# RAKSTI

## **EKONOMIKA**

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## PUBLIC DEBT AND FOREIGN DIRECT INVESTMENT IN SMALL COUNTRIES IN THE CONTEXT OF ECONOMIC GROWTH

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In today's complex and dynamic global processes, it is of particular importance to identify the characteristics of small countries and reflect them in the context of promoting the socioeconomic development of the country and ensuring macroeconomic stability. Small countries are distinguished by the presence of relatively different mechanisms for the functioning and development of the respective socio-economic systems, which, of course, requires that this fact should be taken into account when considering individual economic problems. The role of the socio-economic systems of small countries is growing in the light of new challenges and modern globalization, when the issue of the country's stability, the topic of economic security and the need for the effective implementation of various anti-crisis economic mechanisms are becoming increasingly significant and important. In the process of analyzing the dynamics of foreign direct investment, differences between small countries are more noticeable, that can be explained both by the different investment attractiveness of individual countries and by the existing problems and challenges of a global nature. During the COVID-19 pandemic, countries were faced with the need to take on a large public debt, which further worsened the economic situation. It is important to note that investors will logically avoid investments due to possible force majeure. The result is a decrease in investment flows. At the same time, the role of the socio-economic systems of small countries is growing in the light of new challenges and modern globalization, when the issue of the stability of the country is the topic of economic security and the need to ensure the effective implementation of various vital anti-crisis economic mechanisms. The study showed that distributed lag autoregression (ARDL) and vector autoregression (VAR) models can be used in the analysis of economic growth, public debt, and foreign direct investment in the process of forming appropriate macroeconomic policies.

Key words: small countries, socio-economic systems, economic growth, public debt, foreign direct investments.

#### Valsts parāds un ārvalstu tiešās investīcijas mazajās valstīs ekonomiskās izaugsmes kontekstā

Mūsdienu sarežģītajos un dinamiskajos globālajos procesos īpaši svarīgi ir apzināt mazo valstu īpatnības un atspoguļot tās valsts sociāli ekonomiskās attīstības veicināšanas un makroekonomiskās stabilitātes nodrošināšanas kontekstā. Mazās valstis izcelas ar salīdzinoši atškirīgu attiecīgo sociāli ekonomisko sistēmu funkcionēšanas un attīstības mehānismu esamību, kas prasa, lai šis apstāklis tiktu nemts vērā, izskatot atseviškas ekonomiskās problēmas. Mazo valstu sociāli ekonomisko sistēmu loma pieaug jauno izaicinājumu un mūsdienu globalizācijas gaismā, kad tiek aktualizēts valsts stabilitātes jautājums, ekonomiskās drošības tēma un dažādu pretkrīzes ekonomisko mehānismu efektīvas ieviešanas nepieciešamība. klūst arvien svarīgāki un svarīgāki. Ārvalstu tiešo investīciju dinamikas analīzes procesā vairāk pamanāmas atšķirības starp mazajām valstīm, kas skaidrojamas gan ar atsevišķu valstu atšķirīgo investīciju pievilcību, gan ar pastāvošajām globāla rakstura problēmām un izaicinājumiem. Covid-19 pandēmijas laikā valstis saskārās ar nepieciešamību uzņemties lielu valsts parādu, kas vēl vairāk pasliktināja ekonomisko situāciju. Svarīgi atzīmēt, ka investori loģiski izvairīsies no ieguldījumiem iespējamās nepārvaramas varas dēļ. Rezultāts ir investīciju plūsmu samazināšanās. Vienlaikus pieaug mazo valstu sociāli ekonomisko sistēmu loma, ņemot vērā jaunos izaicinājumus un mūsdienu globalizāciju, kad valsts stabilitātes jautājums ir ekonomiskās drošības un nepieciešamības nodrošināt efektīvu ekonomisko drošību. dažādu vitāli svarīgu pretkrīzes ekonomisko mehānismu ieviešana. Pētījums parādīja, ka dalītās nobīdes autoregresijas (ARDL) un vektoru autoregresijas (VAR) modeļus var izmantot ekonomikas izaugsmes, valsts parāda un ārvalstu tiešo investīciju analīzē atbilstošas makroekonomiskās politikas veidošanas procesā.

Atslēgvārdi: mazas valstis, sociāli ekonomiskās sistēmas, ekonomiskā izaugsme, valsts parāds, ārvalstu tiešās investīcijas.

# Государственный долг и прямые иностранные инвестиции в малых странах в контексте экономического роста

В условиях современных сложных и динамичных глобальных процессов особое значение имеет выявление особенностей малых стран и их отражение в контексте содействия социально-экономическому развитию стран, обеспечения макроэкономической стабильности. Малые страны отличаются наличием относительно разных механизмов функционирования и развития соответствующих социально-экономических систем, что, естественно, требует учета указанного факта при рассмотрении отдельных экономических проблем. Роль социально-экономических систем малых стран возрастает в свете новых вызовов и современной глобализации, когда вопрос устойчивости страны, тема экономической безопасности и необходимости эффективной реализации различных антикризисных экономических механизмов приобретают все большее значение и важность. В процессе анализа динамики прямых иностранных инвестиций более заметны различия между малыми странами, что можно объяснить как разной инвестиционной привлекательностью отдельных стран, так и существующими проблемами и вызовами глобального характера. В течение пандемии короновируса COVID-19 страны столкнулись с необходимостью взять на себя большой государственный долг, что еще больше ухудшило экономическую ситуацию. Важно отметить, что инвесторы вполне логично будут избегать вложений из-за возможных форсмажоров. Результат – снижение инвестиционных потоков. В то же время роль социальноэкономических систем малых стран возрастает в свете новых вызовов и современной глобализации, когда вопрос стабильности страны — это тема экономической безопасности и необходимости обеспечения эффективной реализации различных жизненно важных антикризисных экономических механизмов. Исследование показало, что модели авторегрессии с распределенным запаздыванием (ARDL) и векторной авторегрессии (VAR) можно использовать при анализе экономического роста, государственного долга и прямых иностранных инвестиций в процесе формирования соответствующей макроэкономической политики.

**Ключевые слова:** малые страны, социально-экономические системы, экономический рост, государственный долг, прямые иностранные инвестиции.

#### Introduction

In the conditions of modern dynamic global processes, revealing the peculiarities of small countries and their reflection in the context of promoting the country's socioeconomic development and ensuring macroeconomic stability is of particular importance.

Small countries are distinguished by the presence of relatively different mechanisms of the functioning and development of the corresponding socio-economic systems, which naturally requires the consideration of the mentioned fact when considering individual economic problems.

Economic and financial problems in small countries are of a different nature and are regulated differently, which affects trade relations. Their biggest problem is the effective realization of the mechanisms of influence of trade advantages and currency relations with big countries. Small countries do not have the mechanisms that ensure their competitive advantage in trade with large countries. Economies of scale or exchange rate manipulation do not yield significant results. Joining and unification of large countries in trade and currency zones, along with positive results, as is known, also contains significant threats (Bedianashvili, Kokhreidze 2023; Bräutigam, Woolcock 2001; Jesse, Dreyer 2016).

The role of the socio-economic systems of small countries is growing against the background of new challenges and today's confrontational globalization (Papava 2022), when the issue of the country's sustainability, the topic of economic security, and the need to effectively implement various anti-crisis economic mechanisms gain importance for the standard of living (Bedianashvili 2021).

In recent years, especially during the period of the COVID-19 pandemic, the problem of public debt has been highlighted, its noticeable increase (Papava, Charaya 2021). A number of other problems related to the growth of public debt can be distinguished, among which one of the most important is probably the relationship between this debt and economic growth, as well as foreign direct investment, public debt, and economic growth (Aderemi et al. 2020; Antonio, Alves 2015; Azman-Saini, Law 2010; Camarero et al. 2020; Charaia, Papava 2021; Chikobava et al. 2022; Greiner, 2012; Haq et al, 2020; Heylen et al. 2013; Lećo 2013; Lim, Groschek 2021; Donayre, Taiwan 2017; Casares 2015; Azman-Saini, Law2010; Reinhart et al. 2012; Sharma, Kumari 2017; Sabir et al. 2013; Sharma, Kumari 2017; Tan, Ismail2015; Pegkas 2018).

The purpose of the research presented in the article is to reveal the specifics of the impact of public debt and foreign direct investments on economic growth based on the modern conditions of globalization, taking into account the systemic features of small countries in the context of their socio-economic development, ensuring macro-economic stability in crisis situations.

### Research methodology and information base

There is no unified opinion about the concept of small countries in the scientific literature (see, for example, Alouini, Hubert 2019; Antola 2002; Armstrong, Read, 2003; Bailes 2009; Brito 2015; Kraay, Easterly2000; Hanggi 1998; Ingebritsen et al. 2012; Milton-Edwards 2023; Sampson et al. 2023; Schettkat 1999; Steinmetz 2016). In our study, small countries are considered in the context of the EU accession and integration processes in the EU structures due to the relative similarity of the population and the size of the territories. In addition, the selection of countries for benchmarking purposes was taken into account.

11 small countries were selected in the study, some of which are already members of the European Union, and the other part is on the way to becoming a member of the European Union. The selection of countries was carried out from the standpoint of the interests of Georgia's integration into the European Union. The choice of small countrieswas made like this: the members of the European Union (Austria, Belgium, Czech Republic, Estonia, Ireland, Latvia and Lithuania), the candidate countries of the European Union (Albania, Moldova and North Macedonia) and one country as a potential candidate country (Georgia). Such a selection, we think, would be interesting for analysis both, first of all, for Georgia, and directly for the candidate countries.

The necessary statistical indicators were searched in the databases of the World Bank (https://data.worldbank.org/indicator) and the International Monetary Fund (https://www.imf.org/en/Data). Econometric methods were used directly in the research. Unfortunately, not enough data was available for all countries in this category, so we had to drop some of them.

It is also important that macroeconomic variables usually have a trend. Trend plays a major role in econometric analysis. For example, when variables have trends in opposite directions, this can affect the stability of the model, particularly the coefficients. This usually distorts the interpretation. In addition, variables with mixed trends in most cases create non-linear relationships, which were not included in the goals of our work at this stage. Nonlinear relationships between variables reduce the reliability of least-squares estimates.

On the other hand, when variables have a common trend, this creates a risk of spurious regression. In this case, the existence of a connection between the variables is determined not by the direct influence of one variable on the other, but by the fact that both have a common, one-directional trend. There are several ways to overcome this problem. Among them, the most popular approaches are:

- 1. Adding trend as an explanatory variable to a regression. The trend, which is in the random term of the equation and correlates with the explanatory variables, causes serious problems in the model, such as bias and non-consistent estimates. If we add the trend as an explanatory variable and it is significant, then this problem is solved.
- 2. Detrending series. In this case, we subtract the trend from series and get a clean series that no longer has a trend. Building this kind of model shows the net relationship between the variables, without intervening trends.

3. Cointegration. When we detrend the series and break the trend, we are effectively giving up long-term correlation analysis and denying long-term equilibrium. And this, according to Nelson and Plosser, is unjustified, because most macroeconomic variables belong to non-stationary time series and the exclusion of long-term dependence is unjustified. In this case, the problem can be solved by cointegration. Among the non-stationary series, a linear combination can be existed, and in this above mentioned linear combination the residual term of the model is a stationary series. In this case, we say that the time series is cointegrable. In other words, cointegration means long-run equilibrium between variables (Enders 2015; Verbeek 2000).

In our case, cointegration became the main factor in the choice of variables. A long-term relationship was observed between the variables of the countries we selected (Table 1), which allowed us to conduct an in-depth analysis and analyze the long-term dynamics as well.

Table 1

Pedroni Residual Cointe	egration Test									
Series: GDP GD FDI										
Date: 06/11/23 Time: 13:25										
Sample: 2002 2021										
Included observations: 2	220									
Cross-sections include	d: 11									
Null Hypothesis: No coil	ntegration									
Trend assumption: No o	deterministic in	itercept or t	rend							
Automatic lag length se	lection based of	on SIĊ with	a max lag of	3						
Newey-West automatic	bandwidth se	ection and	Bartlett kerne	-		Johansen Eishe	r Panel Cointegratic	n Test		
nono, noor aatomaao	banamaaroo	oodon and	Bartiott Horrie			Series: GDP GF	) FDI			
Alternative hypothesis:		oofe (within	n-dimension)			Date: 06/11/23	Time: 13:30			
Alternative hypothesis.	common Arro	0613. (WILLIN	Woightod			Sample: 2002 2	n21			
	Statiatia	Drob	Statiatia	Droh		Included observ	ations: 220			
Denal ··· Ctatiatia			0 100470			Trend assumption	nn: No deterministic	trend		
Panel V-Statistic	2.863/62	0.0021	2.182470	0.0145		Lags interval (in	first differences): 1	1		
Panel mo-Statistic	-3.306930	0.0005	-3.645607	0.0001		Lago intoi vai (in	niot anoronooo). T			
Panel PP-Statistic	-5.257603	0.0000	-5.465992	0.0000		Investricted Coi	integration Bank Te	et (Trace	and Maximum Figenv	(میراد
Panel ADF-Statistic	-6.196497	0.0000	-6.017379	0.0000		onrestricted oor	integration name re-	St ( Hace	and Maximum Eigenv	100/
						Hypothesized	Fisher Stat.*		Fisher Stat.*	
Alternative hypothesis: i	individual AR c	oefs. (betw	een-dimensio	on)		No. of CE(s)	(from trace test)	Prob	(from max-eigen t	Prob
							(	110.01	(nom most olgon un	11001
	Statistic	Prob.	_			None	64.77	0.0000	62.16	0.0000
Group rho-Statistic	-3.612210	0.0002				At most 1	26.60	0.2269	25.36	0.2800
Group PP-Statistic	-9.690033	0.0000				At most 2	19.73	0.6000	19.73	0.6000
Group ADF-Statistic	-9.422726	0.0000						0.0000		0.0000
						* Probabilities ar	e computed using a	asvmptoti	c Chi-square distributi	on.

Cointegration tests results

Source: elaborated by the authors.

## Peculiarities of small countries

The analysis of the gross domestic product (GDP) of the economies of small countries in the retrospective period shows that their dynamics are heterogeneous (Figure 1).

It is worth noting that the response and downturn of the economies of small countries during the COVID-19 pandemic has been to varying degrees, as well as the recovery of economic systems in recent years.

According to the change of the government debt (GD) in the same analysis period, small countries are also distinguished by a different picture from each other (Figure 2).

Figure 1



Annual growth of GDP, %, 2002-2021

Source: compiled by the authors based on data from https://data.worldbank.org/indicator.

Figure 2 Government debt dynamics, % of GDP, 2002–2021



Source: compiled by the authors based on data from https://data.worldbank.org/indicator.

If we look at the change in public debt over time, it is clearly seen to increase in the first years of the COVID-19 pandemic, albeit with different sizes by country. This is due to the specifics of the government support packages for the population of these countries and the non-uniform concepts and institutional provision of state spending to stimulate the respective economies. In the process of analyzing the dynamics of foreign direct investments, more differences are noticeable between small countries (Figure 3), which can be explained both by the different investment attractiveness of individual countries and by existing problems and challenges of a global nature.

Following the decline in economic activity during the COVID-19 pandemic, the slowdown in economic growth and development worldwide has become alarming. Countries were faced with the need to take on large public debt, which further aggravated the economic environment.

The pandemic clearly showed us that even developed countries were not ready for an event of this magnitude.



Source: compiled by the authors based on data from https://data.worldbank.org/indicator.

History remembers the Great Depression, remembers other less important crises, such as, for example, the crisis of 2008–2009. However, the coronavirus pandemic has made it clear that we are dealing with an entirely new type of crisis.

The effects of the pandemic are clearly visible in all three indicators of all the countries we selected. In 2020, when the coronavirus was at its peak, absolutely every country had problems maintaining economic growth.

In general, the following scenario would be expected: in the wake of the pandemic, the rate of economic growth would decrease, as economic activity underwent a rather strong transformation. And we know that the initial stages of transformation are characterized by recession, economic failures, and other problems. Accordingly, we assumed that the pandemic slowed economic growth in the countries.

Similarly, foreign direct investments would also decrease. It is important to note here that investors would avoid investing due to such force majeure. Therefore, it is logical to expect a decrease in investment flows. We have the opposite picture in relation to public debt. When the mechanism of functioning of the economy is disrupted, it is difficult to establish stability with existing policies. It becomes necessary to take on debt to compensate for the losses that will follow the crisis. That is why it is completely logical that the public debt of all countries increased significantly during the coronavirus period.

However, it must be noted that the coronavirus affected countries differently in terms of the extent of damage. This, of course, was caused by the differences between the countries economies and the peculiarities of their socioeconomic systems (Bedianashvili 2022).

#### Results of empirical research

Panel data, sometimes referred to as longitudinal data, is data that contains observations about different cross-sections across time. Examples of groups that may make up panel data series include countries, firms, individuals, or demographic groups.

Like time series data, panel data contains observations collected at a regular frequency, chronologically. Like cross-sectional data, panel data contains observations across a collection of individuals.

Panel data can model both the common and individual behaviors of groups. It contains more information, more variability, and more efficiency than pure time series or cross-sectional data.

In addition, panel data can detect and measure statistical effects that pure time series or cross-sectional data can't. Also, panel data can minimize estimation biases that may arise from aggregating groupsinto a single time series.

In our case, we may model 3 types of regressions: Pooled Ordinary Least Squares (POLS), Model with Fixed Effects, and Model with Random Effects. Let's describe each one.

In some cases, there are no unobservable individual-specific effects. This is a strong assumption and implies that all the observations within groups are independent of one another. In this way the panel data can be treated as one large, pooled dataset. But, linear independence within the groups of a panel is unlikely and pooled OLS is rarely acceptable for panel data models.

The fixed effects panel data model:

- includes unobservable time-specific or individual-specific effects. These effects capture omitted variables;
- assumes that individual-specific effects are correlated with the observed characteristics, x<sub>i</sub>;
- pooled OLS estimates for data generated by this process will be inconsistent. The random effects panel data model:
- includes unobservable time-specific or individual-specific effects,  $\delta z_i$ , which act like individual-specific stochastic error terms;
- assumes that these effects are uncorrelated with the observed characteristics,  $x_{i}$ ;
- does not result in biased OLS estimates of coefficients but does lead to inefficient parameters and incorrect standard inference tools.

We are going to analyze a data set, which contains 11 countries:

- 1. Albania
- Austria
   Belgium

- 5. Estonia
   6. Georgia
   7. Ireland
- 9. Lithuania 10. Moldova
- 11. North Macedonia
- 4. Czech Republic 8. Latvia

For each country, we took 3 macroeconomic indicators:

- 1. GDP growth rate gdp;
- 2. Foreign Direct Investment (FDI) to GDP ratio fdi;
- 3. Central Government Debt (GD) to GDP ratio gd.

Each indicator contains time series data from 2002 to 2021.

### Panel models

For our case, we built 3 models: POLS, FE, and RE. We can see the result in the table below.

Table 2

	Dependent variable:				
		gdp			
	POLS (1)	FE (2)	RE (3)		
fdi	0.179*** (0.032)	0.173*** (0.038)	0.179*** (0.033)		
gd	-0.041*** (0.012)	-0.073*** (0.023)	-0.042*** (0.012)		
Constant	3.956*** (0.577)		3.995*** (0.601)		
Observations R2 Adjusted R2 F Statistic	220 0.144 0.136 18.280*** (df = 2; 2	220 0.122 0.071 217) 14.325*** (df = 2; 207)	220 0.141 0.133 35.683***		
Note:		*p<0.1; **p<0.05;	***p<0.01		

Model's result (POLS, FE, RE)

Source: elaborated by the authors.

Now, we can interpret them. Firstly, let's analyze POLS: if fdi increases by 1% gdp is going to increase by 0.179%, ceteris paribus. If gd increases by 1% gdp is going to decrease by 0.041%.

FE: if fdi increases by 1% gdp is going to increase by 0.173%, ceteris paribus. If gd increases by 1% gdp is going to decrease by 0.073%.

RE: if fdi increases by 1% gdp is going to increase by 0.179%, ceteris paribus. If gd increases by 1% gdp is going to decrease by 0.042%.

Note, that in all models interpretation is compatible with economic theory. Also, it's important to highlight that in all models predictors are significant at 5% level.

We should compare POLS and FE models and take a decision – which one is better? The null hypothesis states for: POLS is a better model, the alternative hypothesis states for: Fixed effect model is better. Here, we can see the results:

```
F test for individual effects
```

```
data: gdp ~ fdi + gd
F = 1.1578, df1 = 10, df2 = 207, p-value = 0.3212
alternative hypothesis: significant effects
```

As we can see, the probability is greater than 0.05, so we don't have enough evidence to reject the null hypothesis. As a result, we conclude that the POLS model is better. After doing this, we can run the Hausman test, in order to conclude which is better: FE model or RE model?

#### Hausman Test

data: gdp ~ fdi + gd chisq = 2.5744, df = 2, p-value = 0.276

The null hypothesis is that the RE model is better than FE, and alternative states for the FE model is better. It's clear that we can't reject the null hypothesis and finally, a model with random effects is better and more appropriate.

The last test we are going to run is aPool ability test. It detects if there are POLS estimates stable we can see the result below:

F statistic

```
data: gdp ~ fdi + gd
F = 1.4884, df1 = 20, df2 = 187, p-value = 0.08925
alternative hypothesis: unstability
```

We can't reject the null hypothesis because the p-value is greater than 0.05. So, we can conclude, that Our POLS estimates are stable.

#### ARDL model

Now, we can run the ARDL model to compare short and long-run periods relationships. For our example, the ARDL model will be:

Table 3

#### ARDL model

Dependent Variable: D(GDP) Method: ARDL Date: 02/08/23 Time: 12:31 Sample: 2003 2021 Included observations: 209 Maximum dependent lags: 4 (Automatic selection) Model selection method: Schwarz criterion (SIC) Dynamic regressors (4 lags, automatic): GD FDI Fixed regressors: C Number of models evalulated: 16 Selected Model: ARDL(1, 1, 1) Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*			
	Long Run Equation						
GD	-0.050523	0.016653	-3.033886	0.0028			
FDI	0.030107	0.013887	2.168051	0.0315			
Short Run Equation							
COINTEQ01	-1.077965	0.087085	-12.37836	0.0000			
D(GD)	-0.611374	0.056215	-10.87560	0.0000			
D(FDI)	0.216216	0.065394	3.306342	0.0011			
C	6.082333	0.548436	11.09032	0.0000			
Mean dependent var	0.153268	S.D. dependent var		5.553126			
S.E. of regression	2.796284	Akaike info criterion		4.514928			
Sum squared resid	1360.541	Schwarz criterion		5.224505			
Log likelihood	-450.6421	Hannan-Quinn criter.		4.801474			

\*Note: p-values and any subsequent tests do not account for model selection.

Source: elaborated by the authors.

What can we say? We can say that in long run period and increase of FDI by 1% is going to increase GDP by 0.03% and an increase of GD by 1% is going to decrease GDP by 0.05%. In the short run period change in the difference of FDI by 1% caused growth of 0.22%. GD causes a decrease by 0.61%. The interesting is the COINTEQ01 variable which is an error correction term. The coefficient determines the "speed of adjustment" toward the long-run equilibrium. The deviations from the long-run equilibrium are corrected gradually by the error correction term through a series of partial short-run adjustments. In our case, the speed of adjustment is 1.07. We can say that almost 107% of the discrepancy between the long run and the short run is corrected within a year.

When estimating a panel ARDL model for multiple countries, the individual error correction models (ECM) for each country can be used to examine the short- and long-run relationships between the variables of interest.

The error correction term in the ECM represents the speed of adjustment towards the long-run equilibrium relationship. If the estimated correction term is not in the interval from -1 to 0, it implies that the adjustment process is faster or slower than what is expected based on theory.

If the estimated correction term is greater than 0, it suggests that the adjustment process towards the equilibrium relationship is faster than expected. This can be interpreted as a strong and quick response of the dependent variable to changes in the independent variables, which can be caused by factors such as policy interventions or changes in economic conditions.

If the estimated correction term is less than -1, it suggests that the adjustment process is slower than expected. This can be interpreted as a weak response of the dependent variable to changes in the independent variables, which can be caused by factors such as market rigidities or other structural impediments that prevent the economy from adjusting quickly to shocks.

If the estimated correction term is outside the -1 to 0 interval, it is important to carefully examine the underlying data and the model specification to ensure that the estimates are reliable and that the model is correctly capturing the dynamics of the relationship between the variables.

We have to note that in most of our cases, we have this exact situation. Correction term for Albania, Austria, Belgium, Czech, Georgia, Lithuania, Moldova, and North Macedonia is less than -1. It makes sense to check model stability:



As we can conclude, the model is stable. As mentioned, we can also consider the individual results of the ECM model. In particular, we built an ECM model separately for all 11 countries:

	11104			
Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01 D(GD) D(FDI) C	-1.216896 -0.553100 0.520509 8.270792	0.037435 0.014218 0.079530 4.071031	-32.50679 -38.90087 6.544807 2.031621	0.0001 0.0000 0.0073 0.1351

Albania:

In the case of Albania, it can be seen that changes in both fdi and gd are important for economic growth. As expected, the change in fdi by 1% has a positive effect and increases the change of economic growth by 0.52%, and the change in gd has a negative effect on the change in economic growth. Increasing by 1% it decreases economic growth by 0.55%. It should be noted that the correction term is also important. But, as we can see the correction term is less than -1, it means that the adjustment process is slower than is expected.

Coefficient Std. Error Prob. 3 Variable t-Statistic COINTEQ01 -1.3152770.017777 -73.987570.0000 D(GD) -0.6863240.011457 -59.904950.0000 D(FDI) -0.028220 0.000878 -32.148200.0001 С 5.659111 2.085620 2.713395 0.0730

Austria:

In the case of Austria, it can be seen that changes in both fdi and gd are important for economic growth. But here the change in fdi by 1% has a negative effect and decreases the change of economic growth by 0.03%, and the change in gd has also a negative effect on the change in economic growth. Increasing by 1% it decreases economic growth by 0.69%. It should be noted that the correction term is also important. But, as we can see the correction term is less than -1, it means that the adjustment process is slower than expected.

Belgium:				
Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01 D(GD) D(FDI) C	-1.292435 -0.422749 0.026748 7.090177	0.015438 0.003899 0.000448 4.469845	-83.71924 -108.4221 59.73681 1.586224	0.0000 0.0000 0.0000 0.2109

In the case of Belgium, it can be seen that changes in both fdi and gd are important for economic growth. A change in fdi by 1% has a positive effect and increases the change of economic growth by 0.03%, and the change in gd has a negative effect on the change

in economic growth. Increasing by 1% it decreases economic growth by 0.42%. It should be noted that the correction term is also important. But, as we can see the correction term is less than -1, it means that the adjustment process is slower than is expected.

Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01 D(GD) D(FDI) C	-1.195425 -0.866776 -0.085004 5.729725	0.029508 0.033362 0.021356 1.399091	-40.51170 -25.98091 -3.980412 4.095319	0.0000 0.0001 0.0284 0.0263

Czech	Repu	blic:
		~ ~ ~ ~ ~ ~

In the case of Czech Republic, it can be seen that changes in both fdi and gd are important for economic growth. But here the change in fdi by 1% has a negative effect and decreases the change of economic growth by 0.085%, and the change in gd has also a negative effect on the change in economic growth. Increasing by 1% it decreases economic growth by 0.87%. It should be noted that the correction term is also important. But, as we can see the correction term is less than -1, it means that the adjustment process is slower than is expected. Also, we should highlight that fdi in this case is less important than in the previous models.

Estonia:

	Variable	Coefficient	Std. Error	t-Statistic	Prob. *
C	OINTEQ01 D(GD) D(FDI) C	-0.541565 -0.741199 0.196971 2.338309	0.038458 0.165352 0.030358 1.681658	-14.08217 -4.482552 6.488376 1.390478	0.0008 0.0207 0.0074 0.2586

In the case of Estonia, it can be seen that changes in both fdi and gd are important for economic growth. A change in fdi by 1% has a positive effect and increases the change of economic growth by 0.197%, and the change in gd has a negative effect on the change in economic growth. Increasing by 1% it decreases economic growth by 0.69%. It should be noted that the correction term is also important. Here we can see that the correction term is between -1 and 0. This means that the adjusting is going correctly. And we can say that almost 54% of the discrepancy between the long run and the short run is corrected within a year.

#### Georgia:

In the case of Georgia, it can be seen that changes in both fdi and gd are important for economic growth. A change in fdi by 1% has a positive effect and increases the change of economic growth by 0.26%, and the change in gd has a negative effect on the change in economic growth. Increasing by 1% it decreases economic growth by 0.48%.

Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01	-1.041363	0.008524	-122.1697	0.0000
D(GD)	-0.482059	0.004071	-118.4241	0.0000
D(FDI)	0.255149	0.016205	15.74518	0.0006
C	6.733958	1.022897	6.583220	0.0071

It should be noted that the correction term is also important. But, as we can see the correction term is less than -1, it means that the adjustment process is slower than expected.

Ireland.

	nen	ind.		
Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01 D(GD) D(FDI) C	-0.950266 -0.330844 0.078917 8.151609	0.035623 0.006171 0.002567 3.886731	-26.67545 -53.60924 30.74000 2.097292	0.0001 0.0000 0.0001 0.1269

In the case of Ireland, it can be seen that changes in both fdi and gd are important for economic growth. A change in fdi by 1% has a positive effect and increases the change of economic growth by 0.08%, and the change in gd has a negative effect on the change in economic growth. Increasing by 1% it decreases economic growth by 0.33%. It should be noted that the correction term is also important. Here we can see that the correction term is between -1 and 0. This means that the adjusting is going correctly. And we can say that almost 95% of the discrepancy between the long run and the short run is corrected within a year.

_	Latvia:				
	Variable	Coefficient	Std. Error	t-Statistic	Prob. *
	COINTEQ01 D(GD) D(FDI) C	-0.667923 -0.766751 0.500064 3.959064	0.009103 0.011937 0.023937 0.725576	-73.37307 -64.23322 20.89101 5.456444	0.0000 0.0000 0.0002 0.0121

In the case of Latvia, it can be seen that changes in both fdi and gd are important for economic growth. A change in fdi by 1% has a positive effect and increases the change of economic growth by 0.5%, and the change in gd has a negative effect on the change in economic growth. Increasing by 1% it decreases economic growth by 0.77%. It should be noted that the correction term is also important. Here we can see that the correction term is between -1 and 0. This means that the adjusting is going correctly. And we can say that almost 66% of the discrepancy between the long run and the short run is corrected within a year.

Lithuania:				
Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01 D(GD) D(FDI) C	-1.023153 -0.870169 0.500888 6.462252	0.024973 0.029187 0.079618 1.697312	-40.97069 -29.81313 6.291164 3.807345	0.0000 0.0001 0.0081 0.0318

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In the case of Lithuania, it can be seen that changes in both fdi and gd are important for economic growth. A change in fdi by 1% has a positive effect and increases the change of economic growth by 0.5%, and the change in gd has a negative effect on the change in economic growth. Increasing by 1% it decreases economic growth by 0.87%. It should be noted that the correction term is also important. But, as we can see the correction term is less than -1, it means that the adjustment process is slower than is expected.

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Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01 D(GD) D(FDI) C	-1.549233 -0.575806 0.272830 7.585900	0.025467 0.034561 0.169786 1.570742	-60.83258 -16.66075 1.606907 4.829502	0.0000 0.0005 0.2064 0.0169

Moldova:

In the case of Moldova, we can say that fdi is not important for economic growth. But, however, a change in fdi by 1% has a positive effect and increases the change of economic growth by 0.27%. The change in gd has a negative effect and decreases the change in economic growth by 0.58%. The correction term is important, but also less than -1, which means the adjustment process is slower than expected.

North Mondania

Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01 D(GD) D(FDI) C	-1.064077 -0.429338 0.139526 4.924765	0.028635 0.012270 0.036177 1.147728	-37.16026 -34.99050 3.856707 4.290882	0.0000 0.0001 0.0308 0.0233

In the case of North Macedonia, it can be seen that changes in both fdi and gd are important for economic growth. A change in fdi by 1% has a positive effect and increases the change of economic growth by 0.14%, and the change in gd has a negative effect on the change in economic growth. Increasing by 1% it decreases economic growth by 0.43%. It should be noted that the correction term is also important. But,

as we can see the correction term is less than -1, it means that the adjustment process is slower than expected.

#### VAR model

The last model we are going to run is the VAR model. As we know, the VAR model is the perfect tool to measure the effects of one endogenous variable on another. Using the VAR model, we can analyze the impulse-response function. Before running the model, we should select an optimal lag. Let's compare different information criteria:

AIC(n)	HQ(n)	SC (n)	FPE(n)
1	1	1	1

The most appropriate lag for our model is 1. So, let's estimate VAR(1) model and see the results:

Table 4

	Dependent variable:				
	gdp (1)	y fdi (2)	gd (3)		
gdp.l1	0.253***	0.024	-0.502***		
	(0.071)	(0.119)	(0.147)		
fdi.l1	0.008	0.518***	0.055		
	(0.036)	(0.061)	(0.075)		
gd. 11	0.007	0.056***	0.909***		
	(0.013)	(0.021)	(0.026)		
const	2.200***	0.834	5.186***		
	(0.668)	(1.118)	(1.383)		
Observations	219	219	219		
R2	0.066	0.332	0.869		
Adjusted R2	0.053	0.322	0.867		
Residual Std. Error (df = 215)	4.427	7.403	9.162		
F Statistic (df = 3; 215)	5.034***	35.586***	476.671***		
Note:	*p<0.1;	**p<0.05	; ***p<0.01		

VAR(1) model results

Source: elaborated by the authors.



As we have already mentioned, in VAR models the most important for analysis is IRF or Impulse-Response function. We can analyze it (Figure 4).

Source: elaborated by the authors.

If we number these graphs from left to right and from top to bottom, we will be able to interpret them: Graph 1 shows the impact of fdi shock on gdp. We see that gdp is increasing, but each period it becomes more slowly. Graph 2 shows the impact of gd shock on gdp. We see that gdp is exactly decreasing. Graph 3 shows the impact of gdp shock on gdp. We see that gdp is increasing, but each period it becomes more slowly. Graph 4 shows the impact of fdi shock on fdi. We see that fdi is increasing, but after 2 periods it's changing a slope andbecome more slowly. Graph 5 shows the impact of gd shock on fdi. We see that fdi is decreasing, but after some periods it becomes stable. Graph 6 shows the impact of gdp shock on fdi. We see that fdi is increasing, but each period it becomes more slowly. Graph 7 shows the impact of gd shock on gd. We see that gd is decreasing and each period it's increasing faster. Graph 9 shows the impact of gdp shock on gd. We see that gd is decreasing rapidly.

#### COVID-19

We know that at the end of 2019, the whole world faced a new challenge in the form of the coronavirus pandemic. Apart from the fact that the pandemic has killed millions of people, it has created a number of economic problems for the whole world.

Following the decline in economic activity, the slowdown in economic growth and development rates worldwide has become alarming. Countries were faced with the need to take on a large public debt, which further aggravated the economic environment and, one might say, led to a complete collapse.

The pandemic has clearly shown us that even highly developed countries, like USA, Japan, EU countries etc., were not ready for an event of such magnitude.

History remembers the Great Depression, remembers other important crises, such as, for example, the crisis of 2008–2009. However, the coronavirus pandemic has made it clear that we are dealing with an entirely new type of crisis.

COVID-19 has changed the normal rhythm of life. Obviously, this is a big negative event for the entire world economy, but as we know, the coin has two sides. Therefore, it is necessary to highlight the positive aspects that followed this pandemic.

The consequences of the coronavirus for the economies of countries are obvious. We can clearly see what changes the rules of the economy have undergone.

We can devote a lot of time to the analysis of the economy directly affected by the coronavirus. Let's compare the main figures and indicators of these countries in prepandemic and pandemic conditions. Also, let's explain the changes in these indicators.

In addition, we can focus specifically on the policies, tools, and levers that countries have applied to combat the pandemic. We can analyze in detail the expediency and effectiveness of using each tool.

Finally, we can talk about the post-pandemic reality, the general economic background and make a future forecast.

The effects of the pandemic are clearly visible in all three indicators of all the countries we selected. In 2020, when the coronavirus was at its peak, absolutely every country had problems maintaining economic growth.

In general, the following scenario could be expected: in the wake of the pandemic, the rate of economic growth would decrease, as economic activity has undergone a rather strong transformation. And we know that the initial stages of transformation are characterized by recession, economic failures, and others. Therefore, we assumed that the pandemic reduced the economic growth in the countries.

Similarly, foreign direct investments would also decrease. It is important to note here that investors would avoid investing due to such a force majeure situation. Accordingly, it is logical to expect a decrease in investment flows.

We have the opposite picture in relation to public debt. When the functioning mechanism of the economy is disturbed, it is difficult to establish stability with existing policies. It becomes necessary to take on debt to compensate for the losses that will follow the crisis. That is why it is completely logical that the public debt of all countries has increased significantly during the coronavirus period.

However, it must be noted that the coronavirus affected countries differently in terms of the extent of damage. This, of course, is due to the differences and peculiarities of the countries' economies.

## Conclusions

Analysis and research of the period of the COVID-19 pandemic showed us that the peculiarities of small countries are significantly manifested in the specifics of the changes and interactions of economic growth, public debt, and foreign direct investment in crisis situations.

At the same time, the role of the socio-economic systems of small countries is increasing in the light of new challenges and today's confrontational globalization, when the issue of the country's stability, the topic of economic security, and the need to effectively implement various anti-crisis economic mechanisms are vitally important.

Econometric analysis showed that the selected small countries had different degrees of resilience to external shocks, which was revealed in the corresponding econometric models. FDI and GD affect the economic growth of the analyzed small countries to different extents: in the case of Albania, a 1% increase in GDI leads to an increase in economic growth by 0.52%, an increase in public debt to the same extent reduces economic growth by 0.55%; For the example of Belgium, a 1% increase in FDI leads to an increase in economic growth by 0.03%, an increase in GD by the same amount reduces economic growth by 0.42%; In the case of the Czech Republic, a 1% increase in FDI leads to an increase in economic growth by 0.085%, an increase in GD by the same amount reduces economic growth by 0.87%; For Estonia, a 1% increase in FDI leads to an increase in economic growth by 0.197%, an increase in GD by the same amount reduces economic growth by 0.69%; In Georgia, a 1% increase in FDI leads to an increase in economic growth by 0.26%, an increase in GD to the same extent reduces economic growth by 0.48%; On the example of Ireland, a 1% increase in FDI leads to an increase in economic growth by 0.08%, an increase in GD by the same amount reduces economic growth by 0.33%; For Latvia - a 1% increase in FDI leads to an increase in economic growth by 0.5%, an increase in GD by the same amount reduces economic growth by 0.77%; In Lithuania, a 1% increase in FDI leads to an increase in economic growth by 0.5%, an increase in GD by the same amount reduces economic growth by 0.87%; For Moldova - a 1% increase in FDI leads to an increase in economic growth by 0.27%, an increase in GD by the same amount reduces economic growth by 0.58%; For the example of North Macedonia, a 1% increase in FDI leads to an increase in economic growth by 0.14%, an increase in public debt by the same amount reduces economic growth by 0.43%; Also in the case of Austria, it appears that changes in both FDI and GD are important for economic growth. But here a change in FDI by 1% has a negative effect and reduces the change in economic growth by 0.03% and a change in GD also has a negative effect on the change in economic growth. A 1% increase reduces economic growth by 0.69%.

The study also showed that autoregressive distributed lag (ARDL) and vector autoregression (VAR) models can be used in the analysis of economic growth, public debt, and foreign direct investment and in the formation of relevant macroeconomic policies.

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