Does More-Expensive College Serve as a Disincentive for High School Graduation?

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In partial fulfillment of the requirement for the Honor's Degree

ABSTRACT

This paper attempts to gain insight into the impact college cost has on graduation rates in secondary education. Both high school and college degree earners have significantly higher wage prospects and quality of life than their non-high school graduate counterparts, in addition to option value that is inherent to both enrollment in high school and college. College affordability has also been shown to incentivize higher college enrollment. I hypothesize that in spite of associated economic positives, the cost of college is a salient factor in individuals' evaluations of the option value of a high school degree, thus leading some students on the margins to miscalculate the value of completing their high school degree and ultimately lowering the graduation rate within their state. Using an ordinary least squares regression, primarily on ASEC and NCES data, I find mixed results with the exception that the hypothesized effect is much more likely to exist for two-year institutions.

I. INTRODUCTION

While high school graduation rates in commonly reported government statistics have been improving steadily since at least 1970 (NCES), there is a general consensus among outside experts that these measures are generally inaccurate (Heckman & LaFontaine, 2010). The inaccuracies mostly stem from the fact that GED recipients are counted in one widely used measure, the *high school status completion rate* (HSSCR), which is the percentage of 18 to 24-year-olds possessing a high school credential (Heckman & LaFontaine, 2010). GEDs, while originally used for GIs coming back from World War II, have become far more widely used, and as a result this measure has seen a general upward trend over past decades. The main problem in including GED recipients in measures of high school graduation is the fact that this group sees different economic outcomes than high school graduates (Heckman and LaFontaine [2006,2009]). Including them in commonly-used measures leads to bias and miscalculation in research and the formulation of education policy.

Other measures have been generated to give a more-accurate representation of the overall state of secondary education in the United States; among these is the *adjusted cohort graduation rate (ACGR)*. The AGCR is calculated as the number of students who graduate within four years of entering 9th grade, with the 9th grade cohort consisting of first-time 9th graders with adjustments made along the four-year duration for transfers in and out of the cohort (NCES 2017). In this research, I use the ACGR as reported by the National Center for Education Statistics' (NCES) Common Core of Data (CCD) for the years 2006 through 2010. This choice was primarily made due to the time involved in constructing the 8th grade-proxied graduation rate and the time constraints to which I was subjected. Further investigation could take place on whether the use of the 8th grade rate changes the results I provide.

Additionally, college costs over the last few decades have seen significant increases, outpacing inflation. Since 1971, costs have increased an average of 2.7% per year for two-year public institutions and 3.1% per year for four-year public institutions. Over the period of inquiry, 2006 to 2010, these costs have increased by an average of .02% and 4.5%, respectively. (College Board, 2017)

College affordability can serve as an incentive for students to perform better in high school, knowing that the option of higher education will be within reach if the performance standards are met. This is especially true for those students on the margins; with a slightly stronger incentive on their horizon, it is possible that they will stay in school and be more inclined to graduate.

II. LITERATURE & THEORY

Literature

Heckman & LaFontaine [2010] estimated through various alternative measurements of high school graduation that the rate hit its peak in 1970 and is consistently lower than officially reported numbers. Furthermore, they attest that while GED recipients have had an equivalency to high school graduates in official statistics, in actuality they see significantly lower results in quality of life due to "non-cognitive skills such as perseverance and motivation" (Heckman & LaFontaine, 2010). It is, in part, for this reason that it is constantly sought to improve high school graduation. There exists proxy response bias and low sample coverage in CPS data, meaning that the use of this data for the estimation of accurate graduation rates is not optimal; for this reason, I use an NCES measure that encompasses all high school students within an individual state and year. Heckman & LaFontaine describe three alternative measures of high school completion, based on CPS supplemental data, NCES Common Core Data (CCD), and National Longitudinal Surveys (NLS) data, respectively; these each come with their own issues.

Using a two-stage dynamic model, Stange [2012] estimates the option value of college at 14% of the total value of attending college. Stange sees this as rationalization of dropping out when "sheepskin" effects are present because individuals must learn of costs and benefits post-enrollment. Certain shocks can alter an individual's preferences and perceptions, making them more- or less-likely to stay in university. Altonji [1993], states that uncertainty regarding the difficulty of schooling can lead to the creation of option value; for high school students considering university, this includes two levels of uncertainty: difficulty of high school and expected difficulty of university.

Klein & Perry-Sizemore [2017] investigate the effect of merit scholarships on high school graduation rates using OLS and various selection models and generally find that the existence of a merit scholarship program increases graduation rates. Some results estimated a negative coefficient, but this may be due to the fact that poorly performing states were among the first to implement such programs. Denning [2017] looks into the effect of community college tuition on enrollment decisions. It finds that a $1000 decrease in tuition leads to a 5.1% increase in enrollment, or an elasticity of -0.29. Additionally, it is found that these enrollees on the margins have similar graduation rates, implying that, if incentivized, those on the margins can equally take advantage of educational investment. Between these two papers, it is apparent that college cost can be an effective incentive in growing human capital.

Theory

College affordability can serve as an incentive to nudge those students on the margins to become more inclined to graduate high school. Note that this is not saying that the student will go on to enroll in university due to its affordability, which other literature has investigated (see Denning, 2017), but rather that this variable serves as a factor in the level of incentive to graduate high school. Put simply, college cost as an incentive is one step removed from high school graduation.

The choice students face in high school pertaining to continuation of schooling is likely driven by economic, social, and psychic costs (Stange, 2012). If these costs are greater than the expected future benefits they will generate, a student will drop out. One caveat to this is the fact that states differ in their level of compulsory education, with schooling being required until the age of 16, 17, or 18, depending on the state. This variation, if assigned randomly, would theoretically lead to depressions in the graduation rates of states with lower required ages of schooling. This would be due to the additional ability of individuals in states with lower age requirements to have more time, one or two years typically, to act on the perceived costs and anticipated benefits of additional schooling. These costs and benefits become more salient and more apparent as students approach this juncture and, with the established benefits of a college degree (Bijlsma & van der Velden, 2016), should pull more students towards graduating.

While classical economic theory would make assumptions such as perfect information or rationality of actors, the circumstance in question is more in-line with the Austrian thinking of the action of an individual being the rational action because it was the action taken. While this is entirely tautological, it gets to the point of miscalculated action still being rational in the eyes of the action-taker. Uneducated individuals, including 16 and 17 year olds, are not fully rational beings and typically underperform at complex cost-benefit analyses such as the decision to stay in school for benefits far-removed, but this does not make their miscalculated decision the wrong one, per se; it is the right decision in that instant in time. These "failings" can be attributable to "bounded rationality," as described by Thaler & Sunstein [1998].

The goal of compulsory education is to enhance the education level of the populace in order to promote economic gains (Torun, 2015), but a secondary goal can be interpreted as requiring students to remain in school until an age where they are typically seen as able to make a decision as large as whether to continue schooling or not. In this sense, compulsory education should serve to have students reserve these decisions until the benefits of education are more salient and, as it relates to my analysis, increase the graduation rate as the age for compulsory schooling increases.

What the data show, at first glance, is a different story. A simple scatter plot and ordinary least squares (OLS) regression show a slightly negative relationship between additional compulsory schooling and the high school graduation rate; however, the relationship is not statistically significant. It is likely that the graduation rate is primarily driven by more-fundamental characteristics within a state than its policy on required schooling. Any variation is absorbed in the creation of state-year averages. A statistical summary of the three groups of states can be found in *Table 2*.

The hypothesis that the incentivization from college cost would be strongest on the margins can be observed indirectly via the difference between the effect of two-year and four-year costs. Students on the margins would focus more on two-year schooling options than their classmates who are competent students in high school and who likely have better-educated and wealthier parents. If the estimated effect is significantly lower for two-year costs, it can be inferred that college cost does have an incentivizing effect on students' efforts to graduate high school; this is an especially important trend in establishing the possibility of this effect, given that individual data regarding the college thought process is unattainable and much of the individual variation in the dataset is averaged out in the state-year averages.

Issues

In estimating the relationship between college cost and high school graduation rates, a number of measurement errors could skew results. The foremost of these possibilities is the graduation rate values themselves. While the data were pulled from the NCES, which had attempted to correct for inflated results through the use of the ACGR based on 9th grade enrollment four years prior to each graduation year in question, this does not correct or control for any possibility of grade inflation. This would bias the measure slightly upward as students undeserving of their marks receive them only due to the laxing of educational standards in their educational setting, thus skewing the measure of graduation rates and masking the signaling power of grades and graduation (Pattison, Grodsky, & Muller, 2013). Unfortunately, this cannot be easily measured or controlled for.

There also exists a downward bias in the ACGR from the NCES data. This is due to double counting of repeat students in the 9th grade denominator, which has increased in recent decades (Heckman, 2010). Miao and Haney [2004] attempt to correct for the increase in the disparity between 9th grade enrollment and the previous year's 8th grade enrollment by using the previous year's 8th grade enrollment as a proxy for first-time 9th grade enrollment. This results in an estimated rate approximately 10 points higher than the ACGR by the mid-2000s and approximately 5 points below the HSSCR (Heckman & LaFontaine, 2010). Due to time constraints, the reported ACGR data is used; this downward bias should be kept in mind when interpreting the results.

Furthermore, it should be noted that the years of the data sample include the onset of the Great Recession, which could influence the results in a number of ways. While I have included state fixed effects and attempted to capture increased demand for schooling through the inclusion of state unemployment rates as a quasi-proxy, non-additive yearly impacts could bias the coefficients. For example, it is generally thought that downturns in economic conditions increase the incentive for individuals to take on additional years of schooling. This is primarily due to the fact that the opportunity cost of attending school is lower with the prevalence of reduced wages and employment opportunities in the labor market and is aimed at the attainment of additional skills or knowledge to make them more competitive in the labor market (Brown & Hoxby, 2014). This effect could lead to an overestimation of positive graduation effects in the face of increasing college costs as the demand curve for education, both at the secondary and post-secondary levels, shifts outward.

Lastly, the question of college cost's impact on high school graduation rates would be best answered with individual-level panel data, including a binary variable for high school graduation and a variable for the cost of the college or university each individual either attends or would be most-likely to attend. Since this would almost certainly violate the anonymity principle of government panel data and I do not have the time or resources to conduct a tailored survey, this dataset does not exist. As a result, I am relegated to using state-year averages to investigate the effect in question. This affects the dataset by severely curtailing the large amount of variation that would exist in aforementioned counterfactual scenario. In effect, the prescribed model exhibits a high amount certainty, as seen in the R^2, but the viability of this model for describing the effect on the margins, where it is strongest, is reduced.

III. MODEL AND METHODS

The decision students must make regarding their completion of high school can be seen as a simple dynamic model, much like the one described in Stange's 2012 paper on the option value of college enrollment (see *Figure 2)*. In my interpretation of this framework, based on an investment theory of education, students must weigh their estimations of costs and benefits and subsequently decide whether or not to remain in school. With states having different levels of compulsory education, students have 0, 1, or 2 years in which they can weigh these options.

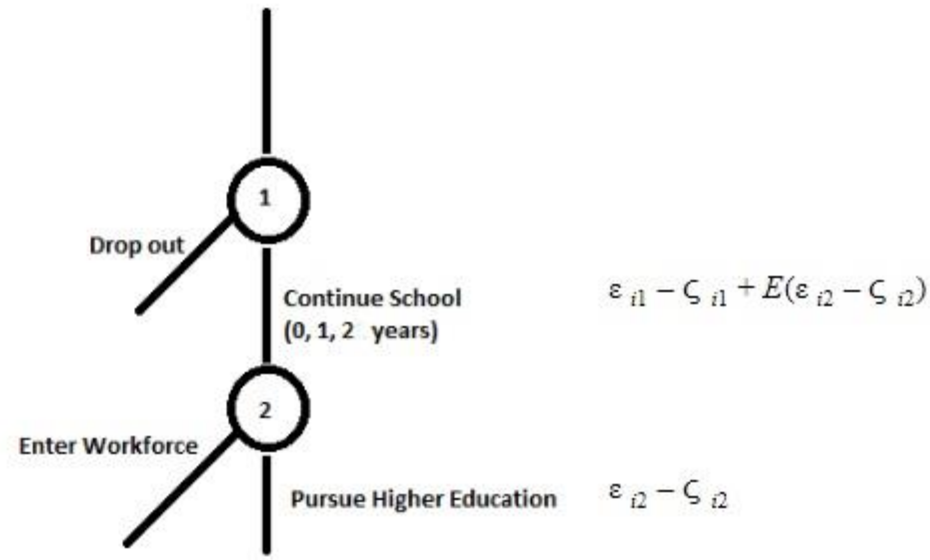

Figure 2. ***Simple Dynamic Model of Education Choice Decision***

In order to capture the effect of college cost on high school graduation rates in an econometric model, I regress graduation rates on college cost in an ordinary least squares multivariate regression model:

$$GR_{s,t} = C_{s,t} * A_s + S_s + \mu_{s,t} + T_t + W_{s,t} + P_{s,t} + u$$

$GR_{s,t}$ is the high school graduation rate in state *s* at time *t*. This is portrayed as a function of average public college cost, $C_{s,t}$, interacted with the variable for a state's compulsory education requirement, A_s. Also included in the function are the state fixed effects, S_s, state unemployment rates, $\mu_{s,t}$, year fixed effects, T_t, wage premia for college grads and high school grads, relative to non-high school graduates, $W_{s,t}$, and parent attributes, $P_{s,t}$, with an error term *u*. These variables all contribute to the equation $\varepsilon_{i2} - \varsigma_{i2}$, while wage premia for high school graduates affects ε_{i1}. If controlled for, these allow for the isolation of the variables of interest, college cost and high school graduation rates, through the two levels of the model. While the state policy regarding compulsory education is absorbed in state fixed effects, the variable can have important implications either as a policy that a state selects into or in its effect on the dependent variable. For this reason, it was important to see if college cost affected these groups of states differently, leading to the choice to interact this variable with the college cost to produce separate, identifiable coefficients.

Data

Primary data sources include compulsory school attendance law and graduation rate data from the NCES, college cost data from College Board's "Trends in Higher Education" reports (College Board), state unemployment rate data from the Bureau of Labor Statistics' Local Area Unemployment Statistics (compiled by Iowa State University's Iowa Community Indicators Program), with all other demographic and economic data computed from the Annual Social and Economic (ASEC) supplement to the Current Population Survey (CPS) from the Integrated Public Use Microdata Series (IPUMS).

As previously mentioned, the NCES graduation rate data consisted of the *"Adjusted Cohort Graduation Rate,"* based off of the 9th grade cohort size and the number of graduates four years later. The college cost data from College Board provided average public "in-state tuition and fees" for four-year schools and public "in-district tuition and fees" for two-year schools; these were originally in 2017 dollars, but later converted into 2010 dollars with the Consumer Price Index for the sake of continuity with other monetary data. Additionally, a variable was assigned to all states to identify the state's requirement for compulsory schooling as either 16, 17, or 18 years of age.

The ASEC supplement is comprised of approximately 97,000 households sampled yearly during the period of inquiry.[1] This, combined with the Hispanic oversample, constituted a dataset of 1,039,000 individual observations from 2006 to 2010, from which the state-year averages were computed. These were constructed from the individual-level data using the assigned survey weights and include variables for average parents' education, as well as high school and college wage premia, relative to non-graduates of high school, which constituted the base population of the model. The first step in creating these variables consisted of recoding the ASEC-defined education variable into years of education. Since parents and their children cannot be tied to one another across decades of Census Bureau survey data, a

[1] https://cps.ipums.org/cps/sample_sizes.shtml

proxy for parents' education was created. A simple approach was used in this process. First, each education category being rounded to the nearest whole year of education, from 6 to 19 years of education. A dummy variable was created identifying any individual of reasonable "parental" age for a high school or college age student, which I defined as ages 33 to 62.[2] I then multiplied each proxy parent's years of education by their survey weight and divided this by the summed weights of all proxy parents for each state in each year, thus generating a weighted average of parents' education in each state year.

For the definition of wage premia, I began by creating dummy variables for those without a high school degree, with a high school degree, and with a college degree. Since only the "outgoing rotation groups" were asked wage questions relevant for this calculation, I also created an alternative wage variable, "morgwage," that restricted its data points to exclude codes for those not in the universe and those who took home no wages. Then, using a looped regression establishing the wage premia for high school and college graduates relative to non-high school graduates, these data were tied back into their respective state-year observations.

Data Issues

In calculating the wage premia, I relied on reported wage data from the outgoing rotation groups of the ASEC supplement to the CPS. This severely limited the number of observations available from which to calculate the wage premia, resulting in some states carrying less than 100 wage observations in a given year. This leads to greater variability in the wage premia regression results, especially across years within a state, which can be seen in *Figure 3*. This factor limits the ability to control for the incentive of education-related wage premia in certain states in the dataset, which could possibly lead to skewed results. Furthermore, the wage premia are likely endogenous variables. Additionally, data on the cost of two-year institutions in Alaska and Washington D.C. were unavailable, leaving these states to be omitted from the regressions of two-year college costs.

IV. RESULTS

[2] This range was based on the Center for Disease Control's age range for fertility measures, with 18 years added.

The empirical results for all econometric models are presented in *Table 4* and *Table 5*. It appears that most of the effects are absorbed by the state fixed effects, with the most notable exception being the unemployment rate, which exhibits the expected effect likely due to its partial capture of the increased demand for education in poorer labor market conditions. The main variables of interest show mixed results and are predominantly positive and statistically insignificant, whereas they were hypothesized to be negative in their relationship. In the simple regression models, which did not include an interaction with the compulsory education policy of a state, the coefficient of the log of the four-year college cost was slightly positive and statistically significant at the 10% level; this implies an elasticity of 0.117 between the log of four-year costs and the log of high school graduation rates.

Among the interacted coefficients, both four-year cost and log of four-year cost exhibit results statistically significant at the 5% level for states requiring schooling until age; these estimate a 1.325% increase in the high school graduation rate for a $1000 increase in the cost of for year schooling and an elasticity of 0.154, respectively. With regards to two-year costs, states which required schooling until age 17 saw significant negative results of a 4.576% decrease in the graduation rate for a $1000 increase in two-year schooling costs and an elasticity of -0.195.

One trend of importance is the relationship between the coefficients for two-year and four-year costs. As mentioned, the recurring presence of a smaller or more-negative effect for two-year college costs can imply that students on the margins are more-affected by the disincentive of higher college cost, even with the averaging out of individual variation due to the use of state averages.

IV. CONCLUSION

This paper examines the possibility of college prices affecting high school graduation rates. Using variation in state-year averages, I estimate that a 1% increase in college tuition leads to a 0.117% increase in a state's high school graduation rate. States require students to remain in school until they are 16, 17, or 18 years of age, which can affect their decision making process with respect to graduating high school. When the econometric estimation is tailored to account for these differences, I find that two-year college cost does have a statistically significant negative relationship with high school graduation rates; states requiring schooling until age 17 saw a 4.5% reduction in the graduation rate for every $1000 increase in the cost of college. States requiring schooling only until age 16 saw a 1.3% increase in the graduation rate for a $1000 increase in college cost. More generally, the effect was less-pronounced or more-negative with two-year college costs, implying that students on the margins were more likely to be de-incentivized to graduate high school by higher college costs.

These results may serve as a basis to further investigate the incentives presented to high school students, specifically by two-year colleges. Because graduation rates will improve further only if marginal students see improvement and these students will more-likely focus on two-year schooling over four-year schooling, the cost of two-year institutions can promote positive externalities in cultivating a more-educated workforce, especially in trade professions.

Table 1. ***Variable Descriptions***

Variable	Description
year	Federal Information Processing Standard state code
state	Year of observation
hsprem	Wage premium associated with completion of a high school degree
collprem	Wage premium associated with completion of a bachelor's degree or higher
age_req	Compulsory schooling requirement of a state
lgrad	Log of graduation rate
state_wt	Sum of sampling weights within a state-year
cost_thous	Average cost of four year public school
cost_thous2yr	Average cost of two year public school
lcost	Log of four year college cost
lcost2	Log of two year college cost
avg_yrs_educ_state	Average education of parent cohort in a given state-year
unemp	State-level unemployment rate

Table 2. ***Summary Statistics of State Clusters by Compulsory Education Policy***

	age_req=16			***age_req=17***			***age_req=18***		
Variable	**N**	**mean**	**sd**	**N**	**mean**	**sd**	**N**	**mean**	**sd**
age_req	75	16	0	55	17	0	125	18	0
gradrate	75	73.89	8.786	52	74.02	8.484	124	71.78	8.408
Educ	75	13.64	0.268	55	13.49	0.412	125	13.54	0.365
cost_4yr	75	6,412	2,389	55	7,529	1,926	125	6,548	1,697
cost_2yr	70	3,108	1,131	55	3,042	714.9	120	2,792	1,029
Lcost	75	1.797	0.345	55	1.985	0.266	125	1.846	0.259
lcost2	70	1.070	0.364	55	1.086	0.233	120	0.951	0.415
hsprem	75	0.276	0.131	55	0.237	0.119	125	0.282	0.126
collprem	75	0.567	0.160	55	0.547	0.158	125	0.569	0.162
Unemp	75	5.947	2.349	55	6.604	2.273	125	6.352	2.591
state_wt	75	5.714e+6	6.058e+6	55	5.579e+6	3.583e+6	125	6.081e+6	7.811e+6

Table 3. ***Sample Summary Statistics***

		U.S. States 2006-2010			
Variable	***N***	***min***	***max***	***mean***	***sd***
year	*255*	*2,006*	*2,010*	*2,008*	*1.417*
gradrate	*251*	*47.50*	*88.55*	*72.88*	*8.573*
avg_educ	*255*	*12.66*	*14.43*	*13.56*	*0.354*
cost_2yr	*245*	*627.7*	*6,264*	*2,938*	*1,006*
hsprem	*255*	*-0.119*	*0.715*	*0.271*	*0.127*
collprem	*255*	*-0.0130*	*1.078*	*0.564*	*0.160*
age_req	*255*	*16*	*18*	*17.20*	*0.865*
state_wt	*255*	*510,817*	*3.680e+07*	*5.865e+06*	*6.577e+06*
cost_4yr	*255*	*3,435*	*12,460*	*6,720*	*2,010*
unemp	*255*	*2.600*	*13.70*	*6.287*	*2.458*
lcost	*255*	*1.234*	*2.523*	*1.862*	*0.295*
lcost2	*245*	*-0.466*	*1.835*	*1.015*	*0.371*

Table 4. ***Regression Results for Simple Regression Models***
(std. errors in parentheses)

	Graduation Rate			
Cost Type	***4-yr***	***Log 4-yr***	***2-yr***	***Log 2-yr***
College Cost	*0.786* *(0.706)*	*0.117** *(0.062)*	*-0.255* *(1.704)*	*0.005* *(0.044)*
Compulsory Schooling Interaction	Yes	Yes	Yes	Yes
State & Year Fixed Effects	Yes	Yes	Yes	Yes
Parent Education	Yes	Yes	Yes	Yes
Wage Premia	Yes	Yes	Yes	Yes
Unemployment Rate	Yes	Yes	Yes	Yes
Observations	*251*	*251*	*242*	*242*
R-Sq	*0.95*	*0.95*	*0.95*	*0.94*

Statistical Significance: * 10% , ** 5% , *** 1%

Table 5. ***Regression Results for Regression Models with Education Policy Interactions***
(std. errors in parentheses)

	Graduation Rate			
Cost Type	***4-yr***	***Log 4-yr***	***2-yr***	***Log 2-yr***
College Cost *(16-yr age requirement)*	*1.325*** *(0.652)*	*0.154*** *(0.062)*	*1.275* *(2.060)*	*0.052* *(0.073)*
College Cost *(17-yr age requirement)*	*-0.284* *(0.701)*	*0.004* *(0.080)*	*-4.576*** *(2.270)*	*-0.195*** *(0.079)*
College Cost *(18-yr age requirement)*	*0.961* *(0.747)*	*0.106* *(0.072)*	*-1.191* *(1.970)*	*-0.007* *(0.051)*
Compulsory Schooling Interaction	Yes	Yes	Yes	Yes
State & Year Fixed Effects	Yes	Yes	Yes	Yes
Parent Education	Yes	Yes	Yes	Yes
Wage Premia	Yes	Yes	Yes	Yes
Unemployment Rate	Yes	Yes	Yes	Yes
Observations	*251*	*251*	*242*	*242*
R-Sq	*0.95*	*0.95*	*0.95*	*0.95*

Statistical Significance: * 10% , ** 5% , *** 1%

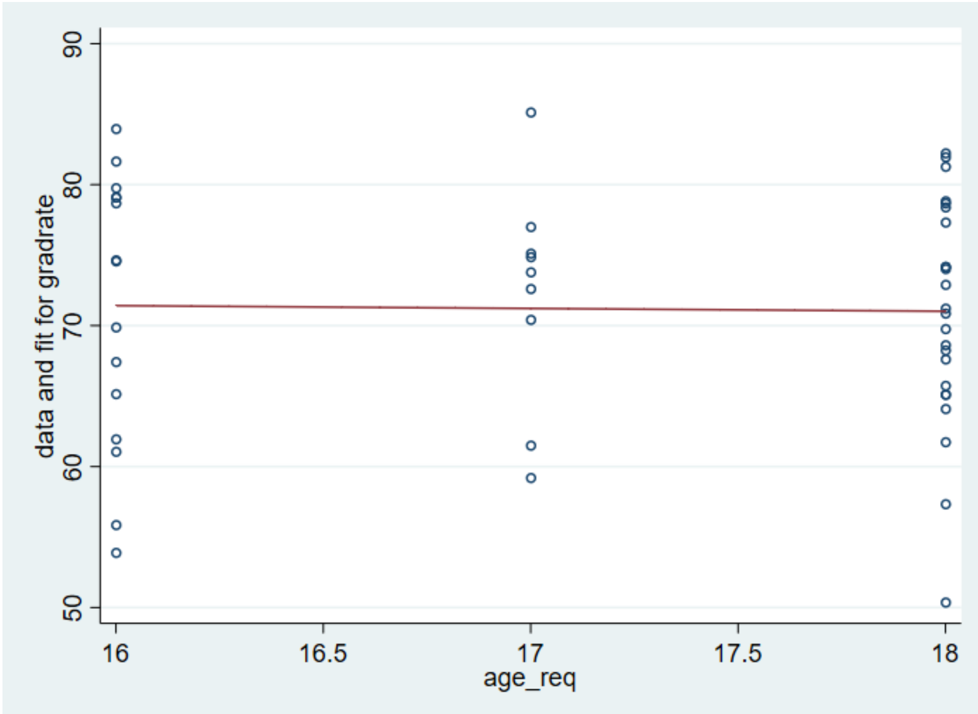

Figure 1. ***Graduation Rates of States, Grouped by Compulsory Education Policy***

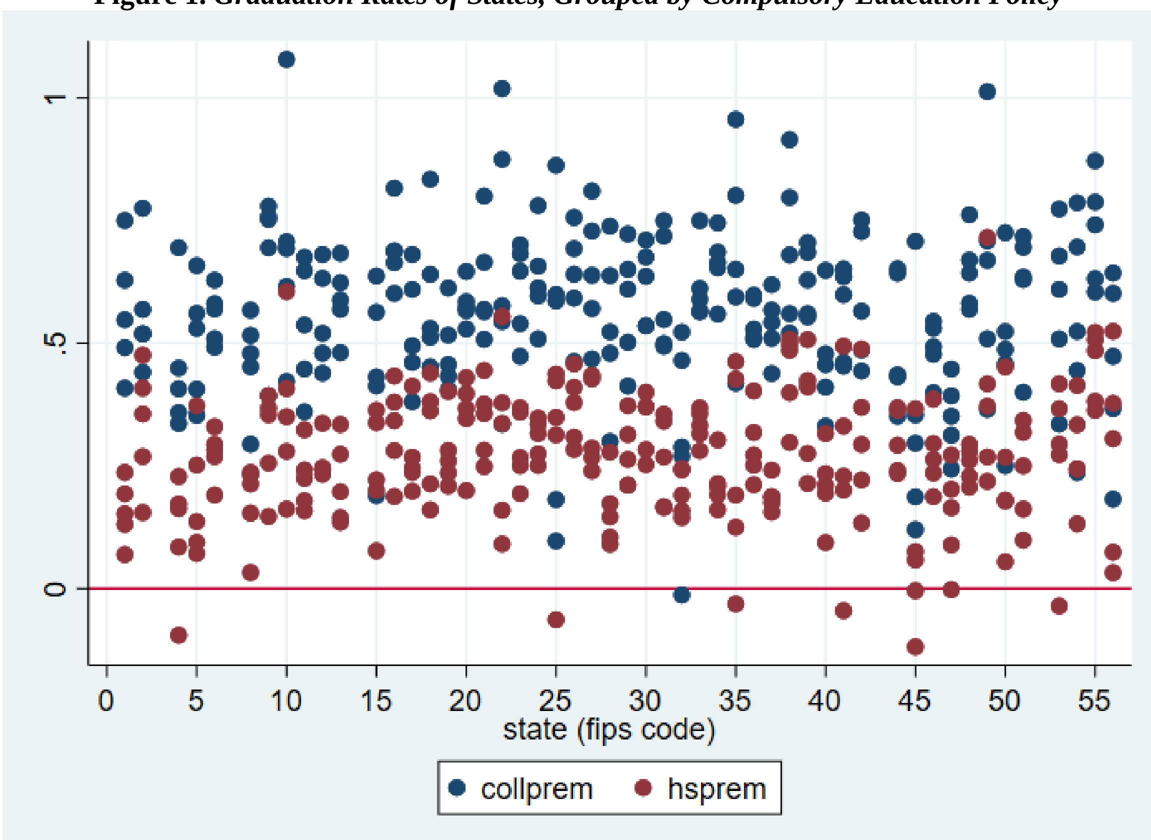

Figure 3. ***High School and College Wage Premia by State.***

Table 6. ***Regression Results for Simple Regression Models (std. errors in parentheses)***

Variable	lgrad	gradrate
lcost	0.172*** (0.059)	
lcost2	-0.046 (0.052)	
cost_thous		1.133* (0.640)
cost_thous2yr		-0.756 (1.616)
1b.state	0.000 (0.000)	0.000 (0.000)
4.state	0.024 (0.033)	2.005 (2.476)
5.state	0.131*** (0.031)	9.504*** (2.370)
6.state	0.005 (0.075)	2.605 (3.734)
8.state	0.126*** (0.032)	8.302*** (2.217)
9.state	0.109** (0.044)	8.125** (3.383)
10.state	0.007 (0.025)	1.089 (1.977)
12.state	0.001 (0.035)	-1.714 (2.113)
13.state	-0.037 (0.026)	-3.328** (1.543)
15.state	0.052 (0.037)	3.321 (2.527)
16.state	0.233*** (0.026)	15.527*** (1.602)
17.state	0.070** (0.032)	5.857* (3.250)
18.state	0.076*** (0.014)	5.820*** (0.938)
19.state	0.258*** (0.018)	19.398*** (1.441)
20.state	0.159*** (0.031)	11.433*** (2.370)
21.state	0.101*** (0.018)	7.482*** (1.434)
22.state	-0.010 (0.036)	-1.723 (2.174)

23.state	0.192***	14.929***
	(0.036)	(2.830)
24.state	0.113***	8.171***
	(0.033)	(2.386)
25.state	0.134***	9.985***
	(0.045)	(3.368)
26.state	0.008	1.494
	(0.032)	(3.091)
27.state	0.246***	19.150***
	(0.040)	(3.425)
28.state	-0.063**	-4.086**
	(0.028)	(1.959)
29.state	0.160***	12.180***
	(0.016)	(1.482)
30.state	0.217***	14.858***
	(0.025)	(1.696)
31.state	0.213***	15.549***
	(0.028)	(2.219)
32.state	-0.219***	-13.218***
	(0.034)	(2.003)
33.state	0.154***	12.058**
	(0.052)	(4.994)
34.state	0.160***	12.479***
	(0.040)	(3.437)
35.state	-0.057	-3.744
	(0.053)	(3.281)
36.state	0.052*	2.893
	(0.029)	(2.333)
37.state	0.052	2.935
	(0.039)	(2.449)
38.state	0.258***	18.688***
	(0.031)	(2.501)
39.state	0.090***	7.200***
	(0.023)	(1.710)
40.state	0.162***	10.751***
	(0.016)	(1.039)
41.state	0.128***	8.786***
	(0.026)	(1.946)
42.state	0.114***	9.197***
	(0.033)	(2.992)
44.state	0.069**	5.351**
	(0.028)	(2.107)
45.state	-0.171***	-10.414***
	(0.028)	(2.131)
46.state	0.242***	17.059***
	(0.033)	(2.916)

47.state	0.095***	6.475***
	(0.015)	(1.041)
48.state	-0.003	0.981
	(0.035)	(2.849)
49.state	0.232***	14.635***
	(0.036)	(2.367)
50.state	0.201***	16.184***
	(0.052)	(5.060)
51.state	0.069**	5.155**
	(0.027)	(2.065)
53.state	0.072***	4.913***
	(0.026)	(1.854)
54.state	0.158***	10.167***
	(0.024)	(1.630)
55.state	0.261***	19.780***
	(0.021)	(1.583)
56.state	0.217***	12.677***
	(0.038)	(2.131)
2006b.year	0.000	0.000
	(0.000)	(0.000)
2007.year	0.077***	5.504***
	(0.010)	(0.599)
2008.year	0.017*	1.298**
	(0.010)	(0.629)
2009.year	0.017	1.432*
	(0.012)	(0.846)
2010.year	0.043***	3.452***
	(0.015)	(1.038)
collprem	-0.025	-1.334
	(0.024)	(1.641)
hsprem	0.009	0.042
	(0.032)	(2.230)
avg_yrs_educ_state	0.001	0.675
	(0.037)	(2.559)
cons	3.861***	49.007
	(0.483)	(34.120)
R^2	0.95	0.95
N	242	242

Table 7. ***Full Regression Results for Regression Models with Education Policy Interactions (std. errors in parentheses)***

Variable	gradrate	lgrad	gradrate	lgrad
16b.age_req#c.cost_thous	1.325**			
	(0.652)			
17.age_req#c.cost_thous	-0.284			
	(0.701)			
18.age_req#c.cost_thous	0.961			
	(0.747)			
16b.age_req#c.lcost		0.154**		
		(0.062)		
17.age_req#c.lcost		0.004		
		(0.080)		
18.age_req#c.lcost		0.106		
		(0.072)		
16b.age_req#c.cost_thous2yr			1.275	
			(2.060)	
17.age_req#c.cost_thous2yr			-4.576**	
			(2.270)	
18.age_req#c.cost_thous2yr			-1.191	
			(1.970)	
16b.age_req#c.lcost2				0.052
				(0.073)
17.age_req#c.lcost2				-0.195**
				(0.079)
18.age_req#c.lcost2				-0.007
				(0.051)
1b.state	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
2.state	-4.389	-0.183		
	(4.075)	(0.133)		
4.state	-6.740	-0.225*	-13.067**	-0.200**
	(4.104)	(0.133)	(5.498)	(0.081)
5.state	2.256	-0.042	-1.021	-0.063
	(4.233)	(0.114)	(5.946)	(0.089)
6.state	-3.597	-0.121	-9.292	-0.164*
	(3.338)	(0.107)	(5.813)	(0.093)
8.state	10.262***	0.143***	8.634***	0.120***
	(2.049)	(0.030)	(2.143)	(0.031)
9.state	2.876	-0.044	2.004	-0.039
	(5.191)	(0.124)	(5.953)	(0.092)
10.state	-8.130	-0.254*	-12.885**	-0.201**
	(4.930)	(0.140)	(6.092)	(0.097)
11.state	-18.556***	-0.372***		
	(4.234)	(0.119)		

12.state	-10.310**	-0.263*	-20.240***	-0.317***
	(4.055)	(0.138)	(5.687)	(0.091)
13.state	-11.977***	-0.299**	-21.014***	-0.329***
	(3.741)	(0.131)	(5.439)	(0.086)
15.state	-1.870	-0.104	-5.513	-0.128
	(3.986)	(0.114)	(5.453)	(0.084)
16.state	7.424**	-0.022	-1.241	-0.042
	(3.691)	(0.129)	(5.415)	(0.084)
17.state	12.706***	0.162***	9.728***	0.135***
	(2.824)	(0.039)	(1.403)	(0.019)
18.state	-1.440	-0.096	-2.649	-0.100
	(4.199)	(0.116)	(5.892)	(0.088)
19.state	10.399**	-0.007	2.701	0.004
	(4.104)	(0.133)	(6.443)	(0.101)
20.state	6.327	0.007	2.483	-0.017
	(3.849)	(0.113)	(5.392)	(0.083)
21.state	-0.963	-0.088	-2.052	-0.098
	(4.116)	(0.114)	(6.471)	(0.093)
22.state	-8.615**	-0.194*	-13.890**	-0.252***
	(3.588)	(0.108)	(5.532)	(0.084)
23.state	18.868***	0.245***	19.100***	0.259***
	(3.366)	(0.043)	(2.881)	(0.037)
24.state	12.234***	0.162***	13.427***	0.187***
	(2.415)	(0.033)	(2.450)	(0.033)
25.state	1.100	-0.131	-5.240	-0.098
	(5.197)	(0.146)	(6.921)	(0.108)
26.state	-5.179	-0.146	-6.061	-0.142
	(5.323)	(0.125)	(5.855)	(0.091)
27.state	23.278***	0.297***	30.005***	0.383***
	(2.704)	(0.037)	(4.558)	(0.048)
28.state	-5.504***	-0.079***	-10.399***	-0.175***
	(1.153)	(0.020)	(2.761)	(0.040)
29.state	14.614***	0.199***	12.218***	0.168***
	(1.096)	(0.016)	(1.258)	(0.017)
30.state	6.752*	-0.041	-1.734	-0.051
	(3.901)	(0.131)	(5.765)	(0.092)
31.state	10.649***	0.061	7.423	0.047
	(3.927)	(0.113)	(5.418)	(0.082)
32.state	-21.116***	-0.409***	-26.695***	-0.473***
	(3.681)	(0.111)	(5.733)	(0.088)
33.state	5.817	-0.004	10.881	0.041
	(6.233)	(0.131)	(9.195)	(0.102)
34.state	3.288	-0.101	0.582	-0.025
	(6.071)	(0.149)	(6.372)	(0.100)
35.state	-9.152**	-0.208*	-15.192***	-0.261***
	(3.624)	(0.110)	(5.827)	(0.086)

36.state	-6.648*	-0.224*	-16.373**	-0.252**
	(3.820)	(0.132)	(6.516)	(0.102)
37.state	-5.383	-0.192	-13.379**	-0.201**
	(3.689)	(0.130)	(5.507)	(0.080)
38.state	10.742**	-0.001	2.319	0.001
	(4.262)	(0.132)	(6.674)	(0.103)
39.state	-0.066	-0.077	0.432	-0.065
	(4.879)	(0.121)	(6.199)	(0.091)
40.state	4.344	-0.013	0.823	-0.043
	(3.464)	(0.109)	(5.482)	(0.084)
41.state	1.472	-0.055	-0.555	-0.078
	(4.051)	(0.116)	(6.258)	(0.093)
42.state	16.791***	0.210***	17.190***	0.236***
	(3.242)	(0.044)	(1.492)	(0.019)
44.state	-1.531	-0.098	-2.471	-0.100
	(4.781)	(0.121)	(6.051)	(0.092)
45.state	-6.132**	-0.109***	-5.341***	-0.089***
	(2.542)	(0.037)	(1.651)	(0.022)
46.state	10.521***	0.061	9.126	0.045
	(3.882)	(0.112)	(6.723)	(0.092)
47.state	-1.325	-0.091	-4.385	-0.119
	(3.750)	(0.112)	(5.826)	(0.088)
48.state	-5.056	-0.149	-7.952	-0.154*
	(4.184)	(0.115)	(5.558)	(0.083)
49.state	8.525**	0.049	3.908	-0.004
	(3.631)	(0.110)	(5.632)	(0.086)
50.state	5.659	-0.073	1.148	-0.007
	(6.352)	(0.149)	(9.757)	(0.125)
51.state	0.172	-0.080	-0.915	-0.073
	(4.545)	(0.119)	(5.620)	(0.086)
53.state	-1.353	-0.097	-3.492	-0.113
	(4.115)	(0.116)	(5.807)	(0.089)
54.state	8.336***	0.127***	6.704***	0.097***
	(1.418)	(0.022)	(1.718)	(0.024)
55.state	13.091***	0.088	11.697*	0.079
	(4.022)	(0.114)	(6.025)	(0.089)
56.state	5.243	-0.032	-4.228	-0.078
	(3.667)	(0.125)	(5.487)	(0.083)
2006b.year	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
2007.year	5.647***	0.081***	5.837***	0.085***
	(0.576)	(0.010)	(0.523)	(0.009)
2008.year	1.165**	0.019**	1.103*	0.017*
	(0.568)	(0.009)	(0.585)	(0.009)
2009.year	-0.086	0.005	-0.026	-0.001
	(1.285)	(0.019)	(1.381)	(0.022)

2010.year	1.885	0.031	2.456*	0.033
	(1.420)	(0.021)	(1.456)	(0.022)
collprem	-1.850	-0.026	-2.103	-0.030
	(1.585)	(0.023)	(1.682)	(0.025)
hsprem	0.558	0.007	0.810	0.013
	(2.228)	(0.032)	(2.378)	(0.036)
avg_yrs_educ_state	-0.961	-0.009	-0.360	-0.000
	(2.265)	(0.033)	(2.281)	(0.034)
unemp	0.415	0.004	0.581**	0.009**
	(0.289)	(0.005)	(0.285)	(0.004)
_cons	75.401**	4.241***	78.274**	4.314***
	(30.096)	(0.432)	(31.468)	(0.461)
R^2	0.95	0.95	0.95	0.95
N	251	251	242	242

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