Academic Benefits of Living On Campus

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January 21, 2010
Measuring Impact on Grade Point Average

Measure the impact of living on campus on students’ academic performance, both immediately and in the long-run.

**Dependent Variables**
- Single semester GPA: used to measure immediate effects.
- Cumulative GPA: used to measure permanent effects.

**Explanatory (Treatment) Variables**
- Student lived on-campus during Spring 2008: used to measure immediate effects.
- Student lived on-campus during any time in the past: used to measure permanent effects.
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Measuring Channels for Improved Performance

Campus Resources

Are students that live on campus...

- study with campus resources: common study areas, computer labs, libraries?
- more likely to see a tutor?
- more likely to engage in extra-curricular activities?
- more likely to use university-provided fitness centers?
- spend more time studying?

Peer Influences

Are students that live on campus...

- more likely to study with roommates and/or classmates?
- less likely to engage in drugs and alcohol with peers?
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Policy Questions

1. Can changing residence hall resources and/or residence hall policies effect academic performance?
2. If so, how?

Search for Causation

- Essential to establish causation for policy implications.
- A laboratory scientist would randomly (independently) assign subjects to a control and treatment group.
- Instrumental Variable Regression: statistical technique that identifies an independent variable to identify causation.
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Sample Selection Bias

- Subjects are not randomly put into treatment and control groups.
- More highly motivated students may choose to live in dorms.
- Students who know they could use the benefits from living on campus may choose to live in dorms.

Instrumental Variables

- Find variable(s) unrelated to academic performance that influence treatment/control assignment.
- Instruments: distance of hometown from school, denied housing due to space limitations.
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On Campus Residence

- Positive impact for freshman: Thompson, et. al. (1993).
- No difference: Delucchi (1993).
- Critical thinking skills: Pascarella et. al. (1993):
Literature

Peer Influences

- Positive influences are dominant: Henderson et. al. (1978).
- Negative influences carry through college: Betts and Morell (1999).
- “Average” students most susceptible to peer influence: Zimmerman (2003).

Campus Resources

- Faculty student interaction: Pascarella and Terenzini (1991), Astin (1993), Kuh and Hu (2001a)
- Information technology: Kuh and Hu (2001b)
- Institutional spending / not necessarily academic support: Toutkoushian and Smart (2001)
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Find evidence of causation.

Investigate the *channels* of dormitory influences.

Changes in student characteristics and features of higher learning likely changes how students learn: Pascarella and Terenzini (1991).
Population and Sample

Population
- Undergraduate students at Indiana University Purdue University - Indianapolis.
- Approximately 19,700 students under age 25.
- Extremely limited on-campus housing capacity: 1,107.
- No on-campus housing requirements.

Sample
- Electronic survey given to 6,000 undergraduate in Fall 2008.
- 363 completed questionnaire [see Sax et. al. (2003)]
- Questions included: living situation, social life, study habits, campus resource utilization, cultural background, academic background.
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Measure of academic performance

- Semester GPA.
- Cumulative GPA.

(Each examined in turn)

Living on campus dummy

- Student lived on campus in concurrent semester.
- Student lived on campus anytime while at IUPUI.
- Student lived on campus in any prior semester.
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Instruments and Controls

Instrumental variables
- Distance of hometown from campus - positively related to whether a student lived on-campus.
- On-campus housing turned down due to lack of available space (dummy).

Controls
- Gender
- Parents’ income
- Non-traditional student dummy (age > 25)
- ACT/SAT percentiles
- Number of semesters completed
- Number of credits in Spring 2008.
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Channel Variables

University Provided Resources: Fall 2008
- Use of fitness resources (hours per week – Tobit).
- Use of tutors (hours per week - Robust OLS).
- Engagement in extra-curricular activities (dummy - Probit).
- Hours using campus resources (hours per week - Tobit).
- Hours studying (hours per week - Tobit).

Peer-Influenced Variables: Fall 2008
- Number of drinks per week (Robust OLS)
- Ever used drugs while at IUPUI (Probit)
- Study with roommates (hours per week - Tobit)
- Study with classmates (hours per week - Tobit)
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Estimating Academic Benefits

Estimation Procedure

1. OLS (No instruments / no control for self-selection bias)
2. IV: Just-identified using only distance from campus.
3. GMM using both instruments.
4. Two-stage MLE (first stage probit) using both instruments.

Three Specifications

1. Cumulative GPA on DORM_EVER.
2. Spring Semester 2008 GPA on DORM_EVER.
3. Spring Semester 2008 GPA on DORM_S08.
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### Coefficient on Living on Campus Dummy

<table>
<thead>
<tr>
<th></th>
<th>Cumulative GPA on DORM_EVER</th>
<th>Spring 2008 Semester GPA on DORM_EVER</th>
<th>Spring 2008 Semester GPA on DORM_S08</th>
</tr>
</thead>
<tbody>
<tr>
<td>OLS, IV, GMM, MLE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OLS</td>
<td>0.210** (0.087)</td>
<td>0.185* (0.095)</td>
<td>0.303*** (0.096)</td>
</tr>
<tr>
<td>IV</td>
<td>0.312* (0.187)</td>
<td>0.221 (0.289)</td>
<td>0.490 (0.642)</td>
</tr>
<tr>
<td>GMM</td>
<td>0.448*** (0.140)</td>
<td>0.416** (0.212)</td>
<td>0.973* (0.526)</td>
</tr>
<tr>
<td>MLE</td>
<td>0.431*** (0.156)</td>
<td>0.410** (0.166)</td>
<td>0.693*** (0.201)</td>
</tr>
</tbody>
</table>

Standard errors in parenthesis.

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Academic Benefits of Living On Campus
Explanatory Variables:
- DORM_PAST: Whether or not student lived on campus in the past.
- DORM_F08: Whether or not student lived on campus in Fall 2008 semester.
  (Both included simultaneously)
- Same set of controls.

No IV estimation:
- Computationally, it’s hard with limited dependent variables.
- Limited sample size and limited explanatory power.
### Results for Campus Resources

<table>
<thead>
<tr>
<th></th>
<th>FITNESS</th>
<th>TUTORS</th>
<th>XTCUR</th>
<th>CAMPUS</th>
<th>STUDY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tobit</td>
<td>Robust OLS</td>
<td>Probit</td>
<td>Tobit</td>
<td>Tobit</td>
</tr>
<tr>
<td>DORM_F08</td>
<td>-3.687**</td>
<td>0.153</td>
<td>0.788*</td>
<td>-6.613***</td>
<td>-1.702</td>
</tr>
<tr>
<td></td>
<td>[1.459]</td>
<td>[0.136]</td>
<td>[0.429]</td>
<td>[2.066]</td>
<td>[1.55]</td>
</tr>
<tr>
<td>DORM_PAST</td>
<td>0.023</td>
<td>-0.279**</td>
<td>0.937***</td>
<td>0.916</td>
<td>1.296</td>
</tr>
<tr>
<td></td>
<td>[1.069]</td>
<td>[0.11]</td>
<td>[0.268]</td>
<td>[1.532]</td>
<td>[1.317]</td>
</tr>
<tr>
<td>N</td>
<td>207</td>
<td>225</td>
<td>232</td>
<td>231</td>
<td>225</td>
</tr>
<tr>
<td>F-stat</td>
<td>1.67</td>
<td>1.46</td>
<td>—</td>
<td>3.09***</td>
<td>1.46</td>
</tr>
<tr>
<td>Wald Stat</td>
<td>—</td>
<td>—</td>
<td>50.45***</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>(Pseudo) $R^2$</td>
<td>0.0163</td>
<td>0.0206</td>
<td>0.1663</td>
<td>0.0228</td>
<td>0.0025</td>
</tr>
</tbody>
</table>

- Except for extra-curricular activities, significant values have opposite than expected signs.
- Engaging in extra-curricular activities has an immediate and permanent effect.
## Results for Peer Influences

### Peer-Influenced Variables

<table>
<thead>
<tr>
<th></th>
<th>DRINKS</th>
<th>DRUGS</th>
<th>STUDCLASS</th>
<th>STUDROOM</th>
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<tr>
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<td>Probit</td>
<td>Tobit</td>
<td>Tobit</td>
</tr>
<tr>
<td>DORM_F08</td>
<td>-0.186</td>
<td>0.200</td>
<td>0.051</td>
<td>2.077</td>
</tr>
<tr>
<td></td>
<td>[0.183]</td>
<td>[0.389]</td>
<td>[1.156]</td>
<td>[1.803]</td>
</tr>
<tr>
<td>DORM_PAST</td>
<td>-0.341***</td>
<td>0.204</td>
<td>2.313***</td>
<td>2.467**</td>
</tr>
<tr>
<td></td>
<td>[0.131]</td>
<td>[0.312]</td>
<td>[0.812]</td>
<td>[1.218]</td>
</tr>
<tr>
<td>N</td>
<td>226</td>
<td>230</td>
<td>231</td>
<td>230</td>
</tr>
<tr>
<td>F-stat</td>
<td>4.58***</td>
<td>—</td>
<td>2.37**</td>
<td>3.50***</td>
</tr>
<tr>
<td>Wald Stat</td>
<td>—</td>
<td>26.98***</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>(Pseudo) $R^2$</td>
<td>0.1322</td>
<td>0.1140</td>
<td>0.0272</td>
<td>0.0601</td>
</tr>
</tbody>
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Delayed but significant long term effects:

- Less likely to consume alcohol.
- More likely to study with peers.

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- Permanent effect: estimates range from 0.210 (OLS) to 0.448 (IV/GMM) increase in cumulative GPA.

Channels

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- Consume less alcohol in subsequent semesters.
- More likely to participate in extra-curricular activities, stay involved.
- Largely failed to identify channels to explain an immediate effect.
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