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Indebtedness and the pace of catching up in the CEE countries

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Abstract. The paper verifies the existence of the relationship between the economic growth – i.e., the main determinant of the catching up process – and the level of government, household and external debt (foreign liabilities). The comparative analysis of the correlation for CEE11 countries and EU14 countries confirms that the level of indebtedness is a strong determinant of economic growth, and thus of the catching up process. The authors confirmed the "unfair" relationship that high debts more severely constrain development in less credible developing countries, and that tolerance for public debt in developing countries has decreased in recent years. The results also show that in developing CEE countries – unlike in the case of developed countries – higher levels of foreign liabilities and their stronger growth turn out to be a hindrance to economic growth. Finally, it should be emphasized that the fact that the stronger increase in household liabilities was accompanied by higher average economic growth in the CEE countries in the analyzed period (as opposed to EU14 countries) should be treated as an important warning. Probably the relatively high (although noticeably lower than in the EU14 countries) and/or growing household debt in the CEE countries will also at some point begin to slow down their economic growth and the pace of the catching up process.

Keywords: economic growth, catching up, general government debt, foreign liabilities, household liabilities, CEE countries

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1. INTRODUCTION

The process of reducing the development distance between less developed countries and the rich West has been observed and studied since the 50s of the 20th century. At that time, the average GDP per capita at purchasing power parity in the richest country of the West (USA), calculated as a multiple of the global average, stabilized at about 5. Thus began the process of catching up with the USA, not only for the Western European countries or Japan, but also for some Asian economies. This can be considered the beginning of the era of convergence (Popov, 2015).

As studies show, developing countries have significantly increased their share in global economy over the past few decades. This is evident with regards to income, international trade, investment, industrial production, as well as the population of our planet. Unfortunately, the developing countries are catching up to the world leaders unevenly; just a few or a dozen of them are showing promising results. Very often, economic growth alone is not a generator of development (Omodero & Alege, 2022; Gouider, 2022). However, this is the only way to improve convergence in the long-term perspective.

One group of countries that has been most frequently surveyed in the recent years in terms of reducing the development distance are members of the European Union (e.g., Borsi & Metiu, 2015; Iancu, 2009; Matkowski & Próchniak, 2005; Stanišić, 2012; Vamvakidis, 2009; Ur et al., 2021). The research began to flourish after successive enlargements of the Community, when it was joined by the countries whose economies significantly differed when compared to the development of the older member states. Scientists are trying to solve a variety of research problems related to the subject; however, it appears to be so dynamic and relevant that it requires constant monitoring, new research approaches and diverse tools.

The round 20th anniversary of the EU membership of the Central and Eastern European countries is still more than 2 years away. However, the available data time series allow us to analyse the efficiency of a 21-year period of EU funding. Since 2000, the candidate countries have started receiving stronger pre-accession support planned for them since the beginning of the 2000-2006 financial perspective. Therefore, we find it worthwhile to examine how much progress the CEE countries have made in reducing the development distance in the first two decades of the 21st century, which countries, supported by the generous EU funds and benefiting from access to the common EU market, achieved the highest average economic growth in the years 2000-2020 and came closest in terms of generated income (per capita) to Western countries and the EU average.

An analysis of statistical data and of other authors' research results (e.g., Batóg, 2010; Bernardelli et al., 2018; Walczak, 2012; Wolszczak-Derlacz, 2009) shows that achievements in overcoming development inequalities varied across countries. It likely depended on a dominant set of factors determining GDP growth in a given economy (Mlynarzewska-Borowiec, 2020), as well as the efficiency of applied economic policy. Evidently, such a positive approach (an analysis of factors stimulating growth and economic development) dominates in existing research.

However, a key question arises: what factors hinder the pace of economic growth in the CEE countries? Could the process of catching up have been slowed down despite many favourable circumstances? The answer to this question is complex. In our article, we aim at examining whether the pace of economic growth and reducing the difference in GDP per capita in the Central and Eastern Europe countries in the years 2000-2020 was dependent on the level of indebtedness and its dynamics. Since the results of empirical research – carried out mainly in developed countries (Reinhart & Rogoff, 2010a, Reinhart & Rogoff, 2010b, Kumar & Woo, 2010, Cecchetti et al., 2011, Checherita & Rother, 2010, Redo, 2019a) – indicate the existence of a negative correlation between government debt and the rate of economic growth, we will begin the analysis by verifying the relationship and then extend it to the financial dependence

of a country's entire economy on foreign capital in the form of total external liabilities and to the household debt.

2. LITERATURE REVIEW

It is most often that the GDP in purchasing power parity in the EU15 serves as a reference point for research on reducing the income differences between the Central and Eastern European countries and the rest of the EU. However, this is only one of many aspects of the process. The concept of convergence is much broader and encompasses many factors, including synchronisation of business cycles of individual economies (Batóg, 2010; Kose et al., 2008; Li et al., 2022).

The literature offers various explanations for the process of reducing income inequalities between countries. The number of scientific papers devoted to the subject is enormous (see the review in e.g.,: Quah, 1996). The theoretical fundamentals of the convergence concept should be sought primarily in neoclassical models of economic growth. The concept assumes that economies of less developed countries are growing faster than economies of more developed countries. As a result, there takes place the process of their gradual convergence, in particular in terms of per capita income index. The neoclassical growth models assume that less developed countries, which have less capital, offer a higher rate of return on investment. It triggers inflows of international capital that is looking for more profitable deposits (Redo & Siemiątkowski, 2017). It results, in turn, in an intensive increase of the productive capital in the country of deposits, followed by dynamic economic growth (Sala-i-Martin, 1996).

An alternative approach to the phenomenon of convergence emphasizes an important role of foreign technology transfer. It assumes that the development of modern technological solutions requires increased capital expenditure and experienced research personnel. Less developed countries are therefore not able to generate a large number of modern inventions and do not take part in the international race for innovation. Actually, they do not have to do so, because a rapid transfer of inventions occurs through the flow of trade streams or international investments, and more importantly, it takes place without high expenditures. The resources thus saved can be used by less developed countries for other purposes and contribute to increasing the dynamics of their growth and the pace of catching up with highly developed countries (Matkowski et al., 2013; Siemiątkowski, 2016).

In the literature there also exist some negative views on the phenomenon of convergence focusing on highlighting the widening of the income gap between less developed and highly developed countries, which has been confirmed by some studies (Alexe, 2012; Monfort et al., 2013). For example, endogenous growth models emphasize the limited ability of less developed countries to absorb innovation effectively due to their lack of a highly skilled workforce. Some research results even deny the existence of convergence and indicate that an unfavourable configuration of economic conditions may lead to a deepening of inequalities between individual countries (Mucha, 2012).

More recent trade theories point to the fact that globalization and the consequent economic integration may strengthen the pre-existing directions of specialisation, which may in turn lead to a widening of the income gap between the cooperating countries (Ehnts & Trautwein, 2012).

There are more and more studies devoted to specific aspects of the convergence process. In recent years, for example, the problem of so-called "brain drain", i.e., the outflow of labour from less developed countries, has often been highlighted. The phenomenon may also cause income differences to widen and the pace of real convergence to decrease (Johnson, 1979; Tritah, 2008). Rodrik drew attention to strong convergence in the manufacturing industry and confirmed its existence on a large group of countries. At the same time, he has failed to confirm a similar degree of convergence for the whole economies. As the

reason for the situation, he points to the low share of industrial employment in low-income countries and their slow pace of industrialisation (Rodrik, 2013).

In addition to the income convergence, a notion of ecological convergence has also gained broad interest in recent years. The interest is probably related to the growing political pressure on climate change issues. A research conducted on a group of OECD countries and based on data for the years 1980-2008 confirmed that in most of the surveyed ranges, the so-called eco-efficiency among members of this organisation has improved (Camarero et al., 2013). However, over the past 40 years, there has been a stable cross-cutting relationship between energy consumption per capita and income per capita with the elasticity of energy consumption in relation to income less than unity. It means that the energy consumption tends to decrease in countries that have become richer, but it does not apply in other countries (Csereklyei et al., 2016).

Cohen and Levinthal (Cohen & Levinthal, 1990) introduced the concept of absorption capacity and showed that the spread of knowledge could induce complementarity of research and development activities. They proved that the idea had broad implications for analysing important aspects of the process of economic growth, such as convergence and divergence between countries, international coordination of climate policy, and the role of the economy's openness in generating innovation (Aghion & Jaravel, 2015).

In the short run, developing countries can implement an imitation strategy by copying existing technology. However, in the long run, the imitation of innovation is always based on the main concepts of developed countries and does not really integrate real opportunities and social resources with the economic situation of developing countries. Thus, developing countries must build up and implement their own path of catching up with the world leaders (Wu et al., 2018).

A country's potential for rapid growth is strong when "it is technologically backward but socially advanced" (Abramovitz, 1986). Thus, developing the social capacities that enable the absorption of technology is crucial. These capacities should be understood in terms of structural transformation, economic and social integration, autonomy and state responsibility. Without building social competences in the above dimensions, inequalities within economies may increase, and this will reduce prospects for the global income convergence (Andersson & Palacio, 2017).

According to the evolutionary approach, the process of catching up by less developed countries is continuous and dynamic. It cannot be planned in detail because it is burdened with various types of risks. Therefore, the pathways to reduce the development distance vary depending on internal conditions, even under similar external conditions (Malerba & Lee, 2021).

Firstly, the EU policy experience shows that the income convergence is not a rapid, continuous or automatic process. Secondly, the convergence proceeded faster on a regional rather than a national level, which was (partly) caused by the fact that development disparities were greater within countries than between them. Thirdly, regional specialisation and concentration have not changed significantly. And fourthly, in the early stages of catching up, the growth usually intensifies in agglomerations, which results in an initial increase in regional inequalities. Investment and total productivity of factors of production served as drivers of convergence, whereas the labour underutilisation was perceived as a hampering factor (European Commission, 2005).

Research demonstrating the convergence process in the EU does not simply concern the differences between the new members and the economies of the so-called original EU member states. The research is also being carried out, for example, on the member states of the eurozone in the first years of its functioning. The studies show that the convergence process is kind of disappearing within the zone. It is believed that the main reason for this is capital misallocation. Yet, some studies explain the situation by pointing to investment backlogs and poor productivity in catching up economies (Balta, 2013).

The issue of the impact of excessive indebtedness on the processes of catching up by the EU11 countries, which we raise in this study, has already been the subject of partial research. For instance, in his estimated model for absolute beta income convergence, Batóg shows that there was a significant decrease in the pace of convergence when government debt was taken account of in the set of explanatory variables (Batóg, 2015). The research indicates that the growing government debt of the European Union economies is not conducive to the real convergence phenomenon (Papageorgiou, 2010).

3. MATERIAL AND METHODS

The aim of the study is to verify the hypothesis of the presumed relationship between the economic growth rate, the pace of reducing the distance (measured in GDP per capita) between the EU average and 11 Central and Eastern European countries (belonging to the EU) in the years 2000-2020 and the level of debt – i.e., the government, household and external debt in the form of foreign liabilities.

A synthesis of conclusions as well as an attempt to identify the determinants of the pace of catching up of the CEE11 countries were made on basis of literature survey and a correlation analysis based on the Pearson coefficient. For this purpose the method of inductive reasoning based on a comparative analysis of the results obtained in the CEE11[1] and EU14 countries[2] was used.

The data used in the analysis are obtained from the Eurostat statistical database.

4. RESULTS AND DISCUSSION

Our correlation analysis shows that in the first two decades of the 21st century in the vast majority of EU countries, not only there were higher levels of government debt accompanied by lower economic growth rates, but the negative relationship also applied to the level of foreign liabilities and household indebtedness. It is therefore important to be aware that high and/or growing debts (public, foreign, household and other) will involve a slower than possible economic growth rate and a slower pace of catching up of the CEE countries in the coming decades. More importantly, a broader analysis of correlation between the above figures has identified important differences between the strength and direction of dependence in the case of the CEE11 and the EU14. It reflected in particular a stronger negative relationship between the size and change in the level of government debt and the average level of economic growth in the analysed period in the case of the CEE11 countries, a positive in the case of the EU14 countries (and negative for CEE11) direction of the relationship between the current level of foreign liabilities (in relation to GDP), their change in the analysed period and the average economic growth rate, and, so far, a positive in the case of CEE11 (and negative for the EU14) direction of correlation between the change in the level of household liabilities and the average economic growth in the analysed period. The differences occur due to different debt levels, different solvency and creditworthiness, and dissimilar capital absorption efficiency of the two groups of countries, as well as changes in the level of acceptable investment risk and acceptable level of debt. The changes have taken place, particularly in the case of poorer countries, since the outbreak of the 2008 crisis. These factors seem to be the key determinants of the pace of catching up by the CEE11 countries.

[1] CEE11 consists of eleven countries of Central and Eastern Europe belonging to the EU: Bulgaria (BG), Croatia (HR), Czechia (CZ), Estonia (EE), Hungary (HU), Latvia (LV), Lithuania (LT), Poland (PL), Romania (RO), Slovakia (SK), Slovenia (SI).

[2] The EU14 is a group of fifteen EU countries prior to the enlargement of the EU to the East and without the UK: Austria (AT), Belgium (BE), Denmark (DK), Finland (FI), France (FR), Germany (DE), Greece (EL), Ireland (IE), Italy (IT), Luxembourg (LU), Netherlands (NL), Portugal (PT), Spain (ES), Sweden (SE).

4.1. Economic growth, the pace of reducing the GDP per capita gap and the level of government debt

An analysis of the size and changes in the government debt level in the EU countries and the level of economic growth in the years 2000-2020 confirms the negative relationship between these variables – see Figure 1 that depicts the average level of economic growth and the average level of general government debt (in relations to GDP) in the EU countries in the years 2000-2020. The negative linear trend and the relatively high concentration of the majority of points - representing the EU countries - around the trend line confirm the negative relationship between the variables.

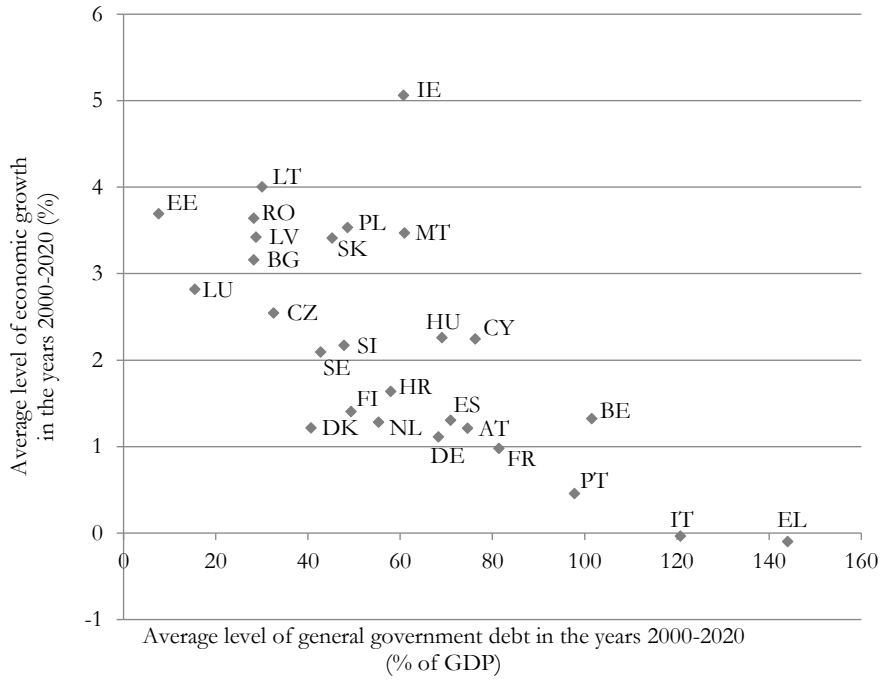

Figure 1. Average level of general government debt (in relation to GDP) and average level of economic growth (in %) in the European Union countries in the years 2000-2020 (scatter chart; linear trend)

Source: own study based on Eurostat data.

The negative and very strong relationship in the case of the 27 EU countries (according to J. Guilford's classification) occurs both between the average level of economic growth and the average level of general government debt (r =-0.715), as well as the current cumulative level of the debt in 2020 (r =–0.716) – see Table 1. The dependence is even stronger in the latter case.

Table 1

Direction and strenght[1] of the relationship between the level and change in the level of general government debt (in relation to GDP) and the average level of economic growth (in %) in the years 2000-2020 in the European Union countries (the Pearson correlation coefficient)

	The Pearson correlation coefficient between the average level of economic growth between 2000 and 2020		
	and the average level of gg debt in the years 2000-2020	and the level of gg debt at the end of 2020	and the change in the level of gg debt (in p.p.) in the years 2000-2020
EU 27	–0.715	–0.716	–0.441
EU 14	–0.601	–0.643	–0.433
CEE 11	–0.677	–0.695	–0.417

[1] statistically significant results are marked in grey

Source: own calculations.

Importantly, both the relationships are stronger in the case of the CEE countries (r=-0.677 and r=-0.695 respectively) than in the case of the 15 older EU member states (r=-0.601 and r=-0.643) – see Table 1. That confirms the well-known "unfair" dependence that high debts further limit the development opportunities for entities with lower credibility.

Apart from Bulgaria, all the other 10 CEE countries appear to have the negative correlation between the economic growth and the level of public debt. The correlation is strong for Latvia, Hungary and Slovakia (almost -0.6) and moderate for other countries, and ranges from r=-0.45 to r=-0.24 (see Table 2).

Table 2

Number of EU countries with a given strenght[1] and direction of correlation (according to J. Guilford's classification[2]) between the level of general government debt (in relation to GDP) and the level of economic growth (in %) in the years 2000-2020

	EU 27	of which CEE
negative correlation:	24	10
• strong (0.5-0.7]	4	3
• moderate (0.3-0.5]	15	6
• low (0.1-0.3]	3	1
• very low (<0.1]	2	0
positive correlation:	3	1
• low (0.1-0.3]	2	1
• very low (<0.1]	1	0

[1] 13 out of 24 results presented in Table 2 are statistically significant. These are all 4 strong correlation results and 9 out of the 15 moderate correlation results

[2] numerical intervals corresponding to the descriptive assessments of the correlation strength are provided in brackets

Source: own study.

As a consequence of the above relationships, the relatively strong negative correlation can also be observed between the level of government debt and the pace of reducing the GDP per capita gap towards the EU average in the CEE countries. Both the higher average level of general government debt (in relation to GDP) between 2000 and 2020 and the higher current level of general government debt (2020) were accompanied by slower increase in GDP per capita (in percentage points) between 2000 and 2020. The

strength of both the relationships is similar and amounts to r=–0.678 and r=–0.626 respectively – see Table 3.

Table 3

Direction and strenght[1] of the relationship between the change in the level of GDP per capita (in percentage points, EU27=100) and the average level of general government debt (in relations to GDP) in the years 2000-2020 and its level at the end of 2020 in the European Union countries (the Pearson correlation coefficient)

	The Pearson correlation coefficient between	
	the change in the level of GDP per capita in the years 2000-2020 (in p.p.) and the average level of gg debt in the years 2000-2020	the change in the level of GDP per capita in the years 2000-2020 (in p.p.) and the level of gg debt in 2020
EU 27	–0.654	–0.646
EU 14	–0.445	–0.503
CEE 11	–0.678	–0.626

[1] statistically significant results are marked in grey

Source: own calculations.

In the 15 older EU member states the negative relation is weaker than in the CEE countries (see Table 3).

4.2. Economic growth, the pace of reducing the GDP per capita gap and the level of foreign liabilities (IIP)

The correlation between the level of foreign liabilities (in relation to GDP), their change and the average economic growth rate in the years 2004-2020 is weak and positive in the case of all 27 EU countries. However, these dependencies, calculated separately in regard to the CEE 11 and to the EU 14 countries, are stronger and, which is particularly worth emphasizing, they have an opposite direction (compare the second row of data with the third one in Table 4). Although the correlation coefficients are moderately strong in the case of the CEE countries, it should be noted that there is a negative dependence between the level of foreign liabilities (in relation to GDP) in 2020, the change in their level (in percentage points) in the years 2004-2020 and the average level of economic growth in 2004-2020. The correlation in the case of the EU 14 countries is, however, of an opposite direction.

Table 4

Direction and strength[1] of the relationship between the average level of economic growth in 2004-2020, the level of foreign liabilities (in relation to GDP) in 2020 and the change in their level (in percentage points) in the years 2004-2020 in the European Union countries (the Pearson correlation coefficient)

	The Pearson correlation coefficient between the average level of economic growth in the years 2004-2020				Critical value $t_{\alpha=0,05,\ n-2}$
	and the level of foreign liabilities (in relation to GDP) in 2020		and the change in the level of foreign liabilities (in relation to GDP) in the years 2004-2020 (in p.p.		
	correlation coefficient r	test statistic	correlation coefficient r	test statistic	
	1	2	3	4	5
EU 27	0.132	0.680	0.149	0.766	2.0595
EU 14	0.348	1.892	0.354	1.930	2.1788
CEE 11	–0.380	–2.098	–0.378	–2.081	2.2622

[1] the correlation strength is too low to obtain statistically significant results at this sample size, but it should be emphasized that the test statistics are slightly lower than the critical value in the case of the correlation determined for the CEE countries
Source: own calculations.

Therefore, it should be emphasized that in the case of the CEE countries, the correlation is moderate, but negative, which means that the higher level of foreign liabilities in 2020 (r =–0.380) and their stronger growth in the years 2004-2020 (r =–0.378) was accompanied by slower economic growth in the analysed period (Table 4).

An analysis of the correlation coefficients determined separately for individual EU countries shows that in the case of 22 countries there existed a negative relationship between the level of economic growth (in %) and the level of foreign liabilities (in relation to GDP) in the years 2004-2020. It relates to all the CEE countries and is depicted in Table 5.

Table 5

Number of EU countries with a given strength[1] and direction of correlation (according to J. Guilford's classification[2]) between the level of foreign liabilities (in relation to GDP) and the level of economic growth (in %) in the years 2004-2020

	EU 27	of which CEE 11
negative correlation:	22	11
• very strong (0.7-0.9]	1	1
• strong (0.5-0.7]	5	3
• moderate (0.3-0.5]	11	7
• low (0.1-0.3]	1	0
• very low (<0.1]	4	0
positive correlation:	5	0
• low (0.01-0.3]	2	0
• very low (<0.1]	3	0

[1] 13 out of 27 results presented in Table 5 are statistically significant. These are all 6 very strong or strong correlation results and 7 out of the 11 mean correlation results
[2] numerical intervals corresponding to the descriptive assessments of the correlation strength are provided in brackets
Source: own study.

More importantly, in the case of 4 CEE countries, the correlation is very strong (Hungary) or strong (Estonia, Romania, Latvia) and amounts to approximately r=–0.6. In the remaining 7 CEE countries the dependence is either "strongly" moderate and falls between –0.49 and –0.44 (Bulgaria, Slovakia, Slovenia and Lithuania) or moderate (and amounts to –0.41 in Croatia, and slightly over -0.3 in Poland and the Czech Republic).

It leads to a conclusion that further increase in the strong financial dependence of the CEE countries on foreign capital, which has been observed for years, may be a factor slowing down their economic growth and the pace of catching up in the coming decades. This is mainly because foreign liabilities (in relation to GDP), which are still larger in Western countries, create a false impression of the possibility of their further increase without consequences in most CEE countries. These countries have basically no alternative to financing the process of catching up and rolling over the dynamically growing debt. Figure 2 depicts the

differences in the average level of foreign liabilities (% of GDP) and in the average annual level of economic growth (%) in individual European Union countries in the years 2004-2020.

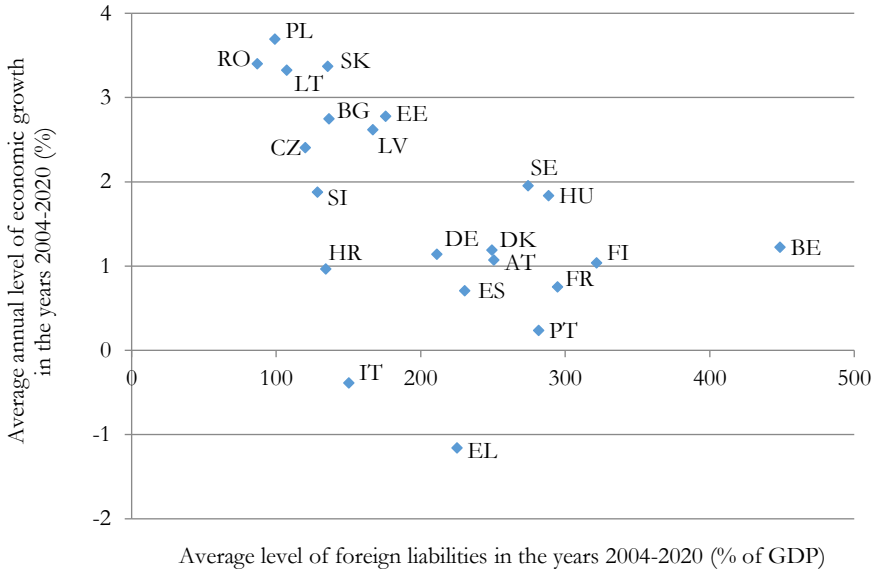

Figure 2. Average level of foreign liabilities (% of GDP) and average annual level of economic growth (%) in the European Union countries[1] in the years 2004-2020 (scatter chart; binomial trend)

[1] without Luxembourg, Malta, Cyprus, Ireland and the Netherlands, whose foreign liabilities ranging are from a thousand to several thousand percent of GDP. Taking them into consideration would make it impossible to read all the remaining data.

Source: own study based on Eurostat data

The largest financial centres in the EU (such as Luxembourg, Malta, Cyprus, Ireland and the Netherlands) have been excluded from the calculations. Their foreign liabilities range from a thousand to even several thousand percent of the GDP and such outliers would significantly distort the graph. The Pearson correlation coefficient showing the relationship between the average annual level of economic growth (%) and the average level of foreign liabilities (% of GDP) in the years 2004-2020 for these 22 EU countries amounts to r=-0.505, which indicates a strong (according to J. Guilford's classification) and, more importantly, a negative relationship between the level of foreign liabilities and the economic growth rate.

However, if we determine the correlation separately for the CEE countries, we receive a negative result (r=-0.446), while for the remaining 11 countries we receive a positive result (r=0.434).[3]

Awareness of the existence of incomparably greater international financial interdependence in richest countries does not help in understanding the threats (resulting from even much lower indebtedness than in developed countries) to the growth of developing countries. This is confirmed by a very strong positive relation which occurs only in the older EU countries, where the higher level of GDP per capita (EU27=100) follows the higher dependence of the state's economy on foreign capital (r=0.802). As presented in column 1 in Table 6, the dependence does not exist (r=0.026) in the CEE countries.

[3] All three results are statistically significant.

Table 6

Direction and strength[1] of the relationship between the level of foreign liabilities (in relation to GDP) in 2020 and the level of GDP per capita (EU27=100), and between changes in levels of both the variables (in percentage points) in the European Union countries in the years 2004-2020 (the Pearson correlation coefficient)

	The Pearson correlation coefficient between	
	the level of foreign liabilities (in relation to GDP) in 2020 and the level of GDP per capita (EU27=100)	the change in the level of foreign liabilities (in relation to GDP) and the change in the level of GDP per capita in the years 2004-2020 (in p.p.)
	1	2
EU 27	0.758	0.107
EU 14	0.802	0.326
CEE 11	0.026	–0.345

[1] statistically significant results are marked in grey

Source: own calculations.

Yet, it should be emphasized that even in the case of the 15 older EU countries, the correlation between the increase in foreign liabilities and the increase in the level of GDP per capita is very moderate (r = 0.326), but still positive – see column 2 in Table 6. However, in the case of the CEE countries, the Pearson correlation coefficient takes a negative value (r =–0.345), which means that the stronger increase in the level of foreign liabilities (in relation to GDP) was accompanied by weaker growth of GDP per capita in the analysed period (see column 2 in Table 6). The strength of this dependence is also moderate.

4.3. Economic growth and the level of household liabilities

An analysis of the relationship between the level of economic growth and household debt in the European Union leads to similar conclusions. The higher household debt (in relation to GDP) was accompanied by slower economic growth in all the EU countries (apart from Malta; r=0.03) in the years 2000-2020. The correlation coefficient is negative in 26 countries, and in 23 of them it indicates either strong or medium dependence. That refers to 10 out of the 11 CEE countries – see Table 7.

Table 7

Number of EU countries with a given strength[1] and direction of correlation (according to the J. Guilford's classification [2]) between the level of household liabilities (in relation to GDP) and the level of economic growth (in %) in the European Union countries in the years 2000-2020

	EU 27	of which: CEE 11
Negative correlation:	26	11
• strong (0.5-0.7]	5	3
• medium (0.3-0.5]	18	7
• low (0.1-0.3]	2	1
• very low (<0.1]	1	0
positive correlation:	1	0
• very low (<0.1]	1	0

[1] 17 of 27 results presented in Table 7 are statistically significant. These are all 5 very strong and strong correlation results and 12 out of the 18 mean correlation results

[2] numerical intervals corresponding to the descriptive assessments of the correlation strength are provided in brackets

Source: own study

The negative and at least medium correlation between the economic growth rate and the level of household liabilities in the analysed period (in as many as 23 EU countries) should serve as another warning to the CEE countries. The current (objectively lower – as presented in Figure 3) level of household debt should not be treated as a factor that could be further deepened without negative consequences for the pace of economic convergence in the CEE countries.

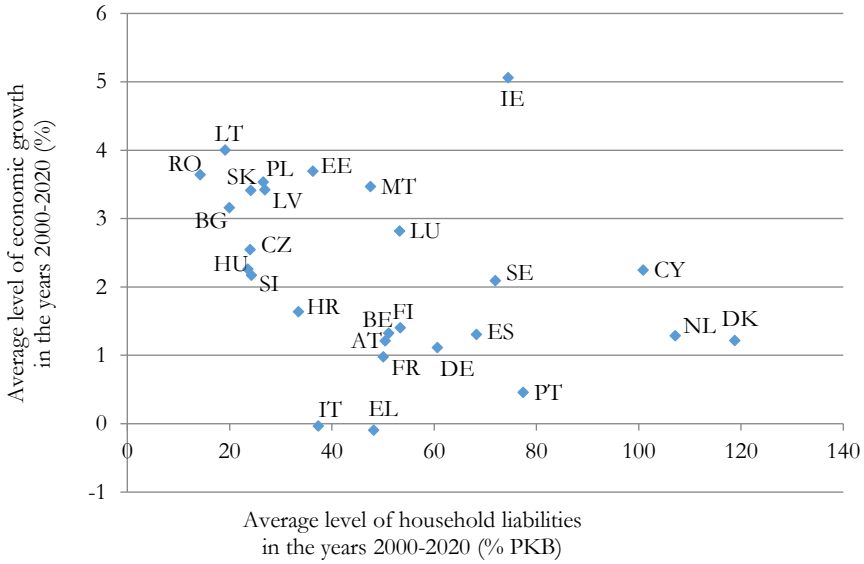

Figure 3. Average level of household liabilities (% of GDP) and average annual level of economic growth (%) in the European Union countries in the years 2000-2020 (scatter chart; binomial trend)

Source: own study based on Eurostat data

What is particularly important is that the analysis of the correlation between the percentage change in the level of household liabilities (% of GDP) in the European Union countries in the years 2000-2020 and the average level of economic growth in the analysed period, indicates the existence of dependencies with different directions in the case of the CEE countries and the EU14 countries. In the first group of countries the relationship is strongly positive, whereas in the second group the dependence is negative (and moderately strong) – see Table 8.

Table 8

Direction and strength[1] of the relationship between the percentage change in the level of household liabilities (% of GDP) and the average level of economic growth in the European Union countries in the years 2000-2020 (the Pearson correlation coefficient).

EU 27	0.490
EU 14	–0.442
EŚW 11	0.667

[1] statistically significant results are marked in grey

Source: own calculations.

This is also confirmed by the direction of correlation between the change in the level of household liabilities in relation to GDP (chain indexes) and the level of economic growth in the years 2000-2020. The

dependence turns out to be positive in all the CEE11 countries and negative in almost all the EU14 countries (except for Greece).[4]

It means that in the analysed period the stronger increase in household liabilities was accompanied by higher average economic growth in all the CEE countries, whereas in the EU14 countries it was followed by lower average economic growth rate.

It is of course important to remember that the size of household liabilities in the EU14 countries is on average more than twice as high as in the CEE countries. At the end of 2020, the liabilities averaged 69.1% of GDP and 30.1% of GDP respectively. There is probably still, therefore, a buffer for an increase in the household debt of the CEE countries, which will – due to the increase in consumption – be accompanied by higher economic growth. However, the above-mentioned correlation coefficients of different directions should be treated as a specific warning for the CEE countries that the increasing household indebtedness observed in some CEE countries (including Poland) will at some point start to slow down their economic growth as well as the pace of catching up and that the positive correlation will be weaker and weaker with the increase in debt. And finally, it will begin to take negative values as it has happened in the case of the EU14 countries. Then, although the economic growth rate will (hopefully) still be higher in the CEE countries than in the EU14 countries in the coming decades, it will be slower than it could be.

5. CONCLUSION

Owing to its economic growth which is faster than in highly developed EU countries, the solvency of Polish economy and its economic entities is growing from decade to decade. As a result, the GDP per capita gap to the EU average is decreasing. It creates an illusion about its solvency convergence towards the most reliable countries and about its capacity to take on greater amounts of debt in foreign markets. Yet, only a few economies – such as the USA or Germany - have limitless debt capacity, which is justified by numerous economic, financial, political, psychological and other factors.

Investors have learned a lesson when Iceland and Greece went bankrupt, and the governments of Spain, Portugal and Ireland were cut off from market financing, or when the Cypriot banking system collapsed. As long as they remember the lesson, they will not allow any weaker countries to take on as much debt as Greece. Therefore, Polish government and Polish economic entities should understand that the limit of debt and foreign capital dependence is much lower in the case of the Polish economy than in the case of Western countries. Besides, the limit is already noticeably lower today than several years ago, that is before the outbreak of the financial crisis of 2008. Another important problem is the incomparably lower ability of the CEE countries to absorb such large amount of capital, which – combined with easier access to foreign capital – drove into a debt trap and economic crises not only the former Eastern Bloc countries, but also some countries in Latin America in the 70s of the 20th century (Redo & Siemiątkowski, 2017: p. 82 and following pages). Yet today, when the dominant part of the debt is market-based, and globalisation and IT technology have made financial markets far more transparent, the threat is much greater. Not only have the less reliable countries limited access to capital, but they also have to pay a higher price for it, which limits the effectiveness of investments made on credit and winds the debt spiral. Moreover, they are exposed to a sudden stop phenomenon even at slight turbulence on the world markets – with a full range of negative consequences for their future stability, credibility, investment risk assessment, development capabilities, investment prospects, and thus the pace of catching up in the coming decades as well as the wealth of future

[4] The correlation is weaker in the CEE11 countries (strongly positive only in Bulgaria) and stronger in the EU14 countries (strongly negative in the case of 5 countries and very strongly negative in Germany).

generations (Redo, 2019b). The unfavourable situation forces them to incur (just in case) even more liabilities and to invest them inefficiently in an excessively liquid way. They do so in order to maintain solvency during the periods of limited access to capital. But in doing so, they reduce the efficiency of external capital absorption and management in general.

The results of the correlation analysis confirm that higher public debts are accompanied by a slower rate of economic growth. The negative correlation between the level of public debt and the economic growth rate in the years 2000-2020 is revealed in 24 out of 27 EU countries. The negative dependence between the size and change in the level of government debt and the average level of economic growth (and the change in the level of GDP per capita) is strong and, more importantly, stronger in the case of the CEE countries. IT confirms the well-known "unfair" relationship that high debts limit the development opportunities of entities with lower credibility. Moreover, the correlation between the average economic growth and the current level of government debt is stronger than between the average economic growth and the average level of government debt in the analysed period, which confirms that there is currently much lower tolerance to weaker countries' government debt than in the past.

The above analysis also indicates the negative correlation between the level of foreign liabilities (in relation to GDP) and the level of economic growth (in %) in the years 2004-2020 in the case of 22 EU countries. At the same time, it shows an opposite direction of the relationship between the current level of foreign liabilities (in relation to GDP), their change, and the average economic growth rate in the years 2004-2020. It is positive in the case of the EU14 countries and negative (and of medium strength) in the case of the CEE11 countries. This confirms that the capacity of weaker CEE countries to borrow in international markets is lower and the impact of debt levels on their credibility is stronger than in the case of stable and highly developed countries. Higher level of foreign liabilities and their stronger growth create development opportunities in highly developed countries, where they are accompanied by a stronger rate of economic growth. On the other hand, in the case of developing CEE countries, higher levels of foreign liabilities and their stronger growth turn out to be a hindrance to economic growth. Their lower solvency results in a stronger increase in the risk premium included in the cost of capital. And more expensive capital leads to a slower rate of growth. Understanding of the opposite direction of the above dependence is particularly important for the CEE countries. The significantly lower level of foreign liabilities[5] could mistakenly suggest that the CEE countries can boost their economic growth by increasing their dependence on foreign capital.

The negative dependence in the EU26 is also revealed by the correlation analysis between the level of household liabilities (in relation to GDP) and economic growth (in %) in the years 2000-2020. It clearly indicated that higher household debt was accompanied by slower economic growth – and vice versa. At the same time, attention should be paid to the opposite direction of correlation between the change in the level of household liabilities and the average economic growth in the analysed period. Namely, the direction was positive in the case of CEE11 and negative in the case of EU14 countries. It means that stronger increase in household liabilities was accompanied by higher average economic growth in the CEE countries and by lower average economic growth in the EU-14 countries in the analysed period. This should serve as a warning to the CEE countries that the relatively high (although noticeably lower than in the EU14 countries) and/or growing household debt will at some point begin to slow down their economic growth and the pace of catching up, and that the positive correlation observed in the CEE countries in the first two decades of the 21th century will be weaker and weaker as the debt increases, and it will finally begin to take on negative values as it happened in the case of the EU14 countries. Then, even though the economic growth rate in

[5] which accounted for an average of 162% of GDP in 2020 (and an average of 139% of GDP without Hungary), while foreign liabilities in the EU11 (excluding Luxembourg, Ireland and the Netherlands) accounted for an average of 304% of GDP.

the coming decades will (hopefully) still be higher in the CEE countries than in the EU14 countries, it will be slower than it could be.

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DATA SOURCE

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