

Determinants of Corruption in the Balkan Countries: An Empirical Analysis

Детерминанте корупције у балканским земљама:
емпиријска анализа

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Abstract

Purpose: Corruption represents one of the most serious problems faced by developing countries, particularly those with a lack of democratic potential. The aim of this paper is to examine, through the application of a dynamic statistical model, the long-term and short-term effects of economic freedom, democracy, and the level of economic development on the level of corruption in the case of Balkan countries.

Methodology: The research is based on panel data for 10 Balkan countries. The observed dependent variable is the World Bank's *Control of Corruption* indicator, while the independent variables include the *Economic Freedom of the World* index published by the Fraser Institute, the *Electoral Democracy Index* published by the V-Dem Institute, and the level of economic development measured by GDP per capita from the World Bank database. The analysis employs an ARDL model, which enables separate examination of the long-term and short-term effects of the independent variables on the dependent variable.

Findings: A statistically significant impact of electoral democracy, economic freedom, and the level of economic development on the level of corruption in the long run has been confirmed. Only economic freedom also has an effect in the short run, with the direction of the effect remaining unchanged.

Originality/value: This is the first study of these determinants of corruption using a sample from the Balkans, and, to the author's knowledge, it is only the second paper in the overall literature to be based on the application of the ARDL model.

Practical implications: Research on the determinants of corruption always has practical relevance in the fight against corruption. Confirmation that corruption is a consequence of a lack of democracy and economic freedom in the Balkans provides guidance for the necessary reforms of the economic and political system.

Limitations: A practical limitation of the study relates to the relatively small number of observed variables, which is a consequence of the choice of the statistical model. Including a large number of variables would lead to the problem of model overidentification.

Keywords: economic freedom, democracy, corruption, the Balkans, ARDL.

JEL classification: P26, O17, B52

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Сажетак

Циљ: Корупција представља један од најозбиљнијих проблема са којима се суочавају земље у развоју, а нарочито оне са недостатком демократског потенцијала. Циљ рада је да применом динамичног статистичког модела испита дугорочан и краткорочан утицај економских слобода, демократије и нивоа економске развијености на ниво корупције у случају балканских земаља.

Методологија: Истраживање се заснива на панел подацима за 10 балканских земаља. Посматрана зависна варијабла је Контрола корупције Светске банке, док су као независне узете Индекс економских слобода у свету Института Фрејзер, Индекс изборне демократије ког публикује В-Дем институт и ниво економске развијености у виду БДП-а *per capita* из базе Светске банке. У анализи је коришћен ARDL модел који омогућава засебно испитивање дугорочног и краткорочног утицаја независних варијабли на зависну.

Резултати: Потврђен је статистички значајан утицај изборне демократије, економских слобода и нивоа економске развијености на ниво корупције у дугом року. Једино економске слободе имају утицај и у кратком року, пре чему се смер утицаја не мења.

Оригиналност/вредност: Ради се о првом истраживању ових детерминанти корупције на узорку балкана, при чему је према сазнању аутора у укупној литератури ово други рад који се заснива на примени ARDL модела.

Практична примена: Истраживања детерминанти корупције увек имају практичну примену у борби против исте. Потврда да је корупција последица недостатка демократије и економских слобода на Балкану пружа правац неопходним реформама економског и политичког система.

Ограничења истраживања: Реално ограничење рада односи се релативно мали број посматраних варијабли, што је последица избора статистичког модела. Укључивање великог броја варијабли би довело до проблема прекомерне идентификације модела.

Кључне речи: економске слободе, демократија, корупција, Балкан, ARDL.

ЈЕЛ класификација: P26, O17, B52

Introduction

Due to the inherent complexity of the phenomenon, there is a large number of definitions of corruption, reflecting its various aspects. According to Collier (Collier, 2002), the absence of a generally accepted definition of corruption is the reason why there is no single interdisciplinary theory of this phenomenon. One of the most frequently used definitions is Tanzi's (1995), according to which corruption exists in the case of a deliberate violation of the principle of impartiality in decision-making, with the aim of appropriating benefits for oneself or a related person. In this way, the problem of defining abstract phenomena such as public interest or public opinion, connected with other popular definitions of corruption, was avoided. However, taking into account the choice of corruption indicators, the paper starts from the definition of the World Bank, which defines corruption as the abuse of public authority in order to obtain personal gains.

Historically speaking, the first traces of corruption come from the period before new era (Bardhan, 1997), but the wider interest of the scientific public in this phenomenon came only in the second half of the 20th century, parallel to the process of decolonization and the second wave of democratization. Modern approaches to the study of corruption are based, above all, on individual choices, with individuals constantly calculating the potential benefits and costs of such illicit practicess (Rose-Ackerman, 1978; Becker & Stigler, 1974; Banfield, 1975). The basic orientation is therefore microeconomic, which may obscure the broader social consequences of corruption. In contrast, the foundational, so-called "traditional" approach to corruption, which we encounter in ancient and medieval

philosophers and writers such as Plato, Aristotle, and Machiavelli, focuses on the "corruption" of social norms. That is where the term corruption comes from, lat. com – together, and rumpere-break.

Within contemporary social science, two conflicting approaches to the study of corruption have emerged - the *grease in the wheels* and the *sand in the wheels* approach. While the former emphasizes the positive effects of corruption (Leff, 1964; Huntington, 1968; Nye, 1967), the latter approach views negatively on the impacts of corruption, as a rent-seeking activity, on socio-economic flows (Rose-Ackerman, 1978; Becker & Stigler, 1974). It was only with the development of statistical instruments and cross-national quantitative corruption metrics in the late 20th century that the negative impact of corruption on economic dynamics was empirically confirmed (Mauro, 1995; Gründler & Potrafke, 2019; Lojanica, 2025). Although corruption may yield short-term benefits for specific actors, its overall long-term effect on society is unequivocally negative. The attitude of modern economic theory towards corruption is negative precisely for this reason, and national legislations around the world prescribe corresponding punishments for such behavior.

Contemporary research rarely addresses the effects of corruption, and it focuses on its causes and determinants. This is because the research is practically oriented, since identifying the determinants of corruption is essential for fighting it (Zhang et al, 2023). When studying a complex and multidimensional phenomenon, such as corruption, it is not justified to limit oneself only to economic analysis, but it is also necessary to include wider institutional and political factors. The microeconomic point of view, despite its advantages regarding the possibility of mathematical modeling, observes reality too narrowly, and ignores the essential determinants of corruption. This particularly refers to the role of the institutional environment in which these types of decisions are made. By defining the rules under which interactions between economic subjects are carried out, political institutions influence the probability of the outbreak of corruption (Lederman, Loayza & Soares, 2005), which is why there is a widespread belief that poor regulation and corruption are "two sides of the same coin" (Lambsdorff, 2006).

This research covers a group of ten Balkan countries in the period 2008-2023. The existing literature unjustifiably neglects this region, characterized by certain specificities, and often deals with almost global samples. All countries within this group, with the exception of Greece, have historically had economic-political systems based on extensive suppression of economic and political freedoms. Later in the transition process, corruption became the most serious problem that transition economies faced (Shleifer, 1997). Today, there are findings that in the Balkans, political elites use corruption in order to consolidate their own power (Sotiropoulos, 2017). All these circumstances actualize the need to study the determinants of corruption in this region.

The starting assumption in the research is the existence of a positive effect of economic freedom and democracy on reducing the level of corruption. The basic theoretical explanation of this relationship stems from the fact that a high level of economic freedom

implies the allocation of resources through the market mechanism, in accordance with the free will and personal choice of economic subjects (Gwartney & Lawson, 2003). By encouraging competition and strengthening the role of the market in the economy, economic freedoms reduce corruption, because civil servants have less room to monopolize the distribution of certain goods and services (Lambsdorff, 2006). On the other hand, by limiting economic freedoms, the state opens up space for corruption, because there are opportunities for rent-seeking activities (Rose-Ackerman, 1999; Paldam, 2002). Some authors point out that in rigid economic systems, corruption can occur as a substitute for the lack of economic freedom (Leff, 1964; Carden & Verdon, 2010). On the other hand, there is research that cast doubt on this theoretical relationship (Bilger & Goel, 2009; Yamarik & Redmon, 2017).

In a democratic system, the division of power is a horizontal mechanism, and periodic elections are a vertical mechanism of government control by citizens (O'Donnell, 1994). In such a society, the demands of the public for the transparency of state activities, and the existence of free and objective media complicate and hinder the implementation of secret and illegal activities by government representatives (Andelković, Stefanović & Petrović, 2024). However, in the case of China and Latin American countries, democratization acted in the direction of spreading corruption (Harris-White & White, 1996). Also, Triesman (2000) points out that the current level of democracy in the country is not relevant, but the fact that the country has been exposed to democracy for a long period of time. Only when democratic institutions are rooted in society, elections become a means of controlling government activities (Serra, 2006). That is why the level of corruption in young democracies is higher than in countries with a long democratic tradition.

In addition to economic freedoms and democracy, the influence of the country's level of economic development was examined in the model. More developed countries have lower levels of corruption due to better public management, the existence of the rule of law and the possibility to create an adequate monitoring mechanism. In poor countries, the marginal value of money is higher, which means public officials derive greater utility from accepting bribes (Sandholtz & Koetzle, 2000). Economic development is believed to reduce corruption through the rationalization of public and private roles, as well as through the expansion of education, making corruption more difficult to hide (Treisman, 2000). Economic development enables individuals to better articulate their desires and participate in the political process (Welzel & Inglehart, 2008). In such conditions, instead of worrying about their own existence, people will be more ready for collective action and will seek better quality public management without corruption.

In accordance with the aforementioned specificities of the observed group of countries, the question arises as to what the relationship between the observed variables will be in the period after the end of the transition process. Also, there is the question whether the required level of economic freedom was achieved in that process and whether democracy was sufficiently consolidated in this part of Europe. The application of the dynamic ARDL model allows us to distinguish short-term from long-term impact, which is lacking in the literature dealing with this topic.

The structure of the work includes three units. In the first part, an overview of the existing literature dealing with this issue was carried out. The second part of the paper presents an overview of the used variables and descriptive statistics by variables and by country. The results of the research together with concluding considerations are at the end, in the third part of the paper.

1. Literature review

The study of the influence of economic freedom and democracy on the level of corruption is not alien to economic literature. A large number of studies have confirmed the influence of these factors on corruption (Paldam, 2002; Lambsdorff, 2006; Jichi & Cabro, 2019), however, this relationship is not always monotonous and unambiguous as theoretically assumed. The very impact of economic freedom depends on the initial level of corruption in the country (Bilger & Goel, 2009). According to the quantile regression method, in those countries where there is already a relatively low level of corruption, an increase in the level of achieved economic freedom will have a positive effect, while in the case of highly corrupt countries, it may have an unfavorable effect. The research also showed that democracy becomes an important factor in reducing corruption only in highly corrupt countries. The level of economic development had a positive impact on the reduction of corruption in all used specifications and in all quantiles. Although the research covered nearly one hundred countries, it only observed a single year. This cross-country research is also a primary limitation of the paper.

In contrast, when Picón & Boehm (2019) applied the same quantile regression method, similar to the aforementioned authors, they reached completely different conclusions. In the wider group of analyzed countries, economic freedom and democracy always proved to be important factors, regardless of the level of corruption in the country. Therefore, countries with a lower degree of economic freedom and democracy have a higher level of corruption and vice versa. Parsons (2025) applied MMQR (Method of Moments Quantile Regression) to a panel of 92 developing countries in the period 1995-2021 and confirmed that economic freedoms reduce corruption in all observed quantiles, i.e. at all levels of corruption.

The joint influence of economic freedom and democracy raises certain doubts. Democracy has an impact on the level of corruption only when there is a low or high level of economic freedom, whereby the direction of the impact differs (Saha, Gounder & Su, 2009). Research based on the OLS method has shown that economic freedoms always lead to a reduction in corruption, but the effect of democracy is conditioned by the level of economic freedoms. If there is a low level of economic freedom in the country, the democratization of society will lead to the spread of corruption, and conversely, if there is a high level of economic freedom, it will affect the reduction of corruption. Other researchers came to a similar conclusion (Viana et al, 2019). Based on a sample of 160 countries between 2010 and 2016, it was observed that when the both democracy and economic freedom are included in the model, democracy loses its statistical significance. On the other

hand, research that did not include economic freedoms at all confirmed the influence of democracy on the reduction of corruption (Chowdhury, 2004).

On a panel of 8 ASEAN countries in the period 2012-2021, the impact of economic freedom, democracy and economic development on corruption was examined using fixed effects (Abbas et al, 2022). The authors also included the interaction between economic freedoms and democracy as a separate variable in the model. Individually, economic freedoms and democracy had a negative sign, i.e. they influenced the growth of corruption, but their interaction had a positive sign.

Jichi & Cabro (2019) examined the relationship between economic freedoms and corruption measured by the *Control of Corruption* indicator using the ARDL model and the Granger causality test. The total number of observed countries in the research was 113, and the period covered was 2002-2016. The authors distinguished two separate groups, namely 36 developed countries and 77 developing countries. Economic freedoms had a statistically significant impact on the level of corruption both in the short and long term, with it being higher in the group of developing countries. However, given that the research deals with the isolated impact of economic freedoms on corruption, no control variable is included, so the results must be taken with caution.

There is also research that did not confirm the impact of economic freedom on corruption, but recognized corruption as a factor that affects the level of economic freedom (Yamarik & Redmon, 2017). Using systemic GMM, the authors identified the level of economic development, democracy, foreign direct investment and Protestant religion as factors that influence the level of corruption, while economic freedoms were not statistically significant. On the other hand, in the model with economic freedom as a dependent variable, corruption had a negative effect. The research included a sample of 164 countries in the period 1995-2012, whereby instead of annual data, five-year averages were used, recalculated on the basis of previous and future years.

Despite extensive literature, there is a common tendency to rely on large samples, which often causes researchers to overlook the specific circumstances in which certain countries are developing. In corruption research, one should refrain from making universal recommendations based on a vast number of countries, and instead focus on smaller groups of countries with similar institutional characteristics. The purpose of this research is to fill that gap in the existing literature.

2. Overview of used variables and descriptive statistics

The sample includes a group of ten Balkan countries in the period 2008-2023. The number of observations is 160, and statistical data processing was performed in the eViews 12 program. The dependent variable is the *Control of Corruption* indicator, while the *Economic Freedom of the World*, *Electoral Democracy index* and *GDP per capita* are independent variables. An overview of the variables used, the names used in the model and the source from which they were taken is given below in Table 1.

Table 1: Overview of used variables

Variable	Name in the model	Source
Control of Corruption	CC	WGI
Economic Freedom of the World	EFW	Fraser Institute
Electoral Democracy Index	EDI	Varieties of Democracy
GDP per capita	GDP per capita	World Bank WDI

Source: Authors

The used dependent variable *Control of Corruption* is based on the perception of the extent to which public power is abused for personal gains, including *petty* and *grand* forms of corruption, as well as the very level of "capture" of the state by elites and private interests (Kaufmann & Kraay, 2024). The *Control of corruption* indicator, as well as its frequently used counterpart, the *Corruption Perception Index* (CPI), are composite indicators, which means that when calculating them by country, different sources are used. Data collection is carried out through surveys aimed at households and individuals from the business sphere, but also based on assessments by a large number of experts (Kaufmann & Kraay, 2024). The indicator ranges from 0 to 100, and higher values symbolize a lower level of corruption. The main reason for choosing this indicator is the possibility of observing a longer period of time compared to the CP index (Corruption Perception Index). Due to methodological changes in the CPI calculation, the data are not comparable with the period before 2012 (Transparency International, 2012).

The *Electoral Democracy Index* is based on Dahl's (1971) concept of polyarchy, according to which the ruler is accountable to the people through periodic elections. It is one of *V-Dem's* five higher-ranking indices, which is also included in the creation of the other four. In this way, the fact that there is no democracy, be it liberal, participative, deliberative or egalitarian, without free elections, is recognized. V-Dem's methodology is based on the process of codification of data taken from other sources or obtained by filling out questionnaires by hired experts for each observed country (V Dem, 2021). The value of the indicator ranges from 0 to 1, with higher values indicating a higher level of democracy.

The basis of economic freedoms are personal choice, freedom of exchange of goods, free competition and protection of person and property (Gwartney & Lawson, 2003). They are represented in this research through the *Economic Freedom of the World* (EFW) index published by the Fraser Institute. Index values range from 0 to 10. Values closer to 10 indicate a higher level of economic freedom and vice versa. When creating the index, the Fraser Institute prefers objective data over questionnaires, which are also used. Data are taken from relevant international sources such as the IMF, the World Bank and the World Economic Forum, while data from national sources are rarely used (Gwartney, Lawson & Murphy, 2023). The index includes 44 indicators, grouped into five different sub-indices, all of which have equal weighting (Fraser Institute):

1. The size of the country
2. Legal system and property rights
3. Access to healthy money
4. Freedom of exchange with foreign countries
5. Regulation of credit, labor and business

GDP per capita expressed in current prices, from the World Bank database, was taken as an indicator of economic development. This indicator primarily has the function of a control variable, because even though it is a relatively small sample of economically mostly similar countries, significant differences in the level of economic development have emerged over time, as can be seen from a review of descriptive statistics.

Table 2: Descriptive statistics

Variable	Mean	Std.dev	Max	Min
CC	50.682	12.449	80.861	24.17
EFW	7.064	0.381	7.809	6.059
EDI	0.638	0.15	0.907	0.337
GDP per capita	11563.76	7138.56	32610.11	3981.72

Source: Authors

Descriptive statistics of the data used are given above in Table 2. The average value of the corruption indicator is 50.682, with the highest value in Slovenia in 2009 being 80.861, and the lowest in Albania in 2013 being 24.17. The index of economic freedom in the group had an average value of 7.064, and the highest recorded value was 7.809 in Romania in 2016, while Serbia achieved the lowest recorded value of 6.059 in 2008, which can partly be explained as a consequence of the late transition. The average value of democracy measured by the *Electoral Democracy Index* was 0.638, of which Greece had the highest level of electoral democracy in 2010, even 0.907 on a scale from 0 to 1. On the other hand, Serbia proved to be the country with the least democratic capacity, because in 2021 it recorded the lowest EDI value within the group, of only 0.337. In relation to the rest of Europe, the Balkan countries can be considered less developed - the average value of GDP per capita in the observed period is 11563.76 USD. Slovenia represents the most developed country in the Balkans - in 2023, it had 32610.11 USD per capita. On the other hand, the lowest recorded value of GDP per capita was achieved in Albania in 2015, 3981.72 USD.

Table 3: Overview of the average values of the observed variables by country

Country	BDP per capita	CC	EFW	EDI
Slovenia	25165.01	77.68	7.12	0.829
Greece	22162.89	56.1	7	0.855
Croatia	15224.25	58.77	6.97	0.78
Romania	11377.39	50.12	7.54	0.69
Bulgaria	9369.96	48.54	7.29	0.66
Montenegro	7947.77	52.7	7.07	0.489

Serbia	7549	43.11	6.57	0.462
North Macedonia	6089.88	47.71	6.97	0.523
BiH	5665.97	38.34	6.56	0.545
Albania	5085.47	33.72	7.55	0.53

Source: Authors

Table 3 shows the average values of the used variables for the observed countries. The most economically developed country is Slovenia with an average value of GDP per capita of 25165 USD, while Albania is the least developed with an average value of 5085.47 USD. According to the average value of the *Control of Corruption* indicator of 77.69, Slovenia is also the least corrupt country, while Albania has the lowest average value of 33.72. Romania has the highest average value of the EFW index at 7.54, and BiH has the lowest at 6.57. According to the electoral democracy indicator of 0.462, Serbia is at the bottom of the observed group, while Greece has the highest average value of 0.855.

An examination of the descriptive statistics indicates that the level of corruption is lowest in the country with the highest average GDP per capita, as well as high levels of democracy and economic freedom, which is consistent with the dominant theoretical perspective. However, according to the Fraser Institute's assessment, Albania has the highest average level of economic freedom in the Balkans, yet it is simultaneously the most corrupt country.

3. Research results and discussion of the results

In accordance with the goal of the research, to examine the long-term and short-term impact of economic freedom, democracy and the level of economic development, as well as by choosing ARDL as the method used, we set up the equation of the model. The part of the model that includes the lagged value of the dependent variable as an independent regressor constitutes its autoregressive component, while the part that includes lagged values of the independent variables represents the distributed lag component (Gujarati, 2003). All variables in the model are logarithmized.

$$\begin{aligned}
 \log cc_t = & \alpha_0 + \alpha_{1i} \sum_{i=1}^2 \Delta \log cc_{t-i} + \alpha_{2i} \sum_{i=1}^2 \Delta \log efw_{t-i} \\
 & + \alpha_{3i} \sum_{i=1}^2 \Delta \log edi_{t-i} + \alpha_{4i} \sum_{i=1}^2 \Delta \log gdp_{t-i} + \varphi_1 \log cc_t \\
 & + \varphi_2 \log efw_t + \varphi_3 \log edi_t + \varepsilon_i
 \end{aligned}$$

- $\log cc$ - logarithmic value of the *Control of Corruption* indicator;
- $\log efw$ - logarithmic value of the *Economic Freedom of the World* index;
- $\log edi$ - logarithmic value of the *Electoral Democracy* index;
- α - short-term coefficients;
- φ - long-term coefficients.

The first step in the analysis is determining the order of integration of the observed variables. Checking the existence of a unit root and the order of integration of the observed variables was performed using the Levin, Lin & Chu test. The null hypothesis (H_0) of the test assumes the existence of a unit root, that is, that the observed variables are non-stationary. The obtained results are shown below in Table 4.

Table 4: Overview of Levin, Lin & Chu test values

Variable	I(0)		I(1)	
	t-statistic	p value	t-statistic	P value
<i>logcc</i>	-0.914	0.1802	-	-
<i>D(logcc)</i>	-	-	-2.608	0.0045
<i>logefw</i>	-2.487	0.0064	-	-
<i>logedi</i>	-0.147	0.4412	-	-
<i>D(logedi)</i>	-	-	-7.349	0.0000
<i>loggdg</i>	6.147	1.000	-	-
<i>D(loggdg)</i>	-	-	-5.852	0.0000

Source: Authors

By comparing the obtained p value of the test with the critical value $\alpha=0.05$, we decide to accept or reject the mentioned H_0 hypothesis of the test. First, the stationarity of the variable at level I(0) is checked, and then, if the H_0 hypothesis is accepted, the stationarity of the variable at the first differential I(1) is checked. Of all observed variables, only the independent variable *logefw* with p value of 0.0064 is stationary at level I(0), while all others are stationary only at the first differential I(1). Given that the variables are of different degrees of integration, it is not possible to use a panel regression model based on the method of least squares or vector models such as VAR or VECM. The only suitable model for analysis in the case that the observed variables are I(0) and I(1) degree of integration is the ARDL model (Pesaran & Shin, 1999; Pesaran et al, 2001).

Given the potential presence of cross-sectional correlation among the data, the results of the Levin, Lin & Chu test should be interpreted with caution, as they may be subject to bias. Therefore, an additional verification was conducted using the CIPS test (Cross sectionally augmented IPS). This is a second-generation unit root test designed for situations where cross-sectional dependence is present (Pesaran, 2007). The results are presented below in Table 5.

Table 5: Overview of CIPS test

Variable	I(0)		I(1)	
	t-statistic	p value	t-statistic	p value
<i>logcc</i>	-1.78	>0.1	-	-
<i>D(logcc)</i>	-	-	-3.21	<0.01
<i>logefw</i>	-2.655	<0.05	-	-
<i>logedi</i>	-2.847	<0.01	-	-
<i>loggdg</i>	-1.494	>0.1	-	-
<i>D(loggdg)</i>	-	-	-3.173	<0.01

Source: Authors

The obtained results are similar to those obtained from the previous first-generation test. The only difference is that democracy is no longer integrated of order I(1) but rather I(0). Corruption and the level of economic development remain integrated of order I(1), while economic freedom is integrated of order I(0). Given the different orders of integration of the observed variables, the application of the ARDL model is justified.

Before proceeding with the model estimation, it is necessary to examine the existence of cointegration among the observed variables using the Johansen cointegration test. The decision criterion is set at $\alpha = 0.05$, and the results are presented below in Table 6.

Table 6: Overview of Johansen cointegration test

No. of Coint. Eq	Trace test	p value	Max-Eigen test	p value
None	189.0	0.000	790.2	0.000
At most 1	185.8	0.000	183.9	0.000
At most 2	35.61	0.017	40.45	0.004
At most 3	9.119	0.981	9.119	0.981

Source: Authors

The results of the Trace and Max-Eigenvalue tests are examined, where p-values lower than the significance level α indicate the rejection of the null hypothesis (H_0). Considering that four variables are analyzed, the maximum possible number of cointegrating equations is three, which determines the specific structure of the null hypotheses of the test. The first null hypothesis, which states that there is no cointegrating equation among the variables, is rejected. The same conclusion applies to the second and third null hypotheses, which assume that there is at most one and at most two cointegrating equations, respectively. The fourth null hypothesis is accepted, leading to the conclusion that there are at most three cointegrating equations among the observed variables. Consequently, the analysis proceeds with further empirical investigation.

The ARDL model can be used if the variables are of I(0) and/or I(1) order of integration, and because it uses the lagged value of the dependent and independent variables, the potential occurrence of autocorrelation and endogeneity in the model is controlled for (Pesaran et al, 2001). When calculating the value for choosing the optimal number of legs, the *Akaike Information Criterion* (AIC) was used, and it was determined as (2,2,2,2). An overview of the obtained coefficients is given below in the Table 7.

Table 7: Overview of ARDL model values

Variable	Coefficient	Std. Error	t-stat	p-value
Long Run				
<i>logefw</i>	1.919***	0.66	2.907	0.0049
<i>logedi</i>	1.205***	0.314	3.834	0.0003
<i>loggdp</i>	0.919***	0.266	3.443	0.001
Short Run				
ECT	-0.233***	0.087	-2.682	0.0092
<i>D(logcorr(t-1))</i>	0.002	0.15	0.014	0.9882
<i>D(logefw)</i>	0.647	0.602	1.074	0.2864

$D(\log_{efw}(t-1))$	2.058***	0.674	3.053	0.0032
$D(\log_{edi})$	0.419	0.3	1.397	0.1669
$D(\log_{edi}(t-1))$	-0.425	0.417	-1.018	0.3119
$D(\log_{gdp})$	0.044	0.097	0.45	0.6537
$D(\log_{gdp}(t-1))$	-0.07	0.088	-0.792	0.4306
C	-1.833	0.666	-2.752	0.0076

Source: Authors

The first part of the table contains the coefficients related to the long-term relationship. In the long term, all independent variables are statistically significant with the expected signs, while in the short term, only the value of economic freedoms $\log_{efw}(t-1)$ is statistically significant. This indicates that the effect of the observed factors on corruption is primarily of a long-term nature. All statistically significant variables have a positive sign, indicating that higher levels of economic freedoms, democracy, and economic development are associated with a decrease in corruption. However, there are differences in the intensity of the effects among these variables. With a coefficient value of 1.919, economic freedom exerts the strongest long-run impact on the level of corruption. Democracy has a weaker effect, while the level of economic development, with a coefficient value of 0.919, exerts the weakest impact in the model. Although there is a slight difference between the short-run and long-run coefficients, 2.058 versus 1.919, this is not sufficient to conclude that the effect weakens over time.

Given that the lagged value of the dependent variable—corruption $\log_{corr}(t-1)$ is not statistically significant in the short run, it can be stated that corruption is not an endogenous variable. Therefore, the level of corruption from the previous period does not influence its future level in society.

The fact that the *Error Correction Term* is statistically significant with the appropriate sign speaks of the importance of the long-term relationship. The negative sign indicates that if some unexpected shocks occur in the short term, the system will strive for long-term equilibrium at the rate of 23.3% per year.

Conclusion

This paper argues that researchers studying corruption should avoid universal recommendations based on a huge number of countries, and instead focus on smaller groups of countries with similar characteristics. The possible contribution of this research to the literature dealing with the issue of the determinants of corruption could be in the selection of the observed sample and the methodology used, which enables the separation of short-term and long-term influence of independent variables. The research confirmed the statistically significant influence of economic freedom, democracy and the level of economic development on the level of corruption in the long term. In the short term, economic freedoms with a lag of one year are the only statistically significant variable.

Therefore, changes to economic and political institutions will lead to a reduction of corruption in this region, although one cannot expect immediate results. The creators of the

public management system are advised to persevere with positive reforms, particularly economic liberalization, as research shows it yields results even in the short term. However, further study is needed to examine how these variables interact with corruption.

Finally, it is necessary to highlight a practical limitation of the study, which implies that the results should be interpreted with a certain degree of caution. Apart from the indicator of economic development, the applied model does not include additional control variables. Due to the complexity of the model, which estimates both short-run and long-run coefficients, the inclusion of a larger number of observed variables would increase the risk of overidentification.

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Appendix

Table 1: Overview of DOLS model values

Variable	Coefficient	Std. Error	t-Statistic	P Value
logefw	1.891***	3.83E-10	4.94E+09	0.000
logedi	0.515***	4.86E-10	1.06E+09	0.000
loggdp	0.43***	6.55E-11	6.57E+09	0.000

Source: Authors

In accordance with the reviewer's recommendation, a robustness check of the long-run coefficients was conducted using the DOLS (Dynamic Ordinary Least Squares) model (Table 1), which was also estimated in EViews12. The signs of the coefficients remain unchanged, indicating that all three observed factors exert a statistically significant long-run effect on the reduction of corruption. Economic freedom continues to have the strongest impact on the level of corruption, with the value of its coefficient remaining almost unchanged 1.891 versus 1.919, while the coefficients for democracy and the level of economic development have decreased 0.515 and 0.43 as opposed to 1.205 and 0.919, respectively.

The normality of the distribution of the error terms for the observed observations was tested using the Jarque–Bera test. The decision criterion was set at $\alpha = 0.05$. The obtained test values are presented below in Table 2.

Table 2: Overview of Jarque-Bera test values

Jarque-Bera	5.051
p value	0.079

Source: Authors

The null hypothesis (H_0) assumes that the data follow a normal distribution. Since the obtained p-value (0.079) is greater than the significance level α , the null hypothesis cannot be rejected. Therefore, it can be concluded that the data follow a normal probability distribution.

The presence of multicollinearity was examined by calculating Pearson correlation coefficient values. The results are presented below in Table 3.

Table 3: Overview of Pearson coefficient

Variable	logcorr	logefw	logedi	loggdp
logcorr	1.000	-	-	-
logefw	0.042	1.000	-	-
logedi	0.601	0.155	1.000	-
loggdp	0.720	0.078	0.744	1.000

Source: Authors

Only values greater than 0.8 indicate the presence of multicollinearity. Since the obtained values for all variables are below this threshold, it can be concluded that the model does not suffer from a multicollinearity problem.