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Short Run and Long Run Effects of Corruption on Economic Growth: Evidence from Balkan Countries

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Abstract: One of the factors that characterize the different countries of the Balkan area is the level of corruption which, as often stressed by scholars, may significantly influence the economic growth of its countries. However, there is still no agreement on the sign of this effect: there are theoretical arguments and empirical results in favor of a positive correlation between corruption and growth, and there are also theoretical arguments and empirical results that support the opposite view. Comparing the short-term and long-term impacts can help to explain this contradiction. In this perspective, we propose an auto-regressive distributed lag (ARDL) methodology. This approach gives both short-run and long-run results simultaneously and it is robust with small samples. The results are not homogeneous for the eight countries covered by our study (Bulgaria, Croatia, Greece, North Macedonia, Romania, Serbia, Slovenia, and Turkey), but the following theoretical intuition is confirmed: although corruption could be seen as a factor that helps economic growth by speeding up the bureaucratic processing in the short run, conversely, in the long run, the social costs associated with corruption are considerable, making it difficult to sustain the political, economic, and social burdens, thus leading to a higher levels of corruption that negatively affect the economic growth. These results confirm certain aspects of Albert Hirschman's ideas regarding private interests and public action.

Keywords: corruption; economic growth; Balkan countries; Albert Hirschman

1. Introduction

Over the years, there has been an attempt to understand how corruption can influence the defining contexts for a country's economic development. This has led several scholars in two opposing directions: the former argues that corruption generates distortive effects, creating costs, reducing efficiency, and forming a barrier to economic growth as it negatively affects the level of Gross domestic product (GDP) (Krueger 1974; Shleifer and Vishny 1993; Gould and Amaro-Reyes 1983; Mauro 1995; Friedman et al. 2000; Tanzi and Davoodi 2002; Dreher and Herzfeld 2005; Del Monte and Papagni 2007; Aliyu and Elijah 2008; Aidt 2009; Kaufmann 2010; Pluskota 2020; Nguyen and Duong 2021; Simovic 2021; Uddin and Rahman 2023).

Supporters of the second line of thinking see corruption as a factor that introduces efficiency into the economy but also has positive effects on economic growth. This argument is supported by the fact that corruption understood as the different forms of payment to bureaucrats acts as a lubricant to facilitate economic development and make the bureaucratic process more efficient and hastier (Leff 1964; Huntington 1968; Friedrich 1972; Acemoglu and Verdier 1998; Lučić et al. 2016; Bitterhout and Simo-Kengne 2020).

Based on these facts, in this work, we will try to understand how the phenomenon of corruption manages to influence economic growth or rather how in the short and long term, the perception index of corruption influences the growth rate of the economy. To

achieve this, we will examine countries that have historically experienced significant levels of corruption. Specifically, we will focus on the Balkan region, which includes Bulgaria, Croatia, Greece, North Macedonia, Romania, Serbia, Slovenia, and Turkey. The historical and institutional characteristics of the Balkan countries are different: in some cases, there is a history of the transition from real socialism to the free market (a passage conducted with few necessary regulatory and institutional structures); in the case of the former Yugoslavia the institutional evolution is complicated by civil wars in the 1990s; five countries (Bulgaria, Croatia, Greece, Romania, and Slovenia) are part of the European Union. However, the following two traits are shared by all the Balkan countries we are referring to: (1) a high regard for corruption and (2) various economic growth initiatives that were largely ineffective because of the corruption itself. In the following section, we will adequately illustrate and discuss these two features. Although there has been a significant increase in economic growth over the years, this does not necessarily indicate an improvement in living standards and social development. In this contribution, we propose an ARDL methodology to identify the differences between short- and long-term in the relationship between perceived corruption and economic growth.

As we will argue, our empirical results demonstrate that there are significant differences between the Balkan countries in the correlation between corruption and economic growth in the short term. However, the long-term estimates tend to show that an increase in corruption is negatively correlated with economic growth. These results confirm several aspects of Albert Hirschman's (1982) thoughts about private interest and public action. Indeed, our study calls attention to the persistent characteristics of corrupt behavior: over time, the immediate effects of illegal payments to bureaucrats distort an economy's and government's qualitative performance and spread a culture of corruption by influencing expectations about future dealings. In other words, a prominent level of corruption, as measured by the corruption perception index, triggers a cumulative mechanism that erodes civic sentiment. This, in turn, leads to a decrease in economic growth factors, as argued by Hirschman (1982).

This study is organized as follows: after this brief introduction, Section 2 presents an overview of the historical and institutional situation of the countries considered. Section 3 presents a detailed review of the literature on the impact of corruption on economic growth. Section 4 describes the methodology that sustains the empirical analysis. The empirical results are shown and discussed in Section 5 before the conclusions in Section 6.

2. The Balkan Area, an Overview

The Balkan region has long been characterized by political instability and shifting global power dynamics. It is a diverse area, home to various cultures, ethnicities, and economic situations, and has been subject to both positive and negative interference from external actors (Bega 2007; Bowen 2005). Therefore, they have leveraged old ploys or the reminiscences of the past, poverty, or local unemployment, the pessimism of the population, the fragility of institutions, links to special interest groups, and often not entirely unrelated to crime, a high level of corruption, all for the purpose of settling in the territory, not necessarily for economic reasons but with the intention of using it for political purposes. It seems that these contradictory influences and differences continue to this day and that this area has never been completely interconnected from a political and economic point of view, even though it has been about twenty years since the end of the secessionist conflicts in the former Yugoslavia that took place from 1990, which began with Slovenia and Croatia until 1999, and concluded with the war in Kosovo.

According to Prevalakis (1997), the spin-off of Yugoslavia that led to the formation of new states occurred in conjunction with the collapse of the central planning system experienced by Albania. It began with the rich countries of the north, Slovenia and Croatia, and completed with the poorest countries in the federation, North Macedonia and Kosovo.

The exit from real socialism and the orientation towards the market economy (Djankov and Murrell 2002) was characterized by the affirmation of state capitalism that put the great

industrial complexes first (destined to fail to survive in the free market economy). The move not without problems from a planned economy to a free-market economy had made growth difficult, causing serious problems to high unemployment and trade deficits, in addition to inadequate corporate restructuring as well as obscure privatization processes that encouraged the development of corruption and illegal practices (Muço 2015). These phenomena have led to de-industrialization and chronic underdevelopment in many areas of the Balkan countries (Bartlett 2009; Djankov and Murrell 2002). It is important to remember that in Eastern Europe, a form of state capitalism had been established before the 1990s. This involved the forced industrialization of entire regions and prioritization of large industrial complexes that were not sustainable in a free market economy (Fiocca 2001).

Furthermore, the various countries in this period introduced a drastic change from organizational, administrative, and managerial points of view, affecting the production structure (Coricelli and Rocha 1991). During this transition period, we see that the business class disappeared (Estrin et al. 2006). According to Svejnar (2002), the legacy of socialism in these countries was not conducive to business activities. This lack of the entrepreneurial class and the country's ability to resume a path of development also stems from the lack of institutional memory, the inability of the institutions, and the absence of the rule of law that has encouraged the development of corruption.

Reforms undertaken for market liberalization and radical change in economic policy initially had a positive impact on the economic growth of the Balkan countries, but very soon this effect began to slow down. According to Stiglitz and Godoy (2006), it was the result not only of internal factors. In this period, there was a strong expansion of the labor-intensive and low-productivity economic sectors.

During the early years of the transition, it was observed that some of the reforms undertaken did not stimulate economic growth, as they were not accompanied by the growth of the financial sector (Muço 2015; Estrin et al. 2006). However, it is important to acknowledge that these countries underwent a significant transformation in a challenging environment marked by a lack of reforms, political unrest, weak institutions, and undemocratic political systems, which hindered both political and economic progress.

A report by the World Bank (2000) indicated that, in these cases, the processes necessary to bring the various countries to the completion of an effective market economy were not implemented, instead, there has been a worsening in living standards, contained growth, and an increase in poverty and unemployment rates.

Regarding integration in the European Union, the area under consideration is a strategic point as it forms a bridge between Europe and the East; in this way, it has attracted international attention by producing policies and interventions aimed at this very area.

The Balkan region is considered a complex area consisting of small states that are in constant conflict with each other, according to the international community.

In the Balkan intra-regional context, in order to implement reforms, efforts were made to intervene by cooperative and political means; therefore, we must not neglect but take into account the variables considered to be problems that are typical of this area (in political and economic terms) and also the starting environmental conditions, the shift from a difficult to resolve conflict phase, and the formation of new political entities, which have tried to legitimize themselves by leveraging ethnic–political elements (Gligorov et al. 1999). Consequently, in addition to cultural or historical difficulties regarding regional cooperation, a key role is played by the gap between economic relations, which is the most acute problem as seen by the European institutions and international analysts, who find in the liberalization of markets the strategic intention towards homogenization of the area characterized by the absence of barriers and customs (World Bank 2000). However, liberalization in itself is neither a sufficient nor a necessary condition for the reduction in corruption.

If we consider the commercial relations, these have changed in Bulgaria and Romania, where the main partner has become the European Union (EU) at the expense of the former Soviet Union. If we consider the Yugoslav Socialist Republic, during the Cold War years it

formed an area of internal trade between the various federated States, having only minimal relations with neighboring countries.

Greece, Romania, and Bulgaria remained isolated from the rest of the region since the end of the Second World War: the same happened for Turkey characterized by cultural and political specificities (for example, political Islam and the Arab–Israeli conflict). However, vertical integration has occurred at the expense of horizontal integration (it is more pronounced between Serbia, Croatia, and North Macedonia). Basically, we can say that there are many negative aspects and the development programs to cope with them must pursue wide-ranging purposes, including social rehabilitation strategies, economic and political life to ensure the attainment of social cohesion (reducing discrimination, poverty, and exclusion), collect social and human capital (affirmation of human rights), and empower citizens with the democratization of political structures.

Since 1995, Transparency International has been presenting data on the corruption perception index (CPI) on an annual basis. The level of corruption is measured using an index that cross-references official data from multiple independent institutions and covers various aspects of corruption. These include the use of public funds and their diversion, the existence of conflict-of-interest laws, the fight against corruption, the level of bureaucratization, media autonomy, and others. The Corruption Perceptions Index (CPI) is scored on a scale of 0 to 100, where 0 represents the highest degree of corruption and 100 represents its complete absence. Looking at the evolution of the CPI, Europe occupies as many as seven of the top ten positions among the most virtuous countries, including the leading position with Denmark. In 2018, the average value of the European Union countries was 66, more than 20 points above the global average. The situation of the Balkan countries is significantly worse: all the countries in the area occupy low average positions in the overall ranking. With an average CPI of only 41 points, Serbia, Bosnia and Herzegovina, Kosovo, North Macedonia, and Albania are between 88th and 100th in the ranking. Only Croatia (60) and Montenegro (68) have fewer worrying values of the CPI.

3. Corruption and Economic Growth

In this classic work titled Shifting Involvements: Private Interest and Public Action (1982), Hirschman offers a stimulating social, political, and economic analysis dealing with how and why frustrations of private concerns lead to public involvement and public participation that eventually leads back to those private concerns. Public affairs are subject to a special kind of instability. Specifically, Hirschman suggests that the shift from an economic system characterized by a massive state presence to one more oriented toward private property occurs after the initial wave of enthusiasm for public service has given way to a more dispassionate assessment of one's chances of achieving public happiness. In such times, people who have successfully developed a strong interest in public affairs recognize and exploit opportunities for personal enrichment at the expense of the public interest. From this perspective, corruption is the result of the lack of satisfaction that comes from acting in the public interest. This lack is replaced by the material benefits that can be obtained on an individual basis. Corruption, from being a response to dissatisfaction with public affairs, becomes a determinant of deeper dissatisfaction, which in turn paves the way for greater corruption. This cumulative dynamic, Hirschman argues, does not tend to operate with the same force in all circumstances, but is particularly characteristic of social systems that have experienced the transition from Weberian patrimonialism to a complete separation between the day-to-day functioning of the economy and public affairs. Within this theoretical framework, which seems very suitable for the Balkan region given the historical–institutional developments we have previously outlined, the distinction between short- and long-term effects of corruption on economic growth assumes clear relevance. This aspect has not been thoroughly addressed in the literature on the subject that we are about to review.

The presence of corruption and non-transparency of rules and regulations have an impact on the development of a country with costs that present a different distribution

within the society itself. Corruption appears to be strongly regressive in terms of public resources, i.e., the provision of meritorious goods, and the welfare state, but also the prevarications and forms of abuse. In these cases, the weaker social classes are particularly affected. There are various forms of corruption; it can be political, bureaucratic, it can bring benefits or reduce costs to the corrupter, it can take the form of a bribe, it can be collusive or coercive, decentralized or centralized, arbitrary or predictable and, finally, it can take place in cash or not (Tanzi 1998). All this could be widespread in a few areas such as defense and weapons, telecommunications and energy products, construction and public works, healthcare, and the pharmaceutical industry (Arnone and Iliopolus 2005).

Corruption-related actions pass from bribes, i.e., benefits or advantages that would not be due, both economically and not, and also abuse of power (Seña 2004). This, in addition to weakening social cohesion, has disastrous effects on the allocation of human resources in public administration, finance, and the effectiveness of reforms by reducing the possibility of economic growth (Visco 2014).

Corruption and its effects have been extensively studied, as demonstrated by the works of Rose-Ackerman (1978) and Bhagwati (1982).

According to Osoba (1996), corruption is an anti-social behavior conferring improper benefits contrary to legal and normal norms that undermine the authority's capacity to secure the welfare of all citizens. Macrae (1982) defines corruption as an arrangement that involves an exchange between two parties (the demander and the supplier), which (i) has an influence on the allocation of resources either immediately or in the future; and (ii) involves the use or abuse of public or collective responsibility for private ends.

As for the forms of corruption, there is a general consensus that corruption is linked to acts in which public power is used to make gains for a matter of personal interest (Coolidge and Rose-Ackerman 1997; Grossman and Helpman 1996; Groenendijk 1997; Ofria 2006). Public officials, in order to increase their personal earnings, are often inclined to bribe their employees too; in this way, the phenomenon of corruption is increasingly widespread (Tirolem 1996). Corruption also includes votes bought and practices for being re-elected or having extensions to stay in their position (Todaro and Smith 2009; Rose-Ackerman 1999). Within these theoretical models, the potential negative effects of corruption on economic growth are not clearly evident.

3.1. How Corruption Impacts Economic Growth: The "Grease the Wheels" versus the "Sand the Wheels" Hypotheses

Over the years, there has been an attempt to understand how corruption can have a direct impact on economic growth. This has led scholars to go in two opposite directions: according to the first, corruption would bring benefits to economic growth. This is the so-called "grease the wheels" hypothesis.

This argument is supported by the fact that corruption, understood as various forms of payment to bureaucrats, can act as a lubricant to facilitate economic development and expedite bureaucratic processes.

The main proponents of this thesis are Leff (1964), Huntington (1968), Friedrich (1972), and Acemoglu and Verdier (1998), who identify corruption as a factor that introduces efficiency into the economy but also has positive effects on economic growth. Studies conducted by Johnson et al. (1998) show that there is a positive relationship between the shadow economy and the presence of corruption. This correlation according to Friedman et al. (2000) could be related to the fact that both variables could depend on a fragile judicial system. According to Leff (1964) and Huntington (1968), corruption can improve efficiency as it manages to remove the rigidities typical of government that hinder economic decisions that would be conducive to growth and investment. Obviously, only a moderate level of corruption can have a positive effect on growth (Trabelsi 2024). Lui (1985) considers corruption as a "time saver" that allows corruptors to obtain faster and more favorable decisions in exchange for illicit services to the corrupt. Leff (1964) and Beck and Maher (1986) argue that corruption can lead to economic growth. For example, businessmen may

pay civil servants to speed up paperwork. According to Spyromitros and Panagiotidis' (2022) study, corruption may not necessarily hinder economic growth if other factors are favorable. For the panel data, they consider that corruption positively affects economic growth in Latin American and MENA countries. Of course, the policy implications are not the increase in corruption, but the study of the remaining factors that intervene in the analysis.

Proponents of the second line of thought, known as the "sand the wheels" hypothesis, argue that corruption causes costs by reducing efficiency and forming a barrier to economic growth as it negatively affects the level of GDP per capita; moreover, it also causes difficulties in transactions, international trade, investment activity, and price stability, influencing the political level (Mcmullan 1961; Buchanan and Tullock 1962; Myrdal 1968; Krueger 1974; Gould and Amaro-Reyes 1983; Shleifer and Vishny 1993; Mauro 1995, 1997a, 1997b; Tanzi 1998; Tanzi and Davoodi 2002; Rose-Ackerman 1999).

There are distorting effects not only at the economic level but even effects that threaten the credibility of the institutions themselves and penalize civil society. Among the various supporters are Friedman et al. (2000), Dreher and Herzfeld (2005), Del Monte and Papagni (2007), Aliyu and Elijah (2008), Aidt (2009), Dreher and Schneider (2010), and Kaufmann (2010). The results they found show how corruption can hamper economic growth by distorting markets and the allocation of resources.

The presence of corruption has negative effects by neglecting health and education. In fact, according to Sylos Labini (1989), scientific–technical progress and education stimulate economic development; however, if there is corruption, this tends to adversely affect these factors, also influencing the increase in social well-being for citizens. Referring to Dokas et al. (2023), corruption has a negative impact on innovation and economic growth.

Mauro (1995), in his empirical model, concludes that corruption is like an income tax and worsens economic growth. Mo (2001), Leite and Weidmann (1999), Poirson (1998), Knack and Keefer (1995), and Mauro (1995, 1997a) achieved similar results. Gould and Amaro-Reyes (1983) also reported similar findings. Tanzi and Davoodi (1997) investigated the effects of corruption on the composition and size of public expenditure. Their findings were reflected in later studies by Tanzi and Davoodi (2002), which showed that corruption not only reduces spending on health and education but also lowers the quality of public infrastructure. Similarly, Akai et al. (2005) found similar results. Muço and Balliu (2018) argue that corruption tends to increase public spending on infrastructure, taking funds away from other sectors such as education and health. According to Afonso and de Sá Fortes Leitão Rodrigues (2022)' study, corruption can affect private investment.

Increased corruption causes costs to expand and investment quality to decrease, but also informal economic growth and distortion of the tax burden as the government's ability to collect tariffs and taxes is compromised (Eilat and Zinnes 2000; Friedman et al. 2000; Del Monte and Papagni 2007; Bird et al. 2008; Dreher and Schneider 2010; Kaufmann 2010). Also, corruption has a negative effect on FDI in a determining country (Kim and An 2022; Asafo-Adjei et al. 2023). According to the study of Paulo et al. (2022), corruption is associated with lower investment in physical capital and lower foreign investment flow.

Several other studies link corruption with the economic conditions of a given country. A country experiencing economic conditions of poverty will tend to have high levels of corruption that will further worsen development (Shleifer and Vishny 1993; Ali and Isee 2003). Dreher and Schneider (2010) empirically verified a weak correlation between corruption and informality. The latter is often present in poor countries. Johnson et al. (1997, 1998) and Fiorino et al. (2012) state the opposite: corruption is what generates poverty, or rather corruption increases the cost of public services, also curbing competition. Moreover, economic growth and investment also decrease, leading to an increase in the costs of services offered by the public. For Bird et al. (2008), corruption entails a rise not only in costs connected to public services but also in long-term tax burdens.

North (1991) argues that corruption among civil servants and the judiciary can hinder a country's growth. An efficient justice system is necessary to enforce contracts. Corruption

in the justice system can create uncertainty about patents and property rights, leading to a decrease in incentives to innovate, invest, and adopt innovative technology. According to Sharma and Mitra's (2019) study, countries with efficient institutions and low levels of corruption do not experience the resource curse.

According to Méndez and Sepulveda (2006) and Aidt et al. (2008), in countries where the government is doing well, there is a negative relationship between growth and corruption; unlike in countries where the government is less efficient where the effect of corruption on growth is negative or even positive.

Countries with a longstanding democratic tradition are typically associated with a robust institutional structure that helps to control this phenomenon (Przeworski and Limongi 1993; Acemoglu et al. 2008). Papaioannou and Siourounis (2008) demonstrated that democracy can have a positive impact on a country's economic growth, and Gundlach and Paldam (2009) further showed that there appears to be a correlation between the presence of democracy and income levels in the long run.

Brunetti and Weder (1998) showed that there is a link between the credibility of laws and economic growth and how corruption also manages to influence the distribution of wealth within a country. Corruption is often associated with informal activity and can lead to a decrease in tax revenues, resulting in growing tax evasion (Friedman et al. 2000). This, in turn, can lead to a reduced ability of the government to provide public services and goods (Johnson et al. 1997, 1998).

Mauro (1995) made empirical estimates to study the impact corruption has on investment but also on growth. The estimates showed that corruption has negative effects on investment by discouraging it. Other research works refine this perspective: Gupta et al. (1998) showed that corruption increases poverty, while other scholars have shown that it does not attract foreign investment and instead forces it away and reduces it (Wei 1997; Habib and Zurawicki 2002), or that it finally curbs productivity (Lambsdorff 2003).

The increase in the corruption index squeezes growth (Mauro 1995) by influencing public expenditure (Mauro 1997a), increasing its size and changing its composition (Tanzi and Davoodi 2002; Akai et al. 2005).

The relationship between economic performance and corruption is evident. Additionally, allocating more resources toward combating corruption can lead to better economic outcomes.

At the macroeconomic level, considering the relationship between GDPs per capita and corruption, it can be seen how Mauro (1995) and Mo (2001) have found that on average corruption is negatively affecting growth.

The relationship between the two is influenced by the context in which it occurs, specifically the stability of economic policy and the structure of government. This is related to the institutional environment, as noted by Méon and Sekkat (2005) and Méon and Weill (2010).

For Kaufmann (2010), policymakers seek to incentivize the large investments that are made in public works, thereby increasing public spending. But corruption causes a rise in debt and, therefore, the costs of being able to pay the debt in the future also increase. This can lead to a vicious circle between rising public debt and corruption (Golden and Picci 2005; Olken 2006). Corruption holds back development and is also the cause of poverty and low incomes (Blackburn et al. 2006; Andvig and Moene 1990).

However, the reviewed contradictory results may no longer seem illogical when considering the possibility that corruption may have different effects in the short and long term. For example, the distinction between short-term and long-term effects is relevant in the paper by Gründler and Potrafke (2019). They examine the long-run relationship between corruption and economic growth using data from 175 countries from 2012 to 2018. The long-term cumulative impact of corruption on growth is that for every standard deviation increase in the inverted Corruption Perceptions Index (CPI), real GDP per capita fell by almost 17%. Corruption has a particularly negative impact on economic growth in autocracies since it raises inflation and reduces foreign direct investment. However,

Gründler and Potrafke (2019) do not compare these long-run results with the possible impacts on economic growth that corruption has in the short run.

Table A1 in the Appendix A summarizes the literature we reviewed by pointing out the different methodologies adopted by researchers and the results regarding the effects of corruption. Our empirical analysis aims to reconcile the two different views that emerge from the existing literature by highlighting the diverse consequences that corruption can have on economic growth in the short and long run.

3.2. Short- and Long-Run Impact of Corruption on Economic Growth

As we have shown in the literature review summarized in Table A1, scholars have used several alternative approaches to estimate the impact of corruption on economic growth. For our case study, i.e., the Balkan area, the use of a panel methodology is not appropriate because we want to highlight the heterogeneity among the different countries that are included in our sample by estimating the short-run and long-run effects of perceived corruption on economic growth for each of these countries. Moreover, as we shall see in the following sections, the time series of GDP and CPI are cointegrated (see Table A1). In this situation, a generalized method of moments (GMM) estimator in prime differences for dynamic panels, such as that proposed by Arellano and Bond (1991), is subject to large biases.

Akai et al. (2005) and Al Qudah et al. (2020) represent the only two empirical contributions that tried to distinguish the effects of corruption on economic growth in the short and long term. Using state-level cross-section data for the United States, Akai et al. (2005) showed that the effect of corruption on economic growth is negative and statistically significant in the middle and long run but insignificant in the short run. They used state-level, cross-section data for the United States and measured economic growth with three different time spans—short (1998–2000), middle (1995–2000), and long (1991–2000). The two-stage least squares (2SLS) technique was employed for separately estimating the effect of corruption on growth.

Adopting the ARDL model, Al Qudah et al. (2020) estimated the long-term relationship (e.g., the co-integration) between corruption and economic development in Tunisia for the period 1995–2014, using annual time series data. Their empirical results showed that corruption has a negative effect on per capita gross domestic product (GDP) in Tunisia. This effect is described as a direct effect of corruption in the long term.

Which of the two empirical strategies (2SLS and ARDL) is preferable?

The Two-Stage least squares (2SLS) methodology is not the most appropriate estimation technique to capture the differences between short and long-term effects. The limiting properties of the 2SLS of an equation in a dynamic simultaneous model when variables are not stationary and cointegrated are presented in Hsiao (1997). The 2SLS model may provide a spurious relationship if all or some variables are non-stationary. In the case of mixed variables, i.e., some variables stationary but others non-stationary, ARDL models are suitable. An ARDL model is an ordinary least squares-based model that is appropriate for both non-stationary time series as well as for times series with mixed order of integration. In a dynamic framework, the most appropriate empirical technique is used to correctly exploit the information obtained from time series data. A multiple distributed lag model allows determining the dynamic influence of a variable on another variable (in our case, corruption on economic growth) and the ARDL model addresses the distributed lag problem more efficiently than other models such as polynomial or geometric.

4. Methodology and Empirical Strategy

In this study, using monthly time series data, we analyze how in the short and long term the perception of corruption influences the growth rate of the economies of eight Balkan countries: Bulgaria, Croatia, Greece, North Macedonia, Romania, Serbia, Slovenia, and Turkey. Twelve countries compose the entire area, but we have excluded Albania, Bosnia–Herzegovina, Kosovo, and Montenegro because in these cases too little data are

available to estimate robustly the relationship between corruption and economic growth. However, the eight countries we are considering contain 82% of the entire population of the area.

The model that we are going to analyze may be explained starting with the following equation:

$$\ln(GDP)_t = \alpha + \beta_1 \ln(Cor)t + \varepsilon_t \tag{1}$$

where GDP represents the monthly growth rate of the economy; Cor is the monthly rate of corruption of the economy measured by the CPI, built by Transparency International (TI). Transparency International ranks countries by their perceived levels of public sector corruption, as determined by expert assessments and opinion surveys.

Additional indices exist to quantify corruption, like TI's Global Corruption Barometer or the World Bank Control of Corruption Indicator. Instead, the so-called corruption index from the International Country Risk Guide (ICRG) is not a good indicator for our purposes. As Lambsdorff (2003, p. 458) argues, this indicator does not measure corruption, but rather the political risk associated with corruption. The political risk measured by the ICRG increases not only with the level of corruption but also with the intolerance of corruption. Various researchers have misinterpreted the ICRG data on corruption (as we summarize in Table A1 in the Appendix A).

The CPI was chosen as it is considered the most dependable measure of corruption. According to a study by Hamilton and Hammer (2018) for the World Bank, the CPI is the most accurate measure of the extent of corruption in many countries, despite some limitations such as changes in the computation methodology in 2012. The CPI is calculated by combining thirteen perception surveys on the administrative and political aspects of corruption. The individuals whose perceptions are being evaluated share a remarkable similarity. They consist of a group of country economists supported by a global network of in-country specialists. Additionally, they rely on the expert opinions of in-country freelancers, clients, and other contacts, as well as business executives in each country. Finally, ordinary people from various professions are also consulted. As a result, those who form the perception are thought to be unaffected by the media or other circumstances. In comparison, the World Bank's Control of Corruption (CCI) dimension of governance provides a broader measure of public sector corruption. The CCI is fairly like the CPI; however, unlike the CPI, one of its representative sources is solely focused on corruption committed by bureaucrats, implying that the lean toward unelected officials may be slightly bigger than the CPI. Furthermore, the CCI employs fewer representative sources (five versus eight), suggesting that it is less likely to be composed of representative sources indicating the level of "political" corruption compared to the CPI. The CPI was published alongside the Global Corruption Barometer (GCB). The idea behind the GCB is that it gives information on the general public's opinions of corruption, which are influenced by visual and written media.

To summarize, it can be claimed that the CPI is the most comprehensive indicator of corruption. This is also why it is by far the most widely used corruption index in empirical work, as evidenced by the contents of the second column in Table A1. This choice is particularly suitable for the problem we want to address, drawing inspiration from Hirschman's approach. In fact, the CPI—unlike the other available indicators—is better able to consider not only the perceived supply of opportunities for bribery but also expectations regarding how many individuals among those who have the opportunity are willing to corrupt and allow themselves to be corrupted.

In our work, we used monthly data over the period from January 2003 to December 2018. The variables used are the following:

1. The rate of economic growth is computed from the historical series of the gross domestic product (GDP). The GDP is given quarterly from the Eurostat dataset. We used a specific filter based on relation to disaggregate the data in monthly observation. We weighed the disaggregation using the price index level dynamics and the industrial

production that is given monthly. Consequently, we obtained the monthly historical series of the rate of economic growth for the eight Balkan countries.

2.   The CPI has been published annually by Transparency International dataset since 1995.

We used the proportions of public expenditure on the GDP for the eight Balkan countries provided quarterly by Eurostat. We then computed the monthly data for public expenditure, using the price index level dynamics and the industrial production that are given monthly.

Finally, considering that the ratio between the annual CPI and the annual public expenditure is equal to the ratio between the monthly CPI and the monthly public expenditure, we obtained monthly data for the CPI. Our procedure assumes that public sector corruption and public expenditure are positively correlated, as shown by all the literature on the subject (Mauro 1997a, 1998). The data we obtain after the monthilization of the CPI respect the time series trend of the index available from Transparency International.

The value of the CPI for each year is evenly distributed over the 12 months that make up the year. This approach means that the estimates we obtain cannot be interpreted as precise measures of the magnitude of corruption's effect on the economy's growth rate. Our contribution solely aims to distinguish between the short-run and long-run effects of corruption on growth in terms of sign (negative or positive).

We acknowledge that economic growth can be better identified by including other explanatory variables in the equation to be estimated, such as gross fixed capital formation, government spending, or public spending on education; for instance, as was carried out by Al Qudah et al. (2020). However, our exercise aims to solely focus on the impact of corruption on the GDP growth rate in the short and long term. Additionally, our method for mensilizing the corruption index utilizes the mensilized time series of government spending, leveraging information from the literature on the correlation between government spending and corruption.

The use of Equation (1) leads to a double problem: first of all, this type of equation does not provide information on the short-term dynamics; secondly, we need a method which must be able to estimate variables characterized by stationarity, i.e., I(0), but at the same time must be able to also estimate those that are not stationary, i.e., I(1). Pesaran et al. (2001) have shown that if the variables exclude unit root tests *a priori,* then it will be possible to define co-integration. Following this approach, the model we are going to estimate takes the following form:

$$\Delta \ln(\text{GDP}_i)_t = \alpha + \sum_{k=1}^{n} \gamma_{1,t-k} \Delta \ln(\text{GDP})_{t-k} + \sum_{k=0}^{n} \gamma_{2,t-k} \Delta \ln \text{Cor}_{t-k} + \theta_1 \ln(\text{GDP})_{t-1}$$
$$+ \theta_2 \ln \text{Cor}_{t-1} + \mu_t \qquad (2)$$

Equation (2) is an ARDL method, which is based on the error correction model (ECM) proposed by Engle and Granger (1987). It is able to simultaneously provide both short- and long-term results and is robust for small samples. Considering the Pesaran hypothesis, the variables are I(0) or I(1). The impact of corruption on economic growth can be assessed by examining the coefficients associated with the first difference variables for short-term effects, and the estimates of θ_2 normalized on θ_1 for long-term effects.

After selecting the optimum number of lags *n* (out of three maximum) by minimizing the Akaike Information Criterion (AIC), we will estimate Equation (2) using OLS for each country *i*. Following the ARDL "bound testing" approach, there would be a cointegrating relationship between the variables only if the lagged variables are jointly significant in the estimation of Equation (2). In order to confirm this, the method we used is based on standard F-statistic, which specifies critical values for its F-test, found by Pesaran et al. (2001) for large samples and Narayan (2005) for the small ones. If the F-test is above the "upper bound", we conclude that there is co-integration between the variables. If it is found to be between the upper and the lower bound, the result is not conclusive. In case the F-statistic is smaller than the critical value, following Lucarelli et al. (2018), we perform an additional test. We re-run Equation (2), replacing the lagged level variables with ECM_{t-1},

and test if the coefficient of ECM_{t-1} is negative and significant; the t-statistic value must exceed 2.94. More precisely, ε_{t-1} substitutes $\theta_{42}Cor_{t-1}$ in Equation (2). The cointegration relationship is confirmed in the long-run analysis. Finally, if the value is smaller than the lower bound, the variables are not integrated. For small samples, as it is in our case, Narayan (2005) suggests a critical value of 3.898.

We will proceed to calculate the coefficients for both the short- and long-run, just for the countries where cointegration is verified. Otherwise, we only estimate the short-run coefficients. We will observe which countries benefit from an increasing CPI in the long run while looking for the short-run effect as well.

A robust justification for the choice of the ARDL methodology is based on the results obtained by Panopoulou and Pittis (2004). They compared the performance of the ARDL and Dynamic OLS cointegration estimators in the case of a serially correlated cointegration error. Their results suggest that ARDL fares consistently better than DOLS, both in terms of estimation precision and reliability of statistical inferences. Additional results suggest that ARDL re-emerges as the optimal estimator within a wider class of asymptotically efficient estimators, including the semiparametric fully modified least squares (FMLS) estimator of Phillips and Hansen, the non-linear parametric estimator (PL) of Phillips and Loretan, and the system-based maximum likelihood estimator (JOH) of Johansen.

5. Results

This section provides the estimation of the ECM (Equation (2)) for the eight Balkan countries that are part of our sample. We will use monthly data over the period January 2003 to December 2018. As mentioned above, the main research questions we want to address are: Are there differences in the short-run and long-run effects of corruption on growth rates in the Balkan countries? Is it conceivable to have a situation in which there are positive short-run effects but negative long-run effects, consistent with a theoretical framework à la Hirschman? The time trend of the CPI is displayed. Remember that the CPI trend should be interpreted as the opposite of corruption: when corruption goes up, CPI goes down. Figure 1 shows the performance of CPI for the eight Balkan countries. The trend of the CPI is in all cases mutable. During the period considered, it is on average decreasing in Bulgaria, Greece, Serbia, and Turkey; this means that in these countries, corruption tends to increase over time. Instead, the CPI trend is on average growing in North Macedonia, meaning that corruption tends to decrease over time.

Romania and Slovenia present a decreasing path in the first decade (2003–2013) and an increasing trend in the period 2014–2018. Croatia is characterized by a long increasing trend in the period 2005–2015, preceded by a short but relevant decreasing CPI—from 64 in 2003 to 59 in 2004—and succeeded by a decreasing CPI—from 65 in 2016 to 60 in 2010.

The decreasing trend is long-lasting in Bulgaria (from 59 in 2004 to 49 in 2018), Greece (from 70 in 2004 to 50 in 2018), and Serbia (from 60 in 2007 to 49 in 2018). The growing trends instead are clear in Romania (from 74 in 2013 to 80 in 2018), North Macedonia (from 30 in 2003 to 49 in 2014), and Turkey (from 51 in 2003 to 61 in 2012), and appear to be milder in Croatia (from 58 in 2005 to 64 in 2015). Five countries (Bulgaria, Greece, North Macedonia, Serbia, and Turkey) present on average a CPI below 60, thus indicating a very significant level of corruption.

Now that we are clear about the trend of the CPI in the period considered, we can proceed to analyze the data. Table 1 offers the results of the F-test. In all eight countries, it lies above the critical value suggested by Narayan (2005), i.e., 3.898. Therefore, we do not need to proceed with the ECM_{t-1} test and we can investigate the short and long-run effects for all the countries.
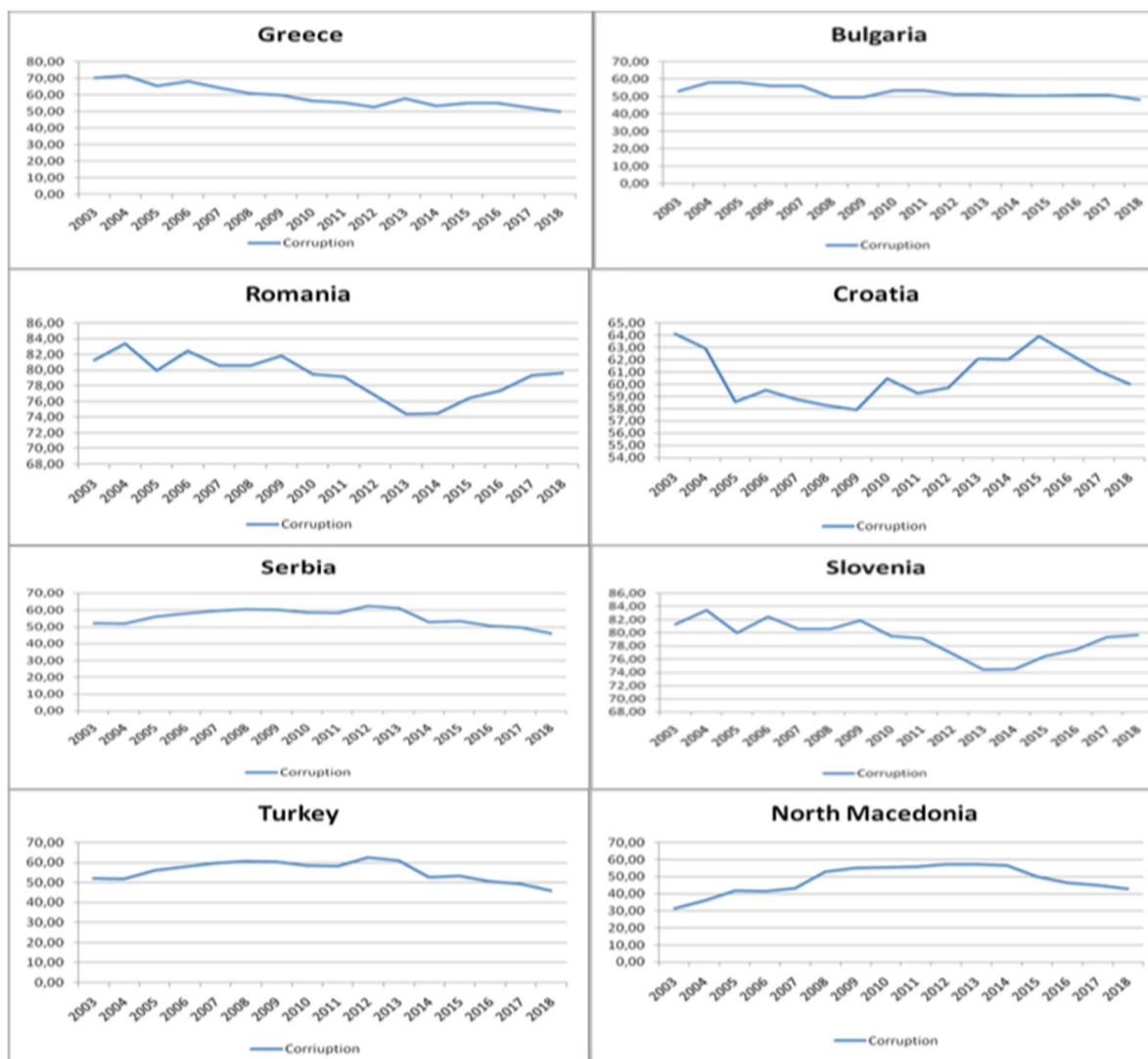
Figure 1. Performance of the corruption perceptions index (CPI) in Balkan countries.

Table 1. F-test of the countries and the presence of co-integration.

Countries	F-Test	Co-Integration
Bulgaria	468.5487	yes
Greece	102.5066	yes
Croatia	478.9577	yes
Romania	261.0294	yes
Slovenia	257.3765	yes
North Macedonia	29.56275	yes
Serbia	126.8950	yes
Turkey	76.94814	yes

Source: Reworked data from Transparency International Agency and Eurostat.

Tables 2 and 3 show, respectively, short and long-run estimation coefficients obtained by the model (Equation (2)) for the eight countries considered.

There is a maximum of three delays for corruption and two for economic growth; the value of the *t*-test is shown in brackets.

The short-run coefficients for the third lag of the independent variable dl_cor present negative signs in all the countries, meaning that the economic growth will increase when the corruption tends to increase, i.e., when the CPI has a decreasing trend.

Table 2. Short-term data for the various countries.

Countries	Constant	dl_cor	dl_cor(-1)	dl_cor(-2)	dl_cor(-3)	dl_GDP(-1)	dl_GDP(-2)
Bulgaria	0.091 (2.23)	0.819 (2.23)	−0.102 (−1.343)	0.095 (3.348)	−0.034 (−2.861)	0.095 (1.06)	−0.107 (−3.19)
Greece	0.158 (1.849)	0.788 (14.06)	0.009 (0.471)	−0.004 (−0.531)	−0.039 (−1.57)	−0.006 (−0.28)	−0.024 (−1.767)
Croatia	0.241 (2.443)	0.84 (15.11)	0.055 (1.629)	0.052 (1.652)	−0.075 (−2.364)	−0.038 (−1.37)	−0.031 (−1.268)
Romania	0.141 (2.466)	0.878 (16.96)	0.022 (0.997)	0.022 (1.057)	−0.018 (−0.801)	−0.038 (−1.703)	−0.038 (−1.714)
Slovenia	0.145 (2.771)	0.71 (11.65)	0.045 (2.289)	0.029 (1.45)	−0.102 (−3.003)	−0.023 (−0.903)	−0.012 (−0.506)
North Macedonia	0.06 (1.02)	0.654 (5.982)	−0.06 (−2.54)	−0.001 (−0.121)	−0.101 (−2.784)	0.056 (2.26)	−0.1 (−1.183)
Serbia	0.308 (2.1)	0.76 (11.45)	0.028 (0.89)	−0.047 (−1.638)	−0.046 (−2.195)	−0.116 (−1.028)	0.007 (2.222)
Turkey	0.165 (2.881)	0.77 (11.46)	0.039 (1.377)	0.407 (1.623)	−0.037 (−1.22)	−0.049 (−1.232)	−0.047 (−1.446)

Source: Reworked data from Transparency International Agency and Eurostat.

Table 3. Long-term data for the various countries.

Countries	l_GDP (-1)	l_cor (-1)
Bulgaria	−0.01 (−2.966)	0.002 (0.171)
Greece	−0.02 (−2.215)	0.035 (3.085)
Croatia	−0.027 (−2.355)	−0.01 (−0.485)
Romania	−0.021 (−2.38)	0.04 (1.681)
Slovenia	−0.013 (−2.531)	−0.018 (−1.599)
North Macedonia	−0.008 (−0.736)	0.0008 (0.051)
Serbia	−0.033 (−1.918)	−0.022 (−0.962)
Turkey	−0.014 (−2.604)	−0.0001 (−0.012)

Source: Reworked data from Transparency International Agency and Eurostat.

However, based on the not-delayed coefficients of dl_cor and in the long run, CPI is positively correlated with the growth rate, which means that when corruption rises, in the long run, economic growth will decrease.

As seen in Graph 1, Bulgaria presents for the period 2003–2018 a decreasing CPI. Our estimation shows—considering the third lag for the variable dl_cor—a short-run negative correlation between economic growth and CPI: an increase in corruption accompanies an increase in the economic growth rate. But this result weakens considering there are only two lags: when the correlation becomes positive and the magnitude of the coefficient becomes higher (0.09 versus −0.03). The case of Serbia is similar.

As far as Greece is concerned, the short term is also characterized by a negative impact of corruption on economic growth, i.e., we have a positive correlation between CPI and the

economic growth rate. The delayed coefficients referred to as CPI are negative but not significant. In the long run, the situation is confirmed: we have a positive correlation between CPI and the economic growth rate for Greece, although the magnitude of the significant long-run coefficient is lower (0.03) than the magnitude of the significant short-run coefficients (0.78).

The Turkish situation is like the Greek one in the short term; as shown in Graph 1, the CPI has a similar trend. In the case of Turkey, however, the long-term relationship between CPI and economic growth is negative although statistically insignificant.

In Croatia (at least since 2005), Romania, and North Macedonia, the trend of CPI is increasing, meaning that corruption tends to decline. Croatia and North Macedonia do not present a significant correlation between CPI and long-term growth rate, unlike Romania where the decrease in corruption has positive effects on economic growth. The short term is characterized by a positive correlation whereby the increase in CPI supports GDP growth. However, in Croatia and North Macedonia the third lags of the dl_cor present a negative sign and are statistically significant, which means that in these two countries, the relationship between growth rate and corruption may be represented as a J-curve: when CPI increases, i.e., corruption decreases, then in the first moment the economic growth will decrease (see the coefficient referred to the third lag of the dl_cor), but later on it will increase (see the not lagged dl_cor coefficient).

In Tables 4–7, we present new estimations on the same sample by selecting the optimum number of lags using the Akaike Information Criterion (AIC) method. The results of the new estimates do not lead to changes in our comments.

Table 4. F-test of the countries and the presence of co-integration after Akaike improvement.

Countries	F-Test	Co-Integration
Bulgaria	468.5487	yes
Greece	99.43956	yes
Croatia	478.9577	yes
Romania	87.67751	yes
Slovenia	257.3765	yes
North Macedonia	29.56275	yes
Serbia	126.8950	yes
Turkey	100.3660	yes

Source: Reworked data from Transparency International Agency and Eurostat.

Table 5. Short-term data for the various countries after Akaike.

Countries	Constant	dl_cor	dl_cor(-1)	dl_cor(-2)	dl_cor(-3)	dl_GDP(-1)	dl_GDP(-2)
Bulgaria	0.091 (2.23)	0.819 (2.23)	−0.102 (−1.343)	0.095 (3.348)	−0.034 (−2.861)	0.095 (1.06)	−0.107 (−3.19)
Greece	0.147 (1.742)	0.784 (13.64)	n.a.	n.a.	n.a.	0.095 (0.893)	−0.029 (−2.640)
Croatia	0.241 (2.443)	0.84 (15.11)	0.055 (1.629)	0.052 (1.652)	−0.075 (−2.364)	−0.038 (−1.37)	−0.031 (−1.268)
Romania	0.146 (2.473)	0.875 (16.21)	n.a	n.a	n.a	−0.01 (−1.499)	−0.01 (−1.45)
Slovenia	0.145 (2.771)	0.71 (11.65)	0.045 (2.289)	0.029 (1.45)	−0.102 (−3.003)	−0.023 (−0.903)	−0.012 (−0.506)
North Macedonia	0.061 (1.02)	0.654 (5.982)	−0.06 (−2.54)	−0.001 (−0.121)	−0.101 (−2.784)	0.056 (2.26)	−0.1 (−1.183)
Serbia	0.308 (2.1)	0.76 (11.45)	0.028 (0.89)	−0.047 (−1.638)	−0.046 (−2.195)	−0.116 (−1.028)	0.007 (2.222)
Turkey	0.171 (3.004)	0.772 (11.63)	n.a.	n.a.	n.a.	−0.001 (−0.11)	0.001 (0.139)

Source: Reworked data from Transparency International Agency and Eurostat.

Table 6. Long-term data for the various countries after Akaike.

Countries	l_GDP(-1)	l_cor(-1)
Bulgaria	−0.01 (−2.966)	0.002 (0.171)
Greece	−0.021 (−0.28)	0.032 (2.625)
Croatia	−0.027 (−2.355)	−0.01 (−0.485)
Romania	−0.019 (−2.36)	0.031 (1.871)
Slovenia	−0.013 (−2.531)	−0.018 (−1.599)
North Macedonia	−0.008 (−0.736)	0.0008 (0.051)
Serbia	−0.033 (−1.918)	−0.022 (−0.962)
Turkey	−0.014 (−2.744)	−0.006 (−0.567)

Source: Reworked data from Transparency International Agency and Eurostat.

Table 7. Robustness test.

Countries	RESET	LM	CUSUM	CUSUMq	Adj. R^2
Bulgaria	50.33	2.958	Stable	Unstable	0.955
Greece	46.80	5.05	Stable	Unstable	0.832
Croatia	37.929	3.749	Stable	Unstable	0.876
Romania	103.554	10.537	Stable	Unstable	0.95
Slovenia	109.386	7.162	Stable	Unstable	0.899
North Macedonia	28.35	3.454	Stable	Unstable	0.701
Serbia	10.078	9.193	Stable	Unstable	0.804
Turkey	75.232	0.17	Stable	Unstable	0.87

Source: Reworked data from Transparency International Agency and Eurostat.

We use robustness tests to validate ECM estimates for the period under consideration.

The RESET test, also known as the Ramsey (Regression Equation Specification Error Test), is used to test the functional form of a model and the possible omission of relevant variables. A critical value of 3.84 is used to determine if coefficients are below the threshold, indicating the absence of residual autocorrelation.

In accordance with the literature on the ECM, we also utilize the LM test (Lagrange Multiplier) to detect autocorrelation. The CUSUM (Cumulative Sum) and CUSUMQ (Cumulative Sum of Squares) tests were used to assess parameter stability.

To see the affability of the various estimates, the Adj. R^2 (Adjusted R^2) is reported.

6. Discussion and Conclusions

The analysis of the corruption perceptions index makes it clear that for the period we have considered, corruption has always been present at relevant levels in the eight countries of the Balkan area. This indicates that corruption in these countries often becomes a cultural factor, which is difficult to prevent and combat. It is argued that corruption is a cultural phenomenon in the Western Balkans, linked to several common factors. These include the strong presence of mafia-style criminality with numerous political influences, the tradition of familyism, the habit of offering presents to doctors who have not previously requested them, and the practice of paying for a position in public administration. These factors have existed in the area under question for many decades.

In this work, starting from this situation, we have empirically examined and verified the impact that perceived corruption has in the short and long term on the economic growth of countries.

The empirical analysis indicates that in contexts where corruption is decreasing, such as Croatia and North Macedonia, there is always a short-term negative impact on growth, followed by an eventual increase. Conversely, an increase in corruption may be accompanied by a short-term increase in GDP growth, as seen in Bulgaria, Serbia, and Slovenia. However, in the long run, corruption has a negative effect on economic growth in all countries.

The following theoretical intuition could, therefore, be confirmed: in the long run, the social costs associated with corruption are considerable, making it difficult to sustain the political, economic, and social burdens, thus leading to a higher level of corruption, burdening the poorest class, which is also struggling to access basic public services. Corruption undermines the rule of law, erodes trust in political institutions, and harms market competition.

In conclusion, corruption impedes development, despite the appearance that it may facilitate economic growth by expediting bureaucratic processes in the short run. Our research also supports a Hirschmanian vision of economic development. It is precisely a reference to the theoretical framework proposed by Hirschman (1982) that can help us interpret our results. As we mentioned, in his theory of society's oscillation between intense interest in public issues and almost total concentration on private goals, the German economist who ended his long career at the School of Social Sciences of the Institute for Advanced Study at Princeton defines corruption as a psychological mechanism that accompanies disappointment in public involvement and indicates a shift toward private goals. According to Hirschman (1982), the practice of corruption has a strong effect on preferences between public and private. The Hirschmanian theory makes it clear in what sense corruption can be considered a cultural factor. The determination of behaviors that corrode civic sense means that in countries where corruption is widespread, individuals' choices are conditioned by preference profiles that favor behaviors aimed at sacrificing the collective interest in favor of selfish interest. Only in the long run can the damaging effects of systemic corruption incentivize citizens to revalue public institutions. Although it may seem beneficial from an individualistic and short-term perspective, corruption becomes a determinant of further and deeper discontent, which in the long run damages civic life and the entire economic system.

In summary, it could be argued that any positive effects of corruption on economic growth may be short-lived, and negative effects may emerge in the long run. This is because economic development is not solely about capital accumulation, but also about the organization and coordination of heterogeneous products and capabilities, which are negatively impacted by corruption.

The policy implications that can be drawn from our study are still very general: to achieve a better understanding of pathological behavior within society means, at least to some extent, to take control of it. However, it is not currently possible to point to direct remedies. This would involve a careful field study to fully understand the state of public institutions in the countries in which we conducted the estimates. It is undoubtedly of utmost importance to disincentivize those opportunistic behaviors that tend to spread in the perception of those citizens convinced that corruption is the best way to obtain economic benefits. The dissemination, especially in school and university institutions, of appropriate civic education can help reconstruct the heterogeneous capabilities that are fundamental in determining the long-term growth trajectories of the Balkan area. This may be more important than the uncritical deregulation of markets or the generic assumption of a Western democratic model that is still the focus of policy directions in much of the literature devoted to the Balkan area.

The conclusions we reach are worthy of future study, particularly because of the limited geographic scope of the cases in question and the way the CPI simplifies the

concept of corruption. Future research based on detailed field case studies will be a more effective way to test the core hypothesis and unearth the subtleties that may be lurking behind the econometric results presented here.

Appendix A

Table A1. Chronology of major studies about the effects of corruption on the economic system.

Paper	Methodology	Main Results of Corruption's Effects
Leff (1964)	Stylized facts.	Corruption, if "speedy money," can cause individuals to circumvent bureaucratic red tape.
Huntington (1968)	Historical institutionalism.	If bureaucrats are paid directly for their work through bribes, this should make bureaucrats work better and faster.
Friedrich (1972)	Political theory.	The violation of moral and political standards can contribute to the good of the system.
Rose-Ackerman (1978)	Theoretical models of bureaucracy.	Competitive bureaucratic structure can reduce corrupt incentives.
Bhagwati (1982)	Taxonomy of directly unproductive, profit-seeking activities.	No specific indication of the effects of corruption.
Macrae (1982)	Game theory.	A simple model is presented showing how bribery might be a dominant strategy.
Andvig and Moene (1990)	Theoretical model.	The model highlights how the profitability of bureaucratic corruption may be related to its frequency.
Przeworski and Limongi (1993)	Critical discussion of statistical studies in which political regime is included among determinants of growth.	No specific indication of the effects of corruption.
Grossman and Helpman (1996)	Political economics model.	The party that is expected to win most of the seats garners greater attention from the lobbies.

Table A1. *Cont.*

Paper	Methodology	Main Results of Corruption's Effects
Mauro (1995, 1997a)	Empirical analysis. The dataset consists of subjective indices of corruption, the amount of red tape, the efficiency of the judicial system, and various categories of political stability for a cross-section of countries (67 countries for the 1960–1985 average).	Corruption is found to lower investment, thereby lowering economic growth.
Osoba (1996)	Historical narrative about corruption in Nigeria.	Corruption is an anti-social behavior conferring improper benefits contrary to legal and moral norms, which undermines the ability of authorities to improve the living conditions of the people.
Coolidge and Rose-Ackerman (1997)	Four case studies (Somalia, Nigeria, Botswana, and Uganda) illustrating issues raised by a theoretical model.	A corrupted policy maker (kleptocrat) whose decision variable is the level of government intervention in the economy will select an excessive level of intervention where national income is less than optimal. Like all monopolists, the kleptocrat seeks productive efficiency except in those cases where inefficiency creates extra rents. The kleptocrat may need to permit lower-level officials to share in the corrupt gains, thus introducing additional costs over and above the problems faced by all rulers seeking to control subordinates.
Wei (1997)	Model of corruption-induced uncertainty and empirical analysis (Modified Tobit; main data: flow of FDI over 1990–1991; Corruption measures from the 1997 Global Competitiveness Report).	An increase in the uncertainty induced by the corruption from the level of Singapore to that of Mexico, at the average level of corruption in the sample, is equivalent to raising the tax rate of multinational firms by 32%,
Groenendijk (1997)	Principal–agent model of corruption.	Trade-off between the general agency problem and the problem of corruption: Acton's principle that power tends to corrupt and absolute power corrupts absolutely, has led to complicated systems of checks and balances, which have contributed to the obfuscation of party responsibility.

Table A1. *Cont.*

Paper	Methodology	Main Results of Corruption's Effects
Johnson et al. (1997, 1998)	Panel regressions for 1989–1994 to explain the determinants of total output in selected transition economies. The index of crime and corruption by The Great Growth Race—scale is 0–10, where a higher score means less crime and corruption (Dec. 1995–Jan. 1996).	A 1-point increase in external liberalization or privatization translates into about a 10-index-point increase in the size of the official economy. The index of crime and corruption is significant with a positive sign.
Acemoglu and Verdier (1998)	Theoretical model.	It may be optimal to allow some corruption and not enforce property rights fully. Less-developed economies may choose lower levels of property rights enforcement and more corruption.
Brunetti and Weder (1998)	Comparative analysis of a large number of uncertainty variables (among them corruption) in a standardized dataset, *International Country Risk Guide* (ICRG; 1982–1995 for 60 countries), and comparative conclusions on the magnitude of their effect on investment.	ICRG indicator is an alternative measure of "corruption in government" to measure the phenomenon more broadly by not only focusing on narrow business transactions. The indicator is significant with the expected negative sign and has a large effect on investment.
Tanzi (1998)	Survey of issues related to the causes, consequences, and scope of corruption, and possible corrective actions.	Different results about the effects of corruption.
Eilat and Zinnes (2000)	Measures of the size of the shadow economy in 25 transition countries for 1990–1997. Authors examine whether the shadow economy prevents, slows down, or promotes economic growth focusing on transition countries.	In terms of economic growth, a shadow economy may cripple an economy by reducing the tax base and eventually reducing overall tax revenue, which is much needed for government expenditure on public infrastructure.
Friedman et al. (2000)	Empirical analysis (regional OLS regressions) about the determinants of unofficial activity in 69 countries. Corruption is measured by the ICRG index for the 1990s (data on 42 countries).	Less corruption correlated with a lower unofficial economy except in transition countries.
Mo (2001)	Quantitative estimates (OLS) of the impact of corruption on the growth and importance of the transmission channels. The measure of the corruption level is obtained from the Transparency International Corruption Perception Index (CPI) as average for the period 1980 to 1985 in 49 countries.	A 1% increase in the corruption level reduces the growth rate by about 0.72%. The most important channel through which corruption affects economic growth is political instability, which accounts for about 53% of the total effect.

Table A1. *Cont.*

Paper	Methodology	Main Results of Corruption's Effects
Habib and Zurawicki (2002)	Empirical analyses (OLS; Probit) to assess the impact on FDI of the absolute differences in corruption between the home and the host countries (89 countries for 1996–1998 period). CPI to measure the corruption level.	Foreign investors generally avoid corruption because it is considered wrong, and it can create operational inefficiencies.
Lambsdorff (2003)	Empirical analysis (OLS; cross countries estimation on 69 countries) to determine the effects of corruption on productivity. CPI to measure the corruption level (by decomposing it into five subcomponents).	A reduction in Tanzania's level of corruption to that of the United Kingdom would increase productivity by 10 percent, leading to a 20 percent increase in GDP. Decomposing this impact reveals that bureaucratic quality is the crucial determinant.
Akai et al. (2005)	Empirical analysis (state-level cross-section data for the USA; two-stage least square estimates; instrumental variables) to assess the effects of corruption on the rate of economic growth for various time spans—short (1998–2000), middle (1995–2000) and long (1991–2000). Corruption index from a survey of state house reporter's perception of public corruption in 1998.	The effect of corruption on economic growth is negative and statistically significant in the middle and long spans but insignificant in the short span.
Méon and Sekkat (2005)	Empirical analysis (generalized least squares; sample of 63 to 71 countries for the 1970–1998 period) to estimate the relationship between the impact of corruption, on investment and growth, and a wide range of indicators of the quality of governance. Corruption is measured by the CPI index and the Control of Corruption (CCI) from World Governance indicators.	The results reject the "grease the wheels" hypothesis but are consistent with the reverse hypothesis: the "sand the wheels" hypothesis.
Méndez and Sepulveda (2006)	Empirical analysis (OLS; cross countries estimation on 77 countries for the period 1960–2000). Corruption is measured by the ICRG index, the Institute for Management Development (IMD) from the World Competitiveness Yearbook and the CPI.	The growth-maximizing level of corruption is significantly greater than zero, with corruption beneficial for economic growth at low levels of incidence and detrimental at high levels of incidence.

Table A1. *Cont.*

Paper	Methodology	Main Results of Corruption's Effects
Olken (2006)	Empirical analysis of Indonesia case study (a large anti-poverty program in Indonesia that distributed subsidized rice to poor households). Estimation of the extent of corruption by comparing administrative data on the amount of rice distributed with survey data on the amount actually received by households.	The welfare losses from corruption may have been large enough to offset the potential welfare gains from the redistributive intent of the program. Corruption may impose substantial limitations on developing countries' redistributive efforts.
Blackburn et al. (2006)	Theoretical model.	Corruption arises from the incentives of public and private agents to conspire in the concealment of information from the government.
Del Monte and Papagni (2007)	Empirical analysis on the Italian case (time series; Autoregressive Distributed Lags; 20 Italian Regions for the 1963–2001 period). The number of corrupt activities reported to the police per 1 million inhabitants to measure corruption.	The level of corruption differs between Italian regions, and the decrease in the level of corruption after 1993 is explained by political and cultural variables and economic variables. Public expenditure on consumption goods and services seems to be an important cause of corruption.
Aidt et al. (2008)	A theoretical model to study the role of political accountability as a determinant of corruption and economic growth.	In a regime with high-quality political institutions, corruption has a substantial negative impact on growth. In a regime with low-quality institutions, corruption has no impact on growth.
Bird et al. (2008)	Empirical analysis (cross-section data with mean values for the 1990–1999 period; 105 observations). Corruption is measured with the mean value of six governance dimensions for 1996, 1998, and 2000 (World Bank).	A more legitimate and responsive state is an essential precondition for a more adequate level of tax effort in developing countries and also high-income countries. Improving corruption, voice, and accountability may not take longer nor be necessarily more difficult than changing the opportunities for tax handles and economic structure.
Dreher and Schneider (2010)	Empirical analysis (OLS; cross-section of 98 countries; all data are averaged over the 2000–2002 period). Corruption is measured with the ICRG. The focus of the index is capturing the political risk involved in corruption.	There is no robust relationship between corruption and the size of the shadow economy when ICRG is used. Employing an index of corruption based on a structural model, corruption, and the shadow economy are complements in countries with low income.

Table A1. *Cont.*

Paper	Methodology	Main Results of Corruption's Effects
Méon and Weill (2010)	Empirical analysis to assess the interaction between aggregate efficiency, corruption, and other dimensions of governance for a panel of 69 countries, both developed and developing, for the 1994–1997 period. Two composite indices and one survey index assess the consequences of corruption: the World Bank indicator, the CPI, the Wei's index.	Evidence for the "grease the wheels" hypothesis in its weak and strong forms. Corruption is less damaging to efficiency in countries where institutions are less effective. It may be positively associated with efficiency in countries where institutions are extremely ineffective.
Kaufmann (2010)	Empirical analysis on governance and budgetary data from over 35 industrialized countries. Corruption is measured by Control of Corruption (CCI) from World Governance indicators.	Industrialized countries vary in their ability to control corruption. Strong relationship between corruption and fiscal deficits.
Muço and Balliu (2018)	Empirical analysis (panel data on 10 Balkan countries—Albania, Bosnia, Serbia, Macedonia, Montenegro, Kosovo, Bulgaria, Croazia, Romania and Slovenia—for the period 1996–2016). Corruption is measured by the CPI index.	Corruption has a positive but very weak impact on real GDP per capita growth, perhaps a low level of corruption can reduce bureaucracy and this can stimulate economic growth. The impact of the components public spending on corruption has a positive impact, but the result in this case is not robust.
Gründler and Potrafke (2019)	Empirical analysis (dynamic panel data; instrumental variables; 175 countries for the 2012–2018 period). Corruption is measured by the CPI index.	Corruption is negatively associated with economic growth. Real per capita GDP decreased by around 17% in the long run when the reversed CPI increased by one standard deviation. The effect is pronounced in autocracies and countries with low rule of law.
Sharma and Mitra (2019)	Empirical analysis (dynamic panel data; instrumental variables; models generalized method of moments; 103 countries for the 1996–2015 period). Corruption is measured by the ICRG index.	The benefits of corruption control are evident in low- and lower-middle-income countries. For the middle-high-income countries, the effect of corruption control is not very explicit individually.
Al Qudah et al. (2020)	Empirical analysis (ARDL model for the 1995–2014 period) to assess the effect of corruption on economic growth in Tunisia. CPI to measure the corruption level.	Corruption has a negative effect on per capita GDP over the long run. Physical capital and the level of government during the previous year are positively significant in the presence of corruption.

Table A1. *Cont.*

Paper	Methodology	Main Results of Corruption's Effects
Afonso and de Sá Fortes Leitão Rodrigues (2022)	Empirical analysis (dynamic panel data; generalized method of moments; 48 countries for the 2012–2019 period). CPI to measure the corruption level.	Developing economies, regardless of government size, benefit less from reducing corruption. Government size is not sufficient to explain the influence of corruption on economic activity. Private investment is a potential transmission channel for corruption.
Paulo et al. (2022)	Empirical analysis (panel data; two-way fixed-effect and system-generalized method of moments estimators) on the effects of corruption on the economic development of the Latin American and Caribbean countries, for the 2000–2018 period. CPI to measure the corruption level.	A one-standard-deviation increase in corruption is associated with a decrease of 12.2% in gross domestic product per capita and a decrease of 3.05% in economic growth. This supports the view that corruption "sands the wheels" of development.
Kim and An (2022)	Empirical analysis (logit) on the effects of the e-government development level (EGDI) on inward FDI. CPI to measure the corruption level of each of the 16 OECD countries for the 2014–2018 period.	The impact of EGDI on FDI changes for different CPI values. Under the presence of corrupt practices in local markets, e-government information can be a highly crucial location-specific advantage triggering FDI.
Asafo-Adjei et al. (2023)	Empirical analysis (instrumental variables panel quantile regression) about the asymmetric relationship between foreign FDI and economic growth amidst financial sector development and corruption covering a sample period of 2002 to 2020 for 48 sub-Saharan economies. CCI to measure corruption.	FDI inflows have a significant positive relationship with economic growth for economies with low growth (less than 50% quantile) but negative at high growth levels. CCI significantly interacts negatively with FDI and GDP per capita irrespective of the GDP levels.
Dokas et al. (2023)	Empirical analysis of the direct and indirect impact of corruption on economic growth. Granger causality test for panel data (109 countries for the 2010–2018 period). Nonstationary panel techniques with Fully Modified OLS to assess stationarity and long-run relationships. CCI from the World Bank, ICRG, and the CPI to measure corruption.	Robust negative relationship between corruption and economic growth and corruption and innovation. Innovation was found to reduce the harmful effects of corruption on economic growth, mainly in developed countries.
Trabelsi (2024)	Empirical analysis (panel data; GMM; 65 countries over the 1987–2021 period) to assess the impact of corruption on growth. ICRG to measure corruption.	The results indicate that beyond an optimal threshold, both high and low corruption levels can decrease economic growth. Under this optimal threshold, a moderate level of corruption, defined by the point of reversal of the curve of the marginal corruption effect on growth, could have advantages for economic growth.

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