjoy similar initial conditions and/or similar levels of explanatory variables in vector X . Geographical vicinity, similar social and economic organization and endowments etc. are obvious examples of such similarities that lead to *club convergence*.

Main causes of GDP per capita convergence investigated in empirical research were considered to stem from the increase of capital endowment of economies (capital deepening) and/ or from technological progress (catching-up). Although generally considered to explain various factors that impact the combination of production factors in an economy, total factor productivity (TFP) is usually employed as a reliable proxy for the technological level of an economy in empirical research. The concept of *TFP convergence* thus evolved as explanatory underlying process for income convergence. Correlation between income convergence and differentials in initial levels of TFP and technological growth rates between economies were investigated in empirical research.

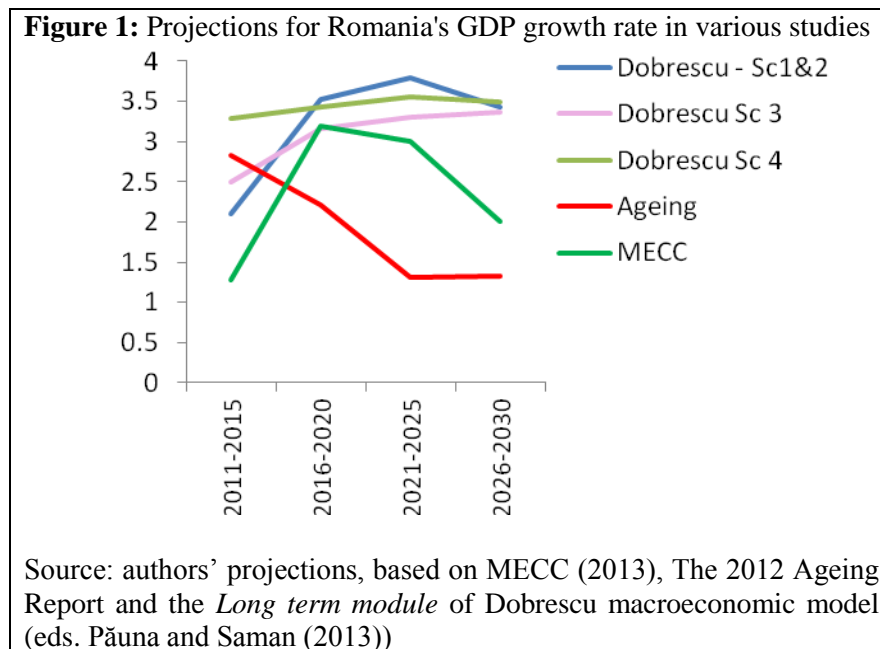
Synchronization of business cycles may also positively influence the convergence processes. The European Central Bank (2006) found that business cycles of Euro zone countries are highly synchronized, namely the standard deviation of the output gaps of a certain country over a period of time has been diminishing since the mid-1990s. Nevertheless, the output volatility is higher for the smaller and more open economies, as well as for the countries that have a relatively high degree of specialization in certain sectors.

2. Romania's convergence, possible paths and their drivers

In PPS terms, Romania's GDP/capita is currently at 54% of the EU27 average. Real convergence requires that Romania grows faster than the EU and that the higher pace is sustainable. In this section we intend to discuss various scenarios regarding the timeline of Romania's convergence with the EU average and also investigate the possible drivers of this catching-up process.

First, we illustrate medium and long term projections for GDP growth rate from existing studies, and then we present simulations of convergence timeline under various assumptions and look at the key determinants of convergence.

2.1 Existing long term projections for Romania



The estimates of Romania's GDP growth rate vary with the authors and the projections time span. The most recent macroeconomic projections for Romania are available from MECC (2013), The 2012 Ageing Report and the long term module of Dobrescu macroeconomic model with its four scenarios (eds. Pauna and Saman (2013)). For comparability reasons, we present projections only until 2030, which is the last year available in national studies.

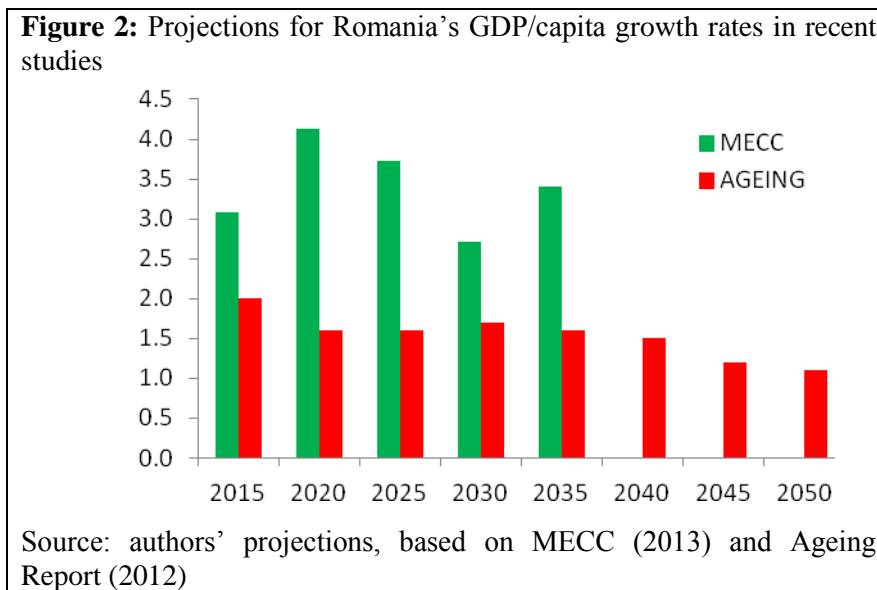
The Figure 2 reflects the level of divergence in estimating Romania's future GDP/capita growth rates between the European Commission's Ageing Report (2012) and both national studies: MECC (2013) and eds Pauna and Saman (2013). According to Ageing Report (2012), the GDP growth rate is expected to be quite modest for Romania and drops significantly after 2020, diverging from projections of both national studies.

Projected GDP/capita growth rate, as a measure of real convergence, does not offer ground for optimism in respect of closing the gap with the EU, at least according to Ageing Report, that estimate Romania's growth rate to about 1.5 % on long term, compared to 1.3% for EU28. Moreover, if we adjust the population figures downwards to the actual numbers (taking out the emigrants accounting for about 12% of the total population³), the decline in population over the projection period would be much less significant, and therefore the GDP/capita growth rate would be even lower. National projections are again much more optimistic, with above 3% GDP/capita growth rate in MECC (2013) and with more than 2 pp above the EU average in the medium term projection of GDP/capita growth included in the Convergence Programme 2014-2020, (Table 2, p.5). The latter suggests that Romania is likely to continue the real convergence process, 'reaching almost 70% of EU28 average GDP/capita in PPS by 2020'.

Projections of GDP/capita reflect various assumptions regarding or estimates of the determinants of economic growth, namely demographics and labour market, capital deepening and total factor productivity trends, but also aspects of structural convergence, such as harmonizing and or synchronizing of shocks, sectoral structure of value added and employment, economic reform, education and research and development.

³INSSE: The estimated number of emigrants as of January 1st, 2013 (number of citizens outside the country for 12 months and above) is 2.344 million.

Below we highlight the main assumptions lying behind the existing projections, as a background in building scenarios in next section.



According to all projections Romania's population will continue its decreasing trend. A sharp decline of total population, by 19.6% until 2060 compared to 2010, is expected according to Ageing Report (2012), despite positive developments in some of its determinants: i) increase of fertility rate (by 17% until 2060); ii) improvement of life expectancy at birth (from 70 years to 81.8 years); iii) reverse of the current net outflow of population. MECC (2013) also assumes an important decline of population over 2010-2030, even bigger than the estimation of Ageing Report for the same period of time.

Since demographics are critical when speaking about real convergence, it is worth to comment on the statistics regarding actual data used for population. In our view, **the historical figures for population are persistently overestimated; therefore the actual drop in population may not be as significant as currently projected**, especially that the migration outflow of is expected to reverse, according to the Aging Report. More precisely, the figure for population, of 21.4 million in 2010 does not include the stock of emigrants that accounted for about 13 % of the population in 2010, i.e. 2.8 million⁴. A more recent estimation of the National Institute for Statistics shows that emigrants represent 12% of the total number of residents in 2013 (2.34 million emigrants versus 19.94 million residents), which is far away from the 'official migration' figure usually included in official population figures, as for example 7,900 persons in 2010. Nevertheless, a smoother decline of population (or even a stagnation), would further deteriorate the GDP/capita growth rate projections of Ageing Report, making the convergence to the EU in terms of per capita GDP even slower.

Labour market developments are going to have negative contribution to GDP developments, but a declining population represents a relative advantage regarding the measure for real convergence, improving the level of GDP/capita compared to GDP growth rate projections. The participation rates are currently far below the target values anticipated in strategies⁵ and the existing projections do not reflect a gap closing trend with the EU. The Ageing Report estimates a decline in the Romanian labour supply by 38.5% until 2050, opposite to the general trend in EU28. The same Report projects a deterioration of the participation rate (25-64 years), from 63.8% in 2010 to 60.9 % in 2060 and an ageing trend in population: the share of 20-64-year-olds will decrease by almost 40%, while the share of 64 and over will increase by almost 90%.

The MECC (2013) projects an equilibrium level of participation rate at 53.52%, below both the current value and the average of last two decades. Low and decreasing participation rates projected in both studies will continue to have a negative contribution to the GDP growth. The long run projections for unemployment rates are to converge to structural unemployment.

⁴<http://siteresources.worldbank.org/INTPROSPECTS/Resources/334934-1199807908806/Top10.pdf>

⁵The National Employment Strategy 2007-2010 target for employment rate was 70% by 2010. Currently the employment rate of 20-64-year-olds is 6 pp below the EU2020 target for Romania, set at 70%.

Labour productivity gains would reflect the increase in TFP and the capital deepening. Estimates of **total factor productivity (TFP)** growth rate projections also vary across different authors. In Dobrescu macromodel for Romania, total factor productivity growth rate estimate for Romania is considered fixed at 2.5%, composed of 1 percentage point representing the TFP growth rate of the EU plus 1.5 percentage points, Romania's convergence rate. However, the Ageing Report estimates an average TFP growth rate of 1.3% and converging to only 1% for all EU Member States.

Regarding the capital deepening, the expectations of the Ageing Report are that the capital growth rate will decline after 2020 from 1.5% to 0.74% on average, over the remaining period until 2060. Romania's Convergence Programme 2014-2020 sees an increasing trend for the contribution of capital to GDP growth, but does not provide any hint regarding the longer term, as the 'Ageing' projections do. In Dobrescu macromodel there are several assumptions regarding the possible capital developments, depending on scenario, but overall GDP growth rely on both capital deepening and a TFP higher than the EU average.

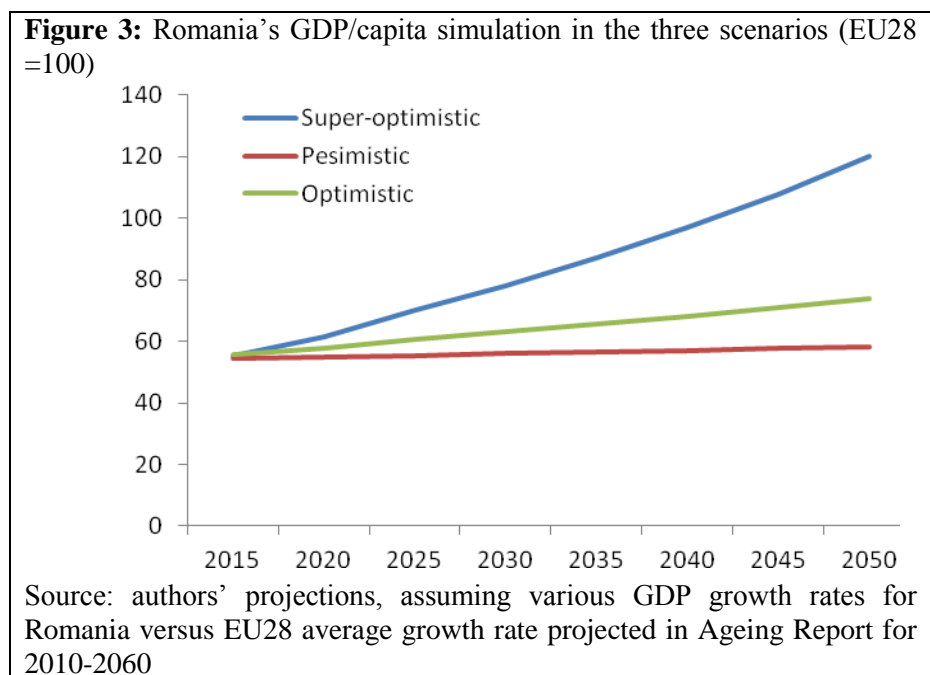
2.2 Three scenarios regarding the timeline for closing the gap of GDP/capita between Romania and EU

In order to investigate possible timelines for closing the gap between Romania and the EU, we imagined the following three scenarios regarding GDP projections (**Error! Reference source not found.**) and discussed their determinants:

Table 1. Three scenarios regarding Romania's convergence with EU28 during 2010-2060 (percentage points)

2010-2060	EU28 scenario	Romania		
		Pessimistic scenario ⁶	Optimistic scenario	Super-optimistic scenario
GDP growth rate(1)	1.4	1.1	2	3.4
Population(2)	0.1	-0.4	-0.1	-0.1
GDP/capita growth rate (3=1-2)	1.3	1.5	2.1	3.5

Source: authors' projections based on various sources, using growth accounting method



⁶cf. Ageing Report 2012

For all scenarios we considered as reference the growth projections for EU28 from Ageing Report, namely an average growth of GDP/capita of 1.3%. We also employed the same accounting rules as used in the Ageing Report and, as mentioned below, adjusted Romania's growth rates provided in public sources in order to fine tune growth in three different scenarios, ranging from 'Pessimistic' to 'Super-optimistic'.

For Romania's GDP/capita growth over 2010-2060 period we considered an average rate of 1.5% in the 'Pessimistic scenario' (similar to the projections of Ageing Report), 2.1% in the 'Optimistic Scenario' and 3.5% in the 'Super-optimistic scenario'. The latter is inspired by the long term projections (until 2030) of Dobrescu macromodel for Romania's GDP growth, taking into account that the model predicts a growth rate higher than EU28's by 2 pp.

As it can be noticed from the graph below, Romania's GDP/capita will likely equal that of the EU28 around 2040 in the 'Super-optimistic scenario', in which Romania's GDP/capita is projected to grow on average by 3.5% and EU's by 1.4% annually. In both the 'Optimistic' and the 'Pessimistic' scenarios the lines illustrating Romania's and EU28's GDP/capital will only intersect – if ever – beyond the projection horizon of 2060.

One conclusion that can be drawn is that the existing estimates on Romania's convergence to the EU range, according to their source, from over confident (Romanian sources) to over pessimistic (EU sources). Even in a moderately optimistic scenario, however, one cannot expect Romania to rapidly converge towards the EU unless the underlying conditions are amended, namely either Romania grows faster than expected and/ or the EU growth diminishes in time.

Further on, for in-depth investigation of the conditions underlying growth projections, we have used the growth accounting method employed in the Ageing Report, to decompose output growth rate into production factors' contributions (capital and labour) and total factor productivity⁷:

Table 2. Decomposition of GDP growth into contributions of factors, 2010-2060 (percentage points)

2010-2060	EU28 scenario	Romania		
		Pessimistic scenario ⁸	Optimistic scenario	Super-optimistic scenario
GDP growth rate (1=2+3+4)	1.4	1.1	2	3.4
Labour input (2)	-0.1	-1.00	-0.5	-0.1
TFP (3)	1	1.3	1.5	2
Capital deepening (4)	0.6	0.8	1	1.5

Source: authors' projections based on various sources

In all our three scenarios labour input is expected to have a negative contribution to Romania's GDP growth, taking into account the negative impact of an Ageing and decreasing population. However, in the 'Optimistic' and 'Super-optimistic' scenarios we departed from the assumption of the 'pessimistic' one (identical to that provided in the Ageing Report 2012) and considered still negative but milder contributions of labour input to growth (from -91% in the 'Pessimistic' to -25% in the 'Optimistic' and -3%, approximately, in the 'Super-optimistic' scenario). We argue that pessimistic projections of labour input do not take into account the already high numbers of unregistered Romanian emigrants. In the long run, demographics are more than likely to negatively impact Romania's growth, although perhaps not as harshly as projected in Ageing Report. Nevertheless, in the long term, labour is expected to contribute to growth less than the other production factors, as it was already confirmed in the Euro area (The European Central Bank (2006)).

TFP and capital deepening are projected to have positive contributions to growth given the fact that Romania still evolves from an 'initial' low position compared to the EU. The current marginal productivity of the capital allows room for increased investments and further integration of Romania's economy into the common market, which will foster rapid adoption of higher productivity enabling technologies. Capital deepening is very likely to have an increasing trend, despite the developments over the last couple of years,

⁷ According to Ageing Report 2012, GDP growth is decomposed in labour input contribution and productivity contribution which, in turn, is further divided into TFP and capital deepening contributions.

⁸cf. Ageing Report 2012

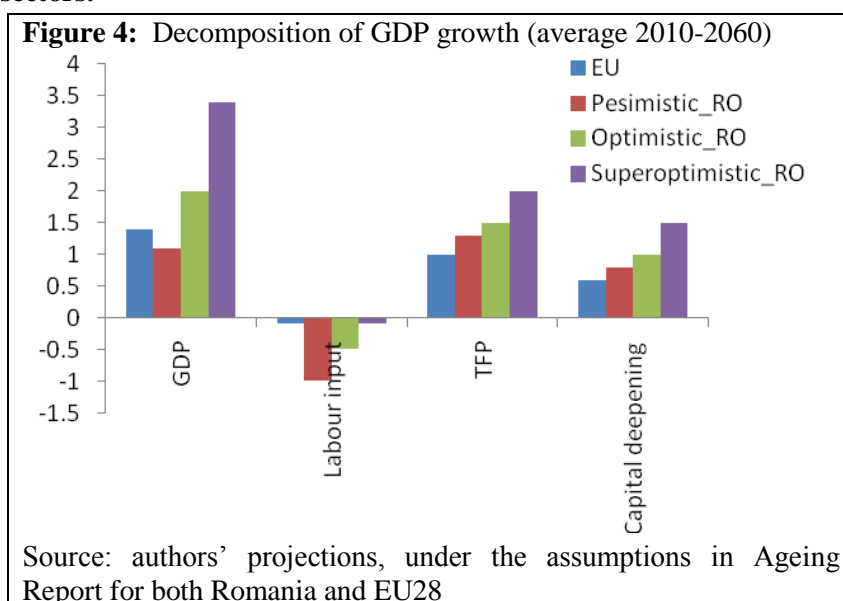
when gross fixed capital formation dropped from about 26% of before the economic crisis (2005-2007) to only 6% over 2011-2013 period.

Adopting new technologies will have a significant impact on the industrial branches by improving the labour productivity. As proven in the EU advanced countries, productivity gains are concentrated in high-tech industries, a fact that further emphasizes the need of structural changes towards more value added activities in Romania.

We share the opinion that Romania GDP growth rate should rely on TFP growth rate significantly above that of EU. Thus, we projected TFP contribution to growth to range from 118% in the ‘pessimistic’ to 75% in the ‘Optimistic’ and 59%, approximately, in the ‘Super-optimistic’ scenario. We tend to consider unrealistic a more than 100% contribution of TFP to growth during the projection period and therefore favor the ‘Optimistic’ and ‘Super-optimistic’ scenarios with lower TFP contributions, although above the estimates of the Romanian Commission for Prognosis. Similarly, we projected capital deepening contribution to growth to range from 72% in the ‘Pessimistic’ to 50% in the ‘optimistic’ and 44%, approximately, in the ‘Super-optimistic’ scenario. Again, in the later scenarios we depart from EU projections but near the estimates made by The Romanian National Commission for Prognosis.

Another two arguments to expect higher TPF rates in Romania are related to the likely changes in the value added structure and the positive contribution of foreign trade.

Currently, Romania has structural deficiencies, such as weak manufacturing base and a high dependency on agricultural production. In terms of value added, it has a much higher share for agri-food, and a twice lower for market services, when compared to the EU’s average. Thus, Romania’s structural convergence with the current EU structures would imply **shrinking the agriculture and to a lesser extent the industry, in favour of services sectors.**



Regarding foreign trade performance, despite the developments over the last two decades, when imports have increased faster than exports, thus deteriorating the trade balance, especially with the EU, foreign trade is not likely to impede economic convergence. The share of Romania in world total exports has increased and the asymmetric shocks between Romania and the EU are likely to decrease, since over the last decade, ‘the level of convergence of Romania’s intra- industrial trade with the EU27 increased significantly’, as estimated in Turlea (2014).

In our assumptions regarding the decomposition of GDP growth into its determinants, we took into consideration also the estimates from the Convergence Programme: the contribution of capital to GDP growth ranges from 50% to 56%, that of the labour from 4% to 10% and the remaining TFP from 37% to 44% during 2013-2017.

Conclusions

Romania, as other New Member States underwent a painful economic restructuring process prior to its accession to the EU. The transformations towards a market economy negatively influenced previous convergence achievements. Unfortunately, even after the EU accession convergence was sluggish in Romania's case although other New Member States took advantage of their newly improved status. Dobrinsky and Havlik (2014) show that over the 1995-2012 period, compared to the EU average, the GDP of New Member States (PPP-weighted) increased by 40 percentage points, while Baltic states gained more than 60 percentage points and Romania less than 20 percentage points. During 1995-2012 Romania's real GDP grew on average by 2.49% annually while EU27's average growth rate was only 1.71% per annum. The 2008 crisis further hit the group of New Member States which grew on average by 0.68% annually between 2008 and 2012. During the same period, the EU27 decreased by 0.23%, and Romania by 1.23%, on average.

In respect of future developments, existing estimates on Romania's convergence to the EU range, according to their source, from over confident, as in the case of Romanian sources, to over pessimist as reflected by EU sources. From 2020 until 2030 Romania's GDP is expected to increase with average rates between 2% and 3.8% annually in Romanian papers and below 1.5% annually in EU sources.

Furthermore, real convergence measured by projected GDP/capita growth rate, does not offer ground for optimism in respect of closing the gap between Romania and the EU. Again, Romanian sources lie in the optimist area of 2.7%-4.1% growth rates while EU sources estimate a GDP/capita growth rate of only 1.1%-2% during 2015-2050.

Although deriving a timeline for Romania's convergence to the EU average is technically trivial once growth rates are estimated, we could not find such tentative timelines in any of the investigated sources. In order to investigate possible timelines for closing the gap between Romania and the EU and starting from the existing estimates we imagined three scenarios regarding the growth of GDP and GDP/capita ('*Pessimistic*', '*Optimistic*' and '*Super-optimistic*') and discussed their determinants.

In the '*Super-optimistic scenario*' Romania's GDP/capita will likely equal that of the EU28 around 2040. In both the '*Optimistic*' and the '*Pessimistic*' scenarios Romania's and EU28's GDP/capita will be on par – if ever – only beyond the projection horizon of 2060. It follows that one cannot expect Romania to rapidly converge towards the EU unless the underlying conditions are amended and either Romania grows faster than expected and/ or the EU growth diminishes in time.

In the long run, demographics are more than likely to negatively impact Romania's growth, although perhaps not as harshly as projected by the EU sources. TFP and capital deepening are projected to have positive contributions to growth given the fact that Romania still evolves from an 'initial' low position compared to the EU. Our expectations regarding the positive contribution of TFP and capital deepening rely on advancements in value added chains, increased both private (domestic and foreign) and public investments (i.e. infrastructure) and positive contribution of foreign trade in respect of technology adoption and positive direct contribution to GDP growth. Despite various attempts in literature to prove differently, economic convergence does not occur automatically, at least in the short and in the medium run. Geographic location, institutional arrangements and, most importantly, public policies implemented in economies influence the convergence processes and Romania will most likely not be an exception.

References

- [1] Arrow et al. (2012). "*Sustainability and the measurement of wealth*", Environment and Development Economics 17: 317–353. Cambridge University Press 2012
- [2] Barro Robert J., Sala-i-Martin Xavier (1992). "*Convergence*", Journal of Political Economy.
- [3] Baro, Robert J., and Sala-i-Martin, Xavier (1995). "*Technological diffusion, convergence and Growth*". Economics Working Paper. Universitat Pompeu Fabra
- [4] Baumol, William J. (1986). "Productivity Growth, Convergence and Welfare: What the Long Run Data Show?" American Economic Review.
- [5] Carl Benedikt Frey, Michael A. Osborne (2013). "*The future of employment: how susceptible are jobs to computerisation?*" Oxford Martin School, www.oxfordmartin.ox.ac.uk

- [6] Corina Saman and Bianca Pauna eds. (2013). *“Building blocks in modeling a market economy Dobrescu macromodel of Romania”*. Nova Publishing Inc., New York. Chapter 6: Long-term forecast, Florin-Marius Pavelescu
- [7] Dobrinsky Rumen, Havlik Peter (2014). *“Economic Convergence and Structural Change: the Role of Transition and EU Accession”*, The Vienna Institute for International Economic Studies Wiener Institut für Internationale Wirtschaftsvergleiche.
- [8] Durlauf, Steven and Paul A. Johnson (1995). *“Multiple Regimes and Cross-Country Growth Behavior.”* Journal of Applied Econometrics.
- [9] European Central Bank (2006). *Nicholai Benalal, Juan Luis Diaz del Hoyo, Beatrice Pierluigi and Nick Vidalis “Output Growth Differentials Across the Euro Area Countries. Some Stylised Facts”*. Occasional Paper Series No. 45/ MAY 2006
- [10] European Commission (2012). *“The 2012 Ageing Report. Economic and Budgetary Projections for the 27 EU Member States (2010- 2060)”*. European Economy 2/2012
- [11] Galor Oded (1996). *“Convergence? Inference from Theoretical Models”*. Economic Journal.
- [12] Government of Romania (2014). *“Convergence Programme 2014-2020”* April.
- [13] Islam, N. (2003). *“What Have We Learnt from the Convergence Debate?”* Journal of Economic Surveys Vol. 17, No. 3.
- [14] MECC (2013) *“Ministry of Environment and Climate Change .Romania’s 2013 Report for the assessment of projected progress under Decision no. 280/2004/EC of the European Parliament and of the Council concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol”*. Paper commissioned by ISPE.
- [15] Solow, Robert M. (1970). *Growth Theory: An Exposition*, Cambridge University Press, London.
- [16] Turlea (2014). *“Avantajele competitive ale României pe piața internă a UE”*. Institutul European din Romania. Strategy and policy studies 2013 – no. 1.
- [17] UNCTAD (2014). *“World Investment Report 2014”*. Country Fact Sheets Romania http://unctad.org/sections/dite_dir/docs/wir2014/wir14_fs_ro_en.pdf