Can Tax Breaks Beat Geography? Lessons from the French Enterprise Zone Experience

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\textsuperscript{3}Howard University

Séminaire Fourgeaud
"Intervention publique et localisation des activités"
10 Décembre 2013
Striking spatial disparities within urban areas in France
⇒ Rising unemployment rates and urban poverty in the 1980s
⇒ Urban segregation, social exclusion, juvenile delinquency
⇒ Violent urban riots in the 1990s and 2000s (suburbs of big cities)

Surge of public policies to revive distressed urban neighborhoods
⇒ First Ministry of Urban Affairs created in 1991
⇒ “Pacte de relance pour la ville” of 1996

Creation of the first French “Enterprise Zones” (EZ):
⇒ Tax incentives to attract firms in lagging urban areas
⇒ Bring jobs to unemployed residents, who are not mobile
⇒ Create positive externalities in the neighborhoods

Cost of the French EZ placed-based policy program:
⇒ 5,5 millions euro/year/EZ, 1,800 euro/worker, 36 euro/resident
⇒ Larger than the 1,25 million euro/EZ Colorado program
⇒ Much larger than the California EZ program (240$/worker)
Aim of the paper

- Should EZ programs be expected to work?
  - Diversion effects: negative spillovers on surrounding areas
  - Windfall effect: firms would have located there anyway
  - Mailbox effect: fiscal optimization strategy, no new jobs
  - Stigma effect: population “sorting” caused by EZ designation
  - Capture by untargeted populations: land owners, commuters...

- Conflicting results from academic studies on foreign EZs!
  - No impact: Neumark & Kolko, Bondonio & Engberg (2010)

- First academic evaluations of the French EZ program:
  - Small impact on firm settlements & jobs (Rathelot & Sillard, 2008)
  - Mostly diversion effects (Givord et al., 2011; Mayer et al., 2012)
  - Small impact on unemployment duration (Gobillon et al., 2012)
  - Strong heterogeneity across EZs (Rathelot & Sillard, 2008)
Our contribution: does geography explain this heterogeneity?  
⇒ Spatial isolation is a barrier to commuting...  
⇒ If new workers can’t commute in, tax credits spread over business owners or workers who were already there (presumably residents?)  
⇒ Spatially-integrated EZ more sensitive to place-based incentives?

Call for systematic evaluation in 2009 from the French government  
⇒ Should the French EZ program be extended... or not?  
⇒ 4 research teams selected to study different aspects of the program, with an expected completion date in January 2012

October 2011: the program is officially renewed for 5 more years...  
⇒ Can we at least improve its targeting?  
⇒ And provide guidance for François Lamy’s reform projects?
Three-tier place-based French program in favor of deprived areas

- ZUS (751) → ZRU (416, nested) → ZFU (100, non nested)
  - Initiated in 1996 (ZUS, ZRU and ZFU1G)
  - Expanded in 2004 (ZFU2G) and 2006 (ZFU3G)
  - 100 ZFU scattered all over France (25 in the Paris region)

- Exemptions of employer social contributions (< 50 employees):
  - ZRU: new workers hired, total exemption for 1 year
  - ZFU: all workers (a % of whom must be living in ZUS), total exemption for 5 years, decreasing over next 9 years

- Exemptions of business taxes (except for the banking, finance, insurance, housing and sea-fishing sectors)
  - ZRU: total exemption for 2 years, decreasing over next 3 years
  - ZFU: total exemption for 5 years, decreasing over next 9 years
The French EZ program (cont’d)

The 93 ZFU of mainland France

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Identification strategy

- Difference-in-Differences approach
  - ZFU2G selected out of ZRU according to unclear criteria
  - Plausible control group: non selected ZRU (spatial diff)
  - Treated group: ZRU targeted ZFU2G after 2004 (time diff)

Annual inflow of establishments in ZRUs and ZFU2Gs (1995 basis)

Source: SIRENE.
Identification strategy (cont’d)

- **Spatial unit of analysis**

  ⇒ Statistical information is not available at the ZFU/ZRU levels...
  ⇒ We choose as the spatial unit of analysis any IRIS intersecting a treated ZFU or a control ZRU on more than **50%** of its surface area
  ⇒ We restrict to the period 2002-2006 (data consistency)

   An example: ZFU “Les 4000” in la Courneuve
Identification strategy (cont’d)

- **Double-Difference estimates:**

  \[ \Delta Y_{i\tau} = Y_{i\tau} - Y_{i\tau-1} = \alpha_\tau + \beta T_{i\tau} + \varepsilon_{i\tau}, \]

  \( \Rightarrow \) where \( i \) is the IRIS, \( \tau \) the year, \( \alpha_\tau \) a time dummy

  \( \Rightarrow \) \( Y_{i\tau} \) is the log of different possible local outcomes:
  - Establishment inflows, creations and transfers (SIRENE)
  - Jobs created, hours worked and earnings (DADS)

  \( \Rightarrow \) Treatment variable: \( T_{i\tau} = 1_{(\tau \geq t_0)} \times 1_{(i \in ZFU2G)} \), otherwise 0

  \( \Rightarrow \) Average impact of treatment is given by coefficient \( \beta \)

- **Triple-Difference estimates:**

  \[ \Delta Y_{i\tau} = \alpha_\tau + \beta T_{i\tau} + \eta G_{ZFU2G/ZRU \ni i} + \lambda T_{i\tau} \times G_{ZFU2G/ZRU \ni i} + \varepsilon_{i\tau} \]

  \( \Rightarrow \) Treatment interacted with a geographical indicator \( G_{ZFU2G/ZRU} \)

  \( \Rightarrow \) \( \eta \): difference in trends, related to geography

  \( \Rightarrow \) \( \lambda \): difference in the impact of treatment across more or less spatially-isolated neighborhoods
Measuring the spatial isolation of neighborhoods

- **Data sources:**
  - BD TOPO (French National Geographic Institute)
    - Topographical map of France with a metric accuracy
  - GIS of the 93 continental ZFU (projection Lambert93)

- Three geographical dimensions of spatial isolation:
  - **Centrality** within the urban area
    - Market potentials: $MP_{ZFU}(x) = \sum_{j \in UA} x_j \frac{dist(ZFU,j)}{\sum_{j \in UA} x_j}$
  - **Accessibility** within the urban area
    - Distance to transportation networks
    - Catchment areas defined according to buffer-zones
  - **Severance** within the urban area
    - Traffic barriers between the ZFU and the CBDs
    - Other cut-offs between the ZFU and the CBDs (rivers...)
Two polar examples

Les 4000 (Courneuve)  
Chantereigne Montvilliers (Troyes)

Notes: ZFU borders in black, highways in purple, busy roads in orange.

⇒ Road severance (% of the border along traffic barriers): 37% vs 12%
⇒ % ZFU less than 500m away from train stations: 65% vs 0%
⇒ Population access in the UA (MP): 0.09 vs 0.33
⇒ Severance index: 296 vs 155
⇒ Accessibility index: 281 vs 176 ⇒ Global isolation index: 188 vs 126
⇒ Centrality index: 118 vs 268
Average impact of the ZFU program

<table>
<thead>
<tr>
<th></th>
<th>Plant inflows</th>
<th>Creations</th>
<th>Transfers</th>
<th>Jobs</th>
<th>Hours</th>
<th>Wages</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Treatment</strong></td>
<td>0.085**</td>
<td>0.033</td>
<td>0.18***</td>
<td>0.085**</td>
<td>0.050</td>
<td>0.0044</td>
</tr>
<tr>
<td></td>
<td>(0.041)</td>
<td>(0.036)</td>
<td>(0.052)</td>
<td>(0.030)</td>
<td>(0.034)</td>
<td>(0.0055)</td>
</tr>
<tr>
<td><strong>Placebo Test</strong></td>
<td>0.031</td>
<td>0.059</td>
<td>0.13</td>
<td>-0.016</td>
<td>0.016</td>
<td>-0.012</td>
</tr>
<tr>
<td>(Bef. treat.)</td>
<td>(0.052)</td>
<td>(0.049)</td>
<td>(0.10)</td>
<td>(0.051)</td>
<td>(0.054)</td>
<td>(0.0097)</td>
</tr>
<tr>
<td><strong>Nobs</strong></td>
<td>3,301</td>
<td>3,256</td>
<td>1,379</td>
<td>2,714</td>
<td>2,714</td>
<td>2,714</td>
</tr>
<tr>
<td><strong>NMA</strong></td>
<td>110</td>
<td>110</td>
<td>93</td>
<td>109</td>
<td>109</td>
<td>109</td>
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<tr>
<td><strong>R-squared</strong></td>
<td>0.013</td>
<td>0.006</td>
<td>0.023</td>
<td>0.022</td>
<td>0.021</td>
<td>0.004</td>
</tr>
</tbody>
</table>

Notes: Standard errors clustered at the MA level; ***p<0.01, **p<0.05, *p<0.1.
Data sources: SIRENE, DADS, BD-TOPO and GIS SG-CIV.

⇒ New jobs created by firm transfers from surrounding areas
⇒ No impact on the intensive margin of labor and on wages
⇒ Robust to changes in the control group (ZFU3G, distant ZRUs, ...)

New jobs created by firm transfers from surrounding areas
No impact on the intensive margin of labor and on wages
Robust to changes in the control group (ZFU3G, distant ZRUs, ...)

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## Spatial isolation and the dynamics of ZFUs

### Panel 1: Treatment impact on spatially-isolated neighborhoods

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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>0.0071</td>
<td>-0.024</td>
<td>0.12**</td>
<td>0.060*</td>
<td>0.020</td>
<td>0.010*</td>
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<tr>
<td></td>
<td>(0.038)</td>
<td>(0.039)</td>
<td>(0.046)</td>
<td>(0.030)</td>
<td>(0.037)</td>
<td>(0.0058)</td>
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<tr>
<td>Nobs</td>
<td>1,588</td>
<td>1,574</td>
<td>664</td>
<td>1,286</td>
<td>1,286</td>
<td>1,286</td>
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<tr>
<td>R-squared</td>
<td>0.005</td>
<td>0.003</td>
<td>0.014</td>
<td>0.021</td>
<td>0.019</td>
<td>0.005</td>
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</table>

### Panel 2: Treatment impact on spatially-integrated neighborhoods

<table>
<thead>
<tr>
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<th>Wages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>0.16***</td>
<td>0.091***</td>
<td>0.24***</td>
<td>0.114**</td>
<td>0.085**</td>
<td>-0.00023</td>
</tr>
<tr>
<td></td>
<td>(0.029)</td>
<td>(0.030)</td>
<td>(0.053)</td>
<td>(0.041)</td>
<td>(0.042)</td>
<td>(0.0092)</td>
</tr>
<tr>
<td>Nobs</td>
<td>1,713</td>
<td>1,682</td>
<td>715</td>
<td>1,428</td>
<td>1,428</td>
<td>1,428</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.026</td>
<td>0.013</td>
<td>0.030</td>
<td>0.024</td>
<td>0.026</td>
<td>0.003</td>
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</table>

*Notes:* Standard errors clustered at the MA level; ***p<0.01, **p<0.05, *p<0.1.
*Data sources:* SIRENE, DADS, BD-TOPO and GIS SG-CIV.
### Spatial isolation and treatment impact across neighborhoods

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<tr>
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<th>Wages</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Treatment</strong></td>
<td>0.091***</td>
<td>0.038**</td>
<td>0.19***</td>
<td>0.087***</td>
<td>0.053*</td>
<td>0.0046</td>
</tr>
<tr>
<td></td>
<td>(0.015)</td>
<td>(0.016)</td>
<td>(0.042)</td>
<td>(0.026)</td>
<td>(0.027)</td>
<td>(0.0054)</td>
</tr>
<tr>
<td><strong>Isolation index</strong></td>
<td>0.029***</td>
<td>0.020***</td>
<td>-0.015</td>
<td>0.005</td>
<td>0.0049</td>
<td>-0.0048***</td>
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<tr>
<td></td>
<td>(0.0062)</td>
<td>(0.0071)</td>
<td>(0.013)</td>
<td>(0.008)</td>
<td>(0.0077)</td>
<td>(0.0014)</td>
</tr>
<tr>
<td><strong>Treat. × Index</strong></td>
<td>-0.10***</td>
<td>-0.089***</td>
<td>-0.030</td>
<td>-0.032**</td>
<td>-0.043***</td>
<td>0.0053*</td>
</tr>
<tr>
<td></td>
<td>(0.010)</td>
<td>(0.014)</td>
<td>(0.019)</td>
<td>(0.016)</td>
<td>(0.016)</td>
<td>(0.0028)</td>
</tr>
</tbody>
</table>

| Nobs                 | 3,301          | 3,256       | 1,379        | 2,714    | 2,714    | 2,714    |
| R-squared            | 0.018          | 0.010       | 0.021        | 0.023    | 0.022    | 0.005    |

**Notes:** Standard errors clustered at the MA level; ***p<0.01, **p<0.05, *p<0.1.

**Data sources:** SIRENE, DADS, BD-TOPO and GIS SG-CIV.

⇒ Spatially-isolated neighborhoods respond less strongly to treatment
⇒ Spatial integration matters to new businesses, but not to relocations
⇒ Treatment generates a slight wage-premium in spatially-isolated areas
⇒ Robust to the inclusion of ZFU2G/ZRU fixed effects
### Treatment impact across different types of neighborhoods

<table>
<thead>
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<tbody>
<tr>
<td><strong>Treatment</strong></td>
<td>0.092***</td>
<td>0.037**</td>
<td>0.18***</td>
<td>0.087***</td>
<td>0.056*</td>
<td>0.0075</td>
</tr>
<tr>
<td></td>
<td>(0.016)</td>
<td>(0.018)</td>
<td>(0.034)</td>
<td>(0.028)</td>
<td>(0.029)</td>
<td>(0.0049)</td>
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<tr>
<td><strong>Severance</strong></td>
<td>0.0060</td>
<td>0.0031</td>
<td>0.0061</td>
<td>0.0007</td>
<td>-0.0038</td>
<td>-0.0028*</td>
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<tr>
<td></td>
<td>(0.0073)</td>
<td>(0.0075)</td>
<td>(0.015)</td>
<td>(0.009)</td>
<td>(0.011)</td>
<td>(0.0016)</td>
</tr>
<tr>
<td><strong>Treat. × Severance</strong></td>
<td>-0.055***</td>
<td>-0.046**</td>
<td>-0.083***</td>
<td>-0.016</td>
<td>-0.0088</td>
<td>-0.0087**</td>
</tr>
<tr>
<td></td>
<td>(0.015)</td>
<td>(0.019)</td>
<td>(0.026)</td>
<td>(0.025)</td>
<td>(0.029)</td>
<td>(0.0043)</td>
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<tr>
<td><strong>Accessibility</strong></td>
<td>-0.011</td>
<td>-0.012</td>
<td>0.0066</td>
<td>0.004</td>
<td>-0.0065</td>
<td>-0.0027*</td>
</tr>
<tr>
<td></td>
<td>(0.0064)</td>
<td>(0.0083)</td>
<td>(0.013)</td>
<td>(0.007)</td>
<td>(0.0074)</td>
<td>(0.0015)</td>
</tr>
<tr>
<td><strong>Treat. × Accessibility</strong></td>
<td>0.056***</td>
<td>0.062***</td>
<td>0.040</td>
<td>0.0096</td>
<td>0.021</td>
<td>0.0020</td>
</tr>
<tr>
<td></td>
<td>(0.013)</td>
<td>(0.018)</td>
<td>(0.032)</td>
<td>(0.021)</td>
<td>(0.022)</td>
<td>(0.0038)</td>
</tr>
<tr>
<td><strong>Centrality</strong></td>
<td>-0.026***</td>
<td>-0.017**</td>
<td>0.018</td>
<td>-0.0077</td>
<td>-0.0058</td>
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</tr>
<tr>
<td></td>
<td>(0.0071)</td>
<td>(0.0074)</td>
<td>(0.014)</td>
<td>(0.012)</td>
<td>(0.012)</td>
<td>(0.0016)</td>
</tr>
<tr>
<td><strong>Treat. × Centrality</strong></td>
<td>0.065***</td>
<td>0.050**</td>
<td>-0.043</td>
<td>0.024</td>
<td>0.038</td>
<td>-0.015***</td>
</tr>
<tr>
<td></td>
<td>(0.016)</td>
<td>(0.019)</td>
<td>(0.032)</td>
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<tr>
<td>R-squared</td>
<td>0.018</td>
<td>0.010</td>
<td>0.023</td>
<td>0.024</td>
<td>0.023</td>
<td>0.008</td>
</tr>
</tbody>
</table>

**Notes**: Standard errors clustered at the MA level; ***p < 0.01, **p < 0.05, *p < 0.1.

**Lecture**: A one standard deviation increase in the severance index is associated with a 5.5 % point decrease in the growth rate of establishment settlements in ZFU2Gs relatively to ZRUs.

**Data sources**: SIRENE, DADS, BD-TOPO and GIS SG-CIV.
### Panel 1: Treatment impact on hours worked, by industry

<table>
<thead>
<tr>
<th>Industry</th>
<th>Treatment</th>
<th>Constr.</th>
<th>Trade</th>
<th>Hotels</th>
<th>Transp.</th>
<th>RE</th>
<th>Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manuf.</td>
<td>0.027</td>
<td>0.011</td>
<td>-0.014</td>
<td>-0.0052</td>
<td>0.012</td>
<td>0.26***</td>
<td>0.21***</td>
</tr>
<tr>
<td>(0.048)</td>
<td>(0.053)</td>
<td>(0.052)</td>
<td>(0.054)</td>
<td>(0.097)</td>
<td>(0.061)</td>
<td>(0.069)</td>
<td></td>
</tr>
<tr>
<td>Nobs</td>
<td>1,598</td>
<td>2,054</td>
<td>2,319</td>
<td>1,308</td>
<td>961</td>
<td>1,571</td>
<td>1,415</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.004</td>
<td>0.011</td>
<td>0.001</td>
<td>0.007</td>
<td>0.008</td>
<td>0.037</td>
<td>0.023</td>
</tr>
</tbody>
</table>

### Panel 2: Spatial isolation and treatment impact on hours worked, by industry

<table>
<thead>
<tr>
<th>Industry</th>
<th>Treatment</th>
<th>Constr.</th>
<th>Trade</th>
<th>Hotels</th>
<th>Transp.</th>
<th>RE</th>
<th>Health</th>
</tr>
</thead>
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<tr>
<td>Manuf.</td>
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<td>0.015</td>
<td>-0.010</td>
<td>-0.0068</td>
<td>0.023</td>
<td>0.26***</td>
<td>0.21***</td>
</tr>
<tr>
<td>(0.050)</td>
<td>(0.049)</td>
<td>(0.029)</td>
<td>(0.054)</td>
<td>(0.091)</td>
<td>(0.061)</td>
<td>(0.058)</td>
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</tr>
<tr>
<td>Isolation index</td>
<td>0.029**</td>
<td>0.010</td>
<td>0.026**</td>
<td>0.031**</td>
<td>-0.058</td>
<td>-0.0070</td>
<td>0.033***</td>
</tr>
<tr>
<td>(0.012)</td>
<td>(0.015)</td>
<td>(0.012)</td>
<td>(0.013)</td>
<td>(0.038)</td>
<td>(0.016)</td>
<td>(0.0099)</td>
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</tr>
<tr>
<td>Treat. × Index</td>
<td>-0.067</td>
<td>-0.072**</td>
<td>-0.081***</td>
<td>-0.018</td>
<td>-0.029</td>
<td>0.00080</td>
<td>-0.078*</td>
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<tr>
<td>(0.047)</td>
<td>(0.035)</td>
<td>(0.019)</td>
<td>(0.031)</td>
<td>(0.061)</td>
<td>(0.038)</td>
<td>(0.040)</td>
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<td>0.012</td>
<td>0.037</td>
<td>0.026</td>
</tr>
</tbody>
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**Data sources:** DADS, BD-TOPO and GIS SG-CIV.
The impact of the ZFU program is modest:
⇒ It is more effective to displace than to create firms
⇒ It is more effective in extending jobs than hours or wages
⇒ Results robust to changes in the control group

Geography matters to the success of place-based programs
⇒ In itself: spatial isolation reduces the effectiveness of the program
⇒ In combination with other features, such as the distribution of firms across creations & transfers, sectors and workers’ types
⇒ Results robust to the inclusion of ZFU/ZRU fixed effects

Implications of our results for policy-makers:
⇒ Economic growth is harder to stimulate in isolated areas
⇒ Trade-off: subsidize depressed population without creating tons of jobs, or create a lot of new jobs for non-resident commuters...
⇒ One can but encourage to:
  → use geographical criteria when targeting the neighborhoods
  → combine place-based tax breaks with transportation policies
Centrality index

Market access within the UA:

Notes: ZFUs in red; Paris-Urban area in dark; Parisian districts (CBDs) in blue
Access to train and metro stations:

Notes: (i) ZFU #31041ZF “Faubourg de Béthune-Moulin-Lille Sud-L’Epi de Soil” in Lille; (ii) ZFU in red; Stars are train or metro stations; Circles delimit a 500m-wide buffer around each station; (iii) In grey: share of the ZFU less than 500m away from a station.

⇒ 7 rail or metro stations less than 500m away from the ZFU
⇒ 23% of the ZFU located less than 500m away from a station
Road severance at the border (traffic barriers):

Notes: (i) ZFU #2315NZF "La Madeleine" in Évreux; (ii) left: border of the ZFU in red; expressways in black; (iii) right: the red line is the border of a 100m-wide buffer-zone centered on the ZFU border; the black line is the border of a 100m-wide buffer-zone centered on the whole set of expressways; the grey area is the fraction of the ZFU buffer which intersects with the road buffer.

⇒ 46% of the ZFU border run parallel to heavy-traffic barriers