

THE EFFECT OF CRIME RATE ON THE ECONOMIC DEVELOPMENT OF UZBEKISTAN

Nigina Shamsiddinova

Westminster International University in Tashkent

niginashamsiddinova19@gmail.com

Abstract

The present study aims to analyze the effect of crime rate on economic development of Uzbekistan. Crime rates have a significantly negative influence on economic growth since it slow-downs economic activity by shattering business confidence, alleviating investment in the area and resulting in government spending being redirected to law enforcement. Using data for a 32-year period starting from 1992, a log-linear model was developed to measure the relationship between crime and GDP growth. The study findings align with existing literature. In Uzbekistan, a 1% rise in criminal activity results in approximately 0.46% decrease in Nominal GDP, suggesting that there is two-to-one negative relationship between the variables of interest. The estimates of the coefficients of crime and unemployment rates turned out to be highly statistically significant, unlike those of other independent variables. The results of the study highlight the importance of policies implemented to reduce criminal activity. However, it is important to achieve it through rising employment opportunities and investment in education, especially in rural areas, to increase the cost-to-benefit ratio of committing crime. These approaches will eventually result in long-term sustainable economic growth.

Key words: Economic development, GDP growth, crime rate, unemployment, Uzbekistan, poverty.

Introduction

Nowadays, for the Republic of Uzbekistan the transition from middle-income emerging economy to higher-income emerging economy is an essential strategic objective. This transition is viewed as fundamental to unlocking higher levels of development, attracting quality investment, and improving the overall standards of living for the population. According to the European Bank of Reconstruction and Development (2023) the Uzbek authorities endeavor higher economic growth and promote a better environment for investors to achieve the transition by 2030. Economic development is a multidimensional term, yet the development can be reflected through economic growth. Further in the study these concepts will be used interchangeably. However, the economic growth is deterred by crime rates, as high crime rate results in decreased foreign and domestic investment, reduced consumer confidence and it

diverts government resources from productive investments in infrastructure, education and healthcare to law enforcement and public safety. Despite the recognized effect of crime rate on economic development globally, there is not much research available specifically on the impact of crime on economic growth in Uzbekistan. Therefore, the given study is aimed to address this gap by analyzing the impact of crime rate on economic development of the Republic of Uzbekistan.

Literature review

Crime impacts the whole economy of a country, the overall economic performance is affected through discouraged domestic and foreign investments, supply chain disruptions and reduced competitiveness of the firms. According to United Nations Office of Drugs and Crime (2020) low crime levels stimulate socioeconomic development. Worth noting, the reported costs of crime in 2019 in Latin America were equivalent to 3.55% of regional GDP, compared to 2.75% and 1.4% in the United States and Germany, respectively. In the research of Delotto and Otranto (2010) the study assessed the impact of crime on economic growth using impulse response analysis. The findings reveal that firms are less likely to reinvest their profits in crime-prone environments, slowing down economic activity and growth. Moreover, it was estimated that a 1% increase in crime rates decreases monthly economic growth by 0.00040%. Overall, the economic cost of crime is changing over time, but is always significant.

Poverty incorporates a variety of interconnected deprivations that affect people's daily lives, such as limited access to education and healthcare, drinking water and sanitation, as well as other factors. High poverty rates can contribute to social unrest, inequality, and political instability, all of which can constrain a country's economic growth. Poverty results in underutilization of human capital and market inefficiencies that heavily impact the economy of a country. For Central Asian countries, the transition to market economy in 1991 was relatively tough, resulting in extreme financial challenges for the public (UN.ESCAP, 2004). Moreover, the transition to market economy system deteriorated the income inequality. For instance, before transition in 1988 Gini coefficient in Uzbekistan was 25.0, while in 1998 it became 45.4. Therefore, in Central Asia, governments had adopted poverty reduction strategies to tackle it having a view of future sustainable development. Turning to poverty metrics, there is a wide range available to measure the depth and severity of poverty be it globally or locally such as Multidimensional Poverty Index (MPI), Headcount Ratio Index and National poverty lines. MPI is a non-monetary measure of poverty. In the study of CERR (2023) the findings reveal that 18.4% of adults in Uzbekistan are multidimensionally poor, reportedly experiencing deprivations in at least 34% of the indicators. As expected, the incidence of multidimensionally poor adults in urban areas is notably lower than in rural areas, 13.9% and 23.2%

respectively. However, the poverty rate estimated at national poverty line as for 2023 considered 11% (Asian Development Bank, 2024). According to Roshaniza and Selvaratnam (2015) poverty rate exhibits negative relationship with GDP growth, this is explained by a decrease of purchasing power and thus decrease in consumption.

Considering the impact of poverty on the crime rate, the connection is straightforward. The case study conducted in the 1970s in the town of Dauphin, Canada involving the provision of unconditional cash payments to its citizens, also the term is known as Universal Basic Income, provided evidence on causal relationship between poverty and crime rates. The cost-to-benefit ratio for the citizens of Dauphin considerably increased due to increase in income, consequently the crime rates had substantially decreased (Calnitsky and Gonalons-Pons, 2020). Other studies that investigated the relationship between poverty, unemployment and other economic factors on crime rates came to similar conclusions: the areas with prevalence of poverty tend to have high unemployment rate and subsequently more violent and property crimes (Patterson, 1991; Bharadwaj, 2014; Sugiharti et al., 2023, and Ajimotokin, Haskins and Wade, 2015; Raphael and Winter-Ebmer, 2001).

The impact of education level on GDP growth should not be overlooked. Education impacts the economic growth through several channels. First and foremost is the enhancement of human capital that consequently increases the productive capacity of a country through increased labor productivity. Secondly, stimulation of innovative capacity. And lastly, the diffusion of knowledge that directly affects the level of how well innovations in the form of new technology were adapted and employed by the population. According to Grant (2017), in lower-middle-income countries like India, Indonesia, Syrian Arab Republic with the half of population aged 15–19 years old studying, the other half of that age group have never been to school or dropped the school before completing secondary school. If in the low-income countries due to lack of skill young people take risky low-paid jobs, in middle income countries there is the problem of unemployment. Therefore, education is essential for low-income countries to boost human capital and for the middle-income countries to progress from the middle-income trap. Although, the impact of education is hard to measure because of different approaches applied to measure education, there are numerous studies that underline the positive impact of education on GDP of a country (Benos and Zotou, 2014; Maneejuk and Yamaka, 2021).

Data and Variables

To estimate the impact of crime rate on the economic growth of Uzbekistan, time-series data for a 32-year period starting in 1992 were collected. The data were collected from the World Bank, UNDP, Macrotrends and the National Statistics Committee of the Republic of Uzbekistan databases.

For this research, the following variables were defined: crime rate, poverty rate,

unemployment rate, and schooling system as explanatory variables and nominal GDP as the outcome variable. Crime rate was chosen as the main independent variable affecting economic growth, since high crime rates hinder economic development both directly and indirectly. To eliminate the omitted variable bias and control for confounding effects, poverty rate, unemployment rate, and changes in the schooling system were added to the regression model.

The association between the independent and dependent variables was analysed by plotting their values pairwise on a Cartesian coordinate system using scatter function in Stata software (see Appendix 1). The scatter plots revealed a logarithmic relationship between the regressand and regressors. As initially the data were collected on the absolute value of nominal GDP it was converted to a logarithmic form given that crime, poverty and unemployment rates were taken in a percentage form for more consistent scaling and later more straight-forward interpretation. Considering above-mentioned relationships between the variables, the following model was built:

$$\ln \text{GDP} = \beta_0 + \beta_1 * \text{Crime} + \beta_2 * \text{Poverty} + \beta_3 * \text{Unemp} + \beta_4 * \text{Schooling} + \varepsilon$$

To run the regression analysis, Stata SE software was used. Given the time-series nature of the data, firstly the `tsset` function was used to set the time variable and then the `regress` function was run.

Table 1. Definition of variables (360)

Variable name	Definition
GDP	The dependent variable that represents the Nominal Gross Domestic Product of Uzbekistan. GDP is measured in billion USD.
Crime	The main independent variable is crime rate. The crime rate is represented by the percentage of crimes committed per 100,000 population.
Poverty	The first control variable is poverty rate. The poverty rate is represented by the percentage of people living below the national poverty line.
Unemp	The second control variable is unemployment rate. The unemployment rate represents the portion of the labor force that is not currently employed but is looking for a job.
Schooling	The third control variable is the change in the schooling system. As

	change in system is categorical data, schooling is regarded as a dummy variable. Before 2017, there were 9 years of school obligatory, however, starting from 2017 Uzbekistan transitioned to an obligatory 11-year schooling system of primary and secondary education. Before 2017 = 0 (reference group), After 2017 = 1 (including 2017).
--	--

Over the observed period considerable improvements in terms of crime and poverty rates have happened. Compared to 1992 when crime and poverty rates were the highest at 5.4% and 57%, by 2023 the indicators considerably decreased and averaged at 2% and 11%, respectively. Regarding the unemployment rate, over the period it has also declines from 13.3% in the late 1990s, approaching considerably lower levels of unemployment at around 5% by 2023. Turning to economic growth, the economy of independent Uzbekistan stabilized by the early 2000s and the nominal GDP starting from 2003 was exponentially increasing.

Table 2. Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
GDP	32	41.32	30.96	9.69	101.6
Crime rate	32	0.0311	0.0135	0.012	0.054
Poverty rate	32	0.2894	0.1433	0.11	0.57
Unemployment rate	32	0.0692	0.0289	0.029	0.133
Schooling system	32	0.22	0.42	0	1

To ensure the reliability of regression estimates, the model was tested for homoscedasticity and multicollinearity, using Breusch-Pagan test and Variance Inflation Factor, respectively (see Appendix 2). There are no heteroscedasticity and multicollinearity issues were found.

Results

The purpose of this paper is to analyze the impact of crime rate on GDP growth of Uzbekistan. According to the method presented in Data and Variables part of the paper the following model was obtained:

$$\ln\text{GDP} = 5.11 - 0.4589 * \text{Crime} - 0.23 * \text{Poverty} - 5.87 * \text{Unemp} + 0.264 * \text{Schooling} + \varepsilon$$

Table 3. The estimated model

Variables	Model
Crime	-0.4589***
	(0.01)
Poverty	-0.23
	(0.79)
Unemp	-5.87*
	(2.811)
Schooling	0.264
	(0.192)
constant	5.11***
	(0.248)
R-squared	0.831
F-statistics	33.11
N	32

In parenthesis standard errors are provided

** - $p < 0.01$, * - $p < 0.05$

By looking at the coefficient of crime rate, the following relationship is evident: An increase in crime rate by 1% decreases GDP by approximately 0.459%. The association is highly significant at α being less than 0.0001. The negative relationship between crime rates and GDP growth, aligns with the findings of Delotto and Otranto (2010) and United Nations Office of Drugs and Crime (2020) discussed in literature review. This negative association can be attributed to decreased investment that directly impacts Investment component of GDP, as well as decrease in production sector because of higher operating costs associated with fraud prevention. It is worth noting, though, that this association can be reversed as well. This means that high economic growth prevents crime by providing social lifts to people through accessible education and healthcare and by efficient law institutions.

The coefficient of poverty rate showed a negative relationship with GDP growth. A 1% increase in poverty rate results in approximately 0.23% decrease in GDP. Increase in poverty directly affects GDP through a decrease in consumption. This result aligns with the findings of Roshaniza and Selvaratnam (2015) discussed in literature review. However, the effect of poverty rate on GDP growth turned out to be insignificant in this model. Yet the inclusion of poverty is essential as the explanatory power of the main independent variable increased in absolute terms from 0.4390 to

0.4589 (see Appendix 3). This suggests that inclusion of poverty rate reduced omitted variables bias and had suppressor variable effect. The confounding effect was reduced as poverty rate positively correlated with crime rate and negatively correlated with GDP growth.

Turning to the effect of unemployment on GDP, it is significant at $\alpha = 0.05$. An increase in unemployment rate by 1% results in approximately 5.87% decrease in GDP. This relationship is consistent with Okun's Law, that states an empirical negative relationship between unemployment and a country's GDP. Constantly high unemployment rate can signal that the economy is not operating in its full capacity, meaning that there is a negative output gap.

Moreover, the structural change of the schooling system in 2017 to an 11-year mandatory education appears to have a positive impact on GDP. Human capital plays a critical role in driving economic growth, therefore educated population is an asset of a country. However, the impact of this reform has not been found to be statistically significant. Education, yet tend to have an accumulating effect. Moreover, considering this change has happened only a few years ago the effect of education might be fully reflected in economic development in the future.

As evident from the table above, the model explains 83.1% of variation in GDP growth rate. Therefore, we can conclude that the model fits the data well. High value of F-statistics of 33.11 proves the overall significance of the model.

Conclusion

Overall, the study successfully addressed the existing gap in the literature on the effect of crime rates on economic growth in Uzbekistan. The impact of crime rate on economic development in Uzbekistan turned out to be highly significant, indicating the importance of crime reduction for the development of a country. As well as crime rate, unemployment proved to have statistically significant relationship with economic growth. GDP growth and unemployment presented a negative relationship, thus 1% increase in unemployment rate is associated with 0.23% decrease in GDP growth. Turning to poverty rate and change in education system, their impact on GDP growth is aligning with that discussed in literature review, yet the dataset for Uzbekistan shows low statistical significance at p-value of 0.7 and 0.2, respectively. However, the overall economic model is significant.

The findings of the study highlight that to achieve sustainable economic development the government should introduce special policies to reduce criminal activity within a country. Moreover, the policies should mainly be addressed to increase education opportunities especially for those who reside in rural areas. In rural areas there is a higher prevalence of poor people (CERR, 2023) thus by providing accessible education in those areas people would get equipped with necessary skill and knowledge to secure stable employment. Further investment in education, such as

provision of scholarships and free professional trainings can in turn boost economic growth by stimulating research and innovation. Moreover, government should support small businesses and entrepreneurs, since self-employment and development of local businesses contribute to the development of sustainable communities and job creation.

In summary, a comprehensive approach combining expanded access to education, provision of scholarships and trainings and entrepreneurship support and can significantly reduce crime by addressing its root economic causes.

Reference list

Ajimotokin, S., Haskins, A. and Wade, Z. (2015). The Effects of Unemployment on Crime Rates in the U.S. Georgia Tech Library. Available from <https://repository.gatech.edu/entities/publication/ef98fcb9-b00f-4a3e-aa8f-173b50ca3214> [Accessed 16 February 2023].

Asian Development Bank. (2024). Poverty Data: Uzbekistan. Asian Development Bank. Available from <https://www.adb.org/where-we-work/uzbekistan/poverty> [Accessed 20 February 2025].

Athirah, N. et al. (2015). Gross Domestic Product (GDP) Relationship with Human Development Index (HDI) and Poverty Rate in Malaysia. PROSIDING PERKEM, 10, 211–217. Available from https://www.ukm.my/fep/perkem/pdf/perkem2015/PERKEM_2015_2C2.pdf [Accessed 21 February 2025].

Benos, N. and Zotou, S. (2014). Education and Economic Growth: a Meta-Regression Analysis. World Development, 64, 669–689. Available from https://scholar.google.com/scholar?hl=ru&as_sdt=0%2C5&q=impact+of+education+on+economic+growth&oq=impact+of+educat#d=gs_qabs&t=1741806847191&u=%23p%3DVILBpTANcXIJ [Accessed 25 February 2025].

Bharadwaj, A. (2014). Is poverty the mother of crime? Empirical evidence of the impact of socioeconomic factors on crime in India. Atlantic Review of Economics, 1. Available from <https://www.econstor.eu/handle/10419/146581> [Accessed 18 February 2025].

Calnitsky, D. and Gonalons-Pons, P. (2020). The Impact of an Experimental Guaranteed Income on Crime and Violence. Social Problems, 68 (3), 778–798. Available from <https://doi.org/10.1093/socpro/spaa001> [Accessed 12 February 2025].

CERN. (2023). Uzbekistan Pilot Multidimensional Poverty Index Report 2023: Poverty and Deprivation Analysis Using the Multidimensional Poverty Index (MPI). Available from <https://ophi.org.uk/publications/Uzbekistan-MPI-2023> [Accessed 3 February 2025].

Detotto, C. and Otranto, E. (2010). Does Crime Affect Economic Growth? Kyklos, 63 (3), 330–345. Available from <https://doi.org/10.1111/j.1467->

6435.2010.00477.x [Accessed 18 February 2025].

European Bank for Reconstruction and Development. (2023). Transition Report 2023-24: Transitions Big and Small. EBRD. Available from <https://www.ebrd.com/home> [Accessed 3 March 2025].

Grant, C. (2017). The Contribution of Education to Economic Growth. The Institute of Development Studies and Partner Organizations. Available from https://opendocs.ids.ac.uk/articles/report/The_Contribution_of_Education_to_Economic_Growth/26453986?file=48235780 [Accessed 1 March 2025].

Macrotrends. (2025). Uzbekistan Crime Rate & Statistics 1990-2025. Available from <https://www.macrotrends.net/global-metrics/countries/uzb/uzbekistan/crime-rate-statistics> [Accessed 7 February 2025].

Maneejuk, P. and Yamaka, W. (2021). The Impact of Higher Education on Economic Growth in ASEAN-5 Countries. *Sustainability*, 13 (2), 520. Available from <https://doi.org/10.3390/su13020520> [Accessed 19 February 2025].

Patterson, E.B. (1991). Poverty, Income Inequality, and Community Crime Rates. *Criminology*, 29 (4), 755–776. Available from <https://doi.org/10.1111/j.1745-9125.1991.tb01087.x> [Accessed 10 February 2025].

Raphael, S. and Winter-Ebmer, R. (2001). Identifying the Effect of Unemployment on Crime. *The Journal of Law and Economics*, 44 (1), 259–283. Available from <https://doi.org/10.1086/320275> [Accessed 19 February 2025].

Roshaniza, M. and Selvaratnam, D. (2015). Gross Domestic Product (GDP) Relationship with Human Development Index (HDI) and Poverty Rate in Malaysia. *PROSIDING PERKEM*, 10 (4), 211–217. Available from https://www.ukm.my/fep/perkem/pdf/perkem2015/PERKEM_2015_2C2.pdf [Accessed 20 February 2025].

Santos, M.E., Dabus, C. and Delbianco, F. (2017). Growth and Poverty Revisited from a Multidimensional Perspective. *The Journal of Development Studies*, 55 (2), 260–277. Available from <https://doi.org/10.1080/00220388.2017.1393520> [Accessed 20 February 2025].

Stat.uz. (2025). National Statistics Committee of the Republic of Uzbekistan . Available from <https://stat.uz/en/> [Accessed 7 February 2025].

Sugiharti, L. et al. (2023). The Nexus between Crime Rates, Poverty, and Income Inequality: A Case Study of Indonesia. *Economies*, 11 (2), 62. Available from <https://doi.org/10.3390/economies11020062> [Accessed 20 February 2025].

The World Bank. (2024). Uzbekistan | Data. [Worldbank.org](https://data.worldbank.org/country/uzbekistan). Available from <https://data.worldbank.org/country/uzbekistan> [Accessed 7 February 2025].

UN.ESCAP. (2004). Bulletin on Asia-Pacific perspectives 2004/05 : Asia-Pacific economies: living with high oil prices? *Handle.net*. Available from <https://doi.org/9211204089> [Accessed 13 March 2025].

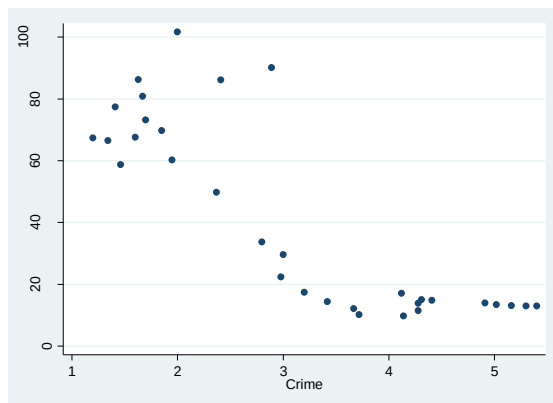
UNDP. (2024). United Nations Development Programme. Available from <https://www.undp.org/uzbekistan> [Accessed 7 February 2025].

UNODC. (2020). Comprehensive strategies for crime prevention towards social and economic development. United Nations Office of Drugs and Crime. Available from <https://www.unodc.org/islamicrepublicofiran/en/comprehensive-strategies-for-crime-prevention-towards-social-and-economic-development.html> [Accessed 15 February 2025].

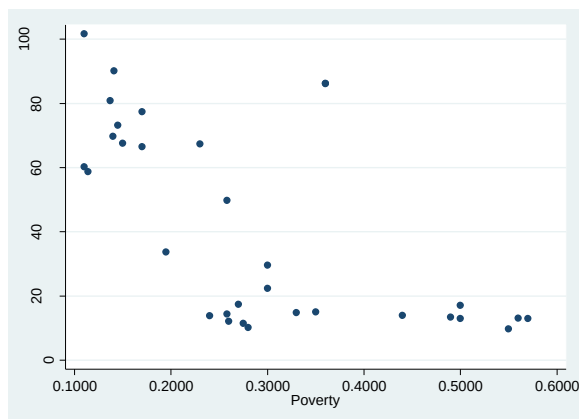
Appendix

Appendix 1

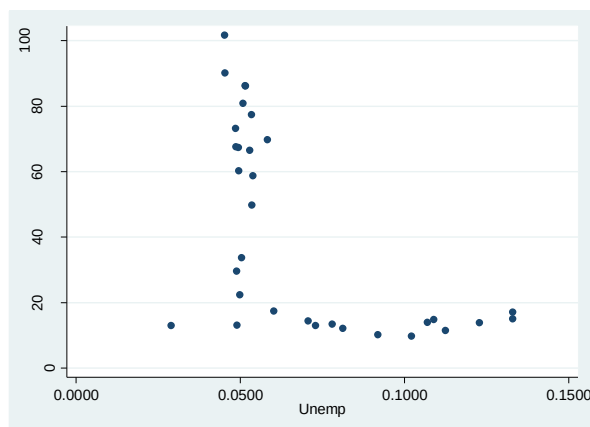
1) scatter GDP Crime



2) scatter GDP Poverty



3) scatter GDP Unemp



Appendix 2

```
. vif
```

Variable	VIF	1/VIF
Crime	3.77	0.265056
Poverty	2.93	0.340893
Unemp	1.49	0.672682
Schooling	1.47	0.679861
Mean VIF	2.42	

```
. estat hettest
```

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of lnGDP

chi2(1) = 0.12

Prob > chi2 = 0.7335

```
.
```

Appendix 3

Regression without Poverty included in the model:

```
. reg lnGDP Crime Unemp Schooling
```

Source	SS	df	MS	Number of obs	=	32
Model	18.1624195	3	6.05413982	F(3, 28)	=	45.61
Residual	3.7166525	28	.132737589	Prob > F	=	0.0000
				R-squared	=	0.8301
				Adj R-squared	=	0.8119
Total	21.879072	31	.705776515	Root MSE	=	.36433

lnGDP	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
Crime	-.4390287	.0655685	-6.70	0.000	-.5733397	-.3047178
Unemp	-6.028689	2.710862	-2.22	0.034	-11.58164	-.4757401
Schooling	.2559808	.1867489	1.37	0.181	-.126557	.6385186
_cons	5.128222	.2364514	21.69	0.000	4.643873	5.61257