Enver Buçaj[1]
Driton Qehaja[2]
Arber Hoti[3]
Atdhetar Gara[4]

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Impact of Socioeconomic Factors on the Proliferation of Organized Crime in Western Balkan Countries

Abstract

Examining organized crime in the Western Balkans is essential to evaluate its socioeconomic consequences and develop informed policy responses. Historically, the Western Balkans have been susceptible to organized crime, particularly following the disintegration of Yugoslavia in the 1990s. The political and economic turmoil created a fertile environment for criminal networks to prosper in diverse illegal dealings. This paper explores the complex interplay between socioeconomic factors and the proliferation of organized crime in the Western Balkans from 2010 to 2022. Several econometric models are used in the study, including Ordinary Least Squares (OLS), OLS with Robust Standard Errors (OLSR), Fixed Effects (FE), and Random Effects (RE), to assess the impact of socioeconomic factors such as unemployment, education, income per capita, inequality, rural Population, COVID-19 impact, government corruption, rule of law, government effectiveness, and the Human Development Index (HDI) on organized crime. The findings demonstrate that higher unemployment rates, particularly among youth, and lower levels of education are linked to the proliferation of organized crime, emphasizing the critical role of socioeconomic

[1] E. Buçaj, Ph.D., Professor, University "Ukshin Hoti", Faculty of Law, Prizren, Kosovo (e-mail: enver.buqaj@uni-prizren.com).
[2] D. Qehaja, Ph.D., Professor, University of Prishtina, Faculty of Economics, Economics Department, Prishtina, Kosovo (e-mail: driton.qehaja@uni-pr.edu). Corresponding Author.
[3] A. Hoti, Ph.D., Professor, University of Prishtina, Faculty of Economics, Accounting Department, Prishtina, Kosovo (e-mail: arber.hoti@uni-pr.edu).
[4] A. Gara, Ph.D., Professor, Southeast European University, Faculty of Economics, Skopje, Macedonia (e-mail: ag31418@seeu.edu.mk). The paper was received on 08.01.2024. It was accepted for publication on 09.04.2024.

instability in sustaining criminal networks in the region. Interestingly, the paper notes a decrease in organized crime rates associated with improvements in governance, such as stronger rule of law and more effective government operations. Furthermore, there has been a notable reduction in organized crime during the COVID-19 pandemic, suggesting shifts in criminal activity patterns and law enforcement priorities during this period.

Keywords: Socioeconomic Factors, Organized Crime, Government Corruption, Western Balkans, Econometric Analysis

1. INTRODUCTION

The relationship between organized crime and socioeconomic instability in the Western Balkans is profound and complex. As noted by Tărteaţă (2021), the intersection of human security, terrorism, and organized crime in the Western Balkans further highlights the region's challenges. High levels of unemployment, income inequality, and limited access to quality education collectively create an environment conducive to criminal activity. These socioeconomic challenges are compounded by governance issues, such as systemic corruption and state capture, which weaken institutional frameworks and hinder efforts to combat organized crime effectively. Furthermore, the rapid development of technology has provided new opportunities for criminal networks, complicating law enforcement efforts.

The COVID-19 pandemic has exacerbated these challenges, offering organized crime groups new vulnerabilities to exploit, underscoring the importance of understanding how socioeconomic factors drive the proliferation of organized crime in this region. Kotzé et al. (2023) and Djordjević and Dobovšek (2020) explore how organized crime has adapted during the pandemic, focusing on the emerging challenges and opportunities for criminal networks in the Balkans. The transition to online activities during lockdowns increased cybercrime, as criminals exploited the inadequate digital infrastructures in the Western Balkans to commit online fraud, identity theft, and digital money laundering. Furthermore, organized crime groups capitalized on disruptions in supply chains to smuggle and traffic goods in high demand, such as medical supplies, protective equipment, and counterfeit products. They also swiftly adapted to new market demands by establishing black markets for counterfeit vaccines, fraudulent COVID-19 tests, and other pandemic-related necessities.

Income inequality plays a crucial role in the spread of organized crime and fosters an environment of social unrest and discontent. The gap between the wealthy and the impoverished fuels resentment andfuels resentment and incentivizes individuals to seek illegal means of financial gain. In the Western Balkans, where income inequality is particularly pronounced, organized crime groups take advantage of these socioeconomic disparities, expanding their influence and operations across the region.

The effectiveness of governance is also crucial in curbing the spread of organized crime. Weak governance structures, characterized by corruption and inefficiency, undermine efforts to combat criminal networks. Bieber (2018) identifies patterns of competitive authoritarianism in the Western Balkans, where weak democratic institutions and governance failures create environments in which organized crime can flourish. Without robust legal frameworks and accountable institutions, organized crime continues to flourish unchecked. Strengthening law enforcement capacity and promoting better governance are essential steps to mitigate the impact of socioeconomic factors on the spread of organized crime. By addressing the root causes—unemployment, inequality, and educational deficiencies—policymakers can foster socioeconomic development that diminishes the appeal of criminal activity. The Western Balkan's geographical position as a bridge between the East and West still makes it a vital pathway for criminal activities. It is crucial to understand this context to comprehend the state of organized crime in the region and the impact of socioeconomic factors on organized crime. This research builds on established findings to explore the influence of key socioeconomic factors—namely corruption, economic instability, urbanization, and foreign investment—on the prevalence of crime in the Western Balkans (Finckenauer, 2005; Ker-Lindsay et al., 2017; Zhilla, 2011). Analyzing the interconnections among these elements is crucial for formulating effective strategies to tackle organized crime and enhance socioeconomic progress in the region. Understanding how these factors interact is essential for developing strategies to combat organized crime and foster socioeconomic development in the area.

Countries in the area with high crime rates include Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia, and Serbia (Djordjević and Dobovšek, 2020). This paper addresses the question: How do socioeconomic factors influence the proliferation of organized crime in Western Balkan countries? Based on

the hypothesis that factors like unemployment rates, education levels, income per capita, and governmental effectiveness impact organized activities, this study suggests that unfavorable socioeconomic conditions can contribute to the growth of organized crime. At the same time, positive developments may help mitigate it.

Various econometric models, including Ordinary Least Squares (OLS), OLS with robust standard errors (OLSR), Fixed Effects (FE), and Random Effects (RE), were used to conduct this study. The analysis used a dataset from 2010 to 2022 covering socioeconomic indicators from the six mentioned Western Balkan countries. Data sources include references such as the World Bank database, the Global Economy Database, the International Monetary Fund, and various national sources in the Western Balkans. This broad data set facilitates an examination of the factors under study. Correlation analyses explored associations between the Organized Crime Index (OCI) and various socioeconomic variables. These analyses provide initial insights but do not imply causal relationships. Further examination through econometric modeling was employed to strengthen the robustness of these findings. The Hausman test guides the selection of a model to ensure reliable and valid findings.

This study provides three contributions to the scholarly and policy debate on organized crime. First, it presents a fresh empirical analysis of the Western Balkans, looking at the 2010-2022 period associated with post-conflict fragility and transitional governance in a critically neglected area of literature that has paid unequal attention to stable economies. Integrating unprecedented COVID-19-induced disruptions, the paper validates contrarian findings - reduced organized crime rates during lockdowns - providing fresh perspectives on crises and their interplay with the criminal establishment. Second, this paper contributes towards enhancing the multidimensional econometric approach (OLS, OLSR, FE, RE) validated by the Hausman test to disentangle the socioeconomic factors' (youth unemployment, education) and governance indicators' (rule of law, corruption) distinct roles far better than previous studies did. Third, the findings from this paper empirically state that rather than tending toward conventional enforcement-oriented policies, enhancing governance institutions (judicial effectiveness, anti-corruption measures) and supporting socioeconomic investments (education, rural development) to dismantle criminal networks are equally significant. These insights provide concrete means for policymaking, law enforcement, and international bodies to devise integrated strategies to deal with the structural vulnerabilities and institutional weaknesses in regions faced with organized crime.

2. LITERATURE REVIEW

Organized crime in the Western Balkans is a complex phenomenon closely linked to a range of socioeconomic challenges, governance deficits, and the transformative role of technology. While the broader criminological literature offers valuable insights into organized crime, few studies address the specific dynamics in the Western Balkans. This section summarizes theoretical and empirical findings in three crucial areas: socioeconomic factors, governance and corruption, and technological influences. In addition, the emerging impact of the COVID-19 pandemic on organized crime is considered, as it has led to significant shifts in criminal activity in the region.

Socioeconomic factors are central to the persistence and spread of organized crime in the Western Balkans. Persistent economic instability, high unemployment, and widespread poverty in the region have created an environment that favors the growth of criminal networks. Baiov et al. (2021) emphasize that the link between organized crime and corruption is one of the most visible manifestations of poor governance and institutional failure that exacerbates the socioeconomic conditions for organized crime to thrive.

Unemployment, especially among youth, is often cited as one of the main causes of organized crime in the Balkans. Aaltonen et al. (2013) and Altindag (2012) find that higher unemployment rates correlate significantly with increased criminal activity, particularly in economically disadvantaged areas. Zeneli (2016)

notes that stagnant economies in Kosovo and Albania push individuals toward illegal activities without viable employment opportunities. Although the relationship between unemployment and crime is not entirely linear, Fougère et al. (2009) and Xu (2017) suggest that governance factors can moderate this connection, making unemployment's impact on crime less significant in some cases.

Income inequality also plays a decisive role. Lindström (2020) and Zhilla (2011) argue that pronounced differences in wealth lead to social instability and increase the likelihood that marginalized people will join criminal organizations. The Gini coefficient points to social unrest and rising crime rates in the Western Balkans. Vauclair and Bratanova (2016) corroborate this, stating that income inequality fosters fear and insecurity, which in turn perpetuates the cycle of crime and social unrest.

Education is also a decisive factor. Vukovic (2013) and Abeling-Judge (2019) point out that limited access to education, especially in rural areas, exacerbates unemployment and increases the likelihood of young people turning to crime. Hooghe et al. (2010) find that regions with low levels of education and high unemployment have higher rates of property and violent crime, highlighting the need for improved educational infrastructure to combat organized crime.

Governance and corruption are key factors that facilitate the existence of organized crime in the Western Balkans. The region has long struggled with a weak institutional framework that makes it relatively easy for criminal networks to operate. As Zhilla (2011) notes, the intertwining of organized crime and corruption in the Balkan justice system is pervasive, with systemic corruption often hindering the prosecution of criminal activity. This is exacerbated by the capture of the state, a process whereby corrupt networks infiltrate public institutions and effectively undermine democratic governance (Richter & Wunsch, 2019). The disintegration of Yugoslavia led to political and economic instability and left gaps in governance that criminal organizations exploited. Finckenauer (2005) and Giatzidis (2007) highlight how organized crime became deeply entrenched in state institutions in the post-conflict period and further consolidated its power through corrupt judicial and law enforcement systems. Corruption, particularly in law enforcement, protects criminal enterprises from scrutiny and makes it difficult to dismantle these networks (Hajdini et al., 2023; Hoxhaj, 2020).

A significant factor in understanding the persistence of organized crime in the Balkans is the entrenched influence of corrupt networks within state institutions. As Richter and Wunsch (2019) argue, this infiltration enables these groups to manipulate political and economic levers of power, effectively merging governance and criminal activity. Efforts at governance reform have been slow and inconsistent, further entrenching organized crime and corruption. Raistenskis et al. (2023) note that countries such as Albania and Montenegro struggle to attract foreign investment due to high levels of corruption, which stifles economic growth and encourages organized crime. The inability to attract foreign direct investment (FDI) limits legitimate economic opportunities, compelling individuals toward illicit activities (Hajdini et al., 2023).

The rise of digital technology has significantly reshaped the organized crime landscape in the Western Balkans, allowing criminal networks to expand and diversify their activities. As Nicola (2022) highlights, these groups have increasingly integrated digital tools to enhance their operational efficiency and anonymity, facilitating cross-border activities such as drug trafficking, human smuggling, and money laundering. The pandemic has exacerbated these trends, creating vulnerabilities that criminals exploit through online fraud and cyberattacks.

The increase in cybercrime is a major problem, according to Mitrovic (2021), who notes that the inadequate digital infrastructure of the Western Balkan countries makes them a major target for hackers. This vulnerability enables traditional organized crime groups and cybercriminals to conduct conventional organized crime groups, and cybercriminals to conduct online fraud, identity theft, and digital money laundering activities. As Mastrorocco (2020) discusses, using cryptocurrencies has further complicated law

enforcement efforts to track illicit financial activity and provides organized crime groups with more anonymity in their transactions.

The increasing complexity of these networks requires new policing approaches. Kruisbergen et al. (2019) argue that traditional methods are inadequate to combat technologically advanced criminal operations, advocating for adopting digital forensics, cyber intelligence, and international cooperation. Nicola (2022) also emphasizes that cross-border collaboration is essential to counter cyber-enabled organized crime. Without such efforts, the region will remain vulnerable to the growing influence of digital crime.

The COVID-19 pandemic has significantly accelerated the digital transformation of organized crime in the Western Balkans, as criminal organizations quickly adapted to the shift to online platforms during lockdowns and social distancing measures. The socioeconomic environment in the Western Balkans has been further destabilized by the COVID-19 pandemic, which exacerbated pre-existing economic vulnerabilities. Markovic (2021) and Rosen (2021) observe that during the financial crisis, criminal activity tends to increase as individuals turn to alternative sources of income. Malaj (2020) highlights that the economic impact, characterized by rising poverty and unemployment, created fertile ground for criminal activity, as financially vulnerable individuals turned to illegal enterprises for survival.

In addition, the pandemic exacerbated pre-existing socioeconomic vulnerabilities and led to increased recruitment by criminal networks, especially among unemployed youth in Bosnia and Herzegovina, Kosovo, Montenegro, and Albania (Markovic, 2021; Zeneli, 2020; Giurgea, 2021). In addition, the rise of cybercrime surged as criminals exploited the region's weak digital infrastructures and regulatory frameworks (Mitrovic, 2021).

3. METHODOLOGY

This study employs empirical research methodologies to investigate how structural socioeconomic conditions contribute to the proliferation of organized crime networks in the Western Balkans. Each variable was carefully selected based on theoretical and empirical findings from the literature on organized crime, socioeconomic instability, and governance. The regressors variables included in the model are unemployment, youth unemployment, education, GDP per capita, income inequality, Population in rural areas, COVID-19 pandemic, government corruption, the rule of law, government effectiveness, and the Human Development Index (HDI). Including these variables in the econometric model directly contributes to the study's primary objective: to analyze how key socioeconomic factors drive the spread of organized crime in the Western Balkans.

The data for this study were sourced from the World Bank Database, the Global Economy Database for regional economic indicators, the International Monetary Fund's Government Finance Statistics, and reports from the national statistical agencies and tax administrations of Kosovo, Albania, Montenegro, Bosnia and Herzegovina, North Macedonia, and Serbia. Missing data were addressed through interpolation where possible. At the same time, outliers were managed using standard statistical techniques, such as trimming extreme values, to ensure the accuracy and consistency of the analysis over the entire 13-year period (2010-2022).[5]

3.1. Econometric model

To measure the impact of socioeconomic factors on the spread of organized crime in the Western Balkans, we used the econometric model presented below:

$$OCI = \alpha + \beta 1\,(UNE\_15-65) + \beta 2\,(UNE\_15-25) + \beta 3\,(EDU) + \beta 4\,(GDPC) + \beta 5\,(GINI) + \beta 6\,(RURALP) + \beta 7\,(COVID) + \beta 8\,(GCI) + \beta 9\,(ROL) + \beta 10\,(GE) + \beta 11\,(HDI) + \mu$$

[5] Outliers were handled by employing standard statistical methods, including trimming extreme values based on the interquartile range (IQR) rule. Specifically, values below Q1 - 1.5IQR or above Q3 + 1.5IQR were identified as outliers and excluded from the analysis. This approach ensured the integrity and consistency of the dataset over the 13-year period (2010–2022).

Table 1. Data used in regression modeling

Variable	Abbreviations	Unit	Source	Expected impact
Organized Crime Index	OCI	Index	Global Economy Data	
Unemployment Rate	UNE_15-65	%	World Bank Data	+
Youth Unemployment Rate	UNE_15-25	%	World Bank Data	+
Gross Domestic Product per Capita	GDPC	US%	World Bank Data	-
Education	Index		Global Economy Data	-
Income Inequality	GINI	Index	World Bank Data	+
Rural Population	RURALP	% of the total Population	World Bank Data	-
Covid-19	COVID	0-Afer Covid	Generated by the authors	+
Government Corruption	GCI	Index	World Bank Data	+
Rule of Law	ROL	Index	Global Economy Data	-
Government effectiveness	GE	Index	Global Economy Data	-
Human Development Index	HDI	Index	International Monetary Fund	-

The study's dependent variable is the organized crime index (OCI). In contrast, the regressor variables include unemployment of the labor force aged 15-65 (UNE_15-65), youth unemployment for ages 15-25 (UNE_15-25), Education (EDU), GDP per capita (GDPC), inequality measured by the Gini index (GINI), the percentage of the Population living in a rural area (RURALP), the period of the covid-19 pandemic represented as a categorical variable (COVID), the government corruption index (GCI), the rule of law index (ROL), the governance effectiveness index (GE), and the human development index (HDI). Finally, the standard error term (μ) is presented, while a and β are parameters estimated by running the model. The data will be processed with the STATA program, where the empirical results are generated using this program. Four econometric models (OLS, OLSR, FE, and RE) were executed, while the Hausman test was used to select the best study model.

This article applies empirical research methods to investigate the impact of socioeconomic factors on the growth of organized crime in the Western Balkans. The decision to use econometric models, specifically OLS, OLSR, FE, and RE, is based on the nature of the data and previous research. Given the longitudinal and cross-country nature of the dataset (spanning 13 years and six countries), these models are well-suited to analyze the relationship between organized crime and its predictors. Previous studies examining the influence of socioeconomic factors on organized crime, such as those by Aaltonen et al. (2013), Edmark (2005), Gould et al. (2002), Janko and Popli (2015), Qehaja et al. (2022), and Zhilla (2011), have used similar econometric approaches, making them a logical choice for this analysis. In addition, the Hausman test was used to determine whether the fixed effects or random effects model is more appropriate, to ensure the robustness of the model selection. The STATA program was used to process the data and produce the empirical results, so the methodology is consistent with common practices in this area of research.

The Fixed Effects (FE) model was chosen as the most suitable in this study due to its ability to control for unobserved heterogeneity across countries, which may influence organized crime rates and related socioeconomic factors. Unlike the Random Effects (RE) model, which assumes that individual country effects are uncorrelated with the regressor variables, the FE model allows for correlation between these unobserved factors and the regressors, thus providing more reliable estimates when this assumption is violated. The Hausman test confirmed the presence of such correlation, making the FE model preferable as it corrects for potential bias that could arise from omitted variables, ensuring robust results in examining the impact of socioeconomic factors on organized crime.

3.2. Descriptive statistics

The statistics in Table 2 provide valuable information on the developments and trends in the Western Balkans region from 2010 to 2022. This data provides a comprehensive overview of the challenges and opportunities important for the region's development. Based on theindicators, we can identify obstacles in the region's economy. One pressing concern is the unemployment rate among young people. With an unemployment rate of 20.34% and a youth unemployment rate of 37.68%, it highlights the difficulties in creating employment opportunities for young people entering the workforce. The Gross Domestic Product (GDP) per capita, averaging only $5800.73, indicates the ongoing challenges in achieving significant economic growth and prosperity.

Furthermore, much of the criminality indicated by an Organized Crime Index of 1.93 adds another layer of complexity to the socioeconomic fabric of the region. In addition, the moderate level of corruption (43.78) and weak rule of law (0.23) underlines the obstacles to governance that may affect economic growth and social stability.

An Organized Crime Index (OCI) score of 1.93 in the Western Balkans indicates a moderate to high prevalence of organized criminal activities. This score underscores the entrenched presence of criminal networks within the socioeconomic fabric of the region and highlights several critical implications:

First, the OCI score reflects a combination of crime-related metrics, including corruption, the rule of law, and the strength of criminal markets. A score nearing two signals systemic weaknesses in governance and law enforcement, creating opportunities for organized crime networks to thrive. Second, benchmarking against the European Union (EU-27) average provides important context. EU-27 countries often report significantly lower OCI scores—frequently below 1 in nations like Finland and Denmark. This stark disparity underscores structural challenges in the Western Balkans, such as persistent corruption and weak institutional frameworks perpetuating organized crime. Third, the economic and social ramifications of this score are significant. Research cited in this manuscript shows a strong correlation between high OCI scores and negative economic outcomes, including reduced foreign direct investment, limited business development, and an increased reliance on informal economies. These factors further entrench organized crime within the region, fostering socioeconomic instability.

To enhance the analysis, comparisons to EU-27 benchmarks are also included for related indicators:

- Education Index: The Western Balkans average (67.74) is substantially lower than the EU-27 average (89.42), highlighting developmental gaps in human capital that exacerbate vulnerabilities.
- Rule of Law (ROL) Index: The ' 'region's average (-0.211) is significantly weaker compared to the EU-27 average (approximately 0.78 in countries like Germany), reflecting governance and law enforcement challenges.
- Human Development Index (HDI): Despite improvements, the Western Balkans average (0.757) still lags behind the EU-27 average (approximately 0.90), illustrating broader developmental disparities that contribute to organized crime.

The comparison between the pre-pandemic period and the pandemic in the Western Balkans region (see Table 3) shows some changes in so-

Table 2. Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
OCI	78	1.935	.962	.8	5.4
UNE_15-65	78	20.346	6.909	8.7	35.4
UNE_15-25	78	37.688	10.601	21.6	62.95
EDU	78	67.744	1.575	64.919	70.459
GDPC	78	5800.734	1562.834	3009.523	9893.5
GINI	78	33.99	4.364	26.3	43.2
RURALP	78	43.782	6.193	32	54
COVID	78	.231	.424	0	1
GCI	78	-.38	.202	-.779	.012
ROL	78	-.211	.13	-.52	.02
GE	78	-.117	.298	-1.04	.29
HDI	78	.757	.181	-.81	.832

Source: *Authors Calculation*

cioeconomic indicators that reveal surprising improvements and concerns. One noticeable aspect is the decrease in the Organized Crime Index (OCI) from 2.02 to 1.64 during the pandemic. This decrease indicates a disruption in organized activity, possibly due to law enforcement agencies shifting their focus or criminals adjusting their behavior due to pandemic-related restrictions. Another positive trend that stands out is the decrease in unemployment (in the 15 to 65 age group) and youth unemployment (in the 15 to 25 age group) during this difficult period.

Descriptive statistics suggest a possible link between economic growth and reduced crime rates, further substantiated by econometric analyses demonstrating a statistically significant negative relationship. This data indicates that economic growth and a fair distribution of money could help alleviate poverty, reducing crime rates. The percentage fell from 21.93% to 15.05%. The percentage fell from 40.23 percent to 29.19 percent, sparking interest in the factors that led to this rapid decline during a global crisis. Government regulations, wage subsidies, adjustments in job-seeking behavior, and changes in labor market dynamics are possible contributing factors. Gross Domestic Product (GDPC) increased from $5,424.09 to $7,056.22 during this period. The exceptional economic growth during a global crisis is truly admirable. This development could be attributable to select enterprises' successful adapting to the epidemic, the effectiveness of government stimulus measures, or changes in customer behavior. Notably, the Gini Coefficient declined during the epidemic, notably from 34.60 to 31.93, indicating a reduction in pay inequality. Should this prolonged decline continue, it could signal a significant shift in conditions. However, some concerning trends are emerging as a result of these changes. The Human Development Index (HDI) has dropped from 0.77 to 0.69, indicating slow progress. This decline could be attributed to healthcare and education system setbacks, healthcare and education system disruptions, or social challenges exacerbating vulnerabilities within the region.

Complexity is increased by the fact that changes in governance and indices relating to governance have also been observed. While there has been a decrease in the Government Corruption Index (GCI), indicating an improvement in perceived

Table 3. Comparison of the Organized Crime Index before and during the pandemic

Variable	Before Pandemic			During Pandemic		
	Obs	Mean	Std. Dev	Obs	Mean	Std. Dev
OCI	60	2.022	1.043	18	1.647	0.547
UNE_15-65	60	21.934	6.8	18	15.053	4.148
UNE_15-25	60	40.235	10.671	18	29.198	3.832
EDU	60	67.949	1.562	18	67.061	1.457
GDPC	60	5424.09	1343.08	18	7056.22	1622.57
GINI	60	34.605	4.487	18	31.937	3.254
RURALP	60	44.583	6.107	18	41.111	5.87
GCI	60	-0.366	0.202	18	-0.424	0.203
ROL	60	-0.225	0.132	18	-0.162	0.11
GE	60	-0.092	0.263	18	-0.199	0.391
HDI	60	0.775	0.025	18	0.697	0.377

Source: *Authors Calculation*

corruption levels, there has also been a mild improvement, which has been observed in the Rule of Law (ROL). On the other hand, government effectiveness (GE) has declined. These conflicting trends in governance metrics call for a nuanced understanding of the underlying changes and their potential implications for policymaking.

4. EMPIRICAL RESULTS

The results of the model with fixed effects are shown in Table 4. The findings reveal the most trustworthy and appropriate coefficient for analyzing the data in this research. The selection of this econometric model is based on the results of the Hausman test (see Appendix 1), where the value of this test is P=0.0000. A Hausman test yielding a p-value of 0.0000 suggests a significant difference between the coefficients estimated in the Fixed Effect (FE) and Random Effect (RE) models. In panel data analysis, Fixed Effects (FE) and Random Effects (RE) models are employed to address the issue of unobserved heterogeneity.

The FE model controls for time-invariant unobserved factors by including individual-specific effects, while the RE model assumes that these unobserved factors are uncorrelated with the observed variables. A low p-value (0.0000) in the Hausman test provides strong evidence to reject the null hypothesis that the differences between the coefficients estimated by the FE and RE models are due to random chance. In other words, there are systematic differences between the coefficients produced by these models. In this scenario, the implication is the FE model (which accounts for individual-specific effects) is more appropriate than the RE model. The FE model provides greater robustness in addressing unobserved individual heterogeneity by including fixed effects for each individual in the panel data. The significant difference between the two models' coefficients suggests that unobserved individual-specific factors substantially influence the observed outcomes in a dataset.

The presented model is statistically significant, with an F-statistic of 4.83 and a p-value of 0.000. It demonstrates a high explanatory power regarding criminality among the independent variables, evidenced by a coefficient of determination (R^2) of 86.6%.

Table 4. Results of fixed effect model

OCI	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
UNE_15-65	.048	.018	2.66	.003	-.117	.02	**
UNE_15-25	.024	.012	2.01	.006	-.063	.014	**
EDU	-.39	.116	-3.35	.001	.157	.622	***
GDPC	-.23	.21	-0.25	.807	.31	.78	
GINI	.028	.041	0.67	.503	-.055	.11	
RURALP	-.213	.046	4.62	.000	.121	.305	***
COVID	.012	.242	0.05	.96	-.472	.496	
GCI	.317	.783	0.41	.687	-1.249	1.883	
ROL	-.054	.188	-3.02	.009	-1.622	1.731	**
GE	-.844	.475	-1.78	.081	-1.794	.106	*
HDI	-.701	.341	-2.05	.044	-1.384	-.018	**
Constant	-32.451	8.728	-3.72	.000	-49.904	-14.999	***

Mean dependent var	1.935	SD dependent var	0.962
R-squared	0.866	Number of obs	78
F-test	4.838	Prob > F	0.000
Akaike crit. (AIC)	108.987	Bayesian crit. (BIC)	137.268

*Note: *** p<.01, ** p<.05, * p<.1*

Source: *Authors Calculation*

Coefficients β1=0.048 and β2=0.024, both statistically significant at the 5% significance level, indicate that unemployment and unemployment among youth positively affect the rise in criminal activity.

On the other hand, the education level negatively impacts crime, with a coefficient β3=-0.39. For every 1 unit of increase in the education index, the crime index decreases by 0.39 units on average. The coefficient is statistically significant at the highest significance level (1%). The standard of living, presented in terms of income per capita (β4=-0.23), has a negative impact on the crime index, where for every 1 dollar added to the income per capita, the crime index decreases by 0.23 units on average. The increase in inequality is considered one of the factors with a positive impact on the increase in crime. Regression analysis further supports this, indicating a positive correlation between income disparities and crime rates. In particular, the regression coefficient β5 has a value of 0.028, which signifies that for each incremental unit increase in the Gini coefficient, there is an average rise of 0.028% in the crime index.

The crime index decreased by 0.012 during COVID-19 compared to the pre-pandemic era. Meanwhile, variables related to state control also have a negative impact; where the influence of the rule of law index is negative (β9=-0.054), the government effectiveness index (β10=-0.844) and the human development index (β11=-0.701), where all three coefficients are statistically significant. So, according to these coefficients, the increase in state control through the rule of law and government efficiency hurts the reduction of criminality in the countries of the Western Balkans.

Our study's findings on the socioeconomic variables influencing organized crime in the Western Balkans show several noteworthy similarities with other studies. Notably, the study aligns with Gould et al. (2002) and Altindag (2012), who have highlighted the link between high unemployment rates, especially among youth, and the escalation of organized crime. This correlation underscores the critical role of economic instability as a driver for criminal activities. Regarding education's impact on crime, our findings resonate with Abeling's (2019) and Groot et al. (2010) research. These studies have shown that higher levels of education correlate with reduced criminal behavior, echoing our observation of a negative correlation between education and organized crime.

The relationship we observed between conditions and organized crime is supported by Plotnikov's (2020) and Goulas & Zervoyianni (2013) research. They explore the link between economic growth and crime rates, suggesting that economic improvements can lead to decreased activities. Furthermore, our study's findings on the link between income inequality as measured by the Gini coefficient and organized crime align with the research conducted by Fajnzylber et al. (2020). They discovered a correlation between income inequality and violent crime rates across different countries. Lastly, the correlation we found between government corruption and organized crime is echoed in Zenelis's (2016) study, which examines how corruption negatively affects factors in the Western Balkans.

Table 5. Time fixed effects

OCI	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Year1	-2.01	1.235	-1.62	.105	-4.421	.421	
Year2	-2.167	1.235	-1.75	.079	-4.588	.255	*
Year3	-2.5	1.235	-2.02	.043	-4.921	-.079	**
Year4	-2.167	1.235	-1.75	.079	-4.588	.255	*
Year5	-2.333	1.235	-1.89	.059	-4.755	.088	*
Year6	.333	1.235	0.27	.787	-2.088	2.755	
Year7	-.333	1.235	-0.27	.787	-2.755	2.088	
Year8	-.667	1.235	-0.54	.589	-3.088	1.755	
Year9	-.833	1.235	-0.67	.542	-3.255	1.588	
Year10	-1.167	1.235	-0.94	.345	-3.588	1.255	
Year11	-.667	1.235	-0.54	.589	-3.088	1.755	
Year12	.833	1.235	0.67	.503	-1.588	3.255	
Year13	-.34	1.235	-0.27	.787	-2.755	2.088	
Constant	1.42	1.235	-1.62	.105	-4.421	.421	

Mean dependent var	58.949	SD dependent var	7.406
Overall r-squared	0.611	Number of obs	78
Chi-square	171.683	Prob > chi2	0.000
R-squared within	0.000	R-squared between	0.000
*** p<.01, ** p<.05, * p<.1			

Table 5 presents regression analysis results incorporating time-fixed effects to evaluate their impact on the Organized Crime Index (OCI). The coefficients associated with the years show varying effects on organized crime, with Years 2, 3, 4, and 5 showing statistically significant negative impacts at different significance levels ($p < 0.1$ and $p < 0.05$). Notably, Year 3 exhibits the most substantial effect, with a coefficient of -2.5 and a p-value of 0.043, suggesting that the factors influencing organized crime were particularly pronounced during that year.

The overall R-squared value of 0.611 indicates that it can explain approximately 61.1% of the variance in the OCI. The Chi-square statistic of 171.683, with a probability of less than 0.000, confirms that the model is statistically significant. This analysis underscores the importance of considering time effects in understanding the dynamics of organized crime across the years in the studied region.

3. CONCLUSION

This research explores the underlying economic factors contributing to organized crime in the Western Balkans from 2010 to 2022. Our findings reveal an interplay of elements that drive activities in the region. A significant discovery is the link between organized crime and socioeconomic instability, particularly highlighted by increased youth and general unemployment rates. This correlation emphasizes how economic hardships can push individuals towards engaging in illegal activities as viable alternatives when employment opportunities are scarce. The inverse relationship observed between higher levels of education, improved governance, and human development indices and organized crime highlights the importance of policy interventions targeting these areas to diminish organized crime networks' influence in the Western Balkans. Investing in education, strengthening the rule of law, and improving government effectiveness are crucial for combating organized crime. Providing a better and more robust legal framework can significantly reduce the appeal and necessity of involvement in organized crime.

The study findings are bolstered by the methodology employed, using the Fixed Effects model, validated by the Hausman test. This model highlights the importance of considering various factors and their impact on organized crime dynamics. The implications for policymaking are significant. The observed association between unemployment rates and organized crime emphasizes the need for targeted policies focused on job creation and vocational training, especially for young people.

This research provides a roadmap for Western Balkans and beyond policymakers, emphasizing the necessity of a multifaceted approach to combat organized crime. The empirical results highlight that addressing high unemployment, particularly among youth, and reducing income inequality are crucial for combating organized crime in the Western Balkans. Policymakers should focus on creating job opportunities and improving access to education, as these factors significantly influence crime rates. Additionally, strengthening governance by enhancing the rule of law and combating corruption will be essential in weakening the institutional support for organized crime. Finally, adopting flexible policies that can address the economic and social disruptions caused by events such as the COVID-19 pandemic is essential to respond to evolving criminal dynamics and maintain regional security.

However, it is important to acknowledge limitations in this study's examination of the impact of various factors on organized crime within the Western Balkans. While the study relies on data sources like the World Bank and IMF, there is a potential risk of inherent biases or gaps related explicitly to sensitive areas like organized crime and government corruption. Additionally, given its focus on the Western Balkans, generalizing these findings to regions with distinct sociopolitical contexts may not be entirely applicable. Methodologically, statistical models predominantly reveal correlations rather than causations and might overlook qualitative aspects associated with understanding organized crime. Furthermore, it is essential to consider that the specific models and statistical techniques chosen, such as the Hausman test, reflect a perspective that could potentially impact the study's findings.

Concerning enhancing research on organized crime and its socioeconomic impacts, a qualitative approach combining a few methods of investigation could be preferred. This may consist of interviews or case studies that can provide a depth of information, thus rendering an idea of the motivations and factors at work. The future research, within this scope, must also be extended beyond merely correlation and work towards proof of causation, which denotes the ability to attribute a change in one variable to a change in another." Their role becomes paramount because of the importance of technology and cybercrime in the contemporary crime investigation landscape. Last, evaluating the effectiveness of policy interventions and strategies in the fight against organized crime may offer valuable insights for policymakers and law enforcement agencies.

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APPENDIXES

Appendix A. Hausman test results

Hausman (1978) specification test	Coef.
Chi-square test value	63.537
P-value	0.0000

Appendix B. Results of random effect model

TC	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
UNE_15-65	.002	.334	-3.01	.005	-.669	.664	**
UNE_15-25	.102	.066	-4.54	.000	-.031	.234	***
EDU	-.208	.184	-3.13	.002	-.159	.575	**
GDPC	2.256	3.915	0.58	.566	-5.564	10.076	
GINI	-.144	2.116	-4.07	.946	-4.084	4.372	***
RURALP	-.616	2.751	-0.22	.823	-6.111	4.878	
COVID	0.002	1.422	-0.05	.842	-2.84	2.84	
GCI	-.142	.233	-5.61	.000	-.322	.607	***
ROL	.723	1.027	0.70	.484	-1.328	2.774	
GE	.761	.524	1.45	.151	-.286	1.808	
HDI	-.139	.086	-1.62	.11	-.31	.032	
Constant	2.256	3.915	0.58	.566	-5.564	10.076	

Mean dependent var	58.949	SD dependent var	7.406
R-squared	0.775	Number of obs	78
F-test	4.795	Prob > F	0.000
Akaike crit. (AIC)	182.259	Bayesian crit. (BIC)	203.470

*Note: *** p<.01, ** p<.05, * p<.1*

Source: Authors Calculation

Appendix C. Correlation analysis

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
OCI (1)	1.00											
UNE_15-65 (2)	0.53	1.00										
UNE_15-25 (3)	0.59	0.53	1.00									
EDU (4)	-0.33	0.28	0.74	1.00								
GDPC (5)	-0.48	0.62	0.25	0.31	1.00							
GINI (6)	0.053	0.09	0.44	0.14	0.46	1.00						
RURALP (7)	-0.66	0.48	0.29	0.12	0.59	0.35	1.00					
COVID (8)	-0.46	0.42	0.44	0.23	0.44	0.25	0.23	1.00				
GCI (9)	0.16	0.11	0.3	0.18	0.45	0.64	0.56	0.12	1.00			
ROL (10)	0.79	0.06	0.07	0.27	0.56	0.40	0.31	0.20	0.55	1.00		
GE (11)	-0.64	0.07	0.31	0.28	0.12	0.09	0.61	0.15	0.32	0.28	1.00	
HDI (12)	-0.61	0.06	0.02	0.07	0.01	0.16	0.06	0.18	0.12	0.15	0.02	1.00

Source: *Authors Calculation*

Utjecaj socioekonomskih čimbenika na širenje organiziranog kriminala u zemljama zapadnog Balkana

Sažetak

Istraživanje organiziranog kriminala na zapadnom Balkanu ključno je za procjenu njegovih socioekonomskih posljedica i oblikovanje utemeljenih političkih odgovora. Povijesno gledano, zapadni Balkan bio je podložan organiziranom kriminalu, osobito nakon raspada Jugoslavije 1990-ih godina. Politički i gospodarski preokreti stvorili su plodno tlo za procvat kriminalnih mreža u različitim ilegalnim aktivnostima. Ovaj rad istražuje složenu međuigru između socioekonomskih čimbenika i širenja organiziranog kriminala na zapadnom Balkanu u razdoblju od 2010. do 2022. godine. U istraživanju se koriste različiti ekonometrijski modeli, uključujući metodu najmanjih kvadrata (OLS), OLS s robusnim standardnim pogreškama (OLSR), model fiksnih učinaka (FE) i model slučajnih učinaka (RE), kako bi se procijenio utjecaj socioekonomskih čimbenika poput nezaposlenosti, obrazovanja, dohotka po stanovniku, nejednakosti, udjela ruralnog stanovništva, utjecaja pandemije COVID-19, korupcije u vlasti, vladavine prava, učinkovitosti vlasti i indeksa ljudskog razvoja (HDI) na organizirani kriminal. Rezultati pokazuju da su više stope nezaposlenosti, osobito među mladima, te niže razine obrazovanja povezane s jačanjem organiziranog kriminala, naglašavajući ključnu ulogu socioekonomske nestabilnosti u održavanju kriminalnih mreža u regiji. Zanimljivo je da rad bilježi smanjenje stopa organiziranog kriminala povezano s poboljšanjima u upravljanju, poput jačanja vladavine prava i učinkovitijeg funkcioniranja vlasti. Nadalje, tijekom pandemije COVID-19 zabilježeno je značajno smanjenje organiziranog kriminala, što upućuje na promjene u obrascima kriminalnih aktivnosti i prioritetima provedbe zakona u tom razdoblju.

Ključne riječi: socioekonomski čimbenici, organizirani kriminal, korupcija vlasti, zapadni Balkan, ekonometrijska analiza