Estimating Returns to College Attainment:

Comparing Survey and State Administrative Data Based Estimates

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Outline

- Research motivation
- Data
- Key findings
- Inter-state mobility and returns to higher education
- Policy implications

Limitations of State Administrative Databases

- State databases seldom contain information on students' family background, previous academic performance, or test scores;
- State databases typically include only students who enrolled for at least one credit in college;
- State databases typically contain wage records only for those who work in the same state after college graduation.

Research Motivation

Use data from *National Longitudinal Survey of Youth 1997 (NLSY97)*

- to provide nationally representative estimates of the early-career returns to post-secondary degrees;
- to assess the possible limitations of single-state, administrative-data-based estimates.

Data: NLSY97

- A longitudinal project that follows a sample of youth in the U.S. who were 13–17 years old at first round of survey in 1997;
- We use data from the first 15 rounds that covers the years of 1997-2011 (respondents were 27-31 years old in 2011);
- NLSY97 contains detailed information on respondents' family background, test scores, and academic performance at each schooling level;
- 66% of the NLSY97 sample have enrolled in college (another 23% only got a HS diploma/GED and the remaining 11% have no educational credentials);
- NLSY97's restricted geocode data contain geographic information, including the state, county, and metropolitan area of residence for each respondent in each survey year.

Findings: Returns to College Attendance and Completion

- Compared with those who only have a high school diploma or GED, people with a BA or higher earn about $18,000 (59%) more in 2010;
- People with an AA degree earn about $6,800 (25%) more, and people who attended some 4-year college without a degree earn about $5,000 (21%) more;
- Returns to other credentials (i.e., certificate and some 2-year college) are not statistically significant;
- All models control for age, race, gender, working experience, geographic and family background, and ability.

Comparing Survey and Administrative Data Based Estimates

Table 1: Comparing Estimates With Different Sample Limitations and Controls

	Model 1			Model 2			Model 3			Model 4		
Variable	Coef.	(S.E.)		Coef.	(S.E.)		Coef.	(S.E.)		Coef.	(S.E.)	
College enrollees only	(College non-completers mean = $34,496)											
Certificate	-$1,614	(2852)		-$1,645	(2760)		-$1,327	(2737)		-$630	(2725)	
Associate's degree	$6,502	(1849)	***	$6,369	(1791)	***	$6,375	(1781)	***	$5,568	(1774)	***
Bachelor's degree	$17,221	(1116)	***	$20,519	(1098)	***	$18,546	(1131)	***	$16,569	(1167)	***
All high school completers	(HS/GED only mean = $31,419)											
Some 2-yr coll. (only)	$1,060	(1278)		$839	(1227)		-$254	(1228)		-$1,122	(1228)	
Some 4-yr coll. (only)	$7,354	(1468)	***	$8,785	(1410)	***	$7,271	(1423)	***	$4,981	(1452)	***
Some coll. (only, type unk.)	$1,988	(4112)		$3,671	(3945)		$2,991	(3918)		$2,130	(3900)	
Certificate	$1,911	(2688)		$2,345	(2580)		$1,444	(2564)		$624	(2553)	
Associate's degree	$9,944	(1758)	***	$10,360	(1688)	***	$8,953	(1690)	***	$6,794	(1708)	***
Bachelor's degree	$20,620	(1084)	***	$24,355	(1053)	***	$21,215	(1130)	***	$17,942	(1217)	***
Model controls:												
Incl. age, race, gender	X			X			X			X		
Incl. exp. and exp. squared				X			X			X		
Incl. geographic and family background							X			X		
Incl. HS GPA and ASVAB										X		

*** $p < .01$, ** $p < .05$, * $p < .1$

Comparing Survey and Administrative Data Based Estimates

- The broad pattern of findings is quite robust to alternative specifications (i.e., with different sets of controls); However, the magnitude of the point estimates can vary substantially:
- For example, controlling for high school GPA and test scores reduces estimated returns to bachelor's degrees by 13 percent, associate degrees by 32 percent, and certificates by 67 percent;
- On the other hand, estimates of returns are biased downward when samples are restricted to college enrollees only (versus using high school graduates as the comparison group).
- On balance, these two countervailing influences roughly balance out.

Inter-state Mobility and Educational Attainment

Table 2: Education and Interstate Mobility (College v.s. High School Only)

	Probability of ever moved across states since 18 years old			Probability of residing in a different state in 2010 from state of residence at 17 years old		
Variable	Coef.	(S.E.)		Coef.	(S.E.)	
Some coll., 2-yr	0.045	(0.018)	**	0.013	(0.017)	
Some coll., 4-yr	0.099	(0.022)	***	0.091	(0.020)	***
Certificate	0.113	(0.039)	***	-0.007	(0.035)	
AA	0.073	(0.027)	***	0.022	(0.024)	
BA	0.140	(0.019)	***	0.130	(0.017)	***
HS/GED (only) mean	0.212			0.128		
N	5753			5371		

*** $p < .01$, ** $p < .05$, * $p < .1$

Interstate Mobility and Returns to Education

Table 3: How Estimated Returns Interact With Interstate Mobility

	Conditional on positive earnings						Unconditional earnings					
	Baseline			Add interactions			Baseline			Add interactions		
Variable	Coef.	(S.E.)		Coef.	(S.E.)		Coef.	(S.E.)		Coef.	(S.E.)	
Earnings in 2010 (inflated to 2015 $)												
Some 2-yr coll. (only)	-$1,122	(1228)		-$1,069	(1333)		-$499	(1060)		-$529	(1152)	
Some 4-yr coll. (only)	$4,981	(1452)	***	$3,540	(1647)	**	$5,037	(1278)	***	$3,491	(1451)	**
Certificate	$624	(2553)		$544	(2858)		$575	(2225)		$23	(2462)	
Associate's degree	$6,794	(1708)	***	$8,017	(1884)	***	$7,917	(1552)	***	$9,191	(1720)	***
Bachelor's degree	$17,942	(1217)	***	$15,832	(1324)	***	$20,939	(1095)	***	$18,605	(1199)	***
Some 2-yr coll., working OOS				-$525	(2653)					-$303	(2348)	
Some 4-yr coll., working OOS				$5,899	(2698)	**				$7,225	(2461)	***
Certificate, working OOS				-$7,317	(7264)					-$4,877	(6420)	
Associate's degree, working OOS*				-$5,249	(3968)					-$4,928	(3650)	
Bachelor's degree, working OOS				$7,724	(1433)	***				$8,528	(1378)	***
HS/GED (only) mean	$31,420						$23,199					
N	4699			4417			5735			5371		

*** $p < .01$, ** $p < .05$, * $p < .1$

Key findings

- Bachelor's degree holders (and those with some four-year college but no degree) are more likely to work outside their home state after college;
- Bachelor's degree holders (and four-year college non-completers) who work out of state also earn more than their counterparts who remain in their home state, suggesting that part of the payoff from four-year college comes from interstate migration;
- Other levels of attainment appear to have no significant correlation with interstate mobility (if anything, associate degree holders who leave their home state appear to earn less than their counterparts who remain).

Treatment of Out-of-State Earnings

Table 4: Alternative Approaches to Treating Out-of-State Earnings

	Unconditional earnings						Conditional on positive earnings from…					
	(1) baseline			(2) naïve treatment (OOS=>0)			(3) …any state (baseline)			(4) …home state only		
Variable	Coef.	(S.E.)		Coef.	(S.E.)		Coef.	(S.E.)		Coef.	(S.E.)	
College enrollees only												
Certificate	-$1,000	(2414)		$996	(2561)		-$630	(2725)		-$682	(2849)	
Associate's degree	$6,355	(1647)	***	$8,592	(1738)	***	$5,568	(1774)	***	$7,746	(1889)	***
Bachelor's degree	$19,151	(1087)	***	$10,649	(1049)	***	$16,569	(1167)	***	$15,129	(1188)	***
All high school completers												
Some 2-yr coll. (only)	-$499	(1060)					-$1,122	(1228)				
Some 4-yr coll. (only)	$5,037	(1278)	***				$4,981	(1452)	***			
Certificate	$575	(2225)					$624	(2553)				
Associate's degree	$7,917	(1552)	***				$6,794	(1708)	***			
Bachelor's degree	$20,939	(1095)	***				$17,942	(1217)	***			
Model controls:												
Incl. age, race, gender	X			X			X			X		
Incl. exp. and exp. squared	X						X					
background	X						X					
Incl. HS GPA and ASVAB	X						X					

*** $p < .01$, ** $p < .05$, * $p < .1$

Out-Of-State Earnings and Returns to College

- The effect of out-of-state mobility is harder to fix:
- Mobility does not appear to be a major obstacle to accurately estimating returns to associate degrees and other sub-baccalaureate credentials;
- But simply treating all out-of-state earnings as zeros substantially underestimates the returns to bachelor's degrees;
- A possible fix is to estimate returns ***conditional on*** in-state employment. We find that this provides a reasonable estimate of the returns conditioned on any employment, but since bachelor's degrees also positively influence employment rates, this still understates the returns to a bachelor's degree.

Discussion

- A simplistic approach that treats all out-of-state earnings as zero earnings (as many state databases, by default, do) will ***severely understate*** the returns to bachelor's degrees, but ***overstate*** the returns to associate degrees;
- Conditioning on in-state employment greatly ameliorates the problem for bachelor's degrees (though conditioning on employment itself will tend to underestimate the total returns to a bachelor's degree), but does not address the problem for associate degree estimates.

Policy Implications

- Based on single-state administrative databases, estimates on returns to sub-baccalaureate degrees are quite precise;
- Might under-estimate the returns to bachelor's degrees;
- Overall, state administrative databases, while imperfect, are still a valid and useful way to examine returns;

Policy Implications

- Moreover, state administrative data has many practical advantages: their large size and frequency make it feasible for policymakers to track outcomes over time for many smaller subgroups than is possible in the NLSY;
- State administrative databases have a particularly strong comparative advantage when it comes to estimating returns to specific degree-fields, especially at the sub-baccalaureate level (for which numbers of observations are quite small in the NLSY).

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