The Relationship between Economic Activity and Types of Crime: A Panel Analysis of the Regions of the Czech Republic between 2005-2023

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Abstract
This study examines the influence of economic factors on crime in the regions of the Czech Republic from 2005 to 2023. The analysis utilizes panel data encompassing economic indicators such as Gross Domestic Product (GDP), the number of business entities exiting the market, and the number of unemployed individuals, alongside crime data across various types. Fixed effects models estimate the relationship between economic activity and crime, with robust standard errors corrected for heteroskedasticity and autocorrelation. Results indicate that GDP and the number of entities exiting the market significantly influence crime rates, while unemployment plays a minor role. An increase in entities exiting the market correlates with a rise in overall and general crime, whereas higher GDP reduces rates of economic crimes, robberies, and burglaries. These findings suggest that economic stability has the potential to mitigate certain types of crime, while economic instability may heighten general criminal activity. The results align with international studies and contribute to a deeper understanding of regional variations in crime dynamics in the Czech Republic, highlighting the need for targeted social policy measures and policies at the organizational level.

Keywords: economics of crime; regional crime; economic instability; social policy.

JEL Classification: K42, C23, E62

DOI: https://doi.org/10.24818/ejis.2024.07

1. Introduction

Crime and its relation to economic and social factors are among the key research areas impacting not only public safety but also broader societal and economic stability. The development of crime rates is often linked to regional economic conditions, with factors such as Gross Domestic Product (GDP), unemployment rate, and economic instability significantly

Received: 1 July 2024; Revised: 9 September 2024; Accepted: 10 October 2024

influencing criminal activity. This study focuses on analysing these relationships across Czech regions from 2005 to 2023, aiming to explore how economic indicators such as GDP, the number of unemployed, and the number of dissolved business entities affect different crime types, including general and economic crime, robberies, burglaries, rape, and murder. The study emphasizes identifying economic determinants of crime on a regional level while accounting for the specificities of each region.

Research motivation stems from the growing need to understand how economic fluctuations influence social issues, including crime and what policies at organizational and state level can be introduced to mitigate negative impacts of crime on economic activity. Recent events, such as economic crises and the pandemic, have underscored the vulnerability of regional economies and their potential impact on social stability (Cermakova et al., 2022). Additionally, evidence suggests that the effect of economic factors on general indicator of crime may not be universal, but rather, it may vary based on regional conditions and crime types (Pieszko, 2016). This research thus aims not only to contribute to the academic discourse on the economy - crime relationship but also to fill the research gap and provide valuable insights for developing organizational and regional social policies focused on crime prevention during periods of economic uncertainty.

Prior research has mainly focused on the substantial economic costs associated with crime, especially in developing countries. An extensive overview of key findings in this area is provided by Pieszko (2016). Generally, economic development is negatively correlated with crime rates, meaning that as economic development rises, crime rates tend to fall. However, this relationship is not linear and may vary across different phases of economic development. Regional proximity may represent an important factor as economic prosperity has been found subject to negative and positive spillovers differing in the short and long run, as showed by a recent study on EU regions (Popescu et al., 2023). Higher poverty, income inequality, and unemployment levels are linked to increased crime rates. Unemployment, in particular, is often associated with a rise in property crimes. Rapid urbanization can also contribute to higher crime rates, especially in areas with inadequate infrastructure and social services. Education plays a crucial role in crime prevention, with research showing that higher education levels are generally associated with lower crime rates. Demographic factors, such as age and gender, also influence crime rates, with younger age groups, particularly males, associated with higher crime levels. Political systems affect crime rates as well, with stable democratic systems generally linked to lower crime rates than authoritarian regimes. The relationship between economic conditions and criminal behaviour has been extensively studied in various contexts, revealing complex interconnections between economic factors and different types of criminal activities.

2. Theoretical Framework: Economic Theory of Criminal Behaviour

The economic approach to analysing criminal behaviour was fundamentally transformed by Gary Becker's (1968) seminal work ”Crime and Punishment: An Economic Approach.” Becker proposed that criminal behaviour can be understood through the lens of rational choice theory, where individuals make decisions about engaging in criminal activities by weighing expected benefits against potential costs. According to this framework, potential criminals act as rational agents who calculate the expected utility from criminal activity by considering these benefits (B): (1) Potential monetary and non-monetary gains; (2) Probability of successful completion; (3) Alternative legal income opportunities; (4) Personal preferences and risk attitudes. On the

other hand, they evaluate potential costs, including: Probability of apprehension (p), severity of punishment if caught (R), various control variables (M) can enhance the model (see Levitt & Miles, 2006; Mungan & Klick, 2016; compare with the criminologists' views in Nagin, 2013) like opportunity costs of foregone legal activities, social stigma, per influence, presence of police and similar deterrence factors, type of crime, wealth level and reputation costs.

The decision to engage in criminal activity (O) can be expressed through Becker's expected utility function (Equation 1):

$$U(O) = \phi \times B - C - p \times R + M \qquad (1)$$

where U represents the individual's utility function, incorporating both monetary and psychic costs/benefits.

This framework suggests that crime rates are influenced by economic conditions affecting legal income opportunities, law enforcement efficiency and resources, severity of punishments, social and institutional factors affecting the costs and benefits of crime. Becker's theory predicts that higher unemployment and lower wages increase criminal activity by reducing the opportunity costs of illegal behaviour. Greater income inequality may increase crime by heightening the relative benefits of illegal activities. Improved law enforcement and stricter punishments should deter crime by increasing expected costs.

Are Criminals Really Rational?

Criminals exhibit a limited form of rationality that is systematically influenced by cognitive biases and limitations in their decision-making processes (Jolls, 2017). The evidence suggests that criminals are "boundedly rational" rather than purely rational actors. This means they do engage in some cost-benefit analysis, but their decision-making is significantly affected by cognitive biases and limitations. They show systematic biases in their thinking - they tend to be overly optimistic about their chances of favourable outcomes (optimism bias) and view potential jail time as disproportionately negative compared to potential benefits (loss aversion). These biases lead them to make decisions that deviate from what a purely rational actor would choose. The legal system recognizes this bounded rationality by implementing structures like sentencing guidelines to create more predictable outcomes and help offset these cognitive biases.

Economic Costs of Crime and Broader Impacts

Crime, including organized crime and corruption, significantly change the outcomes of economic growth, investment, productivity, and human capital development (Sabroso et al., 2023). Global estimates suggest that crime-related costs amount to 3.5-5% of world GDP annually, with some regions, such as Latin America, experiencing even higher costs of up to 10% of GDP. The impact on economic growth is substantial; an increase of one homicide per 100,000 inhabitants can reduce GDP growth by 0.15% annually, with this effect potentially reaching 0.4% in high-crime countries. Crime also diminishes overall factor productivity and adversely affects human capital formation, with high-violence regions showing 7.6% higher school dropout rates.

Detotto and Otranto's (2010) Italian study (1979-2002) quantified crime's impact on economic growth, finding that a 1% increase in crime rates led to a 0.00041% decrease in real GDP growth. While this effect appears minimal, the authors emphasize its significant cumulative impact over time, estimating that Italy's annual economic growth rate would have been 0.0274 percentage points higher without crime's influence.

Regional Studies and Economic Indicators

Research from Azerbaijan (2000-2020) reveals significant correlations between economic factors and violent crime rates. While GDP growth showed a modest negative correlation with violent crime, wage increases demonstrated a more substantial impact. Specifically, each percentage increase in average wages corresponded to a 0.47% decrease in violent crime rates (Aliyeva, 2022).

In Canada, Janko and Popli's (2015) analysis of 1979-2006 data revealed counterintuitive findings regarding unemployment's relationship with crime. While no significant long-term correlation was found between overall unemployment and crime rates, short-term analysis showed that increased unemployment actually led to decreased burglaries (-2.8%) and motor vehicle thefts (-4.3%). This phenomenon is attributed to the "guardianship effect," suggesting higher unemployment results in increased home occupancy, reducing opportunities for certain types of crime.

Research in Macau by Dai et al. (2023) examined the relationship between gambling industry metrics and crime rates (2002-2019). Their findings demonstrated that a 1% increase in gambling revenue corresponded to a 0.41% increase in gambling-related crime, while a 1% increase in visitor numbers led to a 0.68% increase. Economic stress, defined as the interaction between unemployment and gambling revenue, showed significant positive correlations with various crime types, including organized crime and money laundering.

Goulas and Zervoyianni's (2013) examination of 25 OECD countries (1991-2007) established a negative correlation between economic growth and crime rates. Their study particularly highlighted the role of economic uncertainty, measured through stock market volatility. During periods of high economic uncertainty, a 1% increase in crime rates led to a 0.19% decrease in economic growth, while this relationship became statistically insignificant during periods of low uncertainty.

Kizilgöl and Selim's (2017) analysis of 28 EU countries and Turkey (2008-2014) revealed complex relationships between socioeconomic factors and crime rates. Their findings showed that a 1% increase in GDP per capita corresponded to a 0.48% increase in total crime, while a 1% increase in unemployment led to a 0.12% increase. Urbanization demonstrated the strongest effect, with a 1% increase leading to a 0.90% increase in crime rates. Higher education levels were associated with lower crime rates, suggesting education's important role in crime prevention.

Policy Implications and Social Programs

Wagner's (2021) study on the impact of Medicaid expansion in the United States (1995-2010) provides insights into how social programs can affect crime rates. The expansion of healthcare coverage led to approximately a 1.7% reduction in overall crime rates in the first year (70 cases per 100,000 population) and a 4.25% reduction (176 cases per 100,000 population) in the second year, with more pronounced effects on property crimes than violent crimes.

Recent developments in crime prediction, as demonstrated by Wang & Ma (2022) in their Chinese city case study, show promise in utilizing machine learning algorithms for criminal behavioural analysis. Their model, tested on data from January to October 2019, demonstrated high accuracy in predicting various types of criminal activity, particularly for public health-related offenses.

3. Methodology

The goal of this paper is to investigate how economic factors (GDP, business exits, unemployment) influence different types of crime in Czech regions. This analysis is based on panel data covering 14 regions in the Czech Republic from 2005 to 2023. Crime and economic activity data were obtained from the public database of the Czech Statistical Office (2024) and are based on detailed data from the Police Presidium of the Czech Republic. The dataset includes regional data on various types of crime, including general and economic crime, robberies, residential burglaries, rape, and murder, along with economic activity data such as GDP at current prices, the number of dissolved business entities, unemployment rate, and the number of unemployed individuals.

It should be noted that from 2005 to 2009, crime data by region and district did not account for offenses detected by the immigration and railway police. Crimes committed abroad and at international airports are excluded from the 2016 data. The total number of observations is 266, except for the GDP variable, which has 252 observations.

The variables include overall crime, general crime, economic crime, robberies, residential burglaries, rape, and murder, alongside economic indicators such as GDP, the number of dissolved business entities, unemployment rate, and the number of unemployed individuals (***Table 1***).

Table 1. Summary statistics of variables, crime and economic activity in 14 regions of the Czech Republic between 2005 and 2023

Variable	N	Mean	Std. Dev.	Min	Max
Total crime	266	18804.05	16844.05	3754	95653
General crime	266	14485.18	14363.87	2771	83206
Economic crime	266	1955.906	1627.302	310	9737
Robbery	266	206.2481	232.6754	16	1873
Burglary of flats and houses	266	530.0789	549.3961	39	3143
Rape	266	46.42105	27.61753	10	169
Homicide	266	11.69925	7.231467	1	40
GDP in current prices (thousands CZK)	252	331927.5	298258.7	73947	1926323
Dissolved businesses	266	5884.515	5876.578	1289	47708
Unemployment rate (%)	266	4.958233	2.765018	1.24	14.53
Unemployed (thousands of persons)	266	18.18921	13.43533	3.56	86.41

To estimate the model, a fixed-effects panel model was employed, accounting for heterogeneity between regions and eliminating unobserved time-invariant variability among them. Estimates are performed using robust clustered standard errors corrected for heteroskedasticity and autocorrelation within regions. Given the limited degrees of freedom, we did not include year-specific time control variables, nor did we consider the GMM estimation, resulting in models incorporating only first-difference estimations as well as level estimations with a time linear trend. The third model addresses first-order autocorrelation in the error term (Baltagi & Wu, 1999). The Hausman and subsequent Sargan-Hansen tests indicated the unsuitability of the random effect method, and the fixed-effects model was always preferred.

Model using first differencing (Equation 2) is specified as follows:

$$\Delta Y_{it} = \alpha_i + constant + \beta_1 \Delta Economic\_Indicators'_{it} + u_{it} \quad (2)$$

Model using indicators in levels (Equation 3) is specified as follows:

$$Y_{it}=\alpha_i+constant+\beta_1 Economic\_Indicators'_{it} + \beta_3 trend_t + u_{it} \quad (3)$$

Where Y_{it} represents the dependent variable (type of crime), α_i is the fixed effect for individual regions, betas are the coefficients corresponding to the explanatory variables. For the first model, all variables are in the first differences (Δ) of the logarithm, expressing the percentage annual growth rate. In the second and third models, the variables are in their original levels and log transformations. Economic indicators are represented by unemployment, GDP, and the number of dissolved business entities. The model is not fully identified and suffers from omitted variable bias. Crime is also likely influenced by other indicators, such as property security, social exclusion risks, and additional regional factors representing crime risk (see Introduction section). Time-stable factors are captured by regional fixed effects, while time-varying unobserved factors are captured only as a linear trend.

Factors related to the economic level of the region and labour market opportunities are approximated by the gross domestic product and the number of unemployed. Changes in business activity are captured in the number of business closures. The variables enter the models in a logarithmic transformation for practical interpretational reasons. An alpha level of 5% is used in the interpretation and these results are considered statistically significant. For results that are significant at the 10% level, discussion of this effect will be considered.

4. Results

For each crime type, we first interpret individual variables in the FE DIF model and then compare the results in level models (FE OLS and FE AR), focusing particularly on the FE AR model that accounts for residual autocorrelation. Wooldridge's test confirmed first-order autocorrelation in all cases, indicating that OLS model results (Models 2, 4, 6, 8, 10, 12, 14) in levels can be overestimated.

Across all crime types, GDP and the number of dissolved business entities generally have a positive and statistically significant influence on the year-on-year change in crime rates in the DIF model (Model 1, Table 2), suggesting that both GDP growth and an increase in dissolved businesses correlate with rising crime rates under constant conditions. The number of unemployed shows no statistically significant relationship with crime rates. Crime tends to decrease by 6.8% annually if other factors remain unchanged. Detailed observations indicate that the model explains 31.7% of the year-on-year crime rate variability within regions. A 10% increase in dissolved businesses is associated with a 0.92% rise in crime, significant at a 1% level, while a 10% increase in GDP leads to a 7.2% rise in crime, also significant at a 1% level.

When we consider models accounting for autocorrelation in levels, OLS model results appear overestimated, particularly where residual autocorrelation is present (***Table 2***). In the AR model, which considers residual autocorrelation, GDP and the number of unemployed do not show statistical significance in influencing crime rates. After adjusting for autocorrelation, the effect of dissolved business entities on crime rates reduces but remains positive and significant at the 1% level. A 10% increase in dissolved businesses is associated with a 0.968% rise in crime, while the explained variability in AR models tends to be lower due to adjustments for time-dependent correlations in the data.

Table 2. General crime and economic activity in 14 regions of the Czech Republic between 2005 and 2023, first differences (DIF), fixed effects (FE) and a model correcting for autocorrelation in residuals (AR)

Total Crime (ln)	(1) FE DIF	(2) FE OLS	(3) FE AR
GDP in current prices (ln)	0.720***	0.0200	0.0707
	(0.193)	(0.27)	(0.17)
Dissolved businesses (ln)	0,092***	0.120***	0.0968***
	(0.008)	(0.015)	(0.013)
Unemployed (ln)	−0,015	0.0970**	-0.0391
	(0.025)	(0.041)	(0.028)
Linear trend		-0.0450***	
		(0.0065)	
Constant	−0,068***	98.73***	7.550***
	(0.006)	(10.2)	(0.21)
N	238	252	238
R^2-*within*	0.317	0.879	0.161

The first-differences model for general crime (Model 4, ***Table 3***) yields similar results to those for general crime. Here again, the year-on-year increase in GDP and the number of business deaths is associated with an increase in the year-on-year change in general crime, and the number of unemployed is not statistically significant. A more detailed model then explains 20.7% of the variability in the change in crime within counties. The constant term is statistically significant and shows that if all explanatory variables were held constant, the expected average change in crime would show a 6.2% annual decline. Further, then, a 10% increase in the number of business closures is associated with a 0.93% increase in the annual change in crime. And a 10% annual increase in GDP is associated with a 5.56% increase in the annual change in general crime.

Prioritizing the more precise results of the FE AR model (Model 6, ***Table 3***), we again conclude that there is no statistically significant effect of GDP levels on general crime, similar to the number of unemployed. We only see a statistically significant 0.99% average increase in crime with a 10% increase in business closures. The model with an autocorrelation structure explains less variability (9.6%) because part of the explained variability is removed by accounting for time dependence.

Table 3. General crime and economic activity in 14 regions of the Czech Republic between 2005 and 2023, first differences (DIF), fixed effects (FE) and a model correcting for autocorrelation in residuals (AR)

General crime (ln)	(4) FE DIF	(5) FE OLS	(6) FE AR
GDP in current prices (ln)	0,556***	-0.0707	-0.216
	(0.18)	(0.26)	(0.18)
Dissolved businesses (ln)	0,093***	0.124***	0.0990***
	(0.024)	(0.018)	(0.015)
Unemployed (ln)	0,002	0.147***	-0.0207
	(0.054)	(0.047)	(0.034)
Linear trend		-0.0408***	
		(0.0051)	
Constant	-0,062 ***	90.88***	10.97***
	(0.01)	(7.91)	(0.33)
N	238	252	238
R^2-*within*	0.207	0.863	0.096

The first-differences model for economic crime (Model 7, ***Table 4***) shows that, surprisingly, year-on-year changes in GDP do not affect changes in economic crime. The number of business closures has a positive effect on economic crime growth, while unemployment has an adverse influence. We then observe in more detail that this model explains 8.9% of the variability in changes in economic crime across counties. The constant term is negative and statistically significant. That is, if all explanatory variables were held constant, economic crime is expected to decline by 8% per year. In more detail, then, a 10% decline in the number of unemployed is associated with an average 1.36% increase in the annual change in economic crime, holding otherwise constant. And a 10% annual increase in the number of business closures is associated with a 0.63% increase in the annual change in economic crime.

In a model that better accounts for autocorrelation (Model 9, ***Table 4***), GDP has a strong negative effect on economic crime and GDP growth leads to a decline in economic crime. The number of business closures has a positive effect on economic crime. Unemployment has a negative effect on economic crime. In detail, a 10% decline in GDP is associated with a 16.87% increase in economic crime on average. Further, a 10% increase in unemployment is associated with a 2.03% decrease in economic crime. And a 10% increase in the number of defunct businesses is associated with a 0.696% increase in economic crime. The model explains only 21.3% of the variability, which is decent as part of the variability is explained by the autocorrelation structure.

Table 4. Economic crime and economic activity in 14 regions of the Czech Republic between 2005 and 2023, first differences (DIF), fixed effects (FE) and a model correcting for autocorrelation in residuals (AR)

Economic crime	**(7)**	**(8)**	**(9)**
	FE DIF	**FE OLS**	**FE AR**
GDP in current prices (ln)	-0.024	-0.756*	-1.687***
	(0.46)	(0.36)	(0.20)
Dissolved businesses (ln)	0.063***	0.0313	0.0696***
	(0.013)	(0.027)	(0.024)
Unemployed (ln)	−0.136**	-0.0960*	-0.203***
	(0.059)	(0.050)	(0.048)
Linear trend		-0.0352**	
		(0.013)	
Constant	-0.080***	87.64***	28.31***
	(0.015)	(22.2)	(0.76)
N	238	252	238
R^2-*within*	0.089	0.695	0.213

The first-differences model for robberies (Model 10, ***Table 5***) shows that year-on-year changes in GDP have a negative effect on year-on-year changes in robberies - an increase in GDP is associated with a decrease in robberies. Business closures have a positive effect on robberies, while unemployment shows no significant effect. This model explains 6.2% of the variability in year-to-year changes in robberies across counties. The constant term is statistically significant at the 1% level, and this means that if all explanatory variables were held constant, robberies are expected to decline by 10.8% per year. In more detail, then, a 10% annual increase

in the number of defunct businesses is associated with a 0.88% increase in the annual change in robberies. And further, a 10% year-on-year decline in GDP is associated with a 9.01% increase in the year-on-year change in robberies.

In a model that better accounts for autocorrelation (Model 12, ***Table 5***), GDP has a strong negative effect on robberies, implying that an increase in GDP leads to a decrease in robberies. Defunct firms have a positive effect on robberies, suggesting that economic instabilities (e.g., firm defections) may be related to increases in this type of crime. Unemployment does not have a statistically significant effect on robberies in the autocorrelation model, which may suggest that other economic factors play a larger role. The model explains only 8.7% of the variability, which is normal because part of the variability is explained by the autocorrelation structure. In more detail, a 10% increase in the number of defunct businesses is associated with a 1.05% increase in robberies. And a 10% increase in GDP is associated with a 14.53% decrease in robberies.

Table 5. Robbery and economic activity in 14 regions of the Czech Republic between 2005 and 2023, first differences (DIF), fixed effects (FE) and a model correcting for autocorrelation in residuals (AR)

Robbery	**(10)**	**(11)**	**(12)**
	FE DIF	**FE OLS**	**FE AR**
GDP in current prices (ln)	-0,901**	0.246	-1.453***
	(0.36)	(0.47)	(0.32)
Dissolved businesses (ln)	0.088**	0.122**	0.105***
	(0.038)	(0.054)	(0.034)
Unemployed (ln)	0.043	0.149	-0.0297
	(0.095)	(0.096)	(0.072)
Linear trend		-0.0949***	
		(0.0086)	
Constant	-0.108***	191.5***	22.16***
	(0,010)	(13.3)	(1.01)
N	238	252	238
R2-within	0.062	0.838	0.087

The first-differences model for burglary (Model 13, ***Table 6***) shows that year-on-year changes in GDP do not have a significant effect on year-on-year changes in burglary, but the change in the number of dissolved businesses have a positive effect. Unemployment is not significant. This model explains 9.2% of the variability in year-to-year changes in burglary across counties. The constant term is statistically significant at the 1% level, suggesting that holding other variables constant, we expect an average 4.7% decline in year-to-year changes in burglary. In detail, a 10% year-on-year increase in the number of defunct businesses is associated with a 1.59% increase in the year-on-year change in burglaries.

In a model that better accounts for autocorrelation (Model 15, ***Table 6***), GDP growth leads to a significant decline in burglaries. Economic problems such as business closures increase the number of burglaries. Unemployment does not have a significant effect on the number of burglaries after accounting for autocorrelation. This model explains only 8.7% of the

variability, which is typical of models that account for autocorrelation, yet there are many other factors that are missing from the estimate.

Table 6. Burglary and economic activity in 14 regions of the Czech Republic between 2005 and 2023, first differences (DIF), fixed effects (FE) and a model correcting for autocorrelation in residuals (AR)

Burglary of flats and houses	**(13)**	**(14)**	**(15)**
	FE DIF	**FE OLS**	**FE AR**
GDP in current prices (ln)	-0.414	-0.832**	-1.897***
	(0.45)	(0.38)	(0.20)
Dissolved businesses (ln)	0.159***	0.246***	0.187***
	(0.026)	(0.036)	(0.038)
Unemployed (ln)	-0.055	0.298***	0.092
	(0.077)	(0.045)	(0.064)
Linear trend		-0.0224*	
		(0.012)	
Constant	-0.047***	58.59**	27.75***
	(1.85)	(20.8)	(1.56)
N	238	252	238
R^2-*within*	0.092	0.766	0.087

The first differences model for rape (Model 16, ***Table 7***) shows that neither GDP nor other indicators of economic activity of the population have a statistically significant effect on the number of rapes. In a model that better accounts for autocorrelation (Model 18, ***Table 7***), GDP has a significant positive effect on the number of rapes in both level models. Business closures and the number of unemployed have no statistically significant effects in the model with autocorrelated residuals, suggesting that these factors do not play a major role in rape counts within counties over the period of interest.

Table 7. Rape and economic activity in 14 regions of the Czech Republic between 2005 and 2023, first differences (DIF), fixed effects (FE) and a model correcting for autocorrelation in residuals (AR)

Rape	**(16)**	**(17)**	**(18)**
	FE DIF	**FE OLS**	**FE AR**
GDP in current prices (ln)	0.430	0.710**	0.844***
	(0.60)	(0.27)	(0.17)
Dissolved businesses (ln)	-0.070	-0.0699	-0.0529
	(0.053)	(0.045)	(0.042)
Unemployed (ln)	-0.036	0.124*	0.0933
	(0.082)	(0.063)	(0.058)
Linear trend		0.00603	
		(0.0090)	

Constant	0.0081	-17.08	-6.673***
	(0.020)	(15.4)	(1.77)
N	238	252	238
R^2-*within*	0.020	0.197	0.099

The first differences model for homicide (Model 19, ***Table 8***) shows that neither GDP nor other indicators of economic activity of the population have a statistically significant effect on the number of rapes. In a model that better accounts for autocorrelation (Model 21, ***Table 8***), an increase in GDP is on average associated with a lower number of homicides, suggesting improving socioeconomic conditions. In more detail, then, a 10% increase in GDP is associated with an 8.07% decrease in homicides. Business closures and the number of unemployed do not have statistically significant effects in the model with autocorrelation of residuals, suggesting that these factors do not play a significant role in the number of rapes within counties over the study period. The model with autocorrelation of residuals explains about 15.5% of the variability in the number of murders within counties.

Table 8. Homicide and economic activity in 14 regions of the Czech Republic between 2005 and 2023, first differences (DIF), fixed effects (FE) and a model correcting for autocorrelation in residuals (AR)

Homicide	**(19)**	**(20)**	**(21)**
	FE DIF	**FE OLS**	**FE AR**
GDP in current prices (ln)	0.392	0.111	-0.807***
	(1.63)	(0.44)	(0.26)
Dissolved businesses (ln)	0.042	0.0200	-0.0240
	(0.052)	(0.066)	(0.075)
Unemployed (ln)	-0.011	0.144	0.100
	(0.25)	(0.12)	(0.090)
Linear trend		-0.0266	
		(0.015)	
Constant	-0.025	53.81*	12.28***
	(0.052)	(26.2)	(3.29)
N	238	252	238
R^2-*within*	0.011	0.168	0.155

5. Discussion

Studies such as Sabroso (2023) and Goulas and Zervoyianni (2013) highlight a generally negative correlation between economic growth and crime rates. Sabroso (2023) notes how high crime rates hamper economic growth, particularly in developing countries, while Goulas and Zervoyianni (2013) find that GDP growth reduces crime rates, though this effect weakens during periods of economic uncertainty. For Czech regions, comparable models (AR) do not show statistically significant effects of GDP on overall and general crime rates, while for other

crime types, the effect varies in magnitude and is generally negative, except in cases such as sexual offenses, where the relationship is positive.

Unemployment's effect on crime in the literature is mixed, with some studies suggesting it can even reduce property crimes due to the "guardianship" effect (Janko & Popli, 2015). In the United States, Raphael and Winter-Ebmer (2001) found a positive correlation between unemployment and property crime, though the effect on violent crime was less consistent. Our comparable models suggest that an increase in the number of unemployed correlates with a decrease in economic crimes.

Higher business bankruptcy rates, which may signal economic instability, have been linked to higher crime rates (Goulas & Zervoyianni, 2013), aligning with our findings for total, general, economic crime, robbery, and burglary. The importance of accounting for time dependencies in data is emphasized by Detotto and Otranto (2010), who point out that both crime and economic indicators often show autocorrelations that could affect regression model results.

AR models in this analysis explain between 8% and 20% of the variability in crime rates. Future research should consider incorporating additional socio-economic variables, such as the risk of social exclusion, regional gambling rates, youth demographics, urbanization levels, and estimates of the informal economy to improve model accuracy.

Based on the results and a review of the literature, it is appropriate to consider measures targeting periods with high numbers of business closures. These measures could include strengthening healthcare and psychological support systems, particularly for individuals affected by economic crises, unemployment, or business failures. Additionally, programs aimed at preventing and treating addictions, which are often linked to social challenges such as poverty, substance abuse, and related issues, should be implemented to address the social consequences of economic hardship. Efforts to rebuild relationships between offenders and their communities could help minimize recidivism and address the root causes of crime associated with economic insecurity. Furthermore, offering training, counselling, and financial support to individuals seeking to capitalize on market opportunities or start their own businesses during periods of bankruptcy and economic uncertainty could help reduce business failures and promote new business growth.

If there is an increase in economic crime during a period of low unemployment, the situation is different from when crime is linked to economic distress and social problems. Economic crime (financial fraud, corruption, tax evasion, money laundering, etc.) can be regulated by social policy measures focusing on preventing crime linked to economic activities, regulating the market environment and strengthening justice. This means elements of automation and digitization of the tax administration, increasing the number of inspectors and experts who focus on complex tax structures and schemes that can be exploited for criminal purposes. Mandatory disclosure of financial results, more detailed auditing and random anti-corruption checks on companies that work with public funds. At the corporate level, this includes strengthening codes of ethics in companies, training employees on corporate responsibility, the consequences of economic crime and ethics in business. Encouraging companies to set up internal control systems to prevent economic offences. On the other hand, protecting those who report economic crime from reprisals, thereby promoting transparency and combating illegal practices.

This supports behavioural economists' approach (Jolls, 2017) which suggests that the interventions should be tailored to specific types of crimes and leverage different aspects of human psychology and decision-making. For example, for financial crimes, the focus is on making consequences more visible and immediate through transparency tools, pre-commitment strategies, and clear reminders of penalties during transactions. For violent crimes,

interventions target emotional regulation and impulse control through counselling, rapid response systems, and narrative-based campaigns showing real consequences. Drug-related crime interventions emphasize harm reduction and positive incentives, using reward systems and rehabilitation opportunities rather than pure punishment. Cybercrime approaches focus on breaking down the sense of anonymity and impunity, using digital nudges and offering alternative pathways for skills use. Environmental crimes are addressed through community-based incentives and social pressure, making conservation financially and socially rewarding. White-collar crime interventions target overconfidence through randomized audits and mandatory transparency requirements. For juvenile crimes, the emphasis is on mentorship and showing clear pathways away from crime through relatable role models and opportunity-focused programs.

6. Conclusion

Different types of crime across Czech regions from 2005 to 2023 are influenced by economic indicators, particularly GDP and the number of dissolved business entities. GDP and the number of dissolved businesses is significant in determining various crime types, while unemployment has a limited effect. An increase in dissolved business entities is associated with a rise in overall crime. After accounting for autocorrelation, GDP and unemployment are not statistically significant for general crime, whereas the number of dissolved businesses positively correlates with general crime, where a 10% increase results in a 0.99% rise. In economic crime, GDP has a strong negative effect, with a 10% GDP increase resulting in a 16.87% decrease in economic crime. Dissolved business entities, conversely, correlate positively with economic crime, similarly to overall crime trends.

Robbery and burglary data indicate that economic factors, especially GDP, have a negative effect on these crime types; higher GDP correlates with lower robbery and burglary rates, suggesting that economic stability may reduce the likelihood of these offenses. Conversely, an increase in dissolved business entities correlates with a rise in robbery and burglary incidents.

First-difference (DIF) models provide an alternative view, illustrating that year-over-year increases in GDP and dissolved businesses correlate with rises in overall and general crime. For economic crime, DIF models indicate minimal or no effect from GDP, while for robbery, a negative effect is seen. For other crime types, such as sexual offenses and murder, DIF models show no impact of GDP growth or decline on crime rates.

Our findings align with existing studies indicating that economic indicators, particularly labour market and business stability, may play a critical role in crime dynamics. While some studies emphasize unemployment's significant impact on crime, our findings show it to be less relevant, which could reflect specific regional labour market characteristics in the Czech Republic and unobserved factors influencing this area. In contrast, the findings highlight the importance of GDP and regional economic activity, which corresponds with findings from similar studies in other countries.

The implementation of social policies in the Czech Republic necessitates a multifaceted approach encompassing several key interventions. Primary recommendations include the enhancement of healthcare infrastructure and psychological support services, particularly during periods of economic volatility. Furthermore, the development of comprehensive addiction prevention and treatment protocols, coupled with evidence-based community

reintegration programs for offenders, represents a crucial component of the policy framework. Additionally, the provision of entrepreneurial capacity building during economic downturns merits consideration as a preventive measure against potential criminal behaviour.

From an institutional perspective, the modernization of tax administration through digital transformation initiatives, alongside the augmentation of specialized personnel for complex financial investigations, emerges as a critical priority. The implementation of stringent financial disclosure requirements and the reinforcement of corporate ethics frameworks, including robust whistleblower protection mechanisms, constitute essential elements of this reform agenda.

However, several significant barriers impede the effective implementation of these policy recommendations. Resource constraints present a substantial challenge to the establishment of comprehensive support systems at regional level, while the requisite specialized training demands considerable investment. The financial burden associated with tax administration modernization and potential institutional resistance to enhanced regulatory oversight further complicate implementation efforts. Moreover, structural challenges persist, including inter-agency coordination inefficiencies, the complex balance between business support mechanisms and crime prevention initiatives, the establishment of effective whistleblower protection frameworks, and the development of culturally appropriate reintegration programs that align with local contexts.

Acknowledgement: This paper is the result of scientific research conducted at CEVRO University's Department of Economics as part of the project titled "Bariéry efektivního financování sociálních služeb v České republice" [Barriers to Effective Financing of Social Services in the Czech Republic], project number (GA AA/2024/1).

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