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The Impact of Economic Factors on the Level of Social Security in Polish Voivodships

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Abstract: The purpose of this article is to examine the level of security within Polish society by analyzing crime rate data obtained from the Local Data Bank of the Polish Central Statistical Office. The data were collected for the year 2022 and cover individual provinces of Poland. In the second part of the study, a progressive stepwise regression model was developed to analyze the overall crime rate. The independent variables included: the rate of criminal offenses per 1,000 residents, the rate of economic crimes per 1,000 residents, the rate of crimes against life and health per 1,000 residents, the rate of crimes against personal freedoms, freedom of conscience and religion, sexual freedom and morals per 1,000 residents, and the rate of crimes against family and caregiving per 1,000 residents. The analysis was conducted using Statistica 13 software. The findings indicate that the factors significantly influencing the overall crime rate are: the rate of criminal offenses per 1,000 residents, the rate of economic crimes per 1,000 residents, and the rate of crimes against life and health per 1,000 residents. Additional analyses were performed to explore the relationship between crime rates and selected economic indicators.

Keywords: security; crime rates; economic measures; progressive stepwise regression; Poland.

JEL Classification: K42; E24; R11

1. Introduction

Analysis of crime statistics in the Central Statistical Office Local Data Bank is essential to understanding the state of security in Poland. These statistics can be used to establish trends, determine the effectiveness of law enforcement initiatives, and guide policymaking. This increases the potential for proper resource allocation and implementation of preventive interventions.

Local-level security refers to the conditions in an individual's immediate surroundings, such as places of residence, work, or study. Its core purpose is to minimize threats, including crime, accidents, or the adverse effects of natural disasters. Adequate local conditions provide individuals and communities with a sense of stability, fostering social and economic development.

One of the primary responsibilities of the state is to ensure the safety of all its citizens. The concept of local community safety is multifaceted. The highly complex network of interconnections among the elements of this concept contributes to its multidimensional nature and makes precise definition challenging. Safety depends on the level of threats, which, in general terms, are defined as situations where there is an increased likelihood of loss of life, health, freedom, or material assets (Radkevyc et al., 2024).

A threat may arise from natural causes (e.g., the impact of natural forces) or be caused by another human being (Wyrebek, 2021). In this understanding, safety is a function of numerous diverse factors specific to a given community. Among these factors, two primary determinants can be distinguished: threat and risk. The state of threat and the level of risk play a significant role in assessing the sense of security within a community (Stevens et al., 2016). Choosing a place to live requires a critical evaluation of economic, social, and transportation factors, as well as the preferred lifestyle (Li et al., 2023).

Valla (2022) observed that many studies on the perception of security issues address the notion of perceived threats to security. This is particularly interesting because most researchers are inclined to analyze the perception of security threats rather than examine citizens' attitudes toward security services or their views on security programs. The author also highlighted a fundamental theoretical shift in security studies over the past fifty years: the focus of research has transitioned from an almost exclusive emphasis on military aspects to a broader scope encompassing new actors and sectors of security (Valla, 2022).

A single scientific theory cannot fully explain why individuals commit crimes, as criminal behavior is complex and multidimensional. The inability to develop a universal theory addressing all manifestations of criminality should not hinder efforts to analyze the influence of specific factors on crime rates. Some individuals become criminals not because of fundamentally different motivations, but because they calculate costs and benefits differently. Research conducted thus far on the correlation between crime rates and individuals' economic circumstances has yielded varied results. It is widely accepted that economic hardship motivates individuals to commit crimes. The most frequently cited economic factors influencing crime rates include unemployment, poverty, economic growth, income levels, and income inequality. Crime research uses a variety of economic models that incorporate a range of factors and variables (Bieniek et al., 2012).

The relationship between socioeconomic factors and crime is central to criminological research. Numerous studies have demonstrated how economic, social, and demographic conditions influence criminal behavior, revealing the complex relationships among these variables. Understanding these dynamics is essential to developing effective crime prevention strategies and addressing the root causes of criminal activity. Researchers have identified many socioeconomic factors—such as unemployment, poverty, educational attainment, and demographic characteristics—as significant contributors to changes in crime rates. Research emphasizes the need to consider the broader socioeconomic context when analyzing criminal behavior and formulating policies to reduce crime.

Socha and Migała-Warchoł (2020) used 2016 crime data to create a stepwise regression model, and their study found correlations between crime rates and economic conditions. Such analyses could be used to identify high-crime areas, and law enforcement could focus patrols and preventive services where they are most needed (Mishra et al., 2024).

Janko and Popli (2015) examined the relationship between unemployment and crime in Canada using time series data from 1979 to 2006. The study found a significant correlation between unemployment and crime at regional and national levels. This confirmed that economic hardship, mainly unemployment, is a key factor influencing crime rates. This highlights the importance of addressing labor market challenges in crime prevention strategies (Janko & Popli, 2015).

Tarling and Dennis (2016) examined the relationship between crime and socio-economic conditions in England. They included variables such as unemployment, the Index of Multiple Poverty (IMD), average house prices, youth demographics, the resident population, and the transient population. The results showed that the resident population had a negative effect on both property and violent crime, while unemployment, IMD, the youth population, and the transient population were positively associated with crime rates (Tarling & Dennis, 2016).

The results of Kizilgol and Selim (2017) emphasize that there is a complex relationship between socioeconomic factors and crime. The positive correlation between variables such as GDP per capita, inflation, unemployment, and urban overcrowding suggests that economic instability and social pressure may contribute to higher crime rates. These results are consistent with other research findings on crime. The literature on the subject shows that economic factors are often associated with an increase in criminal behavior due to stressors such as financial insecurity, lack of opportunities, and social inequality. Furthermore, the urban context, with higher population density and potentially limited resources, seems to amplify these effects. This emphasizes the importance of comprehensive socioeconomic policies to address the root causes of crime, especially in rapidly urbanizing regions (Kizilgol & Selim, 2017).

Cerulli et al. (2018) examined economic factors influencing crime using data from the 50 U.S. states from 2000 to 2012. Their results indicated that education had a positive effect on crime, while wages had a negative effect (Cerulli et al., 2018).

Khan’s study begins by examining the impact of poverty and unemployment on four specific types of crime: robbery, property theft, burglary, and motor vehicle theft. She uses crime data and social and economic variables from the United States. The study also examines how factors such as GDP, GDP per capita, imports, exports, urban growth, unemployment, and inflation have affected overall crime rates in the United States from 1960 to 2012 (Khan, 2024).

Brosnan (2018) analyzed the socio-economic factors influencing crime in Ireland using data from 2003 to 2012. The study found that factors such as income and detection rates had a positive impact on crime (Brosnan, 2018).

The majority of research employs data to analyze the socio-economic determinants of crime rates. Economists identify potential causal factors that significantly influence the prevalence of criminal activity across various societies (Shah & Kanwal, 2021).

Sheikh et al. (2021, 2022) employed cross-sectional analysis in their research to identify socio-economic determinants of crime among women and men. The results revealed that both crime-related and socio-economic factors significantly influence the type of crime committed (Sheikh et al., 2021; 2022).

Numerous studies examine the relationships between socio-economic factors and criminal behavior. The impact of socio-economic conditions, such as employment status, education level, and social inequalities, on crime rates has been investigated. Research indicates that social factors significantly influence the likelihood of committing crimes. The socio-economic system and criminal behavior are closely linked. People who do not have the necessary resources to succeed due to rapidly evolving technology live in poverty and experience inequality. This situation makes them more likely to engage in criminal behavior. Inflation, poverty, and unemployment are the three main indicators of economic crime (Sultan et al., 2024).

This article attempts to capture the relationship between selected economic factors and crime rates. The literature review explains the determinants of crime across different regions and time periods, focusing on the impact of economic variables such as income, GDP, and unemployment. These factors consistently emerge as significant predictors of crime. Additionally, the article discusses the influence of various social factors on criminal behavior.

The impact of economic factors on the level of social security in Polish voivodeships is an important topic, especially in the context of regional differences in economic development and living standards. Economic factors, including the unemployment rate, income per capita, regional investment, and the structure of the economy, can significantly affect disparities in the level of social security. Voivodeships characterized by lower unemployment and higher wages have greater financial resources to support social policy and help people at risk of social exclusion. On the other hand, regions with worse economic conditions may have greater challenges in providing adequate support to their residents, which can lead to increased social inequalities and a lower sense of social security. While focusing on crime data is key, it is equally important to consider the broader context that may also shape the security situation in Poland. Analysis of these phenomena allows for a better understanding of the impact of the economy on social stability and living conditions in different parts of Poland.

The article addresses two research questions:

Research question 1 - Which types of crime influence overall crime?

Research question 2 - Which economic factors influence the overall crime rate?

2. Methodology

The Pearson linear correlation coefficient and stepwise regression analysis were employed to explore the relationships among the variables under study. The initial method applied is the Pearson correlation coefficient. As noted by Berawi (2014), correlation quantifies the degree of association between two or more variables. The strength of this association is determined by the value of *r*. A higher correlation coefficient, as *r* approaches +1, indicates a strong positive relationship. The specific correlation coefficient values are presented in Table 1.

Pearson’s correlation coefficient was used to assess the strength and direction of relationships between key economic indicators and the level of security across Polish voivodeships. This statistical measure provides an initial insight into the degree of association before performing more complex regression analyses.

Table 1. Interpretation of the correlation coefficient (Hussin et al., 2014)

Coefficient value range	Strength of the correlation
1.0	Perfect
0.80-0.99	Very strong
0.60-0.79	Strong
0.40-0.59	Average
0.20-0.39	Weak
0.01-0.19	Very weak
0.00	No relationship

Stepwise regression involves sequentially adding explanatory variables to the model, prioritizing those that have the most significant effect on the dependent variable. This method evaluates the strength of the relationship between a single dependent variable and multiple independent variables. The strength of this relationship is indicated by the R-squared (R^2) value. R-squared, also known as the coefficient of determination, represents the proportion of the variation in the dependent variable (Y) that can be explained by the independent variables ($X1$-$X3$). The article presents two progressive stepwise regression models. First model for total crime rate and individual crime rates. Second model for total crime rate and economic factors.

The study adopts a regional perspective, analyzing the impact of economic conditions on social security at the voivodeship level in Poland. By integrating economic and social variables, the research provides a comprehensive understanding of the factors influencing security, which is often overlooked in broader national studies. The application of stepwise regression allows for the selection of the most significant economic predictors of social security, ensuring a data-driven model that allows better fitting. This approach enhances the robustness of the findings by refining variable selection, a methodology rarely applied in regional analyses of social security. By utilizing recent economic and social data from Polish voivodeships, this study provides up-to-date insights into the dynamic relationship between economic factors and the level of security. The findings offer valuable implications for policymakers aiming to design region-specific social programs.

3. Results

The purpose of the article is to analyze the level of security within Polish society using data on crime rates and economic indicators collected from the Local Data Bank of the Polish Central Statistical Office. The data were collected for the 2022 year for individual provinces of Poland.

The second table presents descriptive statistics of the variables analyzed – the mean, the minimum, the maximum, the standard deviation, the coefficient of variation and the coefficient of asymmetry for Polish provinces for 2022.

Table 2. Descriptive statistics of crime rates for Polish provinces for 2022

Variables	Descriptive Statistics					
	Mean	Min	Max	S	V	Assymetry
Crimes detected by the Police in total per 1,000 inhabitants	21.65	12.93	35.08	5.19	23.99	1.03
Crimes of a criminal nature detected by the Police per 1,000 inhabitants	12.47	6.81	19.57	3.27	26.23	0.43
Crimes of an economic nature detected by the Police per 1,000 inhabitants	6.27	2.98	17.79	3.34	53.34	2.98
Crimes detected by the traffic police per 1,000 inhabitants	1.90	1.39	2.49	0.32	16.81	0.50
Crimes against life and health detected by the Police per 1,000 inhabitants	0.37	0.26	0.52	0.07	19.82	0.48
Crimes against property detected by the Police per 1,000 inhabitants	10.72	6.46	16.86	2.83	26.36	0.40
Crimes detected by the Police against freedom, freedom of conscience and religion, sexual freedom and decency per 1,000 inhabitants	0.93	0.58	1.57	0.31	32.90	1.04
Crimes detected by the Police against family and care per 1,000 inhabitants	1.28	0.76	1.93	0.36	27.70	0.26
Crimes detected by the Police against public safety and transport safety per 1,000 inhabitants	2.08	1.56	2.69	0.34	16.43	0.44

The highest average values for Polish voivodships (with the exception of the total crime rate – 21.65%) were obtained for the criminal crime rate (12.47%) and the crime rate against property (10.72%). The smallest values were obtained for the crime rate against life and health (0.37%), as well as for the crime rate against freedom, freedom of conscience and religion, sexual freedom and morals (0.93%). The smallest diversification for Polish provinces occurs in the rate of crimes detected by the Police against public safety and transport safety per 1,000 inhabitants (coefficient of variation is equal to 16.43%), while the largest features in the crimes rate of economic nature detected by the Police per 1,000 inhabitants (coefficient of variation is equal to 53.34%). The highest value is characteristic to the overall crime rate and it is equal to 35.08. The lowest value is characteristic to the crime rate against life and health and it is equal to 0.26.

The third table presents results of progressive regression, obtained using the Statistica 13 program. As a result of the research conducted, it was obtained that the indicators affecting the overall crime rate are: crimes rate of a criminal nature detected by the Police per 1,000 inhabitants, crimes rate of an economic nature detected by the Police per 1,000 inhabitants and crimes rate against life and health detected by the Police per 1,000 inhabitants (indicated by the highest values of the estimated parameter b - due to the statistically significant values). It has been verified that the residuals of the model have a normal distribution.

Table 3 displays an R-squared (R^2) value of 0.99, indicating that 99.99% of the variation in the dependent variable (*Y*) can be explained by the independent variables (*X1*-*X3*) combined. The regression model presented in Table 3 provides estimates of the marginal effects for each independent variable as well as model fit statistics. The marginal effects illustrate the expected changes in the overall crime rate resulting from a one-unit increase or decrease in each independent variable.

Table 3. Summary of regression of the dependent variable: total crimes detected by the Police per 1,000 inhabitants

	Summary of regression of the dependent variable: total crimes detected by the Police per 1,000 inhabitants R = 0.99861272 R^2 = 0.99722737 Corrected R^2 = 0.99653421					
	b*	Std. Error b*	b	Std. Error b	t(12)	p
Intercept			0.974259	0.446494	2.18202	0.049714
Crimes of a criminal nature detected by the Police per 1,000 inhabitants	0.679815	0.016298	1.079672	0.025885	41.71030	0.000000
Crimes of an economic nature detected by the Police per 1,000 inhabitants	0.630629	0.015427	0.979073	0.023952	40.87715	0.000000
Crimes against life and health detected by the Police per 1,000 inhabitants	0.041018	0.016360	2.928482	1.168018	2.50722	0.027548

The model fit statistics help determine which independent variables have the strongest individual predictive power for the overall crime rate. It is evident that the rate of criminal offenses detected by the Police (*b* = 1.08) has the most significant impact on the overall crime rate. The marginal effects indicate that a one-unit increase in the economic crime rate is expected to raise the overall crime rate by 0.98 units, while a one-unit increase in the rate of crimes against life and health is projected to increase the overall crime rate by 2.93 units.

The table 4 presents descriptive statistics of the particular economic indicators – the mean, the minimum, the maximum, the standard deviation, the coefficient of variation and the coefficient of asymmetry for Polish provinces for 2022.

Table 4. Descriptive statistics of economic indicators for Polish provinces for 2022

Variable	Descriptive Statistics					
	Mean	Min	Max	S	V	Assymetry
GDP per capita	72,864.75	55,125.00	127,791.0	18,759.16	25.75	1.76
Unemployment rate	5.90	2.90	8.8	1.87	31.63	0.13
Capital expenditure per capita	9,466.63	6,701.00	14,828.0	2,044.29	21.59	1.12
Inflation rate	114.44	113.10	116.1	1.01	0.88	0.37
Average monthly salary	6,286.70	5,662.53	7,913.1	595.12	9.47	1.49

Table 5 displays the correlation coefficients between the total crime rate and selected economic variables. This section of the article explores the relationship between the overall crime rate and economic indicators such as GDP per capita, unemployment rate, investment expenditures per capita, inflation rate, and average monthly salary. The correlation matrix (Table 5) reveals that a statistically significant correlation exists only between the overall crime rate and the unemployment rate (r = -0.60), as well as between the overall crime rate and the average monthly salary (r = 0.53).

The analysis indicates that wealthier provinces are more susceptible to criminal activity. Consequently, the authorities in these regions should consider allocating resources to mitigate and prevent such incidents.

Table 5. Coefficients of correlations between crimes detected and economic indicators

Variables	Correlations, marked with correlation coefficients, are significant with $p < 0.05$					
	Crimes detected by the Police in total per 1,000 inhabitants	GDP per capita	Unemployment rate	Capital expenditure per capita	Inflation rate	Average monthly salary
Crimes detected by the Police in total per 1,000 inhabitants	1.00	0.48	-0.60	0.44	-0.41	0.53
GDP per capita	0.48	1.00	-0.71	0.86	-0.27	0.91
Unemployment rate	-0.60	-0.71	1.00	-0.59	0.11	-0.65
Capital expenditure per capita	0.44	0.86	-0.59	1.00	-0.48	0.82
Inflation rate	-0.41	-0.27	0.11	-0.48	1.00	-0.34
Average monthly salary	0.53	0.91	-0.65	0.82	-0.34	1.00

The table 6 presents results of progressive regression, obtained using the Statistica 13 program. As a result of the research conducted, it was obtained that the economic indicator affecting the overall crime rate is the unemployment rate.

Table 6. Summary of regression of the dependent variable: total crimes detected by the Police per 1,000 inhabitants

	Summary of regression of the dependent variable: total crimes detected by the Police per 1,000 inhabitants $R = 0.69537002$ $R^2 = 0.48353946$ Corrected $R^2 = 0.40408399$					
	b*	Std. Error b*	b	Std. Error b	t(13)	p
Intercept			239.6666	117.9582	2.03179	0.063133
Unemployment rate	-0.562221	0.200448	-1.5644	0.5577	-2.80482	0.014892
Inflation rate	-0.353902	0.200448	-1.8245	1.0334	-1.76555	0.100932

The results of the study indicate the relationship that the richer the region is, the greater the threat to its residents' security. In turn, the analysis of the relationships between the overall crime rate and the selected economic measures made it possible to state that the unemployment rate and average monthly salary statistically significantly influence the overall crime rate in Polish provinces. From the results obtained, a statistically significant moderate dependence occurred first between the unemployment rate (negative one) and the total crime rate, second between average monthly salary (positive one) and the total crime rate.

4. Discussion

The objective of this study was to examine the security level of Polish society by analyzing crime rates sourced from the Local Data Bank of the Central Statistical Office. The analysis revealed that the most dangerous provinces were those with the highest average monthly salaries. A stepwise progressive regression model developed for the total crime rate identified that the overall crime rate was primarily influenced by the criminal crime rate, the rate of economic crimes, and the rate of crimes against life and health, as detected by the Police. Consequently, it is crucial to allocate significant resources toward combating these specific types of crime.

The study results highlight a relationship suggesting that the wealthier a region, the higher the risk to its residents' security. Additionally, the analysis of the correlation between the overall crime rate and selected economic indicators revealed that the unemployment rate and average monthly salary have a statistically significant impact on crime rates across Polish provinces. Specifically, the findings show a moderate, statistically significant negative correlation between the unemployment rate and the total crime rate, and a moderate positive correlation between the average monthly salary and the total crime rate.

The study results highlight the complex relationship between socio-economic factors and crime rates in Polish regions (voivodeships). The analysis shows that regions with higher average monthly wages exhibit higher crime rates, which highlights the paradoxical relationship between economic prosperity and security. The significant impact of unemployment and average wages on overall crime rates further highlights the details of how economic conditions affect criminal behavior. In particular, the negative correlation with unemployment and the positive correlation with wages indicate the need for targeted interventions that address the root causes of crime in both affluent and less affluent areas.

These results suggest that more affluent regions need to develop tailored crime mitigation strategies that focus on different types of crime. The strategy should include crimes that occur most frequently in these areas, such as economic crimes and crimes against life and health. Effectively allocating resources to combat these specific problems is crucial to improving public safety.

What specific measures can policymakers implement to address the link between economic growth, higher average wages, and increased crime scene in wealthier regions? Furthermore, how can targeted crime prevention strategies be tailored to the unique socioeconomic dynamics of these regions while ensuring equitable distribution of resources to less affluent areas? What role should local governments, law enforcement agencies, and community organizations play in developing a holistic approach to reducing crime without compromising economic development?

5. Conclusions

The study highlights the importance of adopting a balanced and region-specific approach to crime prevention, recognizing the diverse socio-economic dynamics at play. Policymakers must consider not only economic growth but also the unintended security challenges it may bring. Cooperation between local governments, law enforcement, and community organizations will be essential in crafting holistic solutions that enhance social stability while maintaining economic progress.

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