International Business and Global Economy 2024, no. 43, pp. 33–49

Edited by the Institute of International Business, University of Gdańsk
ISSN 2300-6102
e-ISSN 2353-9496 https://doi.org/10.26881/ibage.2024.43.03

Filip Paweł Roszkowski
University of Gdańsk

The importance of economic openness for the economic growth of OECD countries in the years 1990–2020

This study analyses the impact of economic openness on economic growth in OECD countries over the years 1990–2020. Utilizing panel data and dynamic panel estimation methods, it examines the relationship between various aspects of economic openness – such as international trade, migration, foreign direct investment and political and economic integration – and the dynamics of economic growth. The results indicate a positive impact of economic openness on economic growth, with varying strength depending on the factor. The analysis also highlights the importance of further research in the context of new global challenges, such as digitization and climate change, for understanding the relationship between openness and economic growth in a changing global environment.

Keywords: economic growth, economic openness, panel data analysis, international trade, economic integration

JEL classification: F43, F63, O47, C23

Introduction

The extremely dynamic economic growth observed in the last century has inspired economists to conduct intensive research focused on identifying its sources. Numerous attempts have been made to create a theoretical model that would satisfactorily explain this phenomenon and provide researchers with appropriate tools for empirical studies, as well as a basis for formulating relevant economic policy recommendations.

The first model meeting these criteria was independently formulated by Solow [1956] and Swan [1956]. Today, it is considered a milestone in macroeconomic research and serves as the primary tool for explaining how capital accumulation, technological progress and population growth impact economic growth. Despite its fundamental role, it has several limitations. These include the assumption of constant returns to scale, which may be increasing due to, for instance, knowledge

accumulation and diffusion or innovations, which this model omits by treating technological progress as an exogenous variable. Furthermore, it predicts the occurrence of absolute convergence, which, as shown by Barro and Sala-í-Martin [1992], among others, has been questioned by other growth models and is not empirically confirmed.

In the dynamically changing post-war world, the elegant simplicity of the Solow–Swan model, due to its limitations, could no longer sufficiently explain economic growth driven by phenomena that were not observed before. The extraordinarily rapid technological progress also introduced new and previously unknown phenomena, setting new directions for social science research. By the late 20th century, successful attempts were made to endogenize technological progress. Among the pioneers of endogenous growth theory are researchers like Lucas [1988], who focused on the role of human capital accumulation, and Romer [1990], who introduced the concept of knowledge spill-overs and emphasized its non-rival nature. Alternative theories were also proposed by Aghion and Howitt [1992], who formulated a model based on innovation and growth through "creative destruction", explaining the replacement of old technologies with new ones. Grossman and Helpman [1991] also created an interesting theory emphasizing the importance of international trade and innovation-friendly policies, among many other researchers over the years.

The significant pace of globalization, the enormous increase in international trade volume, mass migration of people from poorer to richer regions, unprecedented international integration and cooperation, and many other phenomena have resulted not only in new theoretical papers but also numerous empirical studies. Among engrossing examples of such studies are those of Barro [1991] and Rodrik and Rodríguez [2000]. Interesting analyses for Central and Eastern European countries have been conducted by Ciołek [2003] and Rapacki and Próchniak [2014]. A relatively extensive meta-analysis of various studies on the relationship between economic openness and economic growth was presented by Domańska [2011].

Despite numerous empirical studies [e.g. Dallinger, 2013; Ya Wen et al., 2023], there is still no unequivocal answer to the question of the impact of various aspects of economic openness on economic growth, how varied this impact is depending on the region under study, and what the potential causes of this variation might be. Moreover, there seems to be a lack of a theory that satisfactorily and comprehensively explains how economic openness affects economic growth and development. This study provides an empirical attempt to answer the question of the direction and strength of the impact of economic openness on the economic growth of 38 OECD economies in the years 1990–2020, a period of the most dynamic deepening of economic integration among various countries belonging to

this organization, particularly the European Union countries, which constitute the majority of OECD member states.

A review of contemporary research and detailed description of the identified research gap will be discussed in the next section of the article. The third section will provide a concise overview of the changes in GDP per capita levels in the examined economies. The fourth section will present a description of growth regression for panel data, a method popular in the literature for analysing the impact of various variables on the dynamics of economic growth. The fifth section will briefly discuss the methods of estimating dynamic panel models, particularly the FD GMM estimator proposed by Arellano and Bond [1991] and the SYS GMM developed by Blundell and Bond [1998] and improved by Blundell et al. [2001]. The final section will present the results of the growth regression estimation, conducted in three-year intervals to eliminate as much as possible potential business cycle effects that could distort the obtained regression model estimates.

1. Openness and economic growth in empirical research

In the 21st century, quite a lot of empirical efforts are being made to identify the impact of economic openness, understood in various ways, not only on economic growth but also on development, the general standard of living, and socially significant issues such as the wage gap, social inequalities and the demand for social protection. The effects of rapidly progressing globalization and the opening of economies undoubtedly constitute a crucial issue for researchers worldwide.

Dallinger [2013] undertook an analysis of the impact of economic openness and globalization on the demand for social protection and social expenditure. The main premise of her study was the assertion that economic openness, by increasing labour market uncertainty, leads to a higher demand for social protection from voters. However, results obtained using multilevel logistic models did not confirm the main assumption of this study. Economic openness was found to have a negative impact on the demand for social protection. Furthermore, the response to increasing levels of economic openness is class-differentiated – unskilled workers and lower-class employees in the service sector show a higher demand for social protection than skilled workers. Subjective employment uncertainty also negatively affects the demand for social protection. A similar study, but for Latin American countries, was conducted by Burrier [2014]. Including the political orientation of governments, he found opposite conclusions. Based on a panel analysis of seventeen South American countries, he stated that economic openness promotes an increase in social protection expenditure, as does a left-wing government orientation, unlike right-wing governments. According to the author, governments use

this approach to compensate for citizens' uncertainty associated with increased levels of economic openness.

Many studies have also been conducted on income distribution, inequality or the wage share in GDP. For instance, Guschanski and Onaran [2016] analysed factors determining the wage share in GDP in selected OECD countries. They demonstrated that globalization has a strong and negative impact on the wage share in GDP in all the countries they studied. This impact is mainly exerted through variables such as FDI and imports. Among other factors affecting the wage share, they also mentioned union activities and collective bargaining, which had a positive impact, with unions being most influential in Germany and collective bargaining in France and the UK. Technological changes had an ambiguous impact, while the growing role of the financial sector in the economy had a negative impact. Gülsün et al. [2016] conducted a similar study, examining the influence of both globalization and liberalization. According to their findings, both globalization and liberalization contribute to increasing wage inequality, especially in OECD countries. However, economic policies aimed at creating a stable monetary system can help reduce inequality. Özdemir [2019] also studied the relationship between economic openness and income distribution. He found that economic openness promotes the growth of income inequality, with trade openness having a greater impact than financial openness. Thus, contemporary studies confirm the theses of Rodrik [1998] and Stiglitz [2002] that economic openness has an ambiguous impact on the standard of living, which can often be negative, and the potential problems are not limited to developing countries but also affect highly developed economies such as OECD countries.

In studies on economic openness, the approach often focuses mainly on trade openness. Navaratnam [2014] conducted such a study on the economy of Sri Lanka. His findings showed a positive impact of trade openness on Sri Lanka's economic growth. The example of Sri Lanka also shows that trade openness leads to increased employment and capital investment, and positively affects the country's macroeconomic stability. Iyke [2017] conducted a similar study for a slightly larger group of countries. Based on his analysis of seventeen Central and Eastern European countries, he found that trade openness was a significant factor in economic growth in this group of countries. He also analysed trade liberalization policies, but according to his findings, their impact remains ambiguous, indicating the need for further research in this area. An interesting analysis of regional dependencies between economic openness, innovation, and economic growth in China was conducted by Ya Wen et al. [2023]. According to their analysis, the increase in the level of economic openness promotes the optimization of regional development, with technological innovations being a significant channel of optimization, which

seems to be in line with Romer's [1986; 1990] theory of the importance of innovation for economic growth.

Various aspects of economic openness thus seem to have a very diverse impact on macroeconomic variables such as economic growth, the level of income inequality in the economy, government spending on social protection, and many other economic, social, and political variables. Contemporary studies on the impact of trade liberalization are partly contradictory to studies by Sachs and Warner [1995] and Rodrik et al. [2004]. Moreover, studies often focus on the effects of globalization and openness, primarily understood as trade openness, measured by the share of imports and exports in GDP, or financial openness, including FDI.

There seems to be a lack of analyses of the impact of non-financial factors, such as migration or membership in various multilateral agreements and integration groups. The impact of different aspects of openness is usually studied separately. Thus, there is a need for a study that comprehensively takes into account the impact of various factors on economic growth, including all, macroeconomic and social and political ones. This analysis aims to fill this gap by using explanatory variables from each of the mentioned categories, both individually and collectively. It thus aims to answer not only the question of the impact on economic growth of individual variables separately but also whether different combinations of them can affect growth in various ways.

2. Evolution of openness in global economy

As mentioned in the introduction, in the second half of the 20th century, the global economy underwent a profound transformation, marked primarily by a rapid increase in economic openness and a departure from isolationist policies that sometimes prevailed before World War II. This pivotal moment in economic history, initiated by the end of the global conflict, marked the beginning of a new era in global trade and investment. The decisions made during the Bretton Woods Conference in 1944, aimed at post-war economic reconstruction, played a crucial role. Institutions such as the International Monetary Fund and the World Bank were established to support economic stability and post-war recovery. Furthermore, in 1947, the General Agreement on Tariffs and Trade was concluded, later replaced by the World Trade Organization in 1995. The goals of these organizations – promoting international cooperation and the liberalization of trade and capital flows – formed the foundations of the new economic order. As noted by Keynes [1936] and White [1942], the architects of the Bretton Woods system, financial stability and the reduction of trade barriers were seen as key to ensuring long-term economic growth and global prosperity.

The Cold War and its consequences, including the collapse of the Soviet Union, also significantly shaped the global economy. The fall of the Iron Curtain and the establishment of the European Union through the Maastricht Treaty in 1993, culminating a long process of deeper integration in Europe, opened new opportunities for international trade and investment. The economic transformation of the former Eastern Bloc countries, including reforms implemented in Poland and Hungary, as well as economic reforms in China initiated by Deng Xiaoping, profoundly impacted the evolution of the global economy, contributing to increased volumes of international trade, capital flows, and foreign direct investment.

Analysing the various aspects of economic openness and its impact on economic growth reveals the complex and multidimensional nature of this phenomenon. This study primarily distinguishes between economic, social, and political openness. Economic openness is understood as the free flow of goods, services, and capital, manifested through international trade and FDI. Social openness mainly refers to the free movement of people, facilitated by the removal of borders between countries or simplified visa procedures. Political openness is understood as membership in international integration organizations and multilateral political-economic treaties, leading to economic and political integration, access to new markets through the removal of tariffs and various economic blockades. The literature indicates numerous potential benefits from greater integration with the global economy, but many researchers also emphasize the challenges and risks associated with it.

Rodrik [1998] points out that openness may require greater government involvement to stabilize the economy and protect society from the negative effects of globalization, suggesting a complex relationship between openness and economic growth. Sachs and Warner [1995] provide empirical evidence that countries that chose to liberalize their economies experienced accelerated growth, indicating potential benefits from openness. Similar conclusions are drawn by Rodrik et al. [2004], who highlight that trade liberalization, market deregulation, and capital flow facilitation are key elements supporting growth by increasing competition, efficiency, and innovation. An interesting study on the relationship between international trade and per capita income was conducted by Frankel and Romer [1999].

However, as Stiglitz [2002] notes, globalization and economic openness can also bring disappointments, especially for developing economies, highlighting the uneven distribution of benefits and costs of increasing openness, which can hinder economic growth in some regions. He emphasizes the need for reforming global financial and trade institutions to make globalization more fair and beneficial for all. Baldwin [2016] expands this discussion by arguing that the new globalization, driven by technological progress, has a different impact on economies than traditionally understood trade openness. He emphasizes that in the digital age, the

importance of knowledge and information in the global economy is greater than ever, pointing to the necessity for governments and businesses to adapt to new driving forces that will shape the global economic landscape in the future, potentially leading to profound changes in policy and business strategies. Shaping economic policy in the era of globalization will require balancing the opportunities and limitations that economic openness brings to ensure economic growth along with social and economic stability.

The impact of economic openness on economic growth can therefore vary, depending on many factors such as the stage of economic development, the quality of institutions, the economic policy of the country, and adaptive capacities. Developed countries may more quickly reap the benefits of openness due to better infrastructure and institutions, while developing countries may face challenges in fully leveraging the benefits without appropriate investments in socio-economic development.

3. Economic growth of OECD countries in 1990–2020

The OECD was established under the Convention on the Organisation for Economic Co-operation and Development signed in Paris in 1960. Many of the countries that make up this organization today are among the world's largest economies and have had a significant impact on shaping the global economy in the post-war years. These countries, too, have observed and participated in significant economic transformations over the last three decades, closely linked to the processes of opening up their economies. Particularly interesting examples of economies that have achieved spectacular success in recent decades are certainly the countries of the former Eastern Bloc, which transitioned from centrally planned economies to market economies after the collapse of the Soviet Union in the early 1990s.

The transformation process of these economies included a series of reforms, such as the liberalization of prices and exchange rates, privatization of state-owned enterprises, liberalization of international trade and capital flows, and integration with European and global markets. Countries like Poland, the Czech Republic, Hungary, and the Baltic states have demonstrated the ability to adapt and implement deep structural changes that enabled rapid economic growth. As demonstrated by Ciołek [2003], they also exemplify a gradual convergence to the living standards and economic development levels of Western countries.

Table 1 uses GDP per capita PPP in constant 2017 international dollars, as a measure of economic size. According to the data in the table, the most spectacular growth between 1995 and 2020 was achieved by Lithuania, whose GDP per capita increased by 249.42% during this period. Similarly impressive growth was

recorded by Latvia (208.11%), Estonia (181.86%), Poland (162.51%), and Slovakia (133.59%). Among the countries formerly behind the Iron Curtain, somewhat smaller but still impressive growth was noted in Hungary (88.01%) and the Czech Republic (69.78%). It should be emphasized, however, that the GDP figures for 2020 were significantly distorted due to the outbreak of the COVID-19 pandemic. It can be expected that if this black swan event had not altered the global economy, the GDP per capita of the countries studied would likely be much higher[9].

An interesting example of economic success outside Europe is South Korea (133.97% growth). Among others, Rodrik [1995] showed that the export-led growth policy pursued by Korea is not sufficient to explain the country's rapid economic growth. He particularly emphasizes the role of strategic government interventions, including subsidies, coordinated investment strategies and policies aimed at creating a favourable investment climate that fostered technological progress, one of the most important factors in economic growth. Additionally, the external orientation of the economy resulted from increased demand for imported capital goods, driven by the government's increase in private capital returns. Rodrik's study can be seen as a kind of confirmation of the theory developed five years earlier by Romer [1990].

However, among OECD countries, there are also those that did not achieve such economic success. Greece (8.38% growth) can be cited as a primary example of poor policy. Over the last three decades, the growth trajectory of this country has been a sine wave of prosperity, crises, and gradual recovery. The 1990s brought a period of moderate growth driven by integration within the European Union and entry into the Eurozone at the beginning of 2001. However, poor fiscal management led to a huge increase in public debt due to the constant maintenance of a deficit in the public finance sector, which contributed to the reversal of the growth trend for Greece. The global financial crisis of 2007–2008 also wreaked havoc on the country's economy, eventually leading Greece into a debt crisis in 2009. This necessitated multiple international bailout packages from the European Union, conditional on austerity measures and structural reforms. These reforms led to deep recession and social difficulties but were necessary for economic stabilization. Signs of recovery appeared from 2017 onwards, with GDP growth and declining unemployment, although the legacy of the debt crisis and the impact of the COVID-19 pandemic still pose challenges for the country's economy.

In summary, the analysis of the economic growth of OECD member countries reveals a diversity of development trajectories, largely dependent on historical conditions, economic policies and the adaptive capacities of individual economies.

[9] An example of the greatest distortion of results by the COVID-19 pandemic is Italy, whose growth in the years 1995–2020 was only 0.38% due to the significant decline in GDP in 2020. The increase in Italy's GDP in 2019 compared to 1995 precipitated 9.78%.

The complexity of economic processes and the importance of appropriate economic policies, which together shape the prospects for economic growth, are clearly visible. Ultimately, it seems that economic success depends not only on internal factors but also on the ability to adapt to the changing global economic environment.

4. Empirical growth regression for panel data

In studies involving groups of countries, their individual characteristics, such as the level of wealth and the various inputs of different production factors, and thus a diversified production function, can be of significant importance. Also crucial can be the unobservable characteristics of individual economies, such as the level of technology or various institutional, social, historical, and geopolitical conditions. These factors can also change over time. When using models based on cross-sectional data or time series, all unmeasurable or unobservable factors are included in the error term, leading to a violation of the assumption of no correlation between explanatory variables and random disturbances, resulting in a biased model when estimated using methods like OLS and its derivatives [Caselli et al., 1996]. In such a situation, the best solution seems to be estimating a regression model using panel data, which allows the individual specifics of units and periods to be included in the model [Ciołek, 2003].

Due to the emphasis by researchers like Rodrik [1998], Sachs and Warner [1995], and more recently Iyke [2017] and Navaratnam [2014] on the importance of trade openness, it has been included in this study as a variable representing the share of imports and exports in GDP. Financial openness, also frequently mentioned in studies, has been included in the form of variables related to FDI. Additionally, social variables such as the net migration share in the population, and political variables such as membership in international integration groups, have also been included. Thus, the following panel data regression and its various variants with a smaller number of variables have been applied in this study:

$$\begin{aligned}\ln(y_{i,t}) = \alpha_0 + (1-\beta)\ln(y_{i,t-1}) + \alpha_1 s_{i,t} + \alpha_2 \ln(\rho_{i,t}) + \alpha_3 H_{i,t} + \alpha_4 TRADE_{i,t} + \\ \alpha_5 MIG_{i,t} + \alpha_6 PFDI_{i,t}^{IN} + \alpha_7 INT_{i,t} + \varepsilon_{i,t}.\end{aligned} \tag{1}$$

where:

$\ln(y_{i,t})$ – the natural logarithm of real GDP per capita at PPP in the *i*-th economy in the year *t*,

$(1-\beta)$ – autoregressive parameter, used to take into account the occurrence of possible β-convergence[10],

$\ln(y_{i,t-1})$ – the natural logarithm of real GDP per capita at PPP in the i-th economy, lagged by one period,

$s_{i,t}$ – share of gross fixed capital formation in real GDP in the i-th economy,

$\ln(\rho_{i,t}) = (n_{i,t} + g + \delta)$ – the natural logarithm of the sum of the population growth rate (n), the rate of technical progress (g) and the rate of capital depreciation (δ) in the i-th economy,

$H_{i,t}$ – investment rate in human capital per capita, based on the number of years of education and the return on education for the i-th economy,

$TRADE_{i,t} = \left(\frac{I_{i,t} + X_{i,t}}{Y_{i,t}}\right) \times 100\%$ – share of imports (I) and exports (X) in GDP (Y) in the i-th economy,

$MIG_{i,t} = \left(\frac{NM_{i,t}}{P_{i,t}}\right) \times 100\%$ – the ratio of net migration (NM) to population (P) in the i-th economy,

$PFDI_{i,t}^{IN} = \left(\frac{FDI_{i,t}^{IN}}{Y_{i,t}}\right) \times 100\%$ – ratio of foreign FDI inflows to GDP (Y) in the i-th economy,

$PFDI_{i,t}^{OUT} = \left(\frac{FDI_{i,t}^{OUT}}{Y_{i,t}}\right) \times 100\%$ – ratio of domestic FDI outflows to GDP (Y) in the i-th economy[11],

$INT_{i,t}$ – membership in various types of integration groups of the i-th economy,

$\varepsilon_{i,t}$ – error term for the i-th economy in period t.

Since on the right side of equation (1) there is an explanatory variable lagged by one period, it is a dynamic autoregressive model. This study used such an approach to take into account the occurrence of conditional β-convergence among OECD countries, which may be interesting due to the relatively high level of differentiation of individual economies, both in terms of development and the distance between the countries covered by the study.

5. Estimation methods

As mentioned above, this model considers conditional β-convergence and is a dynamic autoregressive model, thus requiring appropriate estimation methods. The presence of a lagged dependent variable, which is correlated with the error term, as well as individual effects indicating the heterogeneity of the countries studied, necessitates the use of suitable estimation methods. Traditional estimators

[10] $\beta = \frac{(1 - e^{\lambda T})}{T}$, where λ – rate of conditional convergence, T – number of observations over time.

[11] This variable was not included in formula (1) because domestic FDI and foreign FDI cannot be combined in one model. It would then be impossible to estimate it correctly.

such as OLS or generalized OLS cannot be used to estimate such a model because their application in this case leads to biased and inconsistent parameter estimates [Baltagi, 2021]. Furthermore, since these estimators do not account for individual or period effects, the results of the autoregressive parameter estimation obtained with these estimators are also incorrect. Consequently, the rate of β-convergence and the impact of the analysed explanatory variables on economic growth cannot be correctly assessed. As shown by Blundell et al. [2000], similar problems occur when using the Within estimator. Although it solves problems related to omitted variables or individual effects, the endogeneity of explanatory variables remains an issue, leading to an incorrect estimation of the autoregressive parameter.

To address these problems, various methods have been proposed, mostly based on the GMM estimator developed in the 1980s by Hansen [1988]. Two approaches dominate in particular. The first is the application of the GMM estimator in the form of first differences (FD GMM), proposed by Holtz-Eakin et al. [1988], and later developed by Arellano and Bond [1991]. The second approach is the use of the so-called System GMM (SYS GMM), proposed by Blundell and Bond [1998].

To eliminate the problem of endogeneity of the variables, the method proposed by Arellano and Bond involves a two-step procedure. The first step is to estimate the equations for the first differences. This solution eliminates the need for the model to meet the assumption of no correlation between explanatory variables and individual effects, as differencing removes them from the regression. However, this does not yet resolve the problem of potential endogeneity of the explanatory variables, so it is also necessary to use appropriately chosen instruments. The Arellano–Bond estimator uses lagged levels of the dependent variable as instruments for the lagged differences of the dependent variable.

In the case of growth regression with conditional β-convergence, the FD GMM estimator can be biased. This occurs when the variance of the individual effects is significantly larger than the variance of the error term, as well as when the autoregressive parameter approaches values close to unity. The reason for this bias is that lagged levels of the dependent variable are weak instruments for the lagged differences of the dependent variable, as they are weakly correlated with each other. In this case, using the FD GMM estimator results in a significant underestimation of the autoregressive parameter, leading to an overly rapid convergence rate [Ciołek, 2001; Blundell, Bond, 1998]. Blundell and Bond proposed addressing this problem by estimating, in addition to the equations for first differences, additional equations for levels. This approach led to the development of the SYS GMM estimator, an extension of the Arellano–Bond estimator. In this study, the SYS GMM estimator was used to estimate the growth regression model.

6. Estimation results

This model was estimated using data from the Penn World Table and the World Bank database. To satisfactorily eliminate the time effects associated with business cycles, the growth rate was determined for three-year intervals. Due to data gaps for some countries in the early years of the study period, an unbalanced panel was used. The study period covered the years 1990–2020. The aim of this study was to demonstrate the impact that various aspects of economic openness have (or do not have) on the economic growth of 38 OECD economies. The Solow–Swan model, extended to include human capital, served as the basic starting point for the first regression, which included the human capital index among the explanatory variables. This approach was used in theoretical models by Lucas [1988] and Mankiw et al. [1992]. Subsequent regressions were estimated by extending the basic model with additional variables representing different aspects of economic openness, mentioned and described in section 3 of this paper. Migration, for instance, can account for the diffusion of technology between countries, according to Romer's theory [1990]. Membership in integration groups significantly facilitates migration within such groups, which can enhance this effect. It is also associated with the removal of trade barriers, such as tariffs, which contributes to increasing the volume of international trade and, therefore, the flow of technology and know-how. This can impact growth by enabling countries with higher innovation costs to imitate technological leaders, according to Barro and Sala-í-Martin's technology diffusion model [1990]. The estimation results are presented in Table 2.

The results of the baseline model estimation (1) indicate statistical significance at the $p = 0.01$ level for all explanatory variables, except for the natural logarithm of the sum of the population growth rate, technological progress rate, and capital depreciation rate (this variable is not statistically significant in any estimated model, likely due to the relative homogeneity of the analysed countries in this respect). They also confirm the occurrence of conditional β-convergence. Additionally, there is a noticeable positive impact on economic growth from the human capital index, which aligns with the theories of Lucas [1988] and Mankiw et al. [1992].

Subsequent regressions were progressively extended by adding variables representing different aspects of economic openness. In the case of model (2), the explanatory variable used was the combined share of exports and imports in GDP. This variable is statistically significant at the $p = 0.01$ level and the parameter is positive, suggesting that international trade seems to have a positive impact on the economic growth rate, although the strength of this factor is rather weak. Model (3) extends the baseline model by including the net migration share in the population. This variable is also statistically significant at the $p = 0.01$ level and shows a positive impact on the economic growth rate, which is significantly

Table 2. Estimation of growth regression for panel data models with openness variables (SYS GMM estimator)

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$\ln(y_{i,t-1})$	0.858*** (0.023)	0.865*** (0.020)	0.831*** (0.029)	0.852*** (0.022)	0.841*** (0.023)	0.842*** (0.025)	0.858*** (0.021)	0.792*** (0.036)	0.808*** (0.0320)
$s_{i,t}$	0.574*** (0.095)	0.498*** (0.082)	0.535*** (0.098)	0.558*** (0.092)	0.550*** (0.095)	0.568*** (0.096)	0.505*** (0.087)	0.515*** (0.096)	0.454*** (0.087)
$\ln(\rho_{i,t})$	0.006 (0.037)	0.012 (0.035)	0.001 (0.039)	0.0004 (0.037)	−0.003 (0.036)	0.007 (0.039)	0.007 (0.035)	0.001 (0.043)	0.002 (0.039)
$H_{i,t}$	0.054*** (0.019)	0.043** (0.017)	0.0635*** (0.022)	0.060*** (0.018)	0.065*** (0.019)	0.055*** (0.020)	0.051*** (0.018)	0.072*** (0.023)	0.064*** (0.021)
$TRADE_{i,t}$	–	0.0003*** (0.0001)	–	–	–	–	0.0003* (0.0001)	–	0.0003* (0.0002)
$MIG_{i,t}$	–	–	0.031*** (0.011)	–	–	–	–	0.044*** (0.012)	0.038*** (0.010)
$PFDI^{IN}_{i,t}$	–	–	–	0.001** (0.0005)	–	–	0.0009** (0.0004)	–	0.0009* (0.0005)
$PFDI^{OUT}_{i,t}$	–	–	–	–	0.001*** (0.0005)	–	–	–	–
$INT_{i,t}$	–	–	–	–	–	0.038*** (0.013)	–	0.056*** (0.017)	0.040*** (0.015)
$\alpha_{0i,t}$	1.235*** (0.229)	1.203*** (0.202)	1.473*** (0.284)	1.265*** (0.219)	1.348*** (0.227)	1.378*** (0.241)	1.237*** (0.207)	1.812*** (0.346)	1.674*** (0.309)
Number of instruments	48	49	49	49	49	49	50	50	52
Number of observations	325	325	325	322	322	325	322	325	322
Number of countries	38	38	38	38	38	38	38	38	38

Notes: Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: Own calculations based on the Penn World Table and World Bank.

stronger than that of international trade. Model (4) extends the baseline model by including the ratio of foreign direct investment inflows to GDP. This variable is statistically significant at the $p = 0.05$ level and also appears to have a positive impact on economic growth, though this impact is weak, however somewhat stronger than that of international trade. Similar estimation results were obtained for model (5), which uses domestic FDI outflows as the explanatory variable, although this variable is statistically significant at the $p = 0.01$ level. The last model with a single additional explanatory variable, model (6), extends the baseline model with a binary variable representing membership in various integration groups. This variable is also statistically significant at the $p = 0.01$ level, and the sign of the estimated structural parameter for this variable is positive. This variable seems to have the strongest positive impact on economic growth among all explanatory variables.

Models (7) and (8) are mixed models, with model (7) using variables related to financial macroeconomic factors, namely the share of imports and exports in GDP and foreign FDI inflows. In this model the variable $TRADE_{i,t}$ is statistically significant only at the the $p = 0.1$ level, while the variable $PFDI^{IN}_{i,t}$ is significant at the $p = 0.05$ level. In both cases, the sign of the parameter estimate is positive. These variables, when examined together, show a weaker impact than when analyzed separately. Model (8) uses socio-political variables, namely the net migration share in the population and membership in integration groups. Both variables are statistically significant at the $p = 0.01$ level, and their parameter estimates have positive values. The combined impact of these variables is stronger than individually.

The last estimated model (9) is a comprehensive model that includes all variables related to economic openness, except for domestic FDI outflows. This variable could not be included in the comprehensive model due to multicollinearity. All variables in this model are statistically significant at the $p = 0.01$ level, except for $TRADE_{i,t}$ and $PFDI^{IN}_{i,t}$, which are significant at the $p = 0.1$ level. The parameters for all variables have positive signs, indicating a positive impact on the economic growth rate. In this model, socio-political variables also exhibit a stronger influence than in the models considering them individually. Therefore, they undoubtedly play a more significant role in economic growth than trade or financial openness, which may be related to the free movement of human capital in the form of know-how, knowledge, and high qualifications, thereby fostering the technology diffusion process. This aligns with the theories of Lucas [1988], Romer [1990] and Mankiw et al. [1992]. In light of these results, Baldwin's [2016] theory on globalization driven by technological processes also remains relevant.

It should also be emphasized that each model confirms the occurrence of conditional β-convergence. This may be related to the fact that OECD countries exhibit relatively high economic openness and are relatively homogeneous. They mostly

have similar structural characteristics, such as income distribution in society, education levels, or demographic structure, particularly considering that a significant part of OECD countries also belong to the European Union.

Conclusions

The results of the growth regression estimation indicate that the various aspects of economic openness have a positive impact on the economic growth of OECD countries. Particularly noteworthy is the fact that variables related to social and political aspects of openness, such as migration and membership in integration groups, appear to have a significantly stronger influence than purely macroeconomic variables like imports, exports or foreign direct investments. Identifying the reasons behind this phenomenon could form an interesting basis for further research. However, trade and financial openness still remain significant, aligning with the findings of Rodrik et al. [2004], Navaratnam [2014] and Iyke [2017]. Frankel and Romer [1999] also pointed to the significant impact of international trade on economic growth and societal incomes. According to them, the main channels through which trade influences economic growth are the accumulation of physical and human capital and increased productivity. The positive impact of globalization on growth does not necessarily translate into a positive impact on societal well-being, as it may lead to increased income inequality, as demonstrated by Guschanski and Onaran [2016], Gülsün et al. [2016] and Özdemir [2019].

It is essential to emphasize that the impact of economic openness on growth can vary depending on the stage of economic development, institutional quality and economic policies of a country. Developed countries tend to derive greater benefits from economic openness due to better infrastructure and institutions, while developing countries may face challenges in fully leveraging the benefits without appropriate investments in socio-economic development. Addressing this diversity will be a subsequent stage of research on the relationship between economic openness and growth.

Furthermore, in the context of future research and policy discussions, it will be crucial to conduct further analyses of the dependencies between openness and economic growth, particularly in light of new challenges such as digitalization, climate change, and geopolitical shifts. Understanding these dependencies will enable the formulation of more effective development strategies that harness the benefits of global integration while minimizing its potential negative consequences. It will also be intriguing to examine the impact of economic openness on the economies of developing countries, such as those in Sub-Saharan Africa or certain countries in Asia and South America, where the effects may not be as straightforward.

References

Aghion P., Howitt P., 1992, *A model of growth through creative destruction*, Econometrica, no. 2.

Arellano M., Bond S., 1991, *Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations*, Review of Economic Studies, no. 2.

Baldwin R., 2016, *The great convergence: Information technology and the new globalization*, Harvard University Press, Cambridge.

Baltagi B.H., 2021, *Dynamic panel data models* [in:] B.H. Baltagi, *Econometric analysis of panel data*, Springer, Cham.

Barro R.J., 1991, *Economic growth in a cross section of countries*, The Quarterly Journal of Economics, no. 2.

Barro R.J., Sala-í-Martin X., 1992, *Convergence*, Journal of Political Economy, no. 2.

Barro R.J., Sala-í-Martin X., 1997, *Technological diffusion, convergence and growth*, *Journal of Economic Growth*, no. 1.

Blundell R., Bond S., 1998, *Initial conditions and moment restrictions in dynamic panel data model*, Journal of Econometrics, no. 87.

Blundell R., Bond S., Windmeijer F., 2001, *Estimation in dynamic panel data models: Improving on the performance of the standard GMM estimator* [in:] *Nonstationary panels, panel cointegration and dynamic panels*, ed. B.H. Baltagi, Emerald, Bingley.

Burrier G., 2014, *Show me the money! Economic openness, the left, and social spending in Latin America*, Journal of International Relations and Development, no. 4.

Caselli F., Esquivel G., Lefort F., 1996, *Reopening the convergence debate: A new look at cross-country growth empirics*, Journal of Economic Growth, no. 3.

Ciołek D., 2003, *Badanie konwergencji krajów Europy Środkowo-Wschodniej z wykorzystaniem danych panelowych*, *Dynamiczne Modele Ekonometryczne*, *VII Ogólnopolskie Seminarium Naukowe 9–11 września w Toruniu*, Wydawnictwo Uniwersytetu Mikołaja Kopernika, Toruń.

Dallinger U., 2013, *Economic openness and domestic demand for social protection: A multi-level analysis of social security preferences between 1990 and 2006*, Comparative Sociology, no. 5.

Domańska A., 2011, *Otwartość gospodarki a poziom i wahania wzrostu gospodarczego – przegląd badań*, Zeszyty Naukowe Uniwersytetu Ekonomicznego w Poznaniu, no. 176.

Frankel J.A., Romer D., 1999, *Does trade cause growth?*, American Economic Review, no. 3.

Grossman G.M., Helpman E., 1991, *Innovation and growth in the global economy*, MIT Press, Cambridge.

Guschanski A., Onaran Ö., 2016, *Determinants of the wage share: A cross-country analysis*, Greenwich Papers in Political Economy no. 15847, University of Greenwich.

Gülsün Y., Hüseyin T., Asuman O., 2016, *Globalization, economic freedom, and wage inequality: A panel data analysis*, Panoeconomicus, no. 5.

Hansen L.P., 1982, *Large sample properties of generalized method of moments estimators*, Econometrica, no. 4.

Holtz-Eakin D., Newey W.K., Rosen H., 1988, *Estimating vector autoregressions with panel data*, Econometrica, no. 6.

Iyke B.N., 2017, *Does trade openness matter for economic growth in the CEE countries?*, Review of Economic Perspectives, no. 1.

Keynes J.M., 1936, *The general theory of employment, interest, and money*, Palgrave Macmillan, London.

Lucas Jr. R.E., 1988, *On the mechanics of economic development*, Journal of Monetary Economics, no. 22.
Mankiw N.G., Romer D., Weil D.N., 1992, *A contribution to the empirics of economic growth*, Quarterly Journal of Economics, no. 107.
Navaratnam R., 2014, *Applicability of openness-led growth hypothesis in Sri Lanka: An ARDL bounds test*, South Asia Economic Journal, no. 2.
Özdemir O., 2019, *The handicap for enhanced solidarity across advanced economies: The greater the economic openness higher the unequal distribution of income*, Annals of Public and Cooperative Economics, no. 3.
Rapacki R., Próchniak M., 2014, *Wpływ członkostwa w Unii Europejskiej na wzrost gospodarczy i realną konwergencję krajów Europy Środkowo-Wschodniej*, Ekonomia, no. 39.
Rodríguez F., Rodrik D., 2000, *Trade policy and economic growth: A skeptic's guide to the cross-national evidence* [in:] *NBER Macroeconomics Annual*, eds. B. Bernanke, K. Rogoff, University of Chicago Press, Chicago.
Rodrik D., 1995, *Getting interventions right: How South Korea and Taiwan grew rich*, Economic Policy, no. 20.
Rodrik D., 1998, *Why do more open economies have bigger governments?*, Journal of Political Economy, no. 5.
Rodrik D., Subramanian A., Trebbi F., 2004, *Institutions rule: The primacy of institutions over geography and integration in economic development*, Journal of Economic Growth, no. 2.
Romer P.M., 1986, *Increasing returns and long-run growth*, Journal of Political Economy, no. 5.
Romer P.M., 1990, *Endogenous technological change*, Journal of Political Economy, no. 5, part 2.
Sachs J.D., Warner A., 1995, *Economic reform and the process of global integration*, Brookings Papers on Economic Activity, no. 1.
Solow R.M., 1956, *A contribution to the theory of economic growth*, The Quarterly Journal of Economics, no. 1.
Stiglitz J.E., 2002, *Globalization and its discontents*, W.W. Norton & Co., New York.
Swan T.W., 1956, *Economic growth and capital accumulation*, Economic Record, no. 2.
White H.D., 1942, *Preliminary draft proposal for a United Nations stabilization fund and a bank for reconstruction and development of the United and Associated Nations* [in:] IMF History, vol. 3: *1945–1965*, International Monetary Fund, Washington, DC.
Wen Y., Song P., Gao C., Yang D., 2023, *Economic openness, innovation and economic growth: Nonlinear relationships based on policy support*, Heliyon, no. 9.

F.P. Roszkowski (✉) filip.roszkowski@phdstud.ug.edu.pl