

Impacts of globalisation on economic growth in Europe Union countries

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ARTICLE INFO	ABSTRACT
DOI:10.46223/HCMCOUJS.econ.en.13.1.2206.2023 Received: March 10th, 2022 Revised: May 31st, 2022 Accepted: June 08th, 2022 JEL classification code: C33; F43; F62; F63; O52 <i>Keywords:</i> economic growth; Europe Union; globalisation; KOF Globalisation Index; panel data	The establishment of the European Union (EU) is the most visible demonstration of the impact of globalisation on economic growth. This study aims to clarify the impacts of globalisation on economic growth in the EU region. Based on panel data analysis with statistics collected from twenty-seven European Union member states continuously for the years 2004 to 2018, the results from the research show that globalisation in general and its all three dimensions including economic, political, and social globalisation have positive impacts on economic growth. Political globalisation has a lower impact level than the other aspects. This is the first research using three dimensions of the KOF Globalisation Index to examine the impact of globalisation on the EU-27 area and it does verify the impact of political and social globalisation on economic growth, in addition to the previous controversy about the impacts of these two aspects.

1. Introduction

For the past few decades, the continuous increase in economic interdependence, regional integration, capital mobility, and advanced technology has led to an inevitable phenomenon called “globalisation”. Statistics from the World Trade Statistical Review (The World Bank, 2019) highlight that world trade has increased by 26 percent since 2008. Thus, globalisation plays a very important role in the world economy and the countries that participate in the process. Globalisation significantly impacts every aspect of society in almost all countries or regions. However, the impacts of different dimensions of globalisation on the economies are still controversial. To verify the impacts of globalisation on economic growth, this paper uses panel data regression to analyze data from 27 member states of the European Union for the period from 2004 to 2018.

The finding from this research proposes that globalisation in general and three dimensions including economic globalisation, political globalisation, and social globalisation have a statistically positive significant effect on economic growth.

This study contributes to existing literature with two features. Firstly, this is the first research using three dimensions of the KOF Globalisation Index to examine the impact of globalisation on the EU-27 area. Dreher (2006) categorizes globalisation into three dimensions: economic, political, and social to measure the level of globalisation. The interdependence of the European Union’s member countries is one of the most visible examples of economic integration fueled by globalisation. Although globalisation has played an essential role in unifying the European Union into a single market, the impact of globalisation on economic growth in each member nation remains quite diverse according to the level of globalisation in each country. The paper examines the impacts of globalisation on economic growth in this region and will comprehensively assess the extent of the impact of globalisation on economic growth.

Secondly, besides confirming the positive effect of economic globalisation on economic growth, we also verify the impact of political and social globalisation on economic growth, in addition to the previous controversy about the impacts of these two aspects. Many previous authors studied the impact of globalisation on economic growth in different approaches. Steger (2003), Chang and Lee (2010) focused on the economic aspect of globalisation. Meanwhile, Krasner (2001), Hebron and Stack (2016) examined the impacts of the political aspect of globalisation on economic growth; research by Jensen, Arnett, and McKenzie (2011) assessed the impact of globalisation based on the socio-cultural dimension. While most previous studies have concluded that economic globalisation has a large impact on economic growth, the socio-cultural and political impacts are still controversial.

The rest of the paper is organized as follows. Section 2 addresses the literature review evaluating the link between globalisation and economic growth, section 3 discusses the methodology of the study. Section 4 provides the results and section 5 concludes.

2. Review of literature and research model

Globalisation

The definition of globalisation is still a contentious topic, so far there is no consensus on the definition of this phenomenon. In English, the phrase “globalization” was used by scholars several hundred years ago when people discovered the spherical earth and called the planet Earth a “globe” (Scholte, 2002). At the end of the nineteenth century, scholars not only used the adjective “global” to indicate “globe” but also “worldwide”.

The concept of globalisation has been considered from many different angles, according to Albrow and King (1990), globalisation refers to “all the processes by which people all over the world are integrated into a single society”. In the same vein, Keivani, Parsa, and McGreal (2001) asserted that globalisation links countries together which makes a modern and integrated society. Graham (2006), Al-Rodhan and Stoudmann (2006), Hebron and Stack (2016) have attempted to define globalisation more generally, encompassing economic, political, cultural, and social aspects. According to Graham (2006, p. 45), “Globalisation is the process by which the world is integrated into one economic space through international trade, the internationalization of production and financial markets”. Whereas globalisation has been argued to be, “a process that includes the causes, processes, and consequences of transnational integration” (Al-Rodhan & Stoudmann, 2006, p. 12).

An important issue in the study of globalisation is determining and measuring the extent of globalisation. Several globalisation indicators have been proposed, such as the Globalisation Index CSGR (Lockwood & Redoano, 2005), the Globalisation Index of Raab et al. (2008), the Maastricht Globalisation Index (Martens & Zywiets, 2006) but these Globalisation indicators only assess the degree of globalisation of a country in general, but do not specify the degree of globalisation in each aspect. This paper applies the KOF Globalisation Index to examine the impacts of globalisation on economic growth in the EU’s country members. The KOF Globalisation Index studied by Dreher (2006) is the most widely used indicator of globalisation.

Dreher (2006) divided globalisation into three dimensions: economic, political, and social. The term economic globalisation is used to define the increasing internationalization of markets for goods and services, the financial system, companies, and sectors of the economy. To measure the degree of economic globalisation, two dimensions have been explored, of which the first one measure capital mobility: trade, foreign direct investment, portfolio investment, and liquidity. income calculation for foreign citizens and human resources. The second aspect is restrictions on trade and the use of capital including import taxes, tariffs in international trade, and capital controls.

Political globalisation refers to the increasing linkages and exchanges between actors in the economy and between countries. To measure the degree of political globalisation, Dreher (2006) has measured through the number of embassies in a country, the number of international organizations of which the country is a member, and the degree of participation in the United Nations Security Council.

The most difficult dimension to define is social globalisation, which refers to the convergence and cross-cultural between countries. The Social Globalisation Index is built around three components: data on personal connections, data on information flow, and data on cultural proximity. Personal connection data includes telecommunications network infrastructure, travel flows, international travel, number of foreign residents, and international correspondence. Information flow data refers to global, wireless, and business networks. Cultural proximity data includes the number of McDonald's stores, the number of IKEA stores, and book sales.

From the above three dimensions of globalisation, the KOF Globalisation Index was initiated to measure the degree of participation in the globalisation process based on three dimensions: economic, political, and social. This index was studied and introduced in 2002 by Dreher (2006) and researchers from the Center of Economic Research at the University of ETH Zurich, Switzerland. The KOF Globalisation Index is calculated annually from 1970 to 2018, however not all data are available for all countries and years. Missing values were calculated using linear interpolation. The general KOF Globalisation Index has been compiled for 187 countries, the economic KOF Globalisation Index has been compiled for 150 countries, the political KOF Globalisation Index has been compiled for 207 countries and 193 countries have been ranked based on the social KOF Globalisation Index. The KOF Globalisation Index of country i in year t is measured by components from year $t-10$ to year $t-1$ to objectively assess the globalisation process of that country.

Dreher (2006) applied the KOF Globalisation Index to determine the impact of globalisation on growth in 123 countries from 1970 to 2000. Globalisation level in three dimensions Economic, political, and social has increased significantly since the 1970s, indicating that countries have promoted globalisation more strongly since the end of the Cold War (Dreher, 2006).

Table 1 shows the measurement of the globalisation index based on three dimensions of the KOF Globalisation Index: economic, political, and social.

Table 1

KOF globalisation index

Indicator and variable	Weights
Economic Globalisation	[33.3%]
Trade Globalisation	(50.0%)
Trade in goods	(40.9%)
Trade in services	(45.0%)
Trade partner diversification	(14.1%)
Financial Globalisation	(50%)
Foreign direct investment, stock	(27.5%)
Portfolio investments	(13.3%)
International debt	(27.2%)
International income payments	(29.6%)

Indicator and variable	Weights
Political Globalisation	[33.3%]
Embassies	(35.7%)
United Nations peace keeping missions	(27.3%)
International NGOs	(37.0%)
Social Globalisation	[33.3%]
<i>Interpersonal Globalisation</i>	(33.3%)
International voice traffic	(22.9%)
Transfer	(27.6%)
International tourism	(28.1%)
Migration	(21.4%)
<i>Information Globalisation</i>	(33.3%)
Patent applications	(35.1%)
International students	(31.2%)
High technology exports	(33.7%)
<i>Cultural Globalisation</i>	(33.3%)
Trade in cultural goods	(22.6%)
Trademark applications	(13.3%)
Trade in personal services	(25.6%)
McDonald's restaurant	(23.2%)
IKEA store	(15.3%)

Source: Globalisation Index (Zurich, 2018)

Economic growth

According to the traditional approach, economic growth refers to the economic system in which there is an increase in the size of capital; meanwhile, in the modern approach, economic growth refers to the change in real income per capita. Researcher Kaldor (1957) in his book "A Model of Economic Growth" highlighted that the purpose of economic growth theory is to show the nature of non-economic variables, which are variables to determine the overall level of production growth of an economy, thereby explaining why some countries grow so much faster than others. Economic growth is often measured by Gross Domestic Product (GDP) per capita at constant prices, which is calculated by dividing a country's real GDP by its population. GDP per capita at constant prices is a common measure of economic growth that shows the value of economic production attributed to each citizen in that country, a method used in the most economic growth research papers including Dreher (2006), Ying, Chang, and Lee (2014) and Suci (2015).

The theory of economic growth has confirmed a positive relationship between trade openness and economic growth in the long run. In the traditional model of international trade, the openness of trade helps to increase the productivity of a country. In other words, trade openness increases the efficiency of allocating economic resources. In the Ricardo model, with the growth of trade, countries that specialize in production will gain productivity advantages over countries that

do not specialize in production. In the Heckscher Ohlin model, it is also shown that exporting countries are those that effectively use the abundant resource factor. The greater the openness to trade, the more strongly it leads to the shift of the economy's resources, which in turn leads to an increase in the GDP (Deluna & Chelly, 2014). Some of the effects of economic globalization are reflected in global markets and world trade. According to Hill and Rapp (2009), global markets are created by economic globalization through the consolidation of individual markets from different countries, thereby promoting the liberalization of goods exchange and economic resources. The removal of economic barriers also promotes the development of global markets.

2.1. Hypotheses

From the results of many previous studies and based on the innovation of the KOF Globalisation Index (Dreher, 2006), this study proposes research hypotheses as follows:

H1: Globalisation in general has a positive impact on economic growth

H2: Economic globalisation has a positive impact on economic growth

H3: Political globalisation has a positive impact on economic growth

H4: Social globalisation has a positive impact on economic growth

2.2. The conceptual framework of the study

Previous studies focused on various aspects of globalisation. This study will concentrate on and apply the theory of globalisation of Dreher (2006) to examine the impacts of globalisation on economic growth.

Kakar, Khilji, and Ahmad (2011), Pelegrinova and Lancy (2013), Deluna and Chelly (2014) have demonstrated the positive effect of overall globalisation on economic growth and these conclusions have been proven through theories of economic growth and globalisation. Research by Todaro and Smith (2020) suggests that globalisation, as well as the economic openness of a country, is closely linked with international trade, international capital flows, and foreign direct investment. In the traditional model of international trade, the openness of trade helps to increase the production value of the economy. In the Ricardo model, with the growth of trade, countries that specialize in production will gain productivity advantages over countries that do not specialize in production.

Results of previous studies, including Hebron and Stack (2016), Zerrin and Dumrul (2018) have shown that economic globalisation has an impact on several economic issues such as international trade, international finance, and economic growth in countries. Dreher (2006), Ying et al. (2014) have shown that economic globalisation has a positive impact on economic growth. In the Heckscher Ohlin model, it is also shown that exporting countries are those that make efficient use of the abundant resource factor. The greater the openness to trade, the more strongly it leads to the shift of the economy's resources, which in turn leads to an increase in the total value of the production (Deluna & Chelly, 2014).

Political globalisation has a positive impact on some areas of economic growth such as economic growth and competitiveness among countries (Destek, 2020; Krasner, 2001). On the other hand, Ying et al. (2014) has argued that political globalisation has a negligible effect on economic growth in ASEAN countries. Besides, research by Rosenberg (2005) proposes that countries that have low levels of political integration suffer the negligible impact of political globalisation on economic growth; whereas this impact is considered significant in areas with a high degree of integration such as the European Union or free trade areas such as NAFTA and MERCOSUR. Furthermore, Dreher (2006) also concludes in his research that political globalisation has no impact on economic growth, in either country with high or low integration levels.

The research results of Ying et al. (2014) and Suci (2015) show that social globalisation has a negative and no impact on economic growth, respectively. On the other hand, Dreher (2006) and Jensen et al. (2011) show that social globalisation positively affects economic growth. In the same vein, Salifou and Haq's (2017) study also shows that the network connecting individuals has a positive influence on economic development in countries thanks to the development in awareness and knowledge of worldwide citizens as a result of improved technology in recent decades.

3. Data and research methods

3.1. Data specification

This study analyses the secondary data of 27 member countries of the European Union excluding the UK covering the period between 2004 and 2018. The reason this study excludes the UK is that this country has officially left the European Union; thus, excluding the UK would warrant the statistical results of the study.

Table 2 shows the list of the 27 EU member countries.

Table 2

List of 27 EU member countries

Ordinal numbers	Countries	Ordinal numbers	Countries
1	Austria	15	Italy
2	Belgium	16	Latvia
3	Bulgaria	17	Lithuania
4	Croatia	18	Luxembourg
5	Cyprus	19	Malta
6	Czech Republic	20	Netherlands
7	Denmark	21	Poland
8	Estonia	22	Portugal
9	Finland	23	Romania
10	France	24	Slovakia
11	Germany	25	Slovenia
12	Greece	26	Spain
13	Hungary	27	Sweden
14	Ireland		

Source: European Union (n.d.)

Based on previous studies, Dreher (2006) used the KOF Globalisation index to study the relationship between economic, political, and social globalisation and economic growth in 123 countries from 1970 to 2000. The KOF Globalisation Index was studied by the Center for Economic Research, ETH Zurich, Switzerland, and is widely accepted as a measure of the degree of participation in the globalisation process of a country or territory. This paper uses the GDP per capita at constant prices to measure economic growth, the database is collected from the website of World Bank Open Data. This study uses 05 control variables that have impacts on economic growth

including inflation, infrastructure, education quality, technology quality, and government spending based on research studied by Dreher (2006) and Suci (2015). All of the indicators related to economic growth are extracted from World Bank Development Indicator.

Countries' inflation rates of countries are calculated and published annually on the World Bank Open Data website by the World Bank. Infrastructure quality is determined by Bottini, Coelho, and Kao (2015), and Cockburn, Dissou, Duclos, and Tiberti (2013), taking the index of Accumulation of Fixed Assets as a representative variable. This index, published by the World Bank, measures government investment in infrastructures such as roads, bridges, railways, electricity networks, machinery, and equipment for the economy. The quality of infrastructure is particularly important in economic development because infrastructure has a significant impact on productivity and growth, facilitating trade and connectivity.

Infrastructure quality is used by Cockburn et al. (2013), and Bottini et al. (2015) taking the index of Gross fixed capital formation (percentage of GDP) as a representative variable. This index, published on the website of World Bank Open Data by the World Bank, measures government investment in infrastructures such as roads, bridges, railways, electricity networks, machinery, and equipment for the economy. The quality of infrastructure is particularly important in economic development because infrastructure has a powerful impact on productivity and growth, facilitating trade and connectivity, and it helps promote international economic integration.

Mercan and Sezer (2014) measured the quality of a country's education taking the proxy variable as the proportion of the population enrolled in secondary education relative to the population of the same official age corresponding to the level of upper secondary education. This rate is measured regardless of age or gender. This paper collects data on secondary education from UNESCO Institute for Statistics. Secondary education is the level at which learners have completed primary education with basic knowledge, laying the foundation for lifelong learning and human development. The quality of education represents the quality of the labor force, which is one of the decisive factors for a country's competitiveness in the world market. The human factor determines the productivity and quality of products and services, thereby creating economic value for that country. The better the quality of education in a country, the stronger its economic growth.

Technology quality is the quality of information technology or telecommunications infrastructure, as represented by individuals using the Internet out of the percentage of the population in a country. This paper collects data from the International Telecommunication Union (ITU) World Telecommunication/ICT Indicators Database. Research by Branch (2010) has shown the positive impact of the quality of technology on the economic growth of a country. Accordingly, the quality of information technology affects the flow of information, and the quality of the information in the lives of residents and businesses, thereby greatly affecting economic growth.

Finally, as a measurement of government spending, the Organisation for Economic Co-operation and Development (OECD) collects and publishes data annually on the levels of government spending by countries, calculated as a percentage of GDP. Government spending on purchasing goods and providing services such as education, health care, social protection, and defense, is measured as a percentage of gross domestic product government spending. Research papers by Enache (2009) have shown that government spending has a positive impact on national growth, in the long run, thanks to the upgrading of public services, infrastructure, social security, and defense in the long run.

This table shows the data sources of all variables.

Table 3

Variables and measurement

Variables	Explanations	Data source
GDP	Gross domestic product per capita at a constant price of country i in year t	World Bank Open Data database
KOF _{it}	Globalisation index of country i in year t	Center of Economic Research at the University of ETH Zurich, Switzerland
KOFECONOMIC _{it}	Economic globalisation index of country i in year t	Center of Economic Research at the University of ETH Zurich, Switzerland
KOFPOLITICAL _{it}	Political globalisation index of country i in year t	Center of Economic Research at the University of ETH Zurich, Switzerland
KOFSOCIAL _{it}	Social globalisation index of country i in year t	Center of Economic Research at the University of ETH Zurich, Switzerland
INFLATION _{it}	Inflation in country i in year t	World Bank Open Data database
INFRASTRUCTURE _{it}	Infrastructure quality of country i in year t	World Bank Open Data database
EDUCATION _{it}	Education quality of country i in year t	UNESCO Institute for Statistics
TECHNOLOGY _{it}	Technology quality of country i in year t	International Telecommunication Union (ITU) World Telecommunication/ICT Indicators Database
GOVERNMENTSPE NDING _{it}	Government spending of country i in year t	Organisation for Economic Co-operation and Development (OECD) database

Source: The researcher's data analysis

3.2. Research method

Besides the dependent and independent variables, this research also uses the explanatory variables that influence economic growth including inflation rate, infrastructure quality, quality of education, quality of technology, and government's spending. These explanatory variables are used in the endogenous growth model (Suci, 2015).

The formula of the study is constructed from its model from the research of Dreher (2006) and adjusted based on using 05 explanatory variables in relation to economic growth. This study does not combine the main variables of economic KOF, political KOF, and social KOF into the same model as the study of Dreher (2006) and Suci (2015) but separates each aspect to analyze the impact of each aspect on economic growth, to avoid the phenomenon of multicollinearity in the independent variables that were found out in data analysis process.

The formulations are presented below:

$$\ln \text{GDP}_{it} = \alpha_0 + \alpha_1 \text{KOF}_{it} + \alpha_2 \text{INFLATION}_{it} + \alpha_3 \text{INFRASTRUCTURE}_{it} + \alpha_4 \text{EDUCATION}_{it} + \alpha_5 \text{TECHNOLOGY}_{it} + \alpha_6 \text{GOVERNMENTSPENDING}_{it} + \varepsilon_{it}. \quad (1)$$

$$\ln \text{GDP}_{it} = \alpha_0 + \alpha_1 \text{KOFECONOMIC}_{it} + \alpha_2 \text{INFLATION}_{it} + \alpha_3 \text{INFRASTRUCTURE}_{it} + \alpha_4 \text{EDUCATION}_{it} + \alpha_5 \text{TECHNOLOGY}_{it} + \alpha_6 \text{GOVERNMENTSPENDING}_{it} + \varepsilon_{it}. \quad (2)$$

$$\ln \text{GDP}_{it} = \alpha_0 + \alpha_1 \text{KOFPOLITICAL}_{it} + \alpha_2 \text{INFLATION}_{it} + \alpha_3 \text{INFRASTRUCTURE}_{it} + \alpha_4 \text{EDUCATION}_{it} + \alpha_5 \text{TECHNOLOGY}_{it} + \alpha_6 \text{GOVERNMENTSPENDING}_{it} + \varepsilon_{it}. \quad (3)$$

$$\ln \text{GDP}_{it} = \alpha_0 + \alpha_1 \text{KOFSOCIAL}_{it} + \alpha_2 \text{INFLATION}_{it} + \alpha_3 \text{INFRASTRUCTURE}_{it} + \alpha_4 \text{EDUCATION}_{it} + \alpha_5 \text{TECHNOLOGY}_{it} + \alpha_6 \text{GOVERNMENTSPENDING}_{it} + \varepsilon_{it}. \quad (4)$$

The study uses Multiple regression analysis to analyze the panel data.

First of all, we use the Pooled Ordinary Least Squares (OLS) regression. The drawback of this method is causing econometric problems including heteroskedasticity, serial correlation, and multicollinearity in panel data analysis. Breusch-Pagan test is applied to detect the heteroskedasticity in the model, then we will use the Fixed Effect Model (FEM) and the Random Effect Model (REM) to tackle the problem of the Pooled-OLS regression (Bollen & Brand, 2010). The most effective model between FEM and REM will be decided by result of the Hausman test. Besides the regression, we also apply the Wald test for heteroskedasticity in FEM or the Breusch-Pagan Lagrange test in REM. On condition that either FEM or REM cannot resolve the problem of econometric problems, the paper utilizes the Feasible General Least Squares (FGLS) regression.

The data analysis process is being conducted by the STATA program version 14.

4. Findings

4.1. Descriptive statistics

The table below shows the statistical description of the data set.

Table 4

Statistical description

Variable	Observations	Mean	Std. Dev.	Min	Max
<i>Dependent variable</i>					
GDP	405	31,670.31	21,503.89	3,389.707	118,823.6
<i>Independent variable</i>					
KOF _{it}	405	82.32183	4.828813	67.67453	90.68347
KOFECONOMIC _{it}	405	78.9033	6.831126	55.74917	92.7738
KOFPOLITICAL _{it}	405	86.55336	10.45389	51.96506	98.06454
KOFSOCIAL _{it}	405	81.50857	5.402257	60.76664	92.199
INFLATION _{it}	405	2.143844	2.182464	-4.478103	15.40232
INFRASTRUCTURE _{it}	405	22.11265	4.062453	11.07356	37.28651
EDUCATION _{it}	397	107.6355	15.84888	81.66381	163.9347
TECHNOLOGY _{it}	405	117.7199	19.75334	47.3419	172.122
GOVERNMENTSPENDING _{it}	405	22.94958	8.645614	0.3134867	50.5426

4.2. Estimated results

The table below shows the Breusch-Pagan/Cook-Weisberg test for heteroskedasticity for Pooled-OLS method.

Table 5

Breusch-Pagan/ Cook-Weisberg test for heteroskedasticity for Pooled-OLS method

Variable	KOF	KOFECONOMIC _{it}	KOFPOLITICAL _{it}	KOFSOCIAL _{it}
Breusch-Pagan/ Cook-Weisberg test for heteroskedasticity	Chi2 (1) = 7.16	Chi2 (1) = 0.97	Chi2 (1) = 8.23	Chi2 (1) = 2.38
	Prob > chi2 = 0.0075	Prob > chi2 = 0.3246	Prob > chi2 = 0.0041	Prob > chi2 = 0.1230

To ensure the statistical significance of Pooled-OLS results, the classical econometric problem of the Pooled-OLS model is tested for heteroskedasticity using the Breusch-Pagan/Cook-Weisberg test. As the test results in variable **KOF** and **KOFPOLITICAL_{it}** show the Prob > chi2 value smaller than 0.05, thus the results of OLS regression could not be used to explain the effect of the globalisation in general and the political globalisation on economic growth while the Pooled-OLS method can be used in models of **KOFECONOMIC_{it}** and **KOFSOCIAL_{it}**.

To tackle the heteroskedasticity of the Pooled-OLS, FEM and REM are used instead.

These tables below present the FEM/REM estimation results in models of **KOF_{it}** and **KOFPOLITICAL_{it}**.

Table 6

FEM/REM estimation results in models of KOF_{it}.

Variables	FEM	REM
KOF _{it}	0.0444 ***	0.0495***
INFLATION _{it}	0.0091**	0.0097**
INFRASTRUCTURE _{it}	0.0084**	0.0106**
EDUCATION _{it}	0.0003	0.0004
TECHNOLOGY _{it}	0.0050***	0.0046***
GOVERNMENTSPENDING _{it}	-0.0010	0.0002

Table 7

FEM/REM estimation results in models of KOFPOLITICAL_{it}.

Variables	FEM	REM
KOFPOLITICAL _{it}	0.0146 ***	0.0149***
INFLATION _{it}	0.0016	0.0013
INFRASTRUCTURE _{it}	0.0023	0.0035
EDUCATION _{it}	0.0016*	0.0020*
TECHNOLOGY _{it}	0.0073***	0.0072 ***
GOVERNMENTSPENDING _{it}	-0.0038***	-0.0029***

Table 8 presents the result of the Hausman test and the appreciated model.

Table 8

Hausman test

Variable	KOF	KOFPOLITICAL _{it}
chi2 (6)	65.26	59.33
Prob > chi2	0.0000	0.000
Appreciated model	FEM	FEM

Table 9 shows the Breusch-Pagan/Cook-Weisberg test for heteroskedasticity for Fixed Effect Model. The classical econometric problem of the OLS model is tested for heteroskedasticity using the Breusch-Pagan/Cook-Weisberg test. Heteroskedasticity issues occurred in both of these models presented by the Prob > chi2 values are less than 0.05.

Table 9

Breusch-Pagan/ Cook-Weisberg test for heteroskedasticity for Fixed Effect Model in models of KOF_{it} and KOFPOLITICAL_{it}.

Variable	KOF	KOFPOLITICAL _{it}
Breusch-Pagan/ Cook-Weisberg test for heteroskedasticity	Chi2 (27) = 332.20	Chi2 (27) = 645.04
	Prob > chi2 = 0.0000	Prob > chi2 = 0.0000

Besides the Breusch-Pagan/Cook-Weisberg test for heteroskedasticity, we also test the autocorrelation in all models using the Wooldridge test, the results of this test are presented below.

Table 10

Wooldridge test for autocorrelation

Variable	KOF	KOFECONOMIC _{it}	KOFPOLITICAL _{it}	KOFSOCIAL _{it}
Wooldridge test for autocorrelation	F (1, 26) = 126.302	F (1, 26) = 136.636	F (1, 26) = 96.354	F (1, 26) = 119.571
	Prob > F = 0.0000	Prob > F = 0.0000	Prob > F = 0.0000	Prob > F = 0.0000

As can be seen form Table 9 and Table 10, heteroskedasticity occurs in two models of KOF_{it} and KOFPOLITICAL_{it} while autocorrelation happens in all four models.

Thus, the Pooled-OLS and FEM methods are not the appropriate methods to estimate these four models. We use the Feasible Generalized Least Squares (FGLS) Model alternatively to fix problems of heteroskedasticity and autocorrelation.

Table 11 illustrates the results of FGLS estimation. The paper uses these results to explain the effects of globalisation on economic growth in EU countries.

Table 11

Research results

Variable	Statistics				Accepted hypothesis
	(1)	(2)	(3)	(4)	
KOF _{it}	0. 1002 ***				H1
KOFECONOMIC _{it}		0. 0499***			H2
KOFPOLITICAL _{it}			0.0132**		H3
KOFSOCIAL _{it}				0.0986 ***	H4
INFLATION _{it}	-0.0047	-0.0236*	-0.0525***	0.0210**	
INFRASTRUCTURE _{it}	0.0029	0.0384***	0.0449***	0.0222**	
EDUCATION _{it}	0.0021*	0.0043**	0.0018***	0.0048***	
TECHNOLOGY _{it}	0.0027**	0.0056***	0.0014***	-0.0012	
GOVERNMENTSPENDING _{it}	0.0053*	0.0405***	0.0054***	0.0171***	

Note: All variables provided as natural logarithms. Standard errors in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1

4.3. Results discussion

As can be seen from Table 5, all the independent and control variables except the inflation rate have a positive impact on the value of GDP per capita at constant prices used to measure economic growth.

Globalisation in general has a positive and strong impact on economic growth in EU countries. Economic growth is not only a positive change in the economic structure but also shows an improvement in people's living quality, which is reflected in many aspects of life, such as education, health care, and working conditions. Globalisation has changed the picture of the EU economy through increased cross-border trade, currency exchange, capital movement, people movement, and information flow. Globalisation has also created a borderless region and removed barriers between EU country members. Globalisation has changed the way of thinking of business owners, businesses have changed their strategies, and the target market of businesses is now not only limited to their own country but the global common market. These changes lead to a remarkable increase in economic growth not only in the EU region but also in each country member.

Economic globalisation is also strongly correlated with economic growth. An approach to explain this impact is the increase in the trade openness of nations. Some of the effects of economic globalisation are reflected clearly in EU markets and trade because this region is one of the most relevant examples of a region that benefits from trade openness. The theory of economic growth has confirmed a positive relationship between trade openness and economic growth in the long run. In the traditional model of international trade, the openness of trade helps to increase the production value of the economy. In other words, trade openness increases the efficiency of allocating economic resources. In the Ricardo model, with the growth of trade, countries that specialize in production will gain productivity advantages over countries that do not specialize in production. Therefore, the greater the openness to trade, the more strongly it leads to the shift of the economy's resources, which in turn leads to an increase in the total value of the production (Deluna & Chelly, 2014). According to Hill and Rapp (2009), global markets are created by economic globalisation through

the consolidation of individual markets from different countries, thereby promoting the liberalization of goods exchange and economic resources. The removal of economic barriers between EU country members also promotes the development of regional markets. Through economic globalisation, EU enterprises get advantages in access to new and expanding markets, as well as capital and advanced technology. Besides, EU customers can access a variety of lower prices products. Therefore, the EU benefits significantly from higher levels of productivity which lead to an increase in GDP per capita.

Political globalisation has a positive impact on economic growth. The impact of political globalisation on economic growth is still a controversial issue and there is not much research in this area, especially among EU country members. Dreher (2006) concluded that political globalisation has no impact on economic growth in 123 countries over the period from 1970 to 2000; Ying et al. (2014) also reached the same conclusion when studying the ASEAN region in the period from 1970 to 2008. These two studies argue that political globalisation leads to the risk that governments are not able to control issues well within their countries and citizens. On the other hand, high political integration causes governments to align on policies to prioritize development and promote the single market, leading to a redistribution of scarce economic resources, which can slow down the country's economic growth rate. The alignment of EU government policies will promote trade flows, remove trade barriers in the region, increase trade, and strengthen cooperation in imports and export, thereby helping to promote the economic growth of country members. The European Union is an area with extensive and comprehensive integration, so political globalisation in the European Union has great significance in cooperation and common policy development, promoting economic growth and development, economic development and human development. In addition, high political integration can help countries have political reforms, learn, and improve science and technology, and promote economic growth.

Social globalisation has a positive effect on economic growth. Similar to the political aspect of globalisation, the social dimension is also a controversial issue. This positive impact on the social dimension of globalisation is explainable because the EU is one of the biggest regions that invest heavily in human capital and technology. Thanks to access to many knowledge sources such as television and the internet, EU citizens show the enhancement of awareness and knowledge which lead to social and economic development. Another social factor that improves economic growth in EU countries is the global network of EU firms. The advanced flow of information systems connects EU firms with other firms to cooperate in production as well as helps EU firms connect to the global market demands, reduce cross-border transaction costs, promoting international trade, thereby leading to economic growth.

5. Conclusions

This paper uses panel data regression to analyze data from 27 member states of the European Union for the period from 2004 to 2018 to study the impact of globalisation on economic growth in this region.

The European Union is a political-economic union with the most extensive and comprehensive regional integration in the world, a clear demonstration of the process, consequences, and impact of globalisation on all aspects of the member countries. The results show that globalisation in general and globalisation in three aspects including economic, political, and social have positive effects on economic growth in the EU country members.

5.1. Contributions of the study

First, this is the first research using three dimensions of the KOF Globalisation Index to

examine the impact of globalisation on the EU-27 area. This study is the first to conduct research in a deeply integrated region like the European Union and has contributed to overcoming the limitations of previous studies.

Secondly, besides confirming the positive effect of economic globalisation on economic growth, this study also verifies the impact of political and social globalisation on economic growth, in addition to the previous controversy about the impacts of these two aspects.

5.2. Limitations and directions for further development of the study

Same as other studies, this research still has some limitations. This study uses the KOF Globalisation Index to measure the level of participation in the globalisation process of countries, although this index is widely accepted and applied in research studies. This index is widely used, but it still does not guarantee the objectivity of the research when using this index because the KOF Globalisation Index was studied by Dreher (2006) and researchers from the Center for Economic Research at the ETH Zurich, Switzerland. Therefore, research papers in this area can study more about other globalisation measures such as the Trade Openness index published by the World Integrated Trade Solution database, the CSGR Globalisation Index (Lockwood & Redoano, 2005), the Globalisation Index of Raab et al. (2008), and the Maastricht Globalisation Index (Martens & Zywiec, 2006).

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