Does the Fiscal Decentralization Promote Public Safety? Evidence from United States

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1. Introduction
   - Can fiscal decentralization promote the public safety?
   - Relevant Literature

2. Theoretical Analysis
   - Local Effect and Spillover Effect
   - Hypotheses

3. Empirical Strategy, Estimation and Data
   - Specification and Estimation Method
   - Data and Measure of Fiscal Decentralization

4. Estimation Results
   - Impact of fiscal decentralization on crime rate

5. Conclusion

6. Appendix
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In theory, the impact of fiscal decentralization, as a policy tool, on promoting public service has been widely discussed.

In empirics, the impacts on several specific kinds of public service have been studied, such as education, health and environment.

However, as an important social and economic issue, no previous research studies the impact of fiscal decentralization on public safety.
The fiscal decentralization is always taken as a tool in policy experiment to promote public service, but does the decentralization improve or worsen the security situation? 

The study has strong policy implication on crime reduction: can we take fiscal decentralization to promote public safety?
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Economics of Crime
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Fiscal Decentralization and Crime
Local Effect (I)

competition effect

- Tiebout competition: Tiebout (1956)
- Tax competition: Brennan and Buchanan (1980)
- Political competition: Besley and Case (1995)
- Competition lowers the crime rate in the process of fiscal decentralization.
expelling effect: another kind of competition effect

- The mobile crime is defined as the one which can be both committed cross-border and locally, such as burglary or vehicle theft.
- Local government has to spend more on crime control for fear an inflow of criminal during decentralization.
However, the cross-border crime also results in a “dark side” of fiscal decentralization.

Authority: the coordination failure in authority to arrest, so the boundary area could be fuzzy grey area of crime after decentralization.
Effect on crime correlation

The correlation of crime is affected by fiscal decentralization

- Effect of competition: common actions matter.
- Effect of mobile crime: cross-border criminals matter.
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Fiscal Decentralization and Crime
Testable Hypothesis (I)

- The local effect of fiscal decentralization on crime is negative.
- The spillover effect of fiscal decentralization on crime is positive.
- The correlation of crime is strengthened by fiscal decentralization.
Testable Hypothesis (II)

- The correlation of police expenditure between jurisdictions is higher after decentralization than before due to competition effect.
- The crime rate in boundary areas is higher after decentralization than before due to coordination failure.
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A spatial autoregressive model with spatial interaction term

\[ \text{crime}_i = \lambda_1 \sum_{j=1}^{n} w_{ij} \cdot \text{crime}_j + \lambda_2 FD_i \cdot \sum_{j=1}^{n} w_{ij} \cdot \text{crime}_j + \alpha FD_i + \beta' x_i + \epsilon_i \]

- \( \lambda_1 \) captures the crime correlation, which is not caused by fiscal decentralization.
- \( \lambda_2 \) measures the correlation of crime caused by fiscal decentralization.
- \( \alpha \) measures the local effect, which is caused by competition.
- The spillover effect has to be calculated by marginal effect.
Best generalized two-stage-least-squares estimation

- Endogeneity problem:
  \[ \sum_{j=1}^{n} w_{ij} \cdot crime_j, \text{ and } FD_i \cdot \sum_{j=1}^{n} w_{ij} \cdot crime_j \]

- Rewrite the model

  \[ Crime_n = \lambda_1 W_n Crime_n + \lambda_2 \tilde{FD}_n W_n Crime_n + FD_n \alpha + X_n \beta + \varepsilon_n \]

- As in Lee(2003), we propose a new best GS2SLS estimator.

- Best instruments: \( W_n \left( I_n - \lambda_{1,0} W_n - \lambda_{2,0} \tilde{FD}_n \cdot W_n \right)^{-1} X_n \beta_0, \tilde{FD}_n \cdot W_n \cdot \left( I_n - \lambda_{1,0} W_n - \lambda_{2,0} \tilde{FD}_n \cdot W_n \right)^{-1} X_n \beta_0, FD_n, \text{ and } X_n \)

- The best G2SLS estimator is consistent and asymptotically normal.
Marginal effect of fiscal decentralization

- Recall the model

\[ Crime_n = (I_n - \lambda_1 W_n - \lambda_2 \tilde{FD}_n \cdot W_n)^{-1}(FD_n \alpha + X_n \beta + \epsilon_n) \]

- Marginal effect

\[ \frac{\partial Crime_n}{\partial FD_i} = \lambda_2 (I_n - \lambda_1 W_n - \lambda_2 \tilde{FD}_n \cdot W_n)^{-1} \tilde{W}_{n,i} Crime_n + (I_n - \lambda_1 W_n - \lambda_2 \tilde{FD}_n \cdot W_n)^{-1} \epsilon_{i\alpha} \]

- The first part is the marginal effect due to varying spatial correlation.
- The second part is the standard marginal effect for spatial model.

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Fiscal Decentralization and Crime
Channel Identification: Competition Effect

\[ \text{policeexp}_i = \lambda_1 \sum_{j=1}^{n} w_{ij} \cdot \text{policeexp}_j + \lambda_2 FD_i \cdot \sum_{j=1}^{n} w_{ij} \cdot \text{policeexp}_j + \alpha FD_i + \beta' x_i + \epsilon_i \]

- If \( \lambda_2 \) is positive, the evidence of competition effect can be further confirmed.
Channel Identification: Spillover Effect

- If the crime rate in boundary areas is higher for the states with higher level of decentralization, the spillover effect is captured in empirical study.
- We will leave it to future research, due to lack of city and town level data.
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Fiscal Decentralization and Crime
Data Source

- Our sample consists of data drawn from various sources, it covers 1508 counties of 25 states in United States in 1991.
- The data on government expenditure are from the Government Census in United States.
- The crime data are from the Uniform Crime Reports issued by the Federal Bureau of Investigation (FBI).
- The data on control variables are all from the County and City Data Book in United States.
Conventional Measure

\[ FisDec_T = \frac{\text{local expenditure}}{\text{total expenditure}} \]

Disadvantages of conventional measure

- Potential endogeneity problem: reverse causality bias.
- The measure of fiscal decentralization is biased due to the functional division in U.S. fiscal system.
New Measure: Government Density

- Number of government measures local government competition, which is the key in the literature of fiscal federalism.
- Note that, the cross-state difference in the number of counties and cities may be due to the size of states, so have to control the size.

\[
FD_{\text{county}} = \frac{\text{number of county government}}{\text{land size}}
\]

\[
FD_{\text{city}} = \frac{\text{number of city (town) government}}{\text{land size}}
\]

- Government density overcomes the problem of reverse causality.
Dependent Variables and Control variables

- Dependent Variable \((crime_{ik})\): \(TotCri_i\), \(VioCri_i\) and \(ProCri_i\).
- Dependent Variable \((crime_{ik})\): \(Murder_i\), \(Rape_i\), \(Robbery_i\); \(Burglary_i\), \(Larceny_i\) and \(Motheft_i\).
- Variables \((FD_i)\): \(FD\_county\) and \(FD\_city\).
- Control variables \((x_i)\) in Moody and Marvell (2010): \(Incpc_i\), \(Unemp_i\) and \(Poverty_i\).
- Other control variables \((x_i)\): \(Youngden_i\) \(Eduhigh_i\), \(Blackrate_i\), \(Policeexp_i\), \(Welfareexp_i\), and \(Correctexp_i\).
- Other control variables \((x_i)\): \(FD_i \cdot Policeexp_i\), \(FD_i \cdot Welfareexp_i\), and \(FD_i \cdot Correctexp_i\).
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Impact of fiscal decentralization on crime rate

Impact on Crime using $FD_{\text{county}}$

Table 1: Results using $FD_{\text{county}}$

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>TotCri</th>
<th>VioCri</th>
<th>ProCri</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\lambda_1$</td>
<td>-3.4607***</td>
<td>-0.9572***</td>
<td>-2.8030***</td>
</tr>
<tr>
<td></td>
<td>(0.2450)</td>
<td>(0.0310)</td>
<td>(0.2449)</td>
</tr>
<tr>
<td>$\lambda_2$</td>
<td>2.3289***</td>
<td>0.7918***</td>
<td>1.7093***</td>
</tr>
<tr>
<td></td>
<td>(0.1388)</td>
<td>(0.0336)</td>
<td>(0.1268)</td>
</tr>
<tr>
<td>$FD_{\text{county}}$</td>
<td>-8.5190***</td>
<td>-0.2721***</td>
<td>-5.7594***</td>
</tr>
<tr>
<td></td>
<td>(3.2002)</td>
<td>(0.0623)</td>
<td>(1.9512)</td>
</tr>
<tr>
<td>Control variables</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1
Impact of fiscal decentralization on crime rate

Impact on Crime using \textit{FD\_city}

Table 2: Results using \textit{FD\_city}

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>TotCri</th>
<th>VioCri</th>
<th>ProCri</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\lambda_1)</td>
<td>-1.9973***</td>
<td>0.1883***</td>
<td>-2.0988***</td>
</tr>
<tr>
<td></td>
<td>(0.2954)</td>
<td>(0.0480)</td>
<td>(0.3451)</td>
</tr>
<tr>
<td>(\lambda_2)</td>
<td>0.6529***</td>
<td>0.0597***</td>
<td>0.6882***</td>
</tr>
<tr>
<td></td>
<td>(0.0898)</td>
<td>(0.0079)</td>
<td>(0.1058)</td>
</tr>
<tr>
<td>\textit{FD_city}</td>
<td>-2.8106***</td>
<td>-0.0405***</td>
<td>-2.6853***</td>
</tr>
<tr>
<td></td>
<td>(0.9646)</td>
<td>(0.0139)</td>
<td>(0.9942)</td>
</tr>
<tr>
<td>Control variables</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Standard errors in parentheses

*** \(p<0.01\), ** \(p<0.05\), * \(p<0.1\)
In New Mexico state, the marginal effect of fiscal decentralization on total crime for two selected counties:

- Mc Kinley county: -2.2096
- Mora county: 1.2254

Given that $\alpha = -8.5190$ (using FD_county), the spillover effect of fiscal decentralization of these two counties could be roughly measured by 6.3094 and 9.7444, respectively.
Impact on Crime

- The impact of fiscal decentralization on various crime rates are negative and statistically significant.
- The impact of fiscal decentralization on crime correlations are positive and statistically significant.
- The marginal effect of fiscal decentralization on various crime rates are ambiguous.
- The spillover effects of fiscal decentralization are positive.
Comparison between Violent and Property Crimes

To compare, we standardize the violent crime and property crime within each state.

Table 3: Comparison using $FD_{\text{county}}$

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>VioCri</th>
<th>ProCri</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\lambda_1$</td>
<td>-0.9572***</td>
<td>-2.8030***</td>
</tr>
<tr>
<td></td>
<td>(0.1362)</td>
<td>(0.2588)</td>
</tr>
<tr>
<td>$\lambda_2$</td>
<td>0.7918***</td>
<td>1.7093***</td>
</tr>
<tr>
<td></td>
<td>(0.1128)</td>
<td>(0.1506)</td>
</tr>
<tr>
<td>$FD_{\text{county}}$</td>
<td>-0.0580</td>
<td>-0.0224</td>
</tr>
<tr>
<td></td>
<td>(0.0697)</td>
<td>(0.0744)</td>
</tr>
<tr>
<td>Control variables</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
A Possible Interpretation

- The effect on crime correlation is supposed to be larger for mobile crime than less mobile crime.
- In general, as pointed out in Porter (1996), most cross-border crimes are associated with property crimes. Mehay (1977) and Hakim et al (1979) also suggest that the spillover effects are mostly on property crime, rather than violent crime.
A Possible Interpretation

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- In general, as pointed out in Porter (1996), most cross-border crimes are associated with property crimes. Mehay (1977) and Hakim et al (1979) also suggest that the spillover effects are mostly on property crime, rather than violent crime.
### Table 4: Results using $FD\_county$ for VioCri

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>Murder</th>
<th>Rape</th>
<th>Robbery</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\lambda_1$</td>
<td>-0.6740***</td>
<td>-3.2448***</td>
<td>-0.0130</td>
</tr>
<tr>
<td></td>
<td>(0.1002)</td>
<td>(0.0381)</td>
<td>(0.0843)</td>
</tr>
<tr>
<td>$\lambda_2$</td>
<td>0.7650***</td>
<td>4.0648***</td>
<td>0.1720***</td>
</tr>
<tr>
<td></td>
<td>(0.0539)</td>
<td>(0.0297)</td>
<td>(0.0397)</td>
</tr>
<tr>
<td>$FD_county$</td>
<td>-0.0041***</td>
<td>-0.0974***</td>
<td>-0.0160**</td>
</tr>
<tr>
<td></td>
<td>(0.0008)</td>
<td>(0.0127)</td>
<td>(0.0061)</td>
</tr>
<tr>
<td>Control variables</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

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Fiscal Decentralization and Crime
### Subcategories of Property Crime

Table 5: Results using $FD_{\text{county}}$ for ProCri

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>Burglary</th>
<th>Larceny</th>
<th>Motheft</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\lambda_1$</td>
<td>-1.0878***</td>
<td>0.3601**</td>
<td>-1.8925***</td>
</tr>
<tr>
<td></td>
<td>(0.0323)</td>
<td>(0.1630)</td>
<td>(0.0466)</td>
</tr>
<tr>
<td>$\lambda_2$</td>
<td>1.0659***</td>
<td>-0.0745</td>
<td>1.0490***</td>
</tr>
<tr>
<td></td>
<td>(0.0233)</td>
<td>(0.1093)</td>
<td>(0.0247)</td>
</tr>
<tr>
<td>$FD_{\text{county}}$</td>
<td>-0.9996***</td>
<td>-0.0426*</td>
<td>-0.2663***</td>
</tr>
<tr>
<td></td>
<td>(0.2977)</td>
<td>(0.2387)</td>
<td>(0.0387)</td>
</tr>
<tr>
<td>Control variables</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Impact on Violent and Property Crimes

- The spillover effect of violent crime is smaller than that of property crime.
- The spillover of rape are the largest in violent crime (c.f. Warr (1988)).
- The spillover effect of burglary and auto theft is largest in property crime, and larger than larceny.
- The case of robbery and larceny.
Channel Identification: Competition Effect

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>Policeexp</th>
<th>Policeexp</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\lambda_1$</td>
<td>-68.3570***</td>
<td>-374.5792***</td>
</tr>
<tr>
<td></td>
<td>(0.4075)</td>
<td>(18.8218)</td>
</tr>
<tr>
<td>$\lambda_2$</td>
<td>39.4797***</td>
<td>80.1492***</td>
</tr>
<tr>
<td></td>
<td>(0.2180)</td>
<td>(13.3617)</td>
</tr>
<tr>
<td>Constant</td>
<td>8.0935***</td>
<td>16.8269***</td>
</tr>
<tr>
<td></td>
<td>(2.4649)</td>
<td>(2.7344)</td>
</tr>
<tr>
<td>Incpc</td>
<td>-0.3254***</td>
<td>-0.1153</td>
</tr>
<tr>
<td></td>
<td>(0.0810)</td>
<td>(0.0865)</td>
</tr>
<tr>
<td>TotCri</td>
<td>-0.0123</td>
<td>-0.0032</td>
</tr>
<tr>
<td></td>
<td>(0.0248)</td>
<td>(0.0285)</td>
</tr>
<tr>
<td>$FD_{\text{county}}$</td>
<td>-1.7600*</td>
<td>-3.3068**</td>
</tr>
<tr>
<td></td>
<td>(1.0021)</td>
<td>(1.6672)</td>
</tr>
</tbody>
</table>
This paper offers an analysis on the effect of fiscal decentralization on crime. Because of competition effect, fiscal decentralization improves public safety, but it also can leads to coordination failure, especially when the crime can be committed cross-border.

It also explores basic pattern of fiscal decentralization affecting crime. The local effect is beneficial, but spillover effect is ambiguous due to coordination failure. An interesting finding is, the effect of decentralization on the correlation of property crime is larger than violent crime due to difference mobility.
We proposed a new measure for fiscal decentralization to avoid several problems in previous literature.

A new spatial model is also proposed, in order to analyze the local effect and spillover effect.

The proposed model can be not only applied to this specific case, but also many other empirical studies without varying spatial effects.
Policy Implication

- Policymaker can take the fiscal decentralization as an efficient policy tool to promote public safety, if the coordination failure caused can be controled.
- The main issue to coordinate in decentralization is on the control of cross-border crime.
Tax competition

- Zodrow and Mieszkowski (1986): Tax base is sensitive to the tax rate.
- Marceau (1997): Tax base is sensitive to the crime rate.
- Keen and Marchand (1997): Structural Bias.
Table 1 (Continued): Results using FD_county

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>TotCri</th>
<th>VioCri</th>
<th>ProCri</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>4.3679</td>
<td>-0.1839</td>
<td>1.4659</td>
</tr>
<tr>
<td>Youngden</td>
<td>0.3276***</td>
<td>0.0202***</td>
<td>0.3046***</td>
</tr>
<tr>
<td>Blackrate</td>
<td>4.8413**</td>
<td>1.1412***</td>
<td>3.7881*</td>
</tr>
<tr>
<td>Eduhigh</td>
<td>3.2294</td>
<td>0.0391</td>
<td>3.3099</td>
</tr>
<tr>
<td>Poverty</td>
<td>-5.1670</td>
<td>0.2059</td>
<td>-6.4112</td>
</tr>
<tr>
<td>Unemp</td>
<td>0.4057***</td>
<td>0.0218***</td>
<td>0.3848***</td>
</tr>
<tr>
<td>Incpc</td>
<td>0.2764***</td>
<td>0.0226***</td>
<td>0.2749***</td>
</tr>
<tr>
<td>Policeexp</td>
<td>10.1789</td>
<td>1.0309*</td>
<td>6.7533</td>
</tr>
<tr>
<td>Welfareexp</td>
<td>6.6353</td>
<td>0.5268</td>
<td>3.3783</td>
</tr>
<tr>
<td>Correctexp</td>
<td>6.5125</td>
<td>0.2503</td>
<td>5.9358</td>
</tr>
<tr>
<td>FD · Policeexp</td>
<td>-13.0405</td>
<td>-1.2060</td>
<td>-9.2778</td>
</tr>
<tr>
<td>FD · Welfareexp</td>
<td>-7.5434</td>
<td>-0.5116</td>
<td>-4.3258</td>
</tr>
<tr>
<td>FD · Correctexp</td>
<td>-2.6039</td>
<td>-0.0488</td>
<td>-2.5504</td>
</tr>
</tbody>
</table>