

ASSESSING PRO-POOR GROWTH IN THE EUROPEAN EXPANSION COUNTRIES IN THE LIGHT OF THE CONVERGENCE CRITERIA

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ABSTRACT

Economic growth is an important factor in poverty reduction. Usually, different societal groups differ in benefiting from growth, and the optimum situation is with the pro-poor growth. This paper is an attempt to determine whether growth in European expansion countries was pro-poor during the period 2006-2018 when convergence criteria imposed by the Maastricht Treaty. This research gets its importance from the fact that it discusses the pro-poverty growth in an area and international economic prospective that have not been previously addressed, and it uses the inductive method to reach its objectives. The paper concluded that growth was pro-poor in (Poland, Malta, Czech, Latvia, Romania, Estonia), while it was not pro-poor in (Cyprus, Bulgaria, Hungary, Slovenia, Slovakia, Lithuania). The paper also concluded that the expanding countries that were able to quickly adapt to convergence criteria achieved pro-poor growth regardless of their income levels.

KEYWORDS: Pro-Poor Growth, European Union, Effective Economic Growth, Convergence criteria, European Expansion Countries

1. INTRODUCTION

The problem of poverty remains a worrying concern for all countries and economic systems because it affects the existence, dignity, and happiness of humanity. Several pieces of research were done in an attempt to determine the dimensions of the problem and the possible mechanisms for dealing with it. Regardless of the multiplicity of alternatives, balanced and sustainable growth remains the ideal tool to alleviate poverty and reduce its negative effects. However, sustainable growth is a complicated process and it is subject to many determinants, which change according to the place, time, and stage of the economy. In this regard, the world witnessed many experiences of economic growth, through which countries were able to move to advanced economic levels that enabled them to emerge from the poverty episodes that surrounded them. Despite the success of some experiences of economic growth in some countries, these experiences were marred by weaknesses represented in the inability to maintain high levels of growth for long periods, or that the

growth was not with a degree of inclusiveness that improves the chances of the poorest classes in society.

The economic theory has indicated, in a previous period, the possibility of emerging of cases of imbalance in growth, especially at the beginning of the development process, given the need of the economy in its early stages of development for the capital accumulation necessary supply and sustain accelerated growth. This crucified acceleration is achieved only through the differentiation between incomes and the standard of living of individuals.

This paper is an attempt to evaluate the extent to which the economic growth in European expansion countries affects the poor segments of these countries in light of these countries' commitment to the criteria of monetary and financial convergence and the true convergence imposed by the Maastricht Treaty. Article 121 of which deals with determining the mechanisms and conditions for monetary and financial convergence of the countries joining the union. Therefore, this research chose the period of 2006-2018 to conduct the study, because this period marks the beginning of the true

integration of these countries into the common currency area.

Poverty-friendly growth is a common term since the Human Development Report 2000 related to poverty (World Bank, 1990). However, the beginnings of the topic have historical dimensions related to the theories of economic growth theories. Concerning the countries of expansion in the European Union, many studies that attempted to discuss the issue of pro-poverty growth, incompletely or partly. Here we can refer to a study (El Ouardighi & Somun-Kapetanovic 2010) through which the researchers tried to discuss to what extent the economic growth was pro-poor in the Balkan countries for the period 1989-2005. The study concluded that, although the economic reforms in these countries were positive, the economic growth was not pro-poorness, and that there was a case of poor distribution of income. The study also showed that growth was pro-poor in both Croatia and Bosnia for the period 1996-2005.

In 2011, Brzezinski, presented a study entitled (Pro-poorness of economic growth in Poland: contrasting cross-sectional and longitudinal approach), (Brzezinski 2011). Through this paper, Brzezinski tried to measure the extent of pro-poorness of growth in Poland during the period (2005-2008). The study showed that the economic growth in Poland achieved high rates of economic growth during this period, and the statistical indicators showed that the growth was pro-poor in the absolute and relative sense and for the cross and long sections.

In 2018, Haidar and Muhannad presented a paper under the title "The impact of financial convergence in the economic growth rates of the expansion countries in the euro area". The research studied the changes occurred in the growth rates of the countries of convergence in the European Union, which applied the standards of the Maastricht Treaty of Financial Convergence. The paper found that before the global financial crisis, the effects of convergence standards were mostly positive on growth in these countries.

The new contribution of this study, which gave it a specificity that differentiates it from the above research, is that it tries to answer two important questions. The first question does the application of the European Union expansion countries to the convergence criteria made growth in these countries pro-poor? and did the

level of income in these countries have any impact on Making growth in these countries pro-poor?

2. CONVERGENCE CRITERIA IN EUROPEAN EXPANSION COUNTRIES FOR THE PERIOD 2006-2015

The concept of convergence is based on the neoclassical literature that sees that the least developed countries can witness accelerated growth at rates greater than what exists in developed countries. This neoclassical vision is based on the idea that if action is taken to develop a shortage of capital, a decline in productivity, and a decline in levels of knowledge it will provide scope for the fastest development in developing countries (see Solow, 1956, Romer 1990 and Barro 1991).

The number of European Union countries has reached 28, after entering Poland and Romania in 2007 and Croatia after six years from this date⁽¹⁾. The largest expansion in the history of the European Union was in 2004 (the fifth expansion) when ten countries entered the union, eight of which were within the former socialist camp. Thus, the term (European expansion countries) often refers to the fifth expansion countries, which are bound within the Maastricht Treaty to a set of criteria for economic convergence. These standards are enforceable and constitute the ideal tool through which to achieve economic efficiency that forms the basis for economic progress and to ensure sustainable growth and real convergence within the European vision (Hayder et al, 2018, 4640). In the period 2006-2018, European expansion countries adhered to the criteria of monetary and financial convergence within the Maastricht Treaty at various levels, which resulted in some countries achieving greater progress in real convergence with better proportions than others (Neven, and Gouymte, 1995, 47-65).

Figure 1, shows the trend of convergence in the European Union, by taking the coefficient of variation of the average per capita income series based on the level of purchasing power (The income per capita at purchasing power standards PPS) for the different groups of European Union countries. We notice from the figure that the direction of the coefficient of variation for countries (EA12)⁽²⁾ and (EA15)⁽³⁾ was descending during the period 1960-2018. This means that there is a convergence in the levels of

incomes in these countries because a decrease in the coefficient of difference means that the dispersion of income values in these countries is declining, meaning that there is a real economic convergence between them. After 2004, the coefficient of variation took an upward trend until 2012, meaning that a state of non-convergence (divergence) dominated during this

period, and the reason for that is due to the crisis that affected the euro as well as the effects of the global financial crisis. As we note in this context that the rise in the coefficient of variation has increased in severity from 2008. As for the period after 2012, there has been a trend towards a decrease in the coefficient of variation, that is, the return to convergence again.

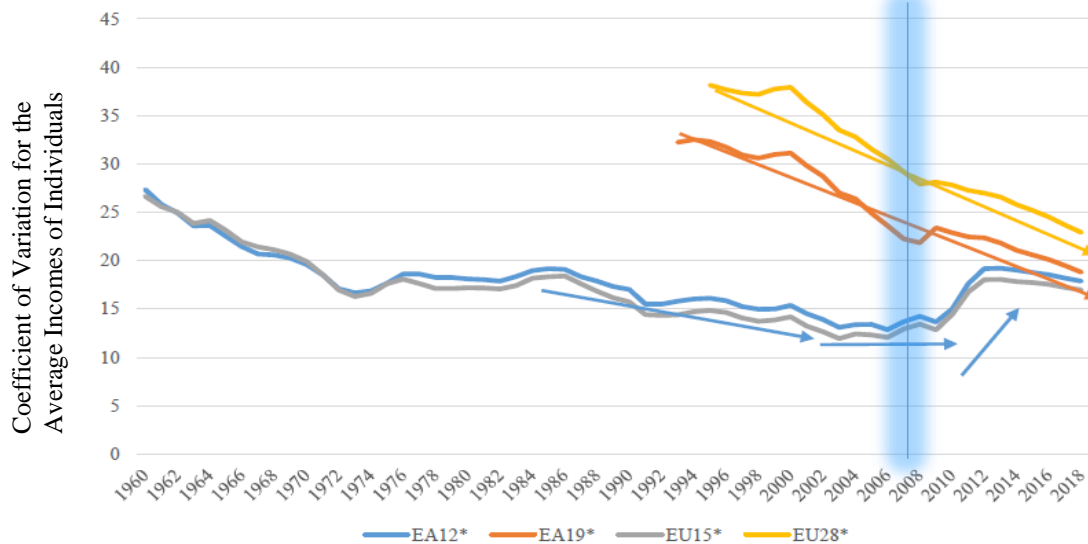


Fig. (1):-Coefficient of variation of GDP per Capita at PPS

Source: Gros, D., (2018), "Convergence in the European Union: Inside and Outside the Euro", *Informal meeting of Economic and Financial Affairs Ministers Sofia*.

For the groups (EA19)⁽⁴⁾ and (EA28)⁽⁵⁾, we notice that the general trend of the difference coefficient for the period 1994-2008 was descending. This means the continuation of the real convergence between them. However, the period of the financial crisis changed this path towards non-convergence (divergence). Then again and slowly, it returned to the converging trend since 2010. As noted from figure 1, the application of the Maastricht Treaty standards for financial and monetary convergence in 2004 contributed greatly to activating convergence in the Union in general due to the high commitment of countries to these standards in the early years of the application of the treaty.

The coefficient β indicator is the most used to measure the convergence between countries and expresses a relationship between the change in per capita real GDP and the first level of per capita GDP. According to this indicator, convergence is achieved whenever less developed countries can achieve higher levels of growth than

their developed counterparts are. Here, if the value of β is negative, then the index is compatible with the convergence hypothesis, which says that the high initial per capita income rate leads to a decline in per capita income growth rates in the next period and vice versa. This means that a lower primary income rate leads to higher individual income growth rates later (Yin 2003 and Barro 1992). Table (1) shows the results of this indicator for the different groups of the European Union countries for the period 2004-2018. We note that the coefficient β was not significant in (EA12) and (EA19) during the period 2004-2018. This means that there is a non-convergence in the groups of these countries, due to the global financial crisis and the euro crisis, followed by the Greek crisis. All of this has led to a decline in real convergence between these countries from what it was in the last three decades of the previous millennium.

Table(1):- Coefficient β for Convergence in European Union countries for the Period 2004-2018.

2004-2018	β	R2
EA-12 (excl. Luxembourg) *	(6.21)	0.27
EA-19 (excl. Luxembourg) *	(4.87)	0.31
memo: EU-28 (excl. Luxembourg) *	(-5.11) **	0.59

Source: Prepared by the researcher based on data of the annual report 2018 and the convergence report 2018 of the European Central Bank.

** at the 5% level of significance.

* Luxembourg excluded due to incomplete data.

As for the group of countries of the EU28, the coefficient β was significant and with a negative signal as evidence of a convergence between these countries during the mentioned period. Perhaps the reason for this is mainly related to the (NMS11) ⁽⁶⁾group of countries, which, most of them were able to achieve growth in individuals' income rates taking advantage of the freedom of movement of production factors within the union, despite having to adhere to the strict monetary and financial convergence standards of the Maastricht Treaty. On the other hand, the NMS11 group of countries includes the poorest countries in the Union, which are supposed to be able, through raising economic efficiency, to achieve higher growth rates in the Union, and this pushes towards promoting convergence.

3. DEFINITION AND METHOD OF MEASURING PRO-POOR GROWTH IN EUROPEAN EXPANSION COUNTRIES

There are several methods of measuring pro-poor growth, but there are two methods are imported than others. The first one depends on poverty indicator, while the second

one depends on income distribution indicators. Generally, as indicated by specialized researchers, the nature of the definition of pro-poor growth determines the method of measuring pro-poor growth (Baulch & McCulloch 2000, Kakwani & Pernia 2000, and Son 2003). This research is based on the definition that states that pro-poor growth is a growth that benefits poor people more than rich people, or it is negative growth in which the losses of poor people are relatively less than rich people are. This definition is derived from the (Son and Kakwani 2006) model, which depends on changes in the spending of different societal groups and which works to move the Lorenz

curve upward towards an equal distribution line or downward away from this line. The model of (Son and Kakwani) depends on the following formula to measure the pro-poor growth:

$$\gamma^* = \gamma - \Delta(G^*)$$

Whereas,

γ represents the rate of growth in the average income of a society,

γ^* represents the rate of growth in the average income of the poorest segment of society,

G^* represents an indication of income inequality that can be obtained through a special formula.

Taking in consideration the above model, to know whether the economic growth in European expansion countries is pro-poor or not, it is necessary to obtain data on the development of average per capita income. Data should also be obtained on the development of the share of different societal segments of the national income, and the development of the Gini coefficient (can be obtained from the World Bank data and Eurostat data for the period 2006-2015).

According to the (Son and Kakwani) model, it is necessary to extract the effective growth rate, which is reached by obtaining the compound growth rate of the average income for each income group during the study period. This average represents the effective growth rate that is compared to the real growth rate of the average per capita income in a society. Here, if the effective growth rate is greater than the real growth rate, then the growth here is pro-poor. If the opposite occurs and the real growth rate is higher than the effective growth rate, then growth, in this case, is not pro-poor.

3.1. Analysis of Average Income Trends in European Expansion Countries.

The European expansion countries had different growth rates in the average per capita income during the period 2006-2015. It is worth noting that this period witnessed two important events for these countries, the first is the economic convergence programs and its requirements that these countries were obligated

to implement. The second is the global financial crisis of 2008-2009, which had negative repercussions on the economies of these countries. In general, as shown in Appendix No. (2), the highest average income was (\$22,990) achieved by Slovenia, followed by the Czech Republic, while the lowest income level was recorded in Bulgaria (\$7450), followed by Romania.

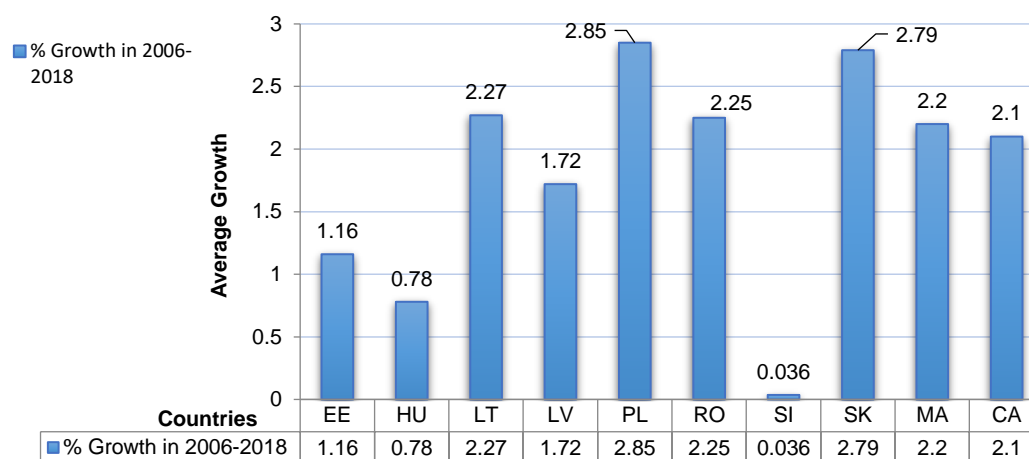


Fig. (2):- Average Compound Growth in European Expansion Countries for the period 2006-2018

Source: Prepared by the researcher by depending on the Annual Macro-economic database (AMECO) of the European Commission and ECB.

As for the compound growth rate, we notice from Figure 2, that the most developed country was Poland, which recorded a rate of 2.85% during the period 2006-2018, as the average per capita income moved from \$ 10900 in 2006 to \$14,100 in 2015. In addition, Poland witnessed the highest growth rate in the average per capita income of 6% in 2008, while the lowest rate of growth was recorded at 1.47% in 2009 due to the global financial crisis.

Turning to the countries of European expansion that have the least growth in per capita income. We notice from Figure 2, that Slovenia has the least growth with a compound growth rate of 0.036%, as its per capita income moved from \$22,910 to \$22,990 during the period 2006-2018. Even though Slovenia has the highest per capita income rate among European expansion countries, and it is considered one of the high-income countries in the European Union and the world, but this indicates that its growth rates were limited. This country achieved negative growth in four years of the study period, the worst of which was in 2009, during

the global financial crisis, as growth recorded (-7.76%).

On the other hand, we can notice that there are five countries achieved growth rates exceeding 2%, and only two countries grew by less than 1% during the study period. This also demonstrates that low-income countries have had higher rates of growth than their high-income counterparts have, which means that the benefit of joining the union was uneven. In general, the growth rates of all countries of the Union have been affected by the global financial crisis.

3.2. Evolution of Population Segments Shares of Income in European Expansion Countries for the Period 2006-2018.

The income shares of different society segments in the European expansion countries had a clear development during the period 2006-2018. The economic openness with other European countries, the freedom of movement of the factors of production helped to increase the ability of individuals to improve their living standards and to improve their choices at

different levels according to the economic situation of the country and the level of the knowledge of the population. Table 2 shows the

evolution of the people's share of income, according to their income brackets.

Table(2):- The Share of Population Segments in Income in European Expansion Countries

Countries	Years	Population Segments				
		Richest 20%	Fourth poorest 20%	Third poorest 20%	Second poorest 20%	Poorest 20%
Estonia	2006	41.7	21.9	16.3	12.6	7.6
	2018	40.4	23.2	16.4	12.5	7.6
Poland	2006	41.5	22.2	16.3	12.1	7.8
	2018	39.5	22.4	16.8	12.8	8.5
Romania	2006	43.3	23.2	16.6	11.4	5.5
	2018	40.7	24.7	17.7	11.8	5.1
Latvia	2006	42.6	22.8	16	11.7	6.8
	2018	41.5	22.8	16.4	12.3	7.1
Lithuania	2006	42	22.1	16.5	12.5	6.9
	2018	44.1	22.1	15.9	11.6	6.1
Czech	2006	36.5	21.9	17.8	14.5	9.3
	2018	35.9	21.9	17.8	14.7	9.7
Slovakia	2006	35.5	22.1	18.3	14.8	9.3
	2018	35	23.2	18.7	14.6	8.5
Slovenia	2006	34.4	22.7	18.2	14.7	10
	2018	35.1	22.6	18.2	14.5	9.6
Hungary	2006	37.1	22.6	17.8	13.8	8.7
	2018	38.4	22.9	17.6	13.3	7.8
Bulgaria	2006	43	22.3	16.3	11.9	6.5
	2018	43.9	22.1	16.2	11.8	6
Malta	2006	37.5	23.1	17.7	13.4	8.2
	2018	38.1	22.5	17.5	13.4	8.5
Cyprus	2006	40.1	21.6	16.7	12.8	8.8
	2018	42.1	21.7	16.2	12.1	7.9

Source: Prepared by the researcher by depending on the Annual Macro-economic database (AMECO) of the European Commission and ECB.

We note from the table that the highest rate of change in the income of the poorest 20% of the population was recorded by Poland, as the share of this segment's income moved from 7.8% in 2006 to 8.5% in 2018, an increase by (0.7%). While we note that there is a decline in the share of this segment's income in six countries, namely (Romania, Lithuania, Slovakia, Slovenia, Hungary, Bulgaria, Cyprus) and that the highest decline was by (0.9%) in Hungary and Cyprus. Generally, the percentage of change in this segment income is between (5-10%) for all countries of the sample and Estonia has the highest percentage, while the lowest percentage was in Romania.

Concerning the 20% richest segment, we notice from the table (2) that the percentage of what they get ranged between (35-44%) for all countries. Lithuania had the largest income for this segment among the sample countries of the study, while the lowest percentage was in Slovakia. Lithuania had the highest rate of change in the share of this segment of income, which moved from 42% in 2006 to 44.1% in 2018, an increase of (2.1%), while the highest

level of decline was in Romania, where the rate of decline was by (2.6%). So, it is clear that what the richest segment gets increased in six countries (Lithuania, Slovenia, Hungary, Bulgaria, Malta, Cyprus), and decreased in the remaining countries.

Turning to the second poorest 20% segment, we note that the income of this segment fluctuated between 11.5% and 14.8%, meaning that its changes remained within the rate of (3.3%), which is less than the previous two segments. The Czech had the highest rate for this segment, while Lithuania has the lowest rate.

As for the income of the middle class (third poorest 20% segment), we notice that it has changed within (15.9-18.7%) for all countries, that is, at a rate that did not exceed (2.8%), which is less than the previous three segments. This is a normal case in most countries, because this segment is not one of the targeted segments, either in terms of support or in tax pressure. The best percentage of income in this segment was in Slovakia, while the lowest was in Lithuania. Turning to the closest segment to the wealthy segment (the fourth poorest 20%), we notice that

its income percentage is between (21.7% and 24.7%), at a change rate of (3%) which is higher than the middle class is. The best income for this segment was in Romania, and the lowest was for Cyprus.

Generally, the trend of change in the shares of different society segment incomes indicates that the highest fluctuation was among the

richest class, followed by the poorest, then the second poorest, then the fourth poorest, and finally the middle segment. This situation is normal in most countries of the world whose economic policies often target the poorest classes for their recovery and the wealthy classes to obtain resources from them.

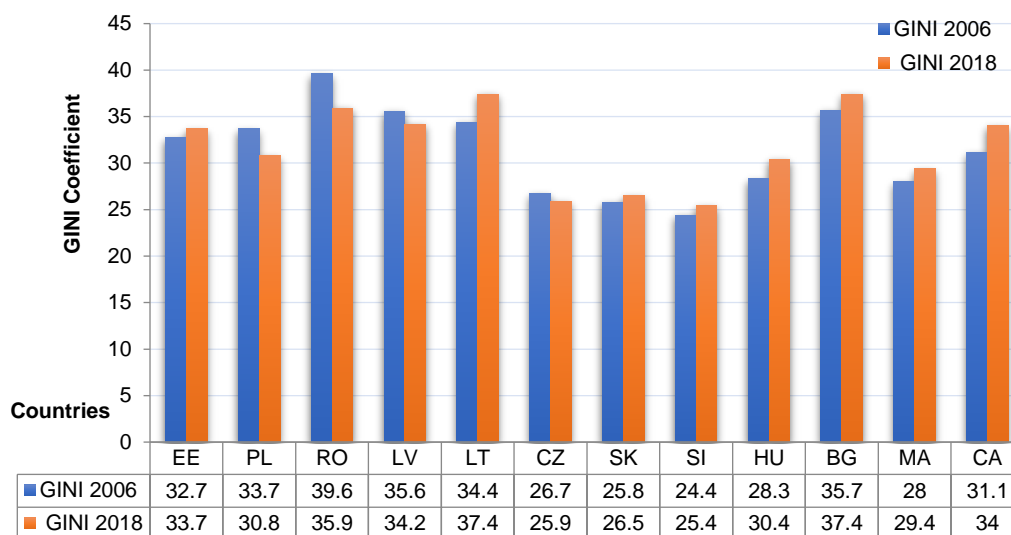


Fig. (2) :- GINI Coefficient in Expansion Countries for Years 2006, 2018

Source: Prepared by the researcher by depending on the Annual Macro-economic database (AMECO) of the European Commission and ECB.

By taking Table 2's data in consideration, we can get a better picture of the changes in income distribution in European expansion countries the Gini coefficient. While figure 3 shows the evolution of the Gini coefficient in the mentioned countries for the period 2006-2018.

The figure shows that the highest Gini coefficient in 2006 was in Romania (39.6%), while the lowest level for the same year was in Slovenia (24.4%), which is one of the lowest global rates. While In 2018, the highest rate for this indicator was in Bulgaria (37.4%), followed by Romania (35.9%), and this indicator remained high in Romania as an expression of the bad distribution of income, even though Romania achieved the third best compound income growth rate (2.25%) in European expansion countries during the study period. While Slovenia continued to achieve the optimum distribution of income among the study sample countries in 2018, as the Gini coefficient in it reached (25.4%), an increase of 1% over the year 2006. Although Slovenia has the highest average per capita income in expansion countries (\$ 23,000 annually), the compound

growth rate of per capita income in Slovenia was the lowest among the sample countries during the study period (0.36%). Slovakia and the Czech Republic also achieved the second and third lowest Gini coefficients in two years. These two countries have a rather high per capita income rate, as they outperform six of the sample countries in this field. Also, Bulgaria and Romania, (the two countries with the lowest per capita income), continued to have a high Gini coefficient as an expression of poor income distribution despite achieving high compound growth rates compared to other countries during the study period.

In general, the limits of the Gini coefficient in European expansion countries now range between (25.4% and 37.4%). This indicates the widening income gap and income distribution between these countries and this certainly make the process of convergence difficult.

3.3. Calculating the Effective Rate of Growth and Determining the Extent of pro-poorness of growth

In this paragraph, we try to estimate the effective growth rate in each country according

to the model (Son and Kakwani). This rate is calculated by taking the average of the effective growth rates for the different income brackets during a given period. After determining the effective growth rate, it will be compared with the actual growth rate in the income per capita for the same period. Here, if the effective growth rate is greater than the actual growth rate, we conclude that the growth in this country is pro-poor because it helps the growth of the income of the society brackets, especially the low-income ones. This means that the Lorenz curve is approaching the equality line and this will lead to a decrease in the Gini coefficient as an expression of the improvement in the level of the income distribution. Certainly, this reversal will be towards raising the standard of living of the poor classes of society.

The researchers measure the effective growth rate of per capita income and compare it with the actual growth rate of income per capita in each country separately. Then, they show the extent of pro-poorness of growth, as shown in appendices (1-12), which are summarized in Table 3.

From this table, we note that the highest rate of effective growth was in Poland (3.12%). Besides, the highest actual growth rate was in Poland (2.85%). The result is that growth in this country was Pro-poor, as the three poorest income sectors achieved a relative growth in their income, exceeded (3%) during the study period. Likewise, the income of the two richest segments grew at a rate greater than (2%), as shown in Appendix (2). This means that under the European Union and the criteria for convergence, Poland is moving towards true convergence. Romania, Malta, Latvia, and

Estonia followed Poland in achieving pro-poor growth based on relatively better real growth rates compared to other countries.

As for the lowest effective income growth rate for the income classes, it was recorded in Slovenia, which was negative (-0.041%). This means a decrease in the percentage of what the income classes receive, especially the poorer ones, as shown in Appendix (8), as the effective income ratios of all segments declined, except the richest segment, which grew at a very simple rate. This means that growth in Slovenia was not favorable for poverty. It is clear the repercussions of the very low actual growth that this country achieved during the study period, although it has the highest average of income per capita among the European expansion countries. Additionally, there are structural and administrative imbalances in the Slovenian economy that made the economic openness and convergence criteria result in counterproductive results on the economy of the country. Here, we can also refer to that, the growth in Lithuania, Slovakia, Bulgaria, and Cyprus, was not pro-poor, although these countries achieved good rates of actual and effective growth. This brings us back to Kuzantes' theory of growth and income distribution, which confirms that the stage of development in which the economy is going through has an effective role in distributing the benefits of growth, which is not in the interest of the poor classes at the early stages (Kuzantes, 1955, 7).

In general, Table (3) indicates that six of the European expansion countries achieved pro-poor growth, and in contrast, six other countries whose growth was not pro-poor.

Table (3):-The Nature of Economic Growth of European Expansion Countries to Period (2006-20018).

Countries	Actual Growth Rate (PC) %	Effective Growth Rate %	Profit and loss in growth %	Nature of growth
Estonia	1.16	1.55	0.39	pro-poor
Poland	2.85	3.12	0.27	pro-poor
Romania	2.25	2.31	0.06	pro-poor
Latvia	1.72	1.9	0.18	pro-poor
Lithuania	2.71	2.37	- 0.34	Non pro-poor
Czech	1	1.1	0.1	pro-poor
Slovakia	2.79	2.69	- 0.1	Non pro-poor
Slovenia	0.037	-0.041	- 0.078	Non pro-poor
Hungary	0.78	0.56	- 0.22	Non pro-poor
Bulgaria	2.35	2.14	- 0.21	Non pro-poor
Malta	2.21	2.24	0.03	pro-poor
Cyprus	2.1	1.79	- 0.31	Non pro-poor

Source: Prepared by the researcher by depending on the Annual Macro-economic database (AMECO) of the European Commission and ECB.

4. CONCLUSION

Since 2004, European expansion countries have started to apply the criteria of monetary and financial convergence, to achieve true convergence imposed by the Maastricht Treaty. Despite the decline in the level of commitment of most of these countries during the global financial crisis, they returned to the path of convergence after the decline of the crisis. Experience in this area has shown that the convergence path of the period 2006-2018 in the European Union is better with the presence of the expansion countries (EU28 countries), while it was less significant among the former European countries (EU12). This is because most expansion countries were able to achieve convergence to a certain degree from each other or with the most developed and oldest countries in the union. To reach this degree of convergence, the European expansion countries made great sacrifices, part of which is related to their sovereignty and economic independence. Given that most of the expansion countries are poor countries in Europe compared to their previous counterparts in the Union, it was expected that they would face many difficulties in applying the convergence criteria. This is what happened and led to varying levels of commitment among them. Some expansion countries managed to achieve real gains from this convergence, while the gains were negligible for others (some of them have remained in place).

The study concluded that a country such as Poland, which is one of the lowest-income countries; their distinguished growth under the criteria of convergence was pro-poor, followed by Romania, Malta, Latvia, Estonia, and Slovakia. While growth in Lithuania, Slovakia, Bulgaria, Cyprus, Hungary, and Slovenia, which was under the same criteria of convergence too, was not pro-poor, despite some of these countries, such as Slovenia has the largest income per capita among expansion countries. The issue is not related to the income level of the state so that the state can convert convergence criteria to a tool to ensure that the growth is linked to a better distribution of income. Nevertheless, it is related to the ability of the state to adapt and restructure the economy while ensuring that convergence constraints are converted into a support tool for the economy. The limits of the Gini coefficient in European

expansion countries now range between (25.4% and 37.4%). This indicates the widening income gap and income distribution between these countries and this certainly make the process of convergence is difficult.

FOOTNOTE

(1) After Britain leaves the Union, the number of European Union countries becomes 27.

(2) includes: Austria (AT), Belgium (BE), Finland (FI), France (FR), Germany (DE), Ireland (IE), Italy (IT), Luxembourg (LU), Netherlands (NL), Portugal (PT), Spain (ES), Greece (EL).

(3) includes: EA12+Slovenia (SI), Cyprus (CY) and Malta (MT).

(4) includes: EA15+ Slovakia (SK)+ Estonia (EE)+ Latvia (LV)+ Lithuania (LT)

(5) includest: The 28 European countries that are part of the EU

(6) NMS11 includes: Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic and Slovenia.

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Appendix (1):-Effective Growth Rate in Estonia.

Population Segments	Income Ratio 2007	Income (PC) 2007	Income Ratio 2018	Income (PC) 2018	The growth rate of Segment Income
Poorest 20%	7.6	5882.78	7.6	6826.7	0.014992
Second poorest 20%	12.6	9753.03	12.5	11228.13	0.014184
Third poorest 20%	16.3	12617	16.4	14731.3	0.015613
Fourth poorest 20%	21.9	16951.7	23.2	20839.4	0.020862
Richest 20%	41.7	32277.9	40.4	36289.3	0.011783
	0.015487059				Effective Growth Rate
	0.011626223				Actual Growth Rate

Source: Prepared by researchers based on the data of the annual report 2018 and the convergence report 2018 of the European Central Bank.

Appendix (2):- Effective Growth in Poland.

Population Segments	Income Ratio 2007	Income (PC) 2007	Income Ratio 2018	Income (PC) 2018	The growth rate of Segment Income
Poorest 20%	7.8	4267.77	8.5	6161.225	0.037401
Second poorest 20%	12.1	6620.52	12.8	9278.08	0.034324
Third poorest 20%	16.3	8918.55	16.8	12177.48	0.031636
Fourth poorest 20%	22.2	12146.7	22.4	16236.64	0.029446
Richest 20%	41.5	22706.7	39.5	28631.58	0.023456
	0.031253				Effective Growth Rate
	0.028523				Actual Growth Rate

Source: Prepared by researchers based on the data of the annual report 2018 and the convergence report 2018 of the European Central Bank.

Appendix (3) :- Effective Growth in Romania.

Population Segments	Income Ratio 2007	Income (PC) 2007	Income Ratio 2018	Income (PC) 2018	The growth rate of Segment Income
Poorest 20%	5.5	2131.25	5.1	2415.105	0.01399
Second poorest 20%	11.4	4417.5	11.8	5587.89	0.026458
Third poorest 20%	16.6	6432.5	17.7	8381.835	0.029848
Fourth poorest 20%	23.2	8990	24.7	11696.69	0.029675
Richest 20%	43.3	16778.8	40.7	19273.49	0.015521
	0.023099				Effective Growth Rate
	0.022533				Actual Growth Rate

Source: Prepared by researchers based on the data of the annual report 2018 and the convergence report 2018 of the European Central Bank.

Appendix (4):- Calculate of Effective Growth in Latvia.

Population Segments	Income Ratio 2007	Income (PC) 2007	Income Ratio 2018	Income (PC) 2018	The growth rate of Segment Income
Poorest 20%	6.8	4073.2	7.1	5042.42	0.021575
Second poorest 20%	11.7	7008.3	12.3	8735.46	0.022274
Third poorest 20%	16	9584	16.4	11647.28	0.019689
Fourth poorest 20%	22.8	13657.2	22.8	16192.56	0.017174
Richest 20%	42.6	25517.4	41.5	29473.3	0.014517
					0.019046
					Effective Growth Rate
					0.017174
					Actual Growth Rate

Source: Prepared by researchers based on the data of the annual report 2018 and the convergence report 2018 of the European Central Bank.

Appendix (5) :-Calculate of Effective Growth in Lithuania.

Population Segments	Income Ratio 2006	Income (PC) 2006	Income Ratio 2018	Income (PC) 2018	The growth rate of Segment Income
Poorest 20%	6.9	3880.56	6.1	4498.445	0.014885
Second poorest 20%	12.5	7030	11.6	8554.42	0.01982
Third poorest 20%	16.5	9279.6	15.9	11725.46	0.02367
Fourth poorest 20%	22.1	12429	22.1	16297.65	0.027469
Richest 20%	42	23620.8	44.1	32521.55	0.032494
					0.023668
					Effective Growth Rate
					0.027141
					Actual Growth Rate

Source: Prepared by researchers based on the data of the annual report 2018 and the convergence report 2018 of the European Central Bank.

Appendix (6):- Calculate of Effective Growth in Czech.

Population Segments	Income Ratio 2006	Income (PC) 2006	Income Ratio 2018	Income (PC) 2018	The growth rate of Segment Income
Poorest 20%	9.3	8381.16	9.7	9664.595	0.01435
Second poorest 20%	14.5	13067.4	14.7	14646.35	0.011472
Third poorest 20%	17.8	16041.4	17.8	17735.03	0.010088
Fourth poorest 20%	21.9	19736.3	21.9	21820.07	0.010088
Richest 20%	36.5	32893.8	35.9	35768.97	0.008415
					0.010883
					Effective Growth Rate
					0.010088
					Actual Growth Rate

Source: Prepared by researchers based on the data of the annual report 2018 and the convergence report 2018 of the European Central Bank.

Appendix (7):- Calculate Effective Growth in Slovakia.

Population Segments	Income Ratio 2006	Income (PC) 2006	Income Ratio 2018	Income (PC) 2018	The growth rate of Segment Income
Poorest 20%	9.3	6455.13	8.5	7769	0.018699
Second poorest 20%	14.8	10272.7	14.6	13344.4	0.026506
Third poorest 20%	18.3	12702	18.7	17091.8	0.030129
Fourth poorest 20%	22.1	15339.6	23.2	21204.8	0.032909
Richest 20%	35.5	24640.6	35	31990	0.026447
		0.026938			Effective Growth Rate
		0.027904			Actual Growth Rate

Source: Prepared by researchers based on the data of the annual report 2018 and the convergence report 2018 of the European Central Bank.

Appendix (8):- Calculate Effective Growth in Slovenia.

Population Segments	Income Ratio 2006	Income (PC) 2006	Income Ratio 2018	Income (PC) 2018	The growth rate of Segment Income
Poorest 20%	10	11453.5	9.6	11035.68	-0.00371
Second poorest 20%	14.7	16836.6	14.5	16668.48	-0.001
Third poorest 20%	18.2	20845.4	18.2	20921.81	0.000366
Fourth poorest 20%	22.7	25999.4	22.6	25979.83	-7.55
Richest 20%	34.4	39400	35.1	40349.21	0.002383
		-0.00041			Effective Growth Rate
		0.000366			Actual Growth Rate

Source: Prepared by researchers based on the data of the annual report 2018 and the convergence report 2018 of the European Central Bank.

Appendix (9):- Calculate Effective Growth in Hungary.

Population Segments	Income Ratio 2006	Income (PC) 2006	Income Ratio 2018	Income (PC) 2018	The growth rate of Segment Income
Poorest 20%	8.7	5637.17	7.8	5464.29	-0.00311
Second poorest 20%	13.8	8941.71	13.3	9317.315	0.004123
Third poorest 20%	17.8	11533.5	17.6	12329.68	0.006698
Fourth poorest 20%	22.6	14643.7	22.9	16042.6	0.009166
Richest 20%	37.1	24038.9	38.4	26901.12	0.011313
		0.005638			Effective Growth Rate
		0.007836			Actual Growth Rate

Source: Prepared by researchers based on the data of the annual report 2018 and the convergence report 2018 of the European Central Bank.

Appendix (10) :-Calculate Effective Growth in Bulgaria.

Population Segments	Income Ratio	Income (PC)	Income Ratio	Income (PC) 2018	The growth rate of Segment Income
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	2006	2006	2018		
Poorest 20%	6.5	1955.53	6	2173.5	0.013298
Second poorest 20%	11.9	3580.12	11.8	4274.55	0.022408
Third poorest 20%	16.3	4903.86	16.2	5868.45	0.0227
Fourth poorest 20%	22.3	6708.96	22.1	8005.725	0.022335
Richest 20%	43	12936.6	43.9	15902.78	0.02614
	0.021376				Effective Growth Rate
	0.023487				Actual Growth Rate

Source: Prepared by researchers based on the data of the annual report 2018 and the convergence report 2018 of the European Central Bank.

Appendix (11):- Calculate effective growth in Malta.

Population Segments	Income Ratio 2006	Income (PC) 2006	Income Ratio 2018	Income (PC) 2018	The growth rate of Segment Income
Poorest 20%	8.2	8179.09	8.5	10322.4	0.026197
Second poorest 20%	13.4	13365.8	13.4	16272.96	0.022108
Third poorest 20%	17.7	17654.9	17.5	21252	0.020818
Fourth poorest 20%	23.1	23041.1	22.5	27324	0.019123
Richest 20%	37.5	37404.4	38.1	46268.64	0.023912
	0.022432				Effective Growth Rate
	0.022108				Actual Growth Rate

Source: Prepared by researchers based on the data of the annual report 2018 and the convergence report 2018 of the European Central Bank.

Appendix (12):- Calculate effective growth in Cyprus.

Population Segments	Income Ratio 2006	Income (PC) 2006	Income Ratio 2018	Income (PC) 2018	The growth rate of Segment Income
Poorest 20%	8.8	10115.2	7.9	11148.09	0.009771
Second poorest 20%	12.8	14713	12.1	17074.92	0.015
Third poorest 20%	16.7	19195.8	16.2	22860.63	0.017626
Fourth poorest 20%	21.6	24828.1	21.7	30621.96	0.021196
Richest 20%	40.1	46092.9	42.1	59409.42	0.025704
	0.017859				Effective Growth Rate
	0.020724				Actual Growth Rate

Source: Prepared by researchers based on the data of the annual report 2018 and the convergence report 2018 of the European Central Bank.