How illegal economies can reduce local fiscal capacity: Quasiexperimental evidence from an *accident* in the Colombian peace negotiations

Patricia Justino  
UNU-WIDER

Santiago Tobón  
Universidad EAFIT

Martín Vanegas-Arias  
Universidad EAFIT

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Different links between conflict (and illegal economies) and local tax performance
(Ch et al. 2018)

- Conflict deteriorates the tax base by, e.g., destroying physical capital

- Conflict generates negative reciprocity of taxpayers (e.g., Cárdenas et al. 2014)

- Conflict reduces the return of legal businesses and raises the return of illegal businesses, which are not taxed (e.g., Besley and Persson 2008)

- Criminal and rebel rule undermine state legitimacy (e.g., Arjona 2016, Blattman et al. 2023, Sánchez de la Sierra 2020)

- Conflict facilitates the capture of local institutions by armed groups (e.g., Eaton 2006; Ch et al. 2018)
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This paper asks three questions

1. Does a positive shock on the size of illegal economies affect local tax revenues?
2. If so, which types of taxes?
3. Finally, which are the relevant explanations?
We study variation in Colombia
- We study how an exogenous positive shock on coca production affects local tax revenues:
  - More specifically, an announcement on future subsidies for coca growers that drove coca and cocaine production up (Prem et al. 2023)

- We focus on the three main municipal-level taxes:
  - Trade and production tax (applies to all sectors except agriculture)
  - Property tax
  - Gasoline sales tax
TL;DR

- We study how an exogenous positive shock on coca production affects local tax revenues:
  - More specifically, an announcement on future subsidies for coca growers that drove coca and cocaine production up (Prem et al. 2023)

- We focus on the three main municipal-level taxes:
  - Trade and production tax (applies to all sectors except agriculture)
  - Property tax
  - Gasoline sales tax

- Our findings suggest that...
  - Trade and production tax remains stable, as aggregate economic activity—legal and illegal—seems to remain stable
  - Property tax decreases, with agriculture transitioning to the illegal sector
  - Gasoline sales tax decreases, with the gasoline retail market transitioning to the illegal sector
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The 1991 Constitution improved decentralization and local fiscal capacity

Three main municipal-level taxes:

1. **Trade and production taxes**: paid by businesses, a percentage of approximate sales or production that explicitly excludes the agricultural sector

2. **Property taxes**: paid by households and businesses, a percentage of property valuation

3. **Gasoline taxes**: paid by households and businesses, a percentage of gasoline sales
How important are these taxes relative to total current income?
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The partial agreement on illicit drugs between the Colombian government and the FARC guerrilla was announced in May 2014 (Prem et al. 2023)

- The announcement explicitly referred to “material welfare conditions” for coca growers

- Only after the press conference, government officials realized the announcement could lead to perverse incentives (Bermudez-Lievano, 2018)

- And in fact, coca growers did receive cash transfers from the government starting in 2017
Coca cultivation increased following the announcement

Notes. Data UNODC
The naive announcement largely explains the increase in coca cultivation in Colombia

(Prem et al. 2023)

Notes. OLS coefficient estimates (and their 95% confidence intervals) are reported. The dependent variable is equal to the Share of coca cultivation over 1,000 hectares in each municipality $i$ and year $t$. Estimation include municipality and department*year FE.
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- Main outcomes:
  - Local tax revenues (National Planning Department, 2023)

- Criminal and rebel group presence and activities:
  - Coca suitability (Mejía and Restrepo, 2015)
  - Presence of armed actors (Ministry of Defense, 2021)
  - Criminal and rebel rule:
    - We scrape human rights violation cases compiled by Osorio et al. (2019)
    - We describe different categories of criminal governance based on Lessing (2020)

- Looking for explanations:
  - Night lights—which proxy for local economic activity (Li et al. 2020)
  - Agricultural production (Ministry of Agriculture, 2023)
  - Arrests (National Police, 2023)
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What is really the *treatment* here

- Coca production, even if conducted mainly by peasants, is regulated and ruled by rebel and criminal organizations.

- These groups, to different degrees, engage in typical governance activities (Lessing, 2020):
  - Policing and enforcement
  - Judicial
  - Fiscal
  - Regulatory
  - Political

- Hence we broadly see a large coincidence of the presence of illegal economies, armed actors, and criminal and rebel rule.
Correlates of armed group presence suggest armed groups rule and participate in the illegal production of cocaine

<table>
<thead>
<tr>
<th>Variable</th>
<th>Dimensions of criminal governance (Lessing 2020)</th>
<th>Coca suitability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Armed actors</td>
<td>0.159*** (0.025)</td>
<td>0.183*** (0.025)</td>
</tr>
<tr>
<td>Controls</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Department FE</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>R2</td>
<td>0.041</td>
<td>0.062</td>
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<tr>
<td>N</td>
<td>8,736</td>
<td>8,736</td>
</tr>
</tbody>
</table>
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Identification

- We follow Prem et al. (2023) and leverage:
  - The timing of the pre-announcement of future incentives to substitute away coca
  - The cross-sectional variation in coca suitability

- The main identifying assumption:
  - In the absence of the announcement, tax revenues in municipalities with high coca suitability would have followed the trajectory of tax revenues in municipalities with low coca suitability

- We estimate *reduced form* effects:
  - The impact of the announcement on local tax revenues
To estimate causal effects, we follow an event study approach

\[ y_{idt} = \sum_{j=-3}^{-2} \beta_j (A_j \times Coca_i) + \sum_{j=0}^{4} \beta_j (A_j \times Coca_i) + \gamma_i + \delta_{dt} + \epsilon_{idt} \]

- $y_{idt}$ is the relevant outcome in municipality $i$, in department $d$, for year $t$
  - **Our primary focus**: Per capita trade, property and gasoline sales tax revenues
  - **Our secondary focus**: Economic activity, agricultural production, gasoline thefts

- $A_i$ is a dummy variable that takes the value one after the announcement

- $Coca_i$ is a measure of the suitability to grow coca (Mejía and Restrepo, 2015)

- $\gamma_i$ and $\delta_{dt}$ stand for municipality and department–by–year fixed effects

- Our coefficients of interest are the $\beta_j$s: the difference in revenues between municipalities with high- vs. low-coca suitability in year $j$ relative to 2013
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No changes in trade and production tax revenue

Notes. OLS coefficient estimates (and their 95% confidence intervals) are reported. The dependent variable is equal to the per capita value of industry and commerce taxes in real terms in each municipality $i$ and year $t$. Estimation include municipality and department*year FE.
Likely explained by no changes in aggregate economic activity—both legal and illegal, as measured with night lights.

Notes. OLS coefficient estimates (and their 95% confidence intervals) are reported. The dependent variable is equal to the average luminosity in each municipality $i$ and year $t$. Estimation include municipality and department*year FE.
A significant decrease in property tax revenues

<table>
<thead>
<tr>
<th>Years</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>OLS coefficient estimates (and their 95% confidence intervals) are reported. The dependent variable is equal to the per capita value of property taxes in real terms in each municipality i and year t. Estimation include municipality and department*year FE.</td>
</tr>
</tbody>
</table>
Likely explained by a transition from the legal to the illegal sector, as measured with the local extension of legal and illegal crops (Prem et al. 2023)

Notes. OLS coefficient estimates (and their 95% confidence intervals) are reported. The dependent variable is equal to the Share of coca cultivation over 1,000 hectares in each municipality $i$ and year $t$. Estimation include municipality and department*year FE.
Likely explained by a transition from the legal to the illegal sector, as measured with the local extension of legal and illegal crops.

Notes. OLS coefficient estimates (and their 95% confidence intervals) are reported. The dependent variable is equal to the hectares cultivated of any legal crop in each municipality $i$ and year $t$. Estimation include municipality and department*year FE.
A significant decrease in gasoline tax revenues

Notes. OLS coefficient estimates (and their 95% confidence intervals) are reported. The dependent variable is equal to the per capita value of gas taxes in real terms in each municipality $i$ and year $t$. Estimation include municipality and department*year FE.
Likely explained by an increase in gasoline theft, as measured with gasoline theft-related arrests.

Notes. OLS coefficient estimates (and their 95% confidence intervals) are reported. The dependent variable is equal to the number of arrests related to gas theft in each municipality $i$ and year $t$. Estimation include municipality and department*year FE.
Why should we expect this? To produce one kilogram of cocaine, you need 75 gallons—280 liters—of gasoline.
Finally: What about illegal taxation? We see some suggestive evidence it is increasing in latter years, however imprecise.

Notes. OLS coefficient estimates (and their 95% confidence intervals) are reported. The dependent variable is equal to the number of arrests related to extortion in each municipality $i$ and year $t$. Estimation include municipality and department*year FE.
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- Hard to dispute that peace in Colombia improved welfare
  - e.g., Prem et al. (2023b) find large positive impacts on human capital

- Yet, naive announcements led to negative unintended consequences
  - e.g., Prem et al. (2023) find large positive increases on coca cultivation

- We document how these negative impacts spilled over to local fiscal capacity
  - A decrease in property tax revenues, probably explained by a substitution between legal and illegal activities
  - A decrease in gasoline tax revenues, probably explained by a substitution between legal and illegal activities

- Overall, our results shed light on the challenges of building fiscal capacity where armed groups, criminal rule, and illegal economies coincide