

## Socio-Economic Convergence as a Necessary Precondition and Determinant of Societal Growth

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### Abstract

*The issue of socio-economic convergence is nowadays more than ever an extremely dominant topic, especially in the case of less developed countries and countries suffering stagnation, mainly due to the integration processes occurring worldwide and the determinant to achieve long-term growth in an effort to advance towards the socio-economic sustainable level of developed economies. A key assumption towards convergence is that economies with initially lower socio-economic levels will at some point reach (in an idea case) or get very close the level of developed economies, gradually reducing the gap between the capital stock and the level of product size between countries, while the lower economic level the country has, the higher the growth rate it will go through the transition period. This suggests that the economies with lower levels of performance will grow on average at a higher rate than economies that are more efficient. It is therefore expected that the growth performance of a country will with its improvement also at some point slow down and quite realistically there can also occur a situation where the levels of development and growth of individual states economies will rather show delay. This is basically an opposite action to the concept of convergence, which is known as the divergence. The aim of our research paper is to analyze closely the concept of convergence, while pointing it is specifically characteristics and overall focusing on the significance of the issue of convergence.*

### Key words

*Cohesion, Convergence, Economic Growth*

**JEL Classification:** A13, O4, O10

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### Introduction

The term convergence comes from the Latin word *convergens*, meaning coming or getting closer, turning towards between two or more researched subjects, whether we talk about countries, regions, but additionally the term convergence is used in many important fields, such as sociology, philosophy, medicine, mathematics, which does not always recruit the same meaning. However, generally, the term is used for a defined state at the time, defined point or equilibrium situation aligned to researched objects, which corresponds to approaching of an infinite series to a finite limit. Socio-economic convergence reflects the diminishing difference in the environment or in the economic and social levels - spheres of at least two states, countries or regions. Otherwise, increasing differences between countries, mean divergence. Convergence has been the subject for years, for both international and national comparisons focusing on

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changes in countries, regions performance over time, known as the convergence vs. divergence dilemma (Hudec, 2016).

Convergence in theoretical concepts is related to economic growth theories, which seek to analyze and explain the factors influencing the pace and levels of economic growth in individual countries. In the late '50s this was mainly neoclassical growth theory, at the turn of the 80s and 90s the Endogenous growth theory, New growth theory, looking and examining the reasons for long-term socio-economic gap between less and more developed countries, explaining the long-term socio-economic development in the form of technological progress and not particularly immediate higher savings rate needed for a single reduction of backwardness of a technological nature, as the Neoclassical theory. Although the convergence theories are dating back to the interwar period, however many significant development issues happened only in the late nineties with a wave of transformation of centrally controlled economies to market economies (Minkenberg, 2015). Convergence depends, among endogenous changes in the economy, also on exogenous factors<sup>2</sup>. Moreover, convergence means that the difference between two values decrease over time and these differences becomes negligible, and converge to zero, measured by at least two or more variables<sup>3</sup>  $y_1$  at time  $t$  and at time  $t-1$ , where the outcome of measured socio-economic variable  $y_1$  (at the time  $t-1$ ) minus variable  $y_2$  (at the time  $t-1$ ), must be higher than subject  $y_1$  (at the time  $t$ ) minus subject  $y_2$  (at the time  $t$ ), in order to converge (Barro, 2004).

## 1 Methodology

Our research article focuses on comparing different types of views among the issue of convergence based on our own research and our own previous research articles dealing with the issue of convergence, using the methods of analysis, induction, deduction and comparison. The main pillar of our research article is naturally, the methodology and information gained through the works and research of the most famous authors, who are actively dealing with the problematic of convergence, its types, manifestations and consequence in the context of socio-economic development of less developed economies trying to converge in the direction of prosperity and better standard of living, which is often occurring in the developed economies and international or regional groupings. We believe that the background for this topic, in the context of the principles of convergence, is fundamentally important especially in the 21st century, since there are still huge gaps and differences between regions, states and the proper understanding of convergence is vital.

To accomplish our aim, we have constructed the following research questions:

- What are the main differences between different types of convergence?
- Which aspects are important when measuring convergence?
- What do we understand between nominal and real convergence?
- What types of convergence is tested among convergence clubs?
- What role do purchasing power parities play in relationship to convergence?

<sup>2</sup> Such as political interferences. An example of exogenous change effect is the integration groupings, such as the entry of European countries into the European Union or the Eurozone.

<sup>3</sup> Variable  $y$  is i.e. the real income per capita in one economy.

- What is the relationship between socio-economic convergence, growth and inflation?
- How do different economic theories perceive socio-economic convergence growth?

## **2 Results and Discussion**

### **2.1 The basic types of convergence**

Substituting economic variables vary per the type of convergence. Simply put, we distinguish between two basic types of convergence, nominal and real, but in literature, we may also read about price convergence. Although the two concepts are interlinked and interdependent, research studies<sup>4</sup> often tend to focus on only one of these convergence types. When it comes to the price convergence, it is often confused with nominal convergence. Testing of price convergence is performed using variables reflecting the price levels of economies, namely individual product prices, or more aggregated data in the form of price indexes. Furthermore, nominal convergence represents convergence of nominal variables, such as GDP in nominal terms or in nominal wages. Mostly, however, under the nominal convergence means the fulfillment of the Maastricht criteria to ensure the stability of the common currency and are a prerequisite for admission to the Eurozone member countries. Real convergence means approaching the socio-economic level of another country or group of countries. The real convergence occurs when the gap in socio-economic level of comparable countries is reduces, measuring the productivity of the economy, by the most commonly used gross national income per capita and real gross domestic product per capita. Therefore, it logically means that the gap between rich and poor economies diminishes over time. In the most cases, the indicator GDP per capita in purchasing power parity is commonly used for measuring real convergence, since the advantage of this indicator is that it reflects the purchasing power of domestic currency, and thus eliminates price differences between the economies, while also reflecting the standard of living of its residents. Real convergence can be further divided into absolute and conditional con-

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<sup>4</sup> Professors Robert Barro and Xavier Sala-i-Martin focus and measure primary real convergence, while Professors Nigel Allington, Ulrich Fritsche, Joseph Gagnon, David Goldberg, Jonathan Haskel, Michael Knetter, Frank Verboven, Holger Wolf focus on price convergence.

vergence among the convergence clubs<sup>5</sup>, as well as for testing and measurement it can be further divided into beta<sup>6</sup> and sigma<sup>7</sup> convergence (Alexiadis, 2013).

Absolute convergence means that economies with lower levels of GDP per capita tend to grow faster than economies with higher levels of GDP per capita. This concept, however, requires that the economic growth of less developed economies is not conditional on any other characteristics of these economies, such as the savings rate or population growth rate, if all economies converge to the same steady state, but they differ with the initial level of GDP per capita. However, the assumption of the same steady state is unrealistic. Different opinions about the practical applicability of the absolute convergence concept has led to the emergence of another concept, and called conditional convergence, which is not based on same steady state, but rather economies are subject to certain identical parameters listed or may be subject to economic inclusion to a certain group, stating that those economies which are furthest from their steady status can grow fastest however, unlike previous concept, less developed countries can also grow slower than the developed ones (Barro, 2004). Additionally, the concept of convergence clubs assumes that the economies that have similar fundamental characteristics and similar initial conditions, demonstrate in the long-term a mutual convergence of GDP per capita.

## 2.2 Relationship and differences between the inherent concepts

As we have analyzed, authors and researchers mostly operate with the two fundamental concepts of convergence in their researches, namely nominal and real, while compared to nominal convergence, real convergence is unlike the nominal convergence, interpreted identically among authors as coming closer by reduction of regional disparities of GDP per capita in purchasing power parity, since the process of catching

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<sup>5</sup> Convergence clubs is a term used in global economic theory, related to levels of international attainment of different clusters of countries. These groups of countries are classified and divided based on their measurable socio-economic factors, e.g. less developed countries which have the tendency to converge towards one another make up a convergence club, for example at a relatively low level of per-capita wealth. On the other hand, developed countries are grouped into convergence clubs based on their higher-income per-capita convergence level. Convergence clubs function on the issue of barriers or limits, demonstrated in groups of economies, e.g. resources, the level of infrastructure, education, corruption, healthcare, pollution etc., which create a natural barrier that blocks and prevents less developed economies from moving to a higher convergence club. Convergence clubs are valuable when it comes to examining, measuring and evaluating the issue of a specific socio-economic development in a selected economy, relative to other economies, which is useful to characterize and compare similarities and differences between different economies.

<sup>6</sup> The concept of  $\beta$  convergence concept assumes that less developed economies, with lower initial levels of GDP per capita, tend to grow faster in the long run than developed economies, with higher initial levels of GDP per capita and thus less developed economies are catching up with developed in their socio-economic levels, meaning that there is an indirect relationship between the logarithm of the initial level of GDP per capita and GDP growth. Eventually,  $\beta$  coefficient indicates how diminished is the difference from the steady state. If the  $\beta$  coefficient is negative, it means that convergence occurs, otherwise occurs divergence. Furthermore, there is only one explanatory variable included. The results show absolute  $\beta$  convergence. However, if we include more explanatory variables and the  $\beta$  coefficient would be negative, then it is a conditional  $\beta$  convergence.

<sup>7</sup> The concept of  $\sigma$  convergence concept assumes that beta convergence basically generates sigma convergence. If less developed economies grow faster than developed, then occurs between the economies narrowing gaps in the variability of GDP per capita in time. Sigma convergence is measured by either variance or standard deviation.

up with the economic level of developed countries is a strategic priority economic development of less developed economies due to the conditions such as different historical development, resources, geographical location, international trade, type of government etc. Real convergence is essentially conditional on long-term advance in overall real income growth, labor productivity and wages. The goal of the less developed countries is therefore to take a position in the division of labor which would allow them to maintain the pace of convergence at the level required to sustain socio-economic growth thus strengthen the competitiveness compared with leading regions (Spence, 2012). Economic level of a country in international comparison is often measured by the GDP per capita in purchasing power parity. In this way, we can eliminate the differences in price levels between countries and can compare the volumes of production of goods and services characterizing the economic performance of the country calculated per capita.

To compare gained data objectively, it is necessary to adjust it to a common base by using purchasing power parities (PPP). PPP is a unit that eliminates the differences in price levels between countries. It represents the ratio of the prices in national currencies for the same products and services through various countries and usually there is a reference country or group of countries used for comparison. It is important to note that it is an artificial currency unit used for international comparisons to express the volume of economic aggregates. PPP thus reflects the different price levels of countries. The most important feature of the exchange rate is that at steady state there are identical<sup>8</sup> prices of tradable goods in open economies, after adjusting for various duties, fees and transportation costs. Purchasing power parity theory in its absolute version is based on the law of one price, underlying that at steady state identical goods should have in all countries the same price. Tool to achieve this state is called commodity arbitrage, while it is important to anticipate the possibility of production of identical goods in different countries, free movement of goods between countries and rapidly adapting exchange rates. This state is measured as the ratio of domestic and foreign price level. The ratio between the market exchange rate and the exchange rate derived by the absolute version of the theory of purchasing power parity is defined as an exchange rate deviation index. This index or coefficient is sometimes interpreted as a measurement of overvaluation, respectively undervaluation of exchange rate of domestic currency against foreign currencies. If the value index is greater than 1, it indicates undervaluation of the exchange rate against the PPP and vice versa. Optimal long-term sustainable value of the coefficient is 1. Additionally, relative version of the theory of purchasing power parity reflects a dynamic view of the exchange rate, where the assumption is the adjustment of exchange rate differences to inflation (Szirmai, 2015).

Moreover, when it comes to relationship between real and nominal convergence, nominal convergence emerged from the optimum growth theory, while real convergence is established upon the neo-classical convergence theory hypothesis. Secondly, the nature of their relationship, called convergence tandem, is established in the Balassa-Samuelson research, in a practical essence. European economic and monetary Eurozone integration is essentially driven by the nominal convergence processes, while on the other hand, real convergence processes apply especially for newly joined mem-

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<sup>8</sup> This theory is called the law of one price, which underlies absolute version of the theory of purchasing power parity.

ber states of the European Union, whose real economy is converging towards the developed EU countries. Furthermore, it would be fair to state that on the one hand, real convergence of the new EU members is driving the nominal convergence towards the euro area. On the other hand, it also works vice versa. We should not forget about the fact that exchange rate is determined by the purchasing power parity from the tradable sector, while a nominal rise in the price level of the economy affects the appreciation of the currency.

Furthermore, if we add price level convergence to our example we would see that it has been a significant (not necessary in the positives way) source driving inflation in the original EU member states, while inflation rates are driven by nominal convergence, at least during the during the transition process and additionally, the slower the adjustment process of newly joined economies, the long will convergence effects last. For example, new EU member states or not so developed economies, compared to the developed ones, are in catching-up process, which means that they have higher productivity rates in the tradable sector, influencing wage increase. If the labor force is flexible and wage increase in the tradable sector<sup>9</sup> happens, this step leads to a similar increase in the whole economy. However, since the productivity level in the non-tradable sphere is lower, wage increases through economy will also affect price increases in the case of non-tradable goods. Since the price level in the through the economy increases, this will be a catalyst towards higher inflation. As we have mentioned before, the term nominal convergence does not have one single understanding, since it can be understood as the convergence of nominal values, which vary from the variables in real terms due to the different price levels in different countries. Moreover, precisely for this reason, to measure the process of nominal convergence we use relative comparable price level (CPL), sometimes referred to as price level index (PLI). CPL indicates the ratio of the overall price level of GDP in a selected country to the reference country or group of countries, expressing the relationship of the market exchange rate at purchasing power parity or currency relation of relevant aggregate to the adjusted exchange rate, compared to the volume adjusted in purchasing power parity. The price level index of GDP in addition also reflects consumer prices, respectively producer prices, however also different price indexes of imported investments, public consumption and changes in exchange rates. The value of CPL is usually stated in percentage, while the value over 100 represents higher price level (Wolff, 2012).

In conclusion, nominal convergence is closely associated with real convergence, since the real convergence processes will produce a tendency toward real appreciation of currency, which after entering the e.g. the Eurozone will emerge as real appreciation of domestic assets. A very important long-term source of real appreciation is labor productivity growth. When it grows during the convergence processes of productivity in the tradable sector of the economy faster than abroad, productivity growth in the non-tradable sector is generally unable to keep the same tempo and therefore arises a gap in the non-tradable sector between productivity growth and wages, and caused nearly the same rate of wage growth in both sectors, which is a source of higher inflation. However, socio-economic level, the level of productivity and price levels of less developed countries converge towards the level of developed countries.

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<sup>9</sup> Tradable goods or services go through the foreign exchange. According to the theoretical assumption, prices of tradable goods in international comparisons should not be too different, whereas non-tradable commodities and services are generally not internationally traded and their market price is therefore determined solely by domestic supply and demand.

### 2.3 Different perceptions towards real convergence – addressing growth

Real convergence is naturally linked with the theory of economic growth. In terms of the impact of convergence, we distinguish between two main groups of theories, the neoclassical model of economic growth and new theory (theories) of endogenous growth. The main difference between the two directions of convergence lies in the assumption regarding return from capital. If we go a bit further into the past, predecessors of the neoclassical growth theory, Professors Evsey Domar and Roy Harrod tried to create a new Keynesian theory of economic growth by making the nature of the theory more dynamic. Both of their models<sup>10</sup> are aimed at the demand side, based on the idea that savings and investments should be in balanced growth, however, economies do not have natural balanced growth. The model deals with the relationship between capital accumulation and output growth, which is based on several assumptions, namely constant price level; the model works with net savings and investments that relate to a particular period; for manufacturing goods there are used two factors of production, labor and capital, which are used in the same proportions; productive capacity of the economy depends for instance on the distribution of income, consumer preferences, on the level of wages in the economy and the structure of the industry (Mankiw, 2015).

Economy is therefore in equilibrium when production capacity<sup>11</sup> equals its national income and full employment will then be achieved when supply and demand will grow at the same rate, and at this rate, investments will rise, affecting growth in both production capacity and national income. The investment growth rate in this model is a key growth rate of the whole economy. Additionally, Harold's model is based on the acceleration and again based on the assumption that demand will be equal to supply. The principle of acceleration implies that the increase of investments depends on the increase of savings. Model also works with the real economic growth rate of income, product in the economy, while Harrod further distinguishes warranted rate of growth. During warranted rate of growth production capacities are fully utilized and investments must be equal to the savings. Lastly, there is the natural rate of growth, which is the maximum rate of growth that can be achieved, depending on population growth, capital accumulation and technological progress at full employment. In an ideal scenario, all three rates of growth should be the same; however, this is hardly achievable because each rate depends on different factors.

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<sup>10</sup> Also, known as the Harrod–Domar model, which is an early post-Keynesian economic growth model used in development economics, focused on explaining growth rate in the context of the level of saving and productivity of capital. The model offers implications for countries with less socio-economic development, where labor is in lavish supply, however, physical capital is missing, which essentially slows down their socio-economic progress. Furthermore, these economies do not have a sufficiently high income, to offer sufficient rates of saving, so naturally the process of physical-capital stock accumulation because of investments is rather very low, implying that to achieve socio-economic growth, it is necessary to generate investment policies, which can be done by increasing saving, and secondly using by utilizing investments in a more efficient fashion by technological advances. The conclusion from this model is that full employment and stable growth rates are not a naturally occurring phenomenon in economies, but must be achieved through investments stimulus and savings.

<sup>11</sup> Total production, which is achieved at full employment. In the standard Keynesian theory, there is no explanation as how income growth rate is achieved in balance, because it assumes that employment is a function of national income. Domar therefore assumes that employment is a function of the ratio between national income and production capacity.

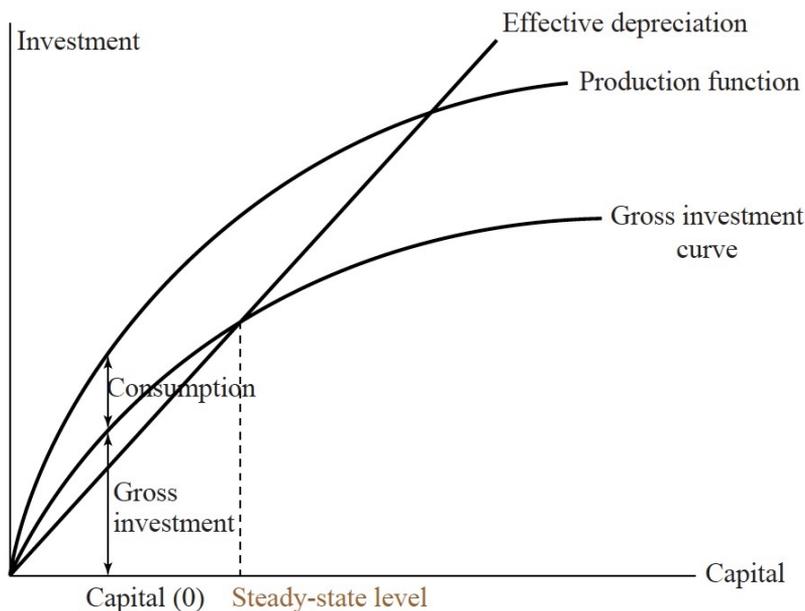
If the real rate of growth exceeds the warranted rate of growth, this leads to higher utilization of production capacity, meaning that more investors are investing and the required efficiency of capital is also higher than it should be, it is therefore higher than the optimum value. Real income growth is increasingly higher and the gap between the two rates is widening. Conversely, if the warranted rate of growth is rate higher than real investments, this leads to pessimism and investors are unwilling to invest further and the required capital efficiency is low. In both cases, we see that the gap between the two rates is widening (Gregory, 2013).

Neoclassical growth theory is based mainly on the pioneering research<sup>12</sup> of Emeritus Professor Robert Solow. According to his model and its variations, done<sup>13</sup> by Professor Gregory Mankiw, David Romer and David Weil, convergence is the only basis for the distinction between developed and less developed countries. These theories allow product growth per worker, only if it increases capital per worker or technologies improve. A prerequisite of these theories, however, is the exogenous progress. For an identical technological progress between countries, the starting point of economic convergence is therefore only the growth of capital per worker, while the mechanism is based on the convergence of diminishing returns on capital. Less developed countries with low capital have higher marginal product of capital, which leads to increased accumulation of capital and faster growth in less developed countries than in developed ones (Menbere, 2015). During less developed country's opening of economy to the world, which occurs in integration process, the convergence process is accelerated and capital flow will be allocated to countries where it is rarer and has higher yields - less developed countries. The higher level of integration, the faster is the convergence-taking place. Furthermore, in the context of neoclassical growth theory, however, it is important to distinguish between different types of convergence. Solow's model does not project convergence in absolute, but conditional convergence, however enhanced neoclassical exogenous Solow-Swan growth model explains the long-run economic convergence growth (seen as a steady-state) by examining capital accumulation (related to investments), labor and population growth, which increase productivity transferred into technological progress, where the curve for gross investment has proportional relationship to the production function, effective depreciation means a straight line from the origin. The steady-state level is therefore driven at the intersection of the gross investment curve.

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<sup>12</sup> A Contribution to the Theory of Economic Growth (1956).

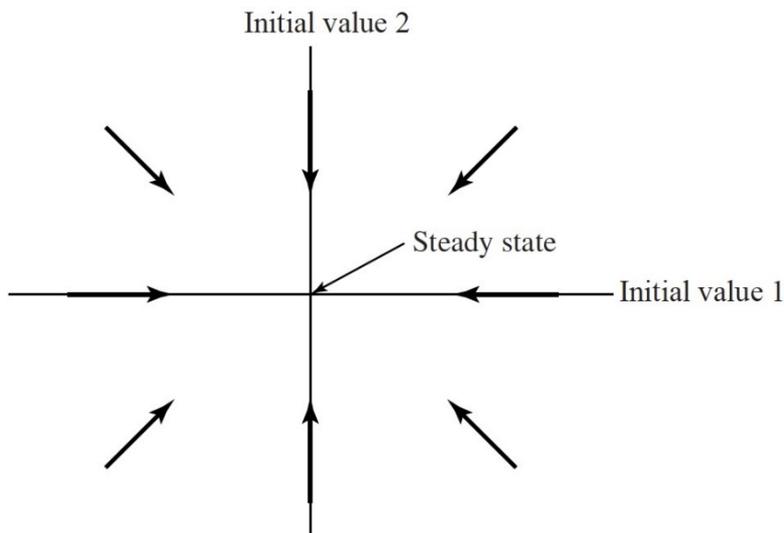
<sup>13</sup> A Contribution to the Empirics of Economic Growth (1992).

**Figure 1** Neoclassical Exogenous Growth Model

Source: Author

The concept of absolute convergence applies if less developed countries grow faster than developed ones and there is a catch-up process. However, studies measuring the speed of convergence<sup>14</sup>, done by Professors William Baumol; Christopher Barry and Robert Jennings; Robert Barro and Xavier Sala-i-Martin, did not confirm a consistent tendency of less developed countries catching up to the developed ones. Additionally, on a positive note, in their studies when they measured less developed countries in a relationship to only a limited group of developed countries, absolute convergence has been demonstrated. It is important to note that these findings have helped to better shape and reformulate theories beyond the standard model of convergence and measurements of theory of absolute convergence to the conditional convergence theory. Conditional convergence does not presuppose convergence in absolute terms, but predicts output growth per worker in an economy further to its level in the steady state. Thus, the rate of growth in the economy decreases as it approaches to its own steady state. Concepts of absolute and conditional convergence may be the same if a select group of countries converges to the same steady state. Various structural properties of countries, such as social preferences, technology, the pace of population growth and government policies, indicate that countries will have different steady states.

<sup>14</sup> Productivity Growth, Convergence, and Welfare: What the Long-Run Data Show (1986); Information and Diversity of Analyst Opinion (1992); Convergence (1992); Technological Diffusion, Convergence, and Growth (1995); The Classical Approach to Convergence Analysis (1996)

**Figure 2** Model of Convergence Steady-state

Source: Author

However, if the test group of countries does not have different structural characteristics<sup>15</sup>, conditional and absolute convergence is the same. In this case, the neoclassical model predicts absolute convergence of less developed countries growing faster than the developed ones. Theory of conditional convergence has in its measurement of the speed of convergence, using the concept of beta convergence, two possible methodological bases. The first alternative is the restriction of choice for those countries for which a presumption of the same structural characteristics is unrealistic and conditional convergence is equal to the absolute convergence. Another option is to add to the general regression equation of beta convergence structural variables as proxy for permanent states. Using these two concepts there was detected the presence of conditional convergence in the United States and Europe. However, measurement of convergence based on neoclassical growth theory also meets with difficulties. Although this approach tests the convergence of standard neoclassical Solow's model, it does not deal with the course of convergence.

Moreover, another issue according to the research<sup>16</sup> of Professors Ron Martin and Peter Sunley is the speed of convergence measured, which is slower than the standard neoclassical model predicts. Furthermore, it shows that the convergence process is not monotonic and that its speed varies over time, nor the deceleration of convergence does not explanation whether exogenous shocks are a special event or whether it is a structural systematic change. To explain these inconsistencies aroused a new theory, called the theory of endogenous growth. The endogenous growth theory has left the assumption of exogenous technological growth and turned away from the assumption of diminishing returns on capital, which in other theories determines the long-term economic growth within the model. Researchers<sup>17</sup> supporting the endogenous growth

<sup>15</sup> It has the same steady states.

<sup>16</sup> Slow Convergence? The New Endogenous Growth Theory and Regional Development (1998).

<sup>17</sup> Increasing Returns and Long-Run Growth (1986); On the Mechanics of Economic Development (1988).

theory, such as Professors Paul Romer and Robert Lucas, have created a model of economic growth, where knowledge is treated as input in the production, which shows growing revenues, while the convergence process is not the only possible result, as in neo-classical models, but also divergence is one of many possible scenarios, based on increasing returns to human capital. Human capital is the main engine of economic growth and the possibility of moving educated people across borders (states) is a cause of divergence of economic integration between the member states of integration groups (Grinin, 2015).

New theories of endogenous growth arose primarily as an effort to modernize the neoclassical growth model, which assumed exogenous technological progress. These theories developed in two directions. In the neoclassical growth model, the concept of capital understood only physical capital in the form of machines used in the production of goods. Revenues from capital amounted to about one third, although in fact the share of capital on the product was higher. New concept of capital itself apart from physical capital also includes human capital, under which we understand certain knowledge and skills acquired by education (Zagler, 2014). If people invest in education, they are thereby postponing their actual - current consumption to increase their future consumption. The second direction<sup>18</sup> of endogenous growth explains the technological advances involving research and development into growth models. Companies located here are in imperfectly competitive environment and make investments in innovation to generate increased revenue. The reward for this is the accumulation of knowledge and higher economic growth. With research and development are also associated externalities. These are mainly positive externalities that arise during research and development in the sense that new ideas will essentially get to other companies, thereby increasing their productivity. However, externalities, there can be negative<sup>19</sup> as well.

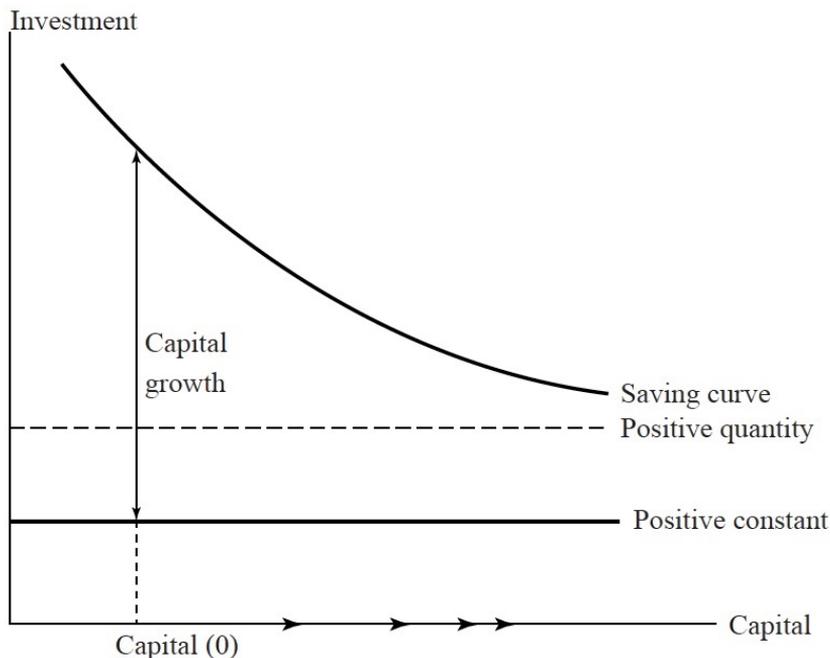
According to endogenous growth, the growth rate of products depends on the amount of savings/investments (growth rate of capital asymptotically approaches a positive constant, while endogenous growth exists hand in hand with a transition, where the growth rate diminishes as the economies - companies develop). So, to achieve a higher growth rate, companies must increase their savings rate. This growth is steady compared to the neoclassical model. In neoclassical growth model, savings rate was taken as an exogenous variable that affected only variable in the steady state, not their rate of growth. On the other hand, according to endogenous growth the speed of convergence of the economies depends on savings/investments, which affect capital rate of growth, and output per worker in the steady state.

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<sup>18</sup> Research and development models.

<sup>19</sup> Appropriability effect (Monopoly profits from a new innovation, there are too few demanded products, while other companies cannot appropriate all consumer surplus), Business stealing effect (New companies ignore loss of profits by incumbents, resulting into too many unwanted – not profitable product), R&D spillover effect (externalities of economic and R&D activity of company x, are positively affecting non-participants – other companies y, but company x is partially losing profits, because companies y also have access to its innovation that are i.e. publicly available).

**Figure 3** Endogenous Growth Model



Source: Author

Convergence is therefore subject to the level of savings/investments that differs among economies, where knowledge is a byproduct of equity investments (Mankiw, 2014). Companies, which increase their physical capital, are at the same time learning how to produce more efficiently. These new skills are also available to other companies, meaning that knowledge is spreading fast through the economy as public good, leading to the accumulation of knowledge throughout the economy. The main objective of endogenous growth models is to explain why companies are investing in new knowledge and innovation. Driving force of innovators is naturally profit. Companies are trying to differentiate their products from other companies, at least for a certain period to benefit from this difference, often investing heavily into R&D, thus significantly reduce costs in the future. Innovation and knowledge have different properties than the conventional economic goods. One of its features is that they are noncompetitive, which means that knowledge can be used without restriction by anyone who knows about them. Another important feature of innovation and knowledge is their, at least temporarily, excluded of consumption. Temporary in the sense that an innovative company can keep this innovation, at least for some time patentable. If innovation and knowledge would not be excludable, companies would likely not invest so much into research, development and innovation.

## Conclusions and policy implications

In modern societies, a great importance is given to globalization, which results in socio-economic convergence progress observed through societies. Diversity at national and regional entities is given historically, but because of the natural processes of market forces over time, centers of development often shift. Economies in their historical development of society naturally go through certain phases of socio-economic development, where the last stage represents a steady state, while it is essentially convergence that leads to further reduction of disparities between economies. As we have analyzed, compared and illustrated in our research paper, convergence means that poorer and less developed economies grow faster than richer, more developed ones and socio-economic inequality between them should therefore shrink. Conversely, divergence of economies logically implies to widening of global inequality, thus there is an inverse relationship between the two phenomena, since differences in socio-economic level between economies have always existed and they will continue to exist. The main factor positively affecting the long-term growth is the openness of economies. The higher is the sum of imports and exports, the higher is the economic growth, leading to less inequality between economies. Mainly new technologies, foreign direct and domestic investments and innovations play a key role towards increasing productivity in the whole economy. To achieve socio-economic convergence towards developed economies, investments into infrastructure, research and development, education are necessary to have skilled and educated population that can benefit from new technologies and work with them. However, the problem is the high prices of capital goods in less developed economies are forcing them to invest in low-quality technologies, leading internal and external inequality affecting regions of a country, individuals and disparities between economies.

If we want to understand why there are different standards of living between countries and regions, it is necessary to first understand why countries face large differences in long-term rate of socio-economic growth, meaning that if a country is for example not open to international trade, it is thereby preventing the migration of labor, capital flows and inflows of new technologies and products. This is a phenomenon where highly educated people do not stay in their native country and decide to leave for better opportunities in wealthier countries. However, by opening to international trade, it can acquire new technologies that increase the productivity and output. Precisely human knowledge and their practical use is the key to convergence, leading to discovery of new and better technologies that increase productivity in various sectors and in the whole economy, which can become more competitive. Innovations essentially allow improve production, thus allowing produce a greater amount of output with the same number of input. These new skills are embodied in technological progress, which is one of the main sources of socio-economic convergence growth. Neoclassical and endogenous theories have different views on the mechanism and processes of real convergence, consisting of different assumptions about the behavior of returns on capital. Therefore, policy recommendations also differ, whereas in the neoclassical model, conditional convergence is in integration units automated and policy measures are needed, while in the endogenous models, convergence may not occur and policies have an impact throughout the political incentives they can stimulate the accumulation of capital and thereby foster growth, hence convergence.

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