Is College Worth It? For Whom?

Thomas R. Bailey
Clive R. Belfield

December 11, 2015   |   IES Principal Investigators Meeting   |   Washington, DC
Bachelor’s Degrees Are Worth It

<table>
<thead>
<tr>
<th>Study</th>
<th>PV Earnings over HS Graduate (*Net of college costs)</th>
<th>Source</th>
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<tr>
<td>Agan (2013)*</td>
<td>$243,700</td>
<td>NLSY79</td>
</tr>
<tr>
<td>Tamborini et al. (2015)</td>
<td>$266,100</td>
<td>SIPP, IRS</td>
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<tr>
<td>Kim et al. (2015)</td>
<td>$321,100</td>
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<td>Mitchell (2014)</td>
<td>$354,300</td>
<td>SIPP 2008</td>
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<tr>
<td>Barrow &amp; Malamud (2015)*</td>
<td>$434,900</td>
<td>CPS 2013</td>
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<td>Avery and Turner (2010)*</td>
<td>$462,000</td>
<td>CPS2009</td>
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<td>Webber (2014)*</td>
<td>$492,400</td>
<td>NLSY79, ACS</td>
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<tr>
<td>Herschbein &amp; Kearney (2014)</td>
<td>$610,000</td>
<td>ACS 2009-12</td>
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<td>Barrow &amp; Rouse (2005)*</td>
<td>$629,400</td>
<td>CPS 2004</td>
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<td><strong>Average (N=9)</strong></td>
<td><strong>$423,800</strong></td>
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CAPSEE Agenda

① What are the employment/earnings benefits of educational pathways and awards?
   • For sub-BA awards, certificates, non-completers, by field of study, at for-profits, after remediation

② What institutional programs and public policies improve completion rates and employment/earnings?
   • Aid, Work Study, SAP incentives, One-Stop Centers
CAPSEE Data

- Transcripts across state-wide community college and four-year college systems for FTIC cohorts in 2000s
- Transfer data from National Student Clearinghouse
- Earnings data from UI systems pre- and post-college

- Many states: AR, CA, MI, NC, NY, OH, VA, WA
Returns to Community College

- By Award
- If Transfer
- On Entry Status
- Per Pathway
## Returns to Community College

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**Data quality, methodology**
Data

• Missing data:
  • Migration out of state; uncovered by UI; reverse transfers

• Window for follow-up is too short:
  • AAs earnings overtake non-completers only after 15Q
  • Over 35Q, earnings gradient for non-completers is flat, for AAs is linear (for BAs is growing)

• Need individual-level data
Split by Gender: Female Students

Different characteristics:
- More prepared (HSGPA +0.15)
- Older and richer (Age > 24 +8%p; EFC +$1950)

Choose differently:
- More intent on AA (+11%p)
- Study health/nursing (+++)

Do better:
- Do better in first semester (CGPA +0.24)
- More credits (+6)
- More awards (+5%p)
Quarterly Earnings by Gender Degree Completers (AR, KY, MI, OH)

- **Male**
- **Female**

College entry 18 Quarters later
Methodology

Fixed Effects or OLS estimations?

• **OLS:**
  • Sensitive to omitted variable bias
  • But easy to interpret and robust

• **Fixed Effects:**
  • Control for unobservable, unchanging individual heterogeneity
  • But not easy to interpret although robust
Fixed Effects: AA over No Award

- Sampling issues:
  - Missing versus zero earnings
  - Transfer students
  - (Not important: age, follow-up, excl. BAs, young, low-wage)

- Specification issues:
  - Award definition (toggle on/off for highest award)
  - (Not important: time trends, Ashenfelter dip, award*enroll interaction)

- OLS and FE results consistent/similar, vary together
By Award

Earnings gains for:

(1) AA degrees
(2) Certificates
(3) Credits
(4) Different no awards
Quarterly Earnings Gains:
AA over No Award 8 Years Post-FTIC (Fixed Effects)

<table>
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<tr>
<th>State</th>
<th>Male Mean</th>
<th>Female Mean</th>
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<tr>
<td>AR</td>
<td>$1,040</td>
<td></td>
</tr>
<tr>
<td>WA</td>
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<td>$1,800</td>
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<td>VA</td>
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PV gain for AA (30 years d=3%)
Male $75,000
Female $135,000
Quarterly Earnings Gains:
Certificate over No Award 8 Years Post-FTIC (Fixed Effects)

- AR
- VA
- WA
- Mean $250
- KY
- NC
- MI
- AR
- NC
- KY
- AR
- Mean $570
- MI
- WA

Mean: $570

Quarterly Earnings Gains: Certificate over No Award 8 Years Post-FTIC (Fixed Effects)

Gains are: modest, temporary, non-robust (except in health).

But certificates vary substantially in credits.
Quarterly Earnings Gain over Zero Credits (8 Years After FTIC in VA/NC)
Award (4): No Award

- Returns to awards *ex ante* reflect:
  - $R_C$: Returns to completion of award (*ex post*)
  - $P(C)$: Probability of completion
  - $R_{NC}$: Returns to non-completion

- *Ex ante* returns differ from *ex post* returns because of differences in completion probabilities and returns to non-completion
Returns over Diploma-Holder

- Female
  - AA: -40%
  - Cert: 0%
  - No AA: -20%
  - No Cert: 20%
  - No Dipl: 0%

- Male
  - AA: -20%
  - Cert: -20%
  - No AA: 0%
  - No Cert: 0%
  - No Dipl: 0%
By Award: Questions

① What are the returns to different types of AA degrees?
② Are returns to certificates actually subject effects?
③ What are the returns to awards that interact/stack?
By Transfer

(1) To for-profit colleges

(2) Upward to four-year colleges
Transfer (1): To For-Profit Colleges

- Evidence (but weak) of earnings penalty from attending FP
- No clear gains in earnings from even attending FP after community college
- Big tuition / loan balance penalty to FP
- Resume studies: “the bachelor's degrees granted by [FPs] are associated with the worst callback outcomes for jobs requiring a bachelor's degree”
Figure 3. Earnings of College Enrollees Ten Years Later
[Aggregated by College]

Transfer (2): Upward

Students who transfer to a four-year public college have:

- Higher earnings than students who do not transfer (Reynolds, 2012)
- Lower earnings than those who started at a four-year college (Andrews et al., 2013)

Earnings gains are sensitive to pathways:

- Which type of college a student transfers to
- Whether student completes an award before transfer
By Transfer: Questions

① What are the adverse features of for-profit colleges?
② What are the returns to reverse transfer?
③ What is the value of transfer with AA degree versus without?
By Entry Status

Returns by:

1. High school quality
2. Preparedness
3. Age
Quarterly Earnings Gaps of Arkansas Community College Students Across 147 High Schools
Quarterly Earnings Gaps of Arkansas Community College Students Across 147 High Schools

Earnings gaps are not statistically significantly different for schools within box.
Entry Status (2): Preparedness

- More prepared students earn more
- Controls for preparedness do not much influence returns to college
- Estimation split by preparedness shows similar returns
Earnings Gains:
AA over No Award, Well-Prepared Students

- Male
  - HS GPA
  - HS Award

- Female
  - HS GPA
  - HS Award

Readiness

Earnings:

- Male: $0
- Female: $1,000
- Male: $2,000
- Female: $0

Students: Male

Prepared: Male

Students: Female

Prepared: Female
Earnings Gains: AA over No Award, Ill-Prepared (Light Bars) and Well-Prepared Students

- Readiness
- Male HS GPA
- HS award
- Readiness
- Female HS GPA
- HS award

$0  $1,000  $2,000
Entry Status (3): Age

Earnings Growth: AA Completers by Age on Entry

- Ages 18-20
- Ages 21+

[Graph showing earnings growth over time for different age groups.]
Entry Status: Questions

① Is this a puzzle?
   • More prepared students have higher earnings
   • All students gain about the same in earnings

② If entry status does not influence returns per year of attainment, what selection decisions are students making?
Per Pathway

Pathways:
(1) Subject / field
(2) College choice
(3) Aid allocation
(4) Working while enrolled
(5) Course sequences
Per Pathway (1): Subject/Field

• Heterogeneous returns per:
  • Subject / field (vocational/CTE)
  • Subject-award combination

• Health awards:
  • Returns are big, persistent, and robust to modeling / sub-sampling
  • Approx. double returns to other AAs
Per Pathway (2): Choosing a College

- College attended does not seem to matter much

- US DOE data:
  - Community college completion rate
  - College-level average earnings 10 years later
  - Correlation between these variables: approximately zero
Figure 5-9a: Relationship Between Earnings and Completion Rate

Mean Earnings
120,000
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0

Completion Rate
0
0.2
0.4
0.6
0.8
1

- 2 Year Schools
- 4 Year Schools

Note: Chart uses 10 year mean earnings and the 150% completion rate from IPEDS.
Source: Department of Education, College Scorecard Data
Per Pathway (3): Aid

Aid effects are extremely complicated:

- Type of aid
- Take-up of aid
- Incentives
- Targeting accuracy
- Changes in aid systems
Per Pathway (4): Job

- FE models estimate that penalty to being in college is $200-$300 per quarter
- Very low earnings penalty for studying
- Preliminary evidence shows that work-study is an effective form of student aid because it offers better jobs
Per Pathway: Questions

① Why do health programs not expand?
• College-level barriers to enrollment in high-return fields?
• Restrictive practices in labor market?
• Selectivity into low returns areas?

② Which college characteristics matter: Class size? Faculty quality?
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