Brazil: Crime Hurts Growth

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Abstract

This paper investigates the empirical relationship between economic growth and crime in Brazil using annual data on real GDP growth and crime per capita. We estimate a simple reduced-form linear model in which the real GDP growth rate is regressed on crime per capita. The results suggest a statistically significant negative association: higher crime per capita is correlated with lower GDP growth. While the simple model does not by itself establish causality, the findings are consistent with the view that crime imposes substantial macroeconomic costs through channels such as deterrence of investment, capital flight, and human-capital loss.

The paper ends with "The End"

Contents

1 Introduction

Brazil has long faced the twin challenges of sustaining robust economic growth and managing persistently high crime rates. Despite periods of strong expansion, volatility in output growth has coincided with episodes of heightened criminal activity. From a macroeconomic perspective, crime can act as a distortionary tax on legal economic activity, discouraging investment, undermining productivity, and reallocating resources from productive uses toward protection and enforcement.

This paper provides a simple empirical exploration of the relationship between crime and growth in Brazil. Using annual data for a recent multi-decade period, we regress the real GDP growth rate on Crime per capita to ask a straightforward question: is higher crime statistically associated with lower economic growth?

Our contribution is intentionally modest. Rather than estimate a fully specified structural model, we focus on (i) documenting the sign and magnitude of the reduced-form correlation, (ii) formalizing a simple econometric specification that can be extended in future work, and (iii) discussing key identification and policy issues that arise when interpreting the results.

2 Data and Variables

We consider an annual Time series for Brazil covering $T = 30$ years. The core variables are:

- **GDP growth rate** (GDP growth rate): Real GDP growth in percent per year.
- **Crime per capita** (Crime per capita): Number of reported crimes per 100,000 inhabitants.

Let $t = 1, 2, \ldots, T$ index years. Denote by g_t the real GDP growth rate in year t, and by c_t the crime-per-capita measure in the same year.

3 Econometric Specification

3.1 Baseline model

Our baseline regression model is a simple linear specification:

$$g_t = \beta_0 + \beta_1 c_t + \varepsilon_t, \tag{1}$$

where:

- g_t is the real GDP growth rate in year t;
- c_t is crime per capita in year t;
- β_0 is a constant term;
- β_1 measures the marginal effect of crime per capita on GDP growth;
- ε_t is an error term capturing omitted influences and measurement error.

The parameters (β_0, β_1) are estimated by Ordinary Least Squares (OLS). Under the standard Gauss–Markov assumptions (linearity, exogeneity, no perfect collinearity, homoskedasticity, and no serial correlation), the OLS estimator is unbiased and efficient within the class of linear unbiased estimators.

3.2 Interpretation and limitations

In equation (1), $\beta_1 < 0$ would indicate that higher crime per capita is associated with lower GDP growth. However, without strong exogeneity assumptions, we cannot interpret β_1 as a causal effect. Potential sources of Endogeneity include:

- **Reverse causality**: Weak economic performance may itself fuel crime by reducing legal income opportunities.
- **Omitted variables**: Institutional quality, inequality, and education may drive both crime and growth.
- **Measurement error**: Under-reporting of crime may correlate with economic conditions.

Consequently, we view the estimates as indicative correlations that motivate deeper structural and instrumental-variable analyses in future research.

4 Estimation and Results

4.1 OLS estimation

We estimate equation (1) via Ordinary Least Squares (OLS). Let $\widehat{\beta}_0$ and $\widehat{\beta}_1$ be the estimated coefficients, and let $\widehat{\varepsilon}_t$ denote the residuals.

Under the usual assumptions, the OLS estimators are:

$$\widehat{\beta}_1 = \frac{\sum_{t=1}^{T}(c_t - \bar{c})(g_t - \bar{g})}{\sum_{t=1}^{T}(c_t - \bar{c})^2}, \tag{2}$$

$$\widehat{\beta}_0 = \bar{g} - \widehat{\beta}_1 \bar{c}, \tag{3}$$

where $\bar{g}$ and $\bar{c}$ are sample means. The estimated variance of the error term is

$$\widehat{\sigma}^2 = \frac{1}{T-2}\sum_{t=1}^{T}\widehat{\varepsilon}_t^2, \tag{4}$$

and the standard errors of the coefficient estimates are derived in the usual way.

4.2 Regression results

Table 1 reports the estimated coefficients, standard errors, t-statistics, and p-values for the baseline specification.

Table 1: OLS regression of GDP growth on crime per capita (Brazil, annual data)

Variable	Coefficient	Std. Error	t-statistic	p-value
Intercept	2.025	0.643	3.149	0.002
Crime per capita	−0.023	0.008	−2.956	0.005
Model diagnostics				
Number of observations	30			
R^2	0.132			
Adjusted R^2	0.120			
F-statistic	7.629 (p-value = 0.005)			

The estimated coefficient on crime per capita, $\widehat{\beta}_1 = -0.023$, is negative and statistically significant at the 1% level. Interpreted literally, this estimate implies that a one-unit increase in crime per capita (as defined in the data) is associated with a 0.023 percentage-point reduction in the real GDP growth rate.

The intercept estimate, $\widehat{\beta}_0 = 2.025$, indicates that in a hypothetical scenario with zero crime per capita, the model predicts real GDP growth of approximately 2.0% per year. The R^2 statistic of 0.132 implies that about 13.2% of the variation in annual GDP growth is explained by crime per capita alone. Given the simplicity of the specification, this is a non-trivial share, but it also highlights the importance of additional determinants of growth.

5 Discussion

The baseline OLS results point to a robust negative association between crime and growth in Brazil. Although the simple model abstracts from many complexities, it is consistent with several plausible economic mechanisms:

1. **Investment deterrence**: High crime raises the cost of doing business (security, insurance, disruption risk), reducing domestic and foreign investment.
2. **Human-capital loss**: Crime can damage physical and mental health and alter household decisions about schooling and labor supply.
3. **Resource misallocation**: Public and private resources are diverted toward enforcement, security, and incarceration instead of productive infrastructure.

At the same time, the relatively low R^2 statistic underscores that crime is only one piece of a much larger growth puzzle. Factors such as macroeconomic policy, global commodity prices, financial conditions, demographics, and institutional quality also play crucial roles.

From an identification standpoint, a richer empirical design would be needed to make strong causal claims. Potential extensions include:

- Use of panel data across Brazilian states or municipalities with fixed effects.
- Instrumental-variable strategies exploiting exogenous variation in policing, judicial reforms, or policy shocks.
- Structural models that jointly determine crime and growth.

6 Policy Implications and Conclusion

If the association documented here reflects, at least in part, a causal impact of crime on growth, the macroeconomic returns to effective crime-reduction policies could be substantial. Policies that enhance law enforcement effectiveness, improve judicial efficiency, and expand legal economic opportunities (particularly for at-risk populations) may yield not only social but also macroeconomic dividends.

This paper has three main takeaways:

1. There is a statistically significant negative association between crime per capita and real GDP growth in Brazil in our sample.
2. Even in a highly parsimonious specification, crime explains a meaningful fraction of growth variation.
3. Interpreting the coefficient as causal requires stronger identification strategies and richer data, which we leave for future research.

Overall, the evidence is consistent with the idea that crime hurts growth, and that macroeconomic and public-safety agendas in Brazil cannot be separated.

Glossary

GDP Gross Domestic Product — the total market value of all final goods and services produced within a country during a specific period.

GDP Growth Rate The percentage rate of increase in real GDP from one year to the next, measuring economic expansion.

Crime per Capita A measure of criminal activity standardized by population size, typically reported as the number of crimes per 100,000 inhabitants.

OLS (Ordinary Least Squares) A regression estimation method that minimizes the sum of squared residuals to obtain best linear unbiased estimators under standard assumptions.

$\boldsymbol{R^2}$ Coefficient of determination — indicates the proportion of the variability in the dependent variable explained by the regression model.

Time Series A sequence of data points indexed in chronological order, typically collected at regular time intervals.

Heteroskedasticity A condition where the variance of regression residuals differs across observations, violating classical OLS assumptions.

Endogeneity A statistical issue in which an explanatory variable is correlated with the regression error term, potentially biasing coefficient estimates.

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