Using Propensity Score Matching to Investigate the Economic Impact of College Outmigration

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Motivation

• Outmigration

  – Illinois has historically ranked near the bottom in outmigration.
  
  – Compounding the problem is the fact that Illinois-based higher education institutions are unable to attract enough high school graduates from outside the state to make up for the loss.
  
  – In terms of net-migration, Illinois also ranks near the bottom.
  
  – Outmigrants are more likely to stay out-of-state upon graduation than their counterparts who enrolled in-state (Adelman, 2004).
  
  – This represents a significant loss of tax revenue for the state (Smith & Wall, 2006).
Outmigration

• Each year the state of Illinois experiences a net loss of roughly 11,000 students.

• Outmigrants tend to be among the best and brightest Illinois high school graduates (Manley et al., 2013; Smalley et al., 2010).

• This represents a significant loss of human capital.
Research Questions

• Given the present and historical problem of outmigration, we are left with the following questions:

  – Do outmigrants return home to work and find employment in Illinois?

  – And if so, what are their earnings?

  – How do these Illinois-specific workforce outcomes compare with an observationally equivalent comparison group?

  – Also, among the outmigrants who returns?
Data Sources

- Home grown database
- ACT/PSAE (all high school graduates from 2003)
- National Student Clearinghouse (through 2010)
  - College Enrollment
  - Degrees
- Illinois-specific UI-wage records (through 2013)
Creating the ‘Treatment’ and Comparison Groups

End of Study Status (seven years out) for the Illinois High School Class of 2003 (N=128,323)

- No Degree, Not Enrolled: 53.9%
- Bachelor’s or higher: 32.7%
- Associate: 7.1%
- Certificate: 5.0%
- No Degree, but Still Enrolled: 1.3%
Defining Outmigrants

- Based on the location of one’s bachelor’s granting institution
- Included community college to four-year transfer students
Outmigration Status

N=41,929

Outmigrant: 32%
Stayer: 68%
Outmigration
Study Group Composition Prior to Matching

Post-Bachelor’s Enrollment

Post-Bachelor’s Enrollment

No Post-Bachelor’s Enrollment

38%

62%

No Valid SSN

Valid SSN

17%

83%

No Major Indicated

Major Indicated

91%

31%

67%

31%

99%

Outmigrant

Stayer

n=25,806

N=41,929

n=21,508

n=19,503

Outmigrant

Stayer

Delisted
Study Group Composition Prior to Matching

N=41,929

Outmigrant: 32%  
Stayer: 68%

Post Bachelor's Enrollment: 38%  
No Post Bachelor's Enrollment: 62%

n=25,806

No Valid SSN: 31%  
Valid SSN: 69%

n=21,508

No Major Indicated: 67%  
Major Indicated: 33%

n=19,503

Outmigrants: 31%  
(n=6,087)

Stayers: 69%  
(n=13,416)
Conceptual Model Predicting Outmigration

Pre-College Characteristics

Environmental Factors

Geography

Involvement

Pathways

Treatment vs. Control
(Probability of being an Outmigrant)
Matching Methods

- Required an exact match on region and locale to control for economic and school context
- Required an exact match on the selectivity of the bachelor’s granting institution to control for college context
- Required an exact match on major (2-digit CIP code) as a post-treatment adjustment
- Used predicted probabilities to find nearest neighbor
- Used a caliper of .25 SD units
- Dummy variable adjustments for those with missing data
Matched Pairs:

• Were from the same region and locale
• Had nearly the same likelihood of being an outmigrant
• Graduated from a four-year college with the same Barron’s competitiveness rating
• Had the exact same major associated with their bachelor’s degree
• The only observable difference between each member of the matched pairs was exposure to the ‘treatment’
## Balancing Diagnostics – Environment

<table>
<thead>
<tr>
<th></th>
<th>Prior to Matching</th>
<th>After Matching</th>
<th>Standardized Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Outmigrants</td>
<td>Stayers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(n=6,087)</td>
<td>(n=13,416)</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High School Level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HS Mean Composite ACT</td>
<td>22.31</td>
<td>21.10</td>
<td>51.86</td>
</tr>
<tr>
<td>HS Percentage Low Income</td>
<td>0.16</td>
<td>0.21</td>
<td>-38.40</td>
</tr>
<tr>
<td>Expected Financial Aid:</td>
<td>0.19</td>
<td>0.20</td>
<td>-1.77</td>
</tr>
<tr>
<td>Planned Work Hours: 0</td>
<td>0.23</td>
<td>0.14</td>
<td>23.65</td>
</tr>
<tr>
<td>Planned Work Hours: 1-10</td>
<td>0.26</td>
<td>0.23</td>
<td>6.60</td>
</tr>
<tr>
<td>Planned Work Hours: 11-20</td>
<td>0.24</td>
<td>0.32</td>
<td>-17.56</td>
</tr>
<tr>
<td>Planned Work Hours: 21-30</td>
<td>0.05</td>
<td>0.09</td>
<td>-15.41</td>
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<tr>
<td>Planned Work Hours: 31 or more</td>
<td>0.01</td>
<td>0.01</td>
<td>-5.15</td>
</tr>
<tr>
<td>Planned Work Hours: Missing</td>
<td>0.22</td>
<td>0.21</td>
<td>2.44</td>
</tr>
</tbody>
</table>

Cells are shaded according to their difference from zero.
Overall Rate of Post-Bachelor’s Illinois Employment

Stayers
- Employed in Illinois at Least One Quarter: 92%
- Never Employed in Illinois: 8%

Outmigrants
- Employed in Illinois at Least One Quarter: 33%
- Never Employed in Illinois: 67%
Cumulative Rate of Illinois Employment by Outmigration Status
Quarterly Wages

- Stayers (50th Percentile)
- Stayers (25th Percentile)
- Stayers (75th Percentile)
- Outmigrants (50th Percentile)
- Outmigrants (25th Percentile)
- Outmigrants (75th Percentile)
Predicting Illinois Employment by Outmigration Status

<table>
<thead>
<tr>
<th></th>
<th>Outmigrants Odds Ratio (n=4,400)</th>
<th>Outmigrants Odds Ratio (n=4,400)</th>
<th>Stayers Odds Ratio (n=4,400)</th>
<th>Stayers Odds Ratio (n=4,400)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1</td>
<td>Model 2</td>
<td>Model 1</td>
<td>Model 2</td>
</tr>
<tr>
<td>STEM to Non-Stem</td>
<td></td>
<td>0.701***</td>
<td></td>
<td>0.769</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01, ***p<.001
Major Findings

• Outmigrants were significantly less likely to gain employment in Illinois relative to stayers.

• Among the outmigrants, those with stronger academic profiles were less likely to obtain Illinois employment.

• Further, the outmigrants with the degrees deemed most important for the Illinois economy were even less likely to return to Illinois for employment.
Consequences of Outmigration

- Outmigrants experienced significantly lower rates of Illinois-specific employment relative to the stayers resulting in substantially lower aggregate Illinois wages among the outmigrant group.

- This in turn, represents some of the negative economic impact that outmigration has on the state of Illinois.
Policy Recommendations

• Data specific recommendations:
  – Entering into data sharing agreements with neighboring states.
  – Graduates of private high schools and the ILDS.

• Education policy specific recommendations:
  – Increasing affordable postsecondary options for Illinois students.
  – Actively recruiting outmigrants to return to Illinois for work.
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