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DOES FINANCIAL DEVELOPMENT, GLOBALISATION AND INSTITUTIONAL QUALITY DRIVE THE INCOME CONVERGENCE IN THE CENTRAL AND EASTERN EUROPEAN UNION COUNTRIES?

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Abstract: Central and Eastern European (CEE) countries are struggling with internal and external macroeconomic and social factors in their catching-up strategies to be closer, as economic wealth, to the Western developed European countries. In these ex-communist countries, institutional factors could be seen as critical for success in narrowing the income gap. The paper proposes an analysis of the impact of economic and financial development and globalization on the income gap in 11 Central and Eastern European (CEE) countries (Bulgaria, Croatia, Czechia, Estonia, Latvia, Lithuania, Poland, Romania, Slovak Republic and Slovenia) for the period of 1996 to 2019, taking into consideration institutional factors. The study analyses the variables: transition coefficient as a proxy for income gap, GDP per capita, KOF Financial Globalisation Index, Financial Development Index and World Bank Institutional Indicators in a panel approach methodology and estimation of FMOLS and DOLS equations. The paper's findings show that all considered factors have a significant contribution to the income gap in the examined period of time. Economic and financial development, as well as institutional quality, is positively associated with the closing income gap, while globalization has a negative influence. It is also revealed the direction of the

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causality relationship between the considered variables: from economic and financial development, globalization and institutional quality to the income gap. These findings suggest some policy recommendations in support of the continuation of the European integration process.

Keywords: economic integration; economic development; financial development; globalization; financial development; institutional quality; panel data.

JEL CLASSIFICATON: C33, E02, F15, F43, F63, F68, G00.

1. Introduction

The Central and Eastern European (CEE) countries have a common history related to centralized economic activities and domination of communist doctrine in their public policy. During the period of their pre-accession to the European Union as candidate countries, they overcame all barriers to fulfilling the accession criteria. When becoming the Member States, the process of economic integration raised new challenges related to reaching the living standards of the old and rich European Union members. Each country fights within its own specific condition in order to cover the income gap and to be closer to the developed western countries.

During 1996-2019 new Member States registered an ascending trend in their GDP per capita as % of the 2020 EU value (Figure 1). At the beginning of the examined period of time, two countries had values above 80%, Slovak Republic and Croatia. At the end of the period, the other two countries reached the level of 80%, namely Latvia and Czechia. The lowest levels of GDP per capita are experienced by Romania and Bulgaria (which joined the EU in 2007). Excepting Croatia, the other countries from the analyzed sample joined the EU in 2004. The year of becoming an EU member marked a higher growth rate in all countries reflecting the financial support from the EU budget for development while the post-crisis years (2009-2010) brought a downturn in all countries. The highest gain in income was registered by Romania (from 31,3% to 69,2%), Hungary (from 31,6% to 69,3%) and Czechia (and from 37,2% to 82,4%).

The EU membership was beneficial for these countries in terms of growth due to several favorable factors such as integration in the EU single market, financial funds for investment in infrastructure, and research and development activities. Meanwhile, the development of international relations and the process of globalization supported financial development.

An analysis of the national income gap in the new Member States compared to the old and developed European Union countries is of particular relevance since convergence in per capita income represents a key goal of the European integration process (i.e., Wagner, 2014).

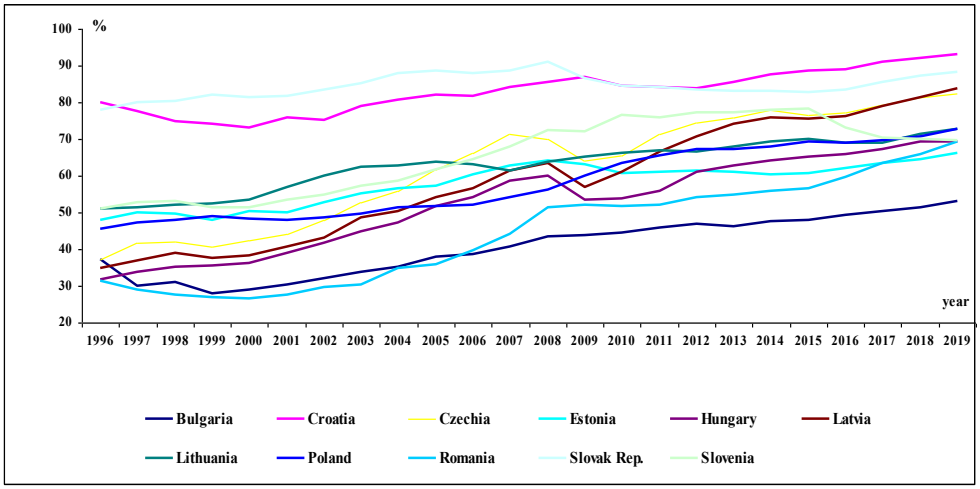

Figure 1 Trend in GDP per capita (a % of 2020 EU value) in eleven Central and Eastern countries (1996-2019)
Source: authors' representation based on EUROSTAT indicators.

Several economic and financial factors could be nominated as affecting economic convergence. Among them, financial development, globalization and institutional quality seem to have an important role, based on findings from studies of the current literature. For example, financial development is seen not only as stimulating economic growth in emerging economies (i.e. Boikos et al., 2022; Nguyen, 2021) but also as a convergence factor; it positively affects the speed of convergence (Ranjibar and Rasseekh, 2017). The process of globalization has beneficial effects on economic growth in developing countries (i.e. Meyer et al., 2020; Neagu and Dima, 2017). Institutional quality is an enabling factor for economic growth, meaning that an improvement in institutional quality will extend the growth potential of the economy and also will increase the rate of economic convergence to a chosen frontier (Bruinshoofd, 2016. Furthermore, a spillover effect of financial development on economic growth is identified: institutions contribute to the prosperity of countries but also the development of neighbors (i.e., Ashraf et al., 2022). The current literature is focused mainly on the effect on economic growth and less on income convergence.

The aim of the paper is to analyze the role of economic and financial development globalization and institutional quality on the income gap in eleven Central and Eastern European countries from 1996 to 2019.

The present study is motivated by the following reasons: (1) the rise of several challenges put in face of emerging economies as CEE countries (i.e., severe

competition on the global markets, volatility exacerbation of globalization and global interdependencies, global concerns related to human health and environment protection) slow down their progress path to economic integration in the European economy; (2) the need to align institutions and other national factors to the requirements to make progress on closing their income gap to the developed countries; (3) as EU members, they follow different strategies aiming to reduce the development gap compared to higher-income economies from Western Europe and old Member States; (4) they have to manage the extension of the financial sector in order to finance their international trade operations and transactions and to sustain their economic growth.

The main contribution of our paper to the existing consists of enriching the literature regarding the role of institutional quality and financial development in reducing the income gap in emerging economies compared to developed ones, through an analysis of the specific situation of CEE countries. It discusses economic convergence in a different way than other studies, namely by using the transition coefficient, as it was defined by Phillip and Sul (2007).

The remainder of the paper is structured as follows. After the Literature review discussing relevant studies on the topic of the paper, the section on Data and Methodology presents variables under examination and their sources and explains the model and its estimation strategy. It follows the section on Main findings describing the results of the study and a short Discussion. The last section exposes the Conclusions and policy implications of the research.

2. Literature review

We discuss below various strands of the current literature regarding the impact on economic convergence and growth of globalization financial development and institutional factors.

The level of financial development is a good predictor of future rates of economic growth, technological change and capital accumulation (Levine, 1996). Several studies are revealing that financial development stimulates economic development through investments promotion, optimal resources allocation and technological advancement (i.e., Sethi et al., 2020). The role of financial development on economic growth is different across countries (e.g., Rousseau and Wachtel, 2011) and depends on the stages of economic development (e.g., Deidda and Fattouh, 2002; Sahay et al., 2015; Boikos et al., 2022). Naceur et al. (2017) found that financial development affects the sources of growth (productivity and investment) using a sample of 145 economies over the period of 1960 to 2011, in a complex relationship. They revealed that the influence of financial development on sources of growth depends on income levels: advanced and middle-income economies may suffer from excessive financial

development while in low-income countries financial integration contributes to faster total productivity factors growth. Ranjibar and Rassekh (2017) provided evidence in support of the idea that financial development is not only a growth factor but also a convergence factor. They revealed that financial development positively affects the speed of convergence. Song et al. (2021) found that economic growth and financial development are positively correlated in a sample of 142 countries from 2002 to 2016, but in developing countries boosting economic growth stimulates financial development. Cheng et al. (2021) found an adverse influence of financial development on economic growth in 72 selected countries while Song et al. (2020) revealed a U-shaped relationship in the case of the Chinese marine economy. The positive association between financial development and economic growth was identified by Atil et al. (2020) in the case of Pakistan's economy. In the case of European countries, economic growth, and institutional quality are positively associated with financial development (Nasreen et al., 2020). Boikos et al. (2022) argue that financial development does matter for growth, especially in countries with low levels of economic growth, along with financial reforms in the sector. Nguyen et al. (2021) confirmed also a positive association between financial development and economic growth in 22 emerging markets over the period 1980-2020.

Globalization has beneficial effects on economic growth in developing countries (i.e. Meyer, 2020; Ulucak, 2019; Neagu and Dima, 2017; Leitao, 2012; Polasek and Sellner, 2011; Rao et al., 2011; Afzal, 2007; Dreher, 2006). Ulucak (2019) found that the overall KOF globalization index has a positive effect on emerging economies. Globalization accelerated the economic growth in South Asian countries over the period from 1971 to 2014 (Hasan, 2019).

The positive impact of financial development and trade globalization on income has been discussed in multiple studies. Daisaka et al. (2014) studied the impact of these two factors on income distribution focusing on the reduction of trade costs under the consideration that the financial institution is imperfect. The study's results revealed that financial development reduces capital misallocation while lowering trade costs has no effect on efficiency, arguing also that financial imperfection creates income inequality. Furthermore, regarding income inequality, Lee et al. (2017) investigated the effects of financial development, urbanization, and globalization on income inequality and concluded that these factors do indeed impact income. In addition, Lee et al. (2017) argued that "financial development is crucial for promoting inclusive growth since it can stimulate economic growth and is found to be an equalizing factor of inequality".

Gravina & Lanzafame (2021) also investigated how financial development, globalization, and technology affect income inequality. Panel data consists of 90 economies studied from 1970 to 2015. The study revealed significant nonlinearities,

consistent with either U-shaped or inverted-U-shaped relationships. Particular attention was paid to financial sector development, globalization and technology. The results showed that "the large majority of emerging economies increasing globalization and urbanization lead to falling income disparities, they are associated with increasing inequality for most advanced economies" (Gravina & Lanzafame, 2021).

Further on, focusing on income inequality, Destek et al. (2020) revealed that "increasing real income and government expenditures reduce income inequality in Turkey for both short-run and long-run relationship". The study is based on four financial development indicators, namely the overall financial development index, banking sector development index, stock market development index, and bond market development index. Destek et al. (2020) concluded that "low-income segments benefit more than high-income segments from increasing prosperity as a result of economic growth", an idea in line also with Hammudeh et al. (2020) who provided evidence of "a positive linear relationship between globalisation and economic growth for the high-income countries".

Also, similarly, Sethi, et al. (2021), mentioned that "the rapid globalisation and financial development witnessed in the past two decades have widened the income gap", hence "globalisation, financial development, lack of education, and inflation are causing inequality in the long-run, whereas, in the short-run, globalisation and financial development are causing income inequality".

Moreover, Destek et al. (2020) argued that "increasing government expenditures reduces inequality, implying that transfer spending has been successfully implemented in terms of reducing income inequality in Turkey", an idea also in line with the findings revealed by (Weychert, 2020). The same study provided evidence that stock market liquidity has a direct positive influence on the low-income population in Turkey, thus "minimized systemic risk in the banking sector facilitates the accessibility of credit by the low-income segment, thereby reducing income inequality" (Destek et al., 2020).

Another study conducted by Katircioğlu & Zabolotnov (2019) focusing on the role of financial development in economic globalization revealed that the "global financial system positively contributes to economic globalization". The study analyzed multiple factors such as trade openness, Foreign Direct Investment (FDI flows, international tourism, number of embassies and participation in international organizations and treaties, concluding that "macroeconomic performances of countries are significant drivers of the economic integration of countries".

Another paper addressing the topic of the impact of globalization on income inequality proposed by Munir & Bukhari (2020) examines the role of three forms of globalization, namely trade globalization, financial globalization and technological

globalization on the Asian emerging economies. The paper's results indicate that "trade globalization significantly contributes to reducing income inequality in the Asian countries", while "financial integration causes an increase in income inequality" (Munir & Bukhari, 2020). Considering these, the study highlights that "the benefits of financial globalization are not evenly distributed among the rich and the poor", an idea previously suggested also by Destek, et al. (2020) and Hammudeh, et al. (2020). In addition, the study reveals that the "impact of technological globalization significantly contributes to the reduction of income inequality" and also that "foreign direct investment (FDI) mostly benefits the high-skilled intensive sector and causes an increase in income inequality" (Munir & Bukhari, 2020).

Regarding the impact of trade openness, FDI, and official development assistance (ODA) on income inequality, Osode, et al. (2020) identified that it "depends on initials levels of income inequality, that is, the either low or high initial level of income inequality". Moreover, this study also revealed that the "influence of institutional quality on income inequality also depends on the initial level of income inequality" (Osode, et al., 2020). In detail, "institutions significantly increase income inequality in countries where the initial levels of income inequality are low, while it insignificantly reduces income inequality in countries where the initial levels of income inequality are high (Osode, et al., 2020). Similarly, in the presence of improved quality of institutions, ODA increases inequality in the same manner as described above.

As far as the sustainable utilization of financial and institutional resources are concerned, Ullah et al. (2021) argued that "globalisation and e-government development improve economic growth and eradicate poverty and income inequality by boosting digitalization, investments, job creation, and wage increases for the semi-skilled and unskilled labour-intensive workforce in Belt and Road countries".

As Kuncic (2014) highlighted, the term institutional quality refers to the quality of the governance system of a country. It consists of a set of working regulations for economic, social, and political frameworks. The variables reflecting the quality of institutions, introduced and developed by Kaufmann et al. (1999, 2001, 2004, 2010 and 2011) are computed in the set of Worldwide Governance Indicators (a project of World Bank) comprising the following aspects of governance: the rule of law, regulatory quality, control of corruption, government effectiveness and voice and accountability. These indicators are largely used in studies focused on the effects of institutional quality on various economic, social and environmental variables.

Institutional quality drives economic and social progress by creating a stimulative environment for innovation and technological advancement and new ways of organizing economic and social activities (Bruinshoofd, 2016). Ashraf et al. (2022) revealed the spillover effect of institutional quality on economic growth in a panel

of 86 Belt and Road initiatives countries. The study of Glawe and Wagner (2021) highlights the existence of several institutional convergence clubs with various countries stuck in a poor institutional trap within the EU countries and underlined that institutional clusters can drive the shape of income convergence clubs. Arvin et al. (2021) found that stronger institutions and more effective fiscal policies in low-income and low-middle-income countries are the most important drivers of long-term economic growth.

To conclude the reviewing the current literature we notice that the impacts of financial development, globalization and institutional quality on economic growth are highlighted in several studies, but their influence on narrowing the income gap between developing and is not specifically treated. Our study intends to cover this shortage by exploring the role of these factors on economic convergence in Central and Eastern European countries.

3. Data and methodology

We estimate the economic convergence through the coefficient transition (h_{it}) as it is computed by Philip and Sul (2007):

$$h_{it} = \frac{GDPpc_{it}}{\frac{1}{N}\sum_{i=1}^{N} GDPpc_{it}} \rightarrow 1 \qquad (1)$$

where: $GDPpc_{it}$ represents Gross Domestic Product per capita in country *i* and year *t* . The values of the transition coefficient tend to 1. The closer the values h_{it} are to 1, the greater tendency to convergence is present and the income gap is lower. In the case of our sample of countries, the variables of the h_{it} vector have increasing values over the period of 1996 to 2019.

The transition coefficient (TC) will be our dependent variable, expressing the closeness of national income in the examined countries to the EU's average and indicating the level of their economic convergence. Higher values of TC express closing the gap between national incomes in CEE countries to the EU's average. Economic convergence presumes a process of narrowing this gap.

We intend to estimate the impact of several factors (economic, financial and institutional) on the economic convergence level as above defined in eleven CEE countries (Bulgaria, Croatia, Czech Republic, Hungary, Estonia, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia) over the period 1996 to 2019. In this view, we consider the following variables of interest: financial development, globalization and institutional quality and the level of development. In order to ensure the reliability and robustness of our results, we add the following control variables: trade openness, gross capital formation and government expenditures.

The following model will be used:

$$TC_{i,t} = \alpha + \beta_1 \cdot ln\, G\, DPpc_{i,t} + \beta_2 \cdot ln\, F\, DI_{i,t} + \beta_3 \cdot IQ_{i,t} + \beta_4 \cdot ln\, K\, OF_{i,t} + \beta_5 \cdot X_{i,t} + \varepsilon_{i,t} \quad (2)$$

where: *TC* express denotes the transition coefficient as an expression of the income gap, *GDPpc* means Gross Domestic Product per capita, *FDI* expresses the Financial Development Index, *KOF* denotes the overall Index of Globalisation and *X* represents the vector of control variables.

Table 1 displays the variables under examination and their sources.

Table 1 Variables and their sources

Acronym	Name	Explanation	Source
TC	Transition coefficient	It is calculated computed with formula (1), as the ratio of a country's GDP per capita to the EU's average. It expresses the income gap.	It is computed based on World Bank Data
Variables of interest			
GDPpc	Gross Domestic Product per capita	Gross Domestic Product per capita on purchasing power parity (PPP) (constant 2017 international USD	World Bank
FDI	Financial Development Index	An aggregate of the Financial Institutions index (banking sector development) and Financial Markets Index (market capitalization)	International Monetary Fund (IMF)
KOF	Globalization Index	Overall Globalisation Index	KOF Swiss Economic Institute
IQ	Institutional Quality	Institutional quality Index computed as the mean of the following indexes: Control of Corruption, Government Effectiveness, Political Stability and Absence of Violence/Terrorism, Regulatory Quality, Rule of Law, Voice and Accountability	World Governance Indicators (WGI)
Control variables			
TO	Trade Openness	Exports of goods and services as % of GDP	World Bank
GCF	Gross Capital Formation	Gross capital formation (investment in fixed assets) as % of GDP	World Bank
GE	Government Expenditures	General government final consumption expenditures as % of GDP	World Bank

Table 2 displays the statistic description of all the considered variables (of interest and control variables) in the period of time under examination.
The transition coefficients are computed based on levels of GDP per capita sourced from the World Bank data series using the formula (1). Time series of the Financial Development Index (Svirydzenka, 2016) are extracted from the International Monetary Fund (IMF) database.

Table 2 Statistic description of variables

	Mean	Median	Maximum	Minimum	Standard Deviation
lnTC	-0.5139	-0.4740	-0.1098	-1.1578	0.2442
lnGDPpc	10.0193	10.0865	10.6208	9.2064	0.3235
lnKOF	4.2055	4.2203	4.4679	3.5864	0.1854
IQ	0.6369	0.7096	1.2372	-0.2471	0.3327
lnFDI	-1.1551	-1.5555	-0.5630	-2.2125	0.3514
lnTO	3.9565	3.9746	4.5673	3.0721	0.3611
lnGCF	3.1610	3.1501	3.7278	2.2749	0.2067
lnGE	2.9357	2.9407	3.2536	2.4572	0.1224

Source: computation based on using E-Views 12.0 software.

We use data on globalization as they are computed by the KOF Swiss Economic Institute for the countries included in the sample, namely the Overall Globalisation KOF Index. We compute the Institutional quality (IQ) as an average of individual indexes reflecting six dimensions of governance: Control of Corruption, Government Effectiveness, Political Stability and Absence of Violence/Terrorism, Regulatory Quality, Rule of Law, Voice and Accountability (Kaufmann et al., 2004, 2009, 2010, 2011). The data sets on control variables (trade openness, gross capital formation and government expenditures) are selected from the World Bank database. All-time series are referring to the period from 1996 to 2019.
In the methodological approach of our study the following steps will be performed: (i) the cross-dependence of variables will be tested with Breusch-Pagan LM, Pesaran Scaled LM, Bias-corrected scaled LM and Pesaran CD (Pesaran, 2004); under the null hypothesis there is no cross-section dependence and the correlation of disturbances between cross-section is null, while the alternative hypothesis says that this correlation is different from zero, meaning that the cross-dependence is present; the values Prob. under the level of 0.05 indicates the rejection of the null hypothesis of no cross-dependence; (ii) if the cross-dependence is revealed, then we will use second-generation unit root tests (PES-CADF and CIPS) (Pesaran 2007; Im, Pesaran, Shin, 2003) for checking stationarity of variables; for both tests, sections in the panel are non-stationary under the null hypothesis, while alternative hypothesis

presumes that at least one section is stationary; (iii) for testing cointegration on long-run of the considered variables, the Westerlund (2015) test will be run; the two assumptions of cointegration (*in some panels* or *in all the panels*) working within this test are checked depending on the p-value of variance ratio (VR) statistic: if the p-value is lower than 0.05, the null hypothesis of no cointegration is rejected indicating the presence of cointegration between the considered variables; (iv) in order to estimate the coefficients of regression (2), the models of Fully Modified Ordinary Least Squares (FMOLS) and Dynamic Least Squares (DOLS) (Pedroni, 2001a, 2001b) will be employed; (v) finally, the direction of causality between the variables of interest will be identified using the Dumitrescu-Hurlin (2012) test.

3. Main findings

We notice from table 3 that the values of Prob (indicated by *) are lower than 0.01 for all considered variables. This allows us to reject the null hypothesis of no cross-sectional dependence and accept the presence of cross-section dependence for our variable, which is important for the further methodological steps.

Table 3 Results of cross-section dependence test

	Breusch-Pagan LM	Pesaran Scaled LM	Bias-corrected Scaled LM	Pesaran CD
lnTC	919.535*	82.430*	82.191*	29.992*
lnGDPpc	1235.619*	112.567*	112.328*	35.142*
lnKOF	986.832*	88.846*	88.607*	31.227*
IQ	459.885*	38.604*	38.365*	5.532*
lnFDI	570.528*	49.153*	48.914*	20.760*
lnTO	909.692*	81.491*	81.252*	29.864*
lnGCF	284.629*	21.894*	21.655*	12.949*
lnGE	230.163*	16.701*	16.462*	5.547*

Note: *p<0.01
Source: authors' computation based on EViews 12.0 software.

The next step consists of testing the stationarity of variables using second-generation unit root tests. The results of performing the PES-CADF and CIPS tests are displayed in Table 4. In the case of both tests and options (constant/constant and trend), the values of Prob indicate that not all variables are stationary for their first level (for example in the case of IQ, lnGCF, lnGE, the prob. value is higher than 0.1) but the values of Prob. is under 0.01 for the series of first difference (ΔlnTC, ΔlnGDPpc, ΔlnFDI, ΔlnKOF, ΔIQ ΔlnTO, ΔlnGCF, ΔlnGE) indicating the presence of stationarity.

Table 4 Results of unit root tests

Variable	PES-CADF test z (t-bar)		CIPS test CIPS statistic	
	constant	*constant and trend*	*constant*	*constant and trend*
lnTC	-3.617*	-1.440***	-3.938*	-3.722*
ΔlnTC	-2.962*	-5.000*	-3.831*	-3.722*
lnGDPpc	-3.166*	-1.454***	-3.174*	-2.728*
ΔlnGDPpc	-2.944*	-4.4768	-3.629*	-3.575*
lnFDI	-1.853**	-2.836**	-2.422**	-2.863**
ΔlnFDI	-6.860*	-6.458*	-4.916*	-5.221*
lnKOF	-2.360*	-1.543***	-2.460*	-2.753***
ΔlnKOF	-10.788*	-9.893*	-4.925*	-5.094*
IQ	1.309	1.245	-1.353	-1.825
ΔIQ	-3.396*	-2.639*	-3.900*	-4.184*
lnTO	-2.580*	0.060	-1.963	-1.938
ΔlnTO	-4.177*	-2.696*	-3.912*	-4.003*
lnGCF	-3.657*	-3.047*	-2.409**	-2.654
ΔlnGCF	-7.541*	-6.099*	-4.279*	-4.315*
lnGE	-2.034*	0.364	-2.046	-2.112
ΔlnGE	-5.539*	-4.649*	--4.534*	-4.651*

Note: *p < 0.01; ** p < 0.05; ***p<0.1
Source: authors' computation based on Stata 15 software.

Given the conclusion that our variables are integrated by their first order I(1), the Westerlund test was appropriated to check the cointegration relationship between variables. According to the results displayed in Table 5, the null hypothesis of no cointegration between lnTC, lnGDPpc, lnKOF, IQ, lnFDI, IQ and lnTC, lnGDPpc, lnKOF, IQ, lnFDI, IQ, lnTO, lnGCF, lnGE under both assumptions for 1% level of significance is rejected and the alternative is adopted. It means that the long-run cointegration relationship is identified within both groups of variables (the first group includes only the variables of interest and in the second group the control variables are added) (Table 5).

Table 5 Results of Westerlund cointegration test

Variables	Assumptions:			
	"some panels are cointegrated"		*"all panels are cointegrated"*	
	statistic	**p-value**	**statistic**	**p-value**
lnTC, lnGDPpc, lnKOF, IQ lnFDI	3.2805	0.000	7.548	0.000
lnTC, lnGDPpc, lnKOF, IQ lnFDI, ln TO, lnGCF, lnGE	10.5375	0.000	6.3467	0.000

Source: authors' computation based on Stata 15 software.

Table 6 depicts the estimation of the regression equation with lnTC as the dependent variable for two variants: (i) with variables of interest and (ii) with control variables included.

Table 6 Results of regression estimation

Dependent variable lnTC:				
	(i)Explanatory variables: lnGDPpc, lnKOF, IQ, lnFDI		(ii)Explanatory variables: lnGDPpc, lnKOF, IQ, lnFDI, lnTO, lnGCF, lnGE	
	FMOLS	DOLS	FMOLS	DOLS
lnGDPpc	0.159*	0.134*	0.589*	0.257*
lnKOF	-0.493*	-0.429*	-0.197*	-0.423*
IQ	0.451*	0.437*	0.060*	0.395*
lnFDI	0.272*	0.289*	0.031*	0.195*
lnTO			-0.005	0.105**
lnGCF			0.009**	-0.132**
lnGE			-0.136*	-.0452*
R-squared	0.6484	0.6383	0.9808	0.7595

Note: *p < 0.01; ** p < 0.05
Source: authors' computation based on EViews 12.0 software.

In the group of variables of interest, all regression coefficients are statistically validated for 1% level of significance. The coefficients of lnGDPpc are positive (0.159 and 0.134) as well as those of IQ (0.451 and 0.437) and lnFDI (0.272 and 0.289) indicating a positive association with the increasing values of transition coefficient and thus, closing the income gap. The coefficient of lnKOF is also significant but negative, revealing a negative association with the transition coefficient. In other words, globalization contributed to the extension of the income gap.

When the control variables are added to the model, the relationship between the dependent variable (lnTC) and the variables of interest (lnGDPpc, lnFDI, IQ and lnKOF) is maintained, indicating the robustness of the results. lnGDPpc, lnFDI, IQ is positively associated with transition coefficient while lnKOF is inversely associated with it. The control variables have adverse effects on the transition coefficient. Government expenditures (lnGE) contributed to its decrease (in both models). Trade openness (lnTO) has also a negative impact on the transition coefficient in the FMOLS model (but the regression coefficient is not significant) while in the DOLS model the coefficient is positive and significant. The coefficients of Gross capital formation are significant for a 5% level of significance; the FMOLS regression reveals a positive association with the dependent variable while in the DOLS model the coefficient is negative, indicating a negative association.

Table 7 Dumitrescu-Hurlin causality test

Null hypothesis	**z-bar**	**p-value**	**z-bar tilde**	**p-value**
lnGDPpc does not Granger -cause lnTC	41.8600	0.0000	34.3569	0.0000
lnKOF does not Granger- cause lnTC	24.8805	0.0026	20.3335	0.0000
lnFDI does not Granger -cause lnTC	2.7095	0.0067	2.0225	0.0043
IQ does not Granger -cause lnTC	10.831	0.0000	8.7359	0.0000

Source: authors' computation based on Stata 15 software.

The results of performing the Dumitrescu-Hurlin causality test (Table 7) show that significant unidirectional causalities are running from GDPpc, KOF, FDI and IQ to the transition coefficient. In other words, these variables have a significant contribution to the increasing economic convergence levels, expressed by the transition coefficient.

4. Discussion

Figure 2 displays the dynamics of the income gap in the examined countries over the period of 1996 to 2019. We defined the income gap as the difference from transition coefficient (TC) to1. Two countries are very close to the EU's average, for the whole period of time namely, the Czech Republic and Slovenia. An accelerated evolution registers Estonia, from 0.52 to 0.20, as well as Lithuania from 0.6 to 0.19. A group of countries consisting of Hungary, Poland, Slovak Republic, Latvia, Croatia and Romania tends to have similar levels of income gap in the last years. Bulgaria remains outside of these evolutions; the income gap remains the highest in the group of eleven examined countries.

We found that the economic development level is a determinant factor of the convergence level; its influence is beneficial for closing the income gap between

national income and the EU's average in CEE countries over the period of 1996 to 2019.

Our results show that the extension of financial sectors in the examined countries contributed to narrowing the income gap and to progress in their path to be closer to the EU's average income as well as the quality of institutions. Our findings are consistent with those of Ranjibar and Rassek (2017) stating that financial development positively influences the rate of convergence.

The identified positive contribution of institutional quality to narrowing the income gap in the examined countries is a result in line with the findings of Bruinshoofd (2016). But our result must be framed within the conclusions of Glawe and Wagner (2021) who established several institutional and income convergence clubs with the EU countries. They found that institutional clusters are shaping the income convergence clubs. In the identified institutional clusters, the best performers are Lithuania, Estonia and Latvia, at the medium level Czech Republic, Hungary, Poland, Slovenia and Slovakia are positioned and at the lowest level are situated Romania and Bulgaria.

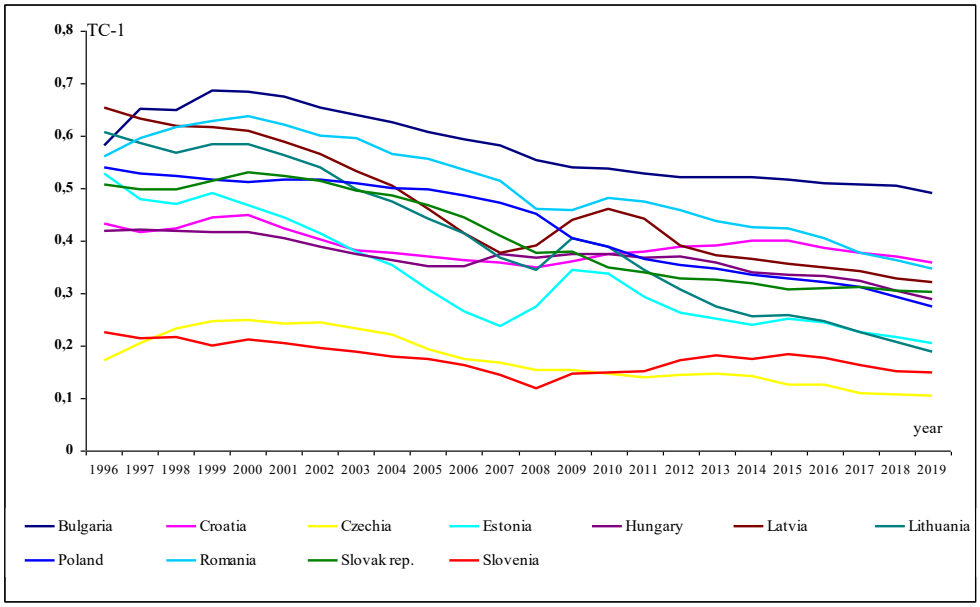

Figure 2 Dynamics of income gap (TC-1) in eleven Central and Eastern countries (1996-2019)

Source: authors' representation based on EUROSTAT indicators.

We revealed also a negative effect of globalization on the economic convergence levels. This could be explained in several ways. One explanation could be the evolution of the globalization index. Based on data from KOF Swiss Economic Institute, it had an accelerated evolution between 1996 -2008 in the CEE countries. After the financial crisis, the levels of the globalization index are stationary. Another cause can be identified in the national economic policies which didn't counteract the negative effects of globalization (i.e., a rise in income inequality, investment and capital flows, volatility of financial markets, prices instability, immigration challenges and loss of qualified human resources, the low wage for local workers). Our result regarding the impact of globalization is contrary to those found by Ullah et al. (2021) for the Belt and Road countries and in line with the conclusions of Destek et al. (2020) and Hammudeh et al. (2020) stating that the benefits of globalization are not equally distributed among the rich and the poor.

5. Conclusions and policy implications

The aim of the paper was to analyze the role of economic and financial development, globalization, and institutional factors on the income gap in eleven Central and Eastern European Union countries. We found that all these factors had a statistically significant impact on the income gap (expressed by the transitional coefficient introduced by Phillip and Sul (2007)), emphasizing their contribution to closing this gap and thus, to their European integration. Our analysis based on a data panel approach revealed the presence of cross-sectional dependence in the sets of variables; therefore unit root tests of the second generation were used to check stationarity. Due to the fact that the data series are stationary at their first level (I(1)), the Westerlund cointegration test is applied. It resulted that our variables of interest are cointegrated in the long run. The estimations of FMOLS and DOLS models revealed that the coefficients of all regression parameters are significant. Economic and financial development, along with institutional quality had a positive impact on the income gap, while globalization had a negative contribution. The relationship between variables of interest remains stable when three control variables are added (trade openness, gross capital formation and government expenditures), indicating the robustness of the results. Moreover, we identified the direction of the causality relationship between the dependent variable and variables of interest. The results of the Dumitrescu-Durlin test revealed a causality running from economic development, globalization, financial development and institutional quality to the income gap.

Based on these findings, the following policy recommendations can be suggested: (1) financial development needs to be mastered and adjusted to the country-specific situation and stability of financial systems must be an objective of national policies

in order to avoid a detrimental effect on growth and economic convergence; furthermore, financial sector can be developed by using the created capabilities and potential coming from globalisation, institutional quality and economic growth; (2) in order to reverse the negative effect of globalisation on economic convergence, national strategies of CEE countries must include effective policies meant to stimulate the drivers of productivity and innovation (i.e., investment in highly-skilled human capital and physical infrastructure, public and private funding for R&D activities and adoption of technological advancement as cloud computing, public support for innovating companies, market-friendly business environment), to promote structural reforms needed for integration in the Single Market (i.e., goods and services market reforms, labour market reforms for cover the loss of resources due to the massive immigration, active labour market policies) and to induce necessary macroeconomic adjustments (i.e., increasing price flexibility, fiscal policies, government spending); (3) institutional quality must be improved, mainly in countries as Romania and Bulgaria, in dimensions such as: corruption, government effectiveness, political risks.

In further directions of research, detailed analysis of individual countries may bring valuable conclusions for policymakers, in order to improve the contribution of examined factors to reducing the income gap and speeding the economic convergence in the CEE countries.

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