THE IMPACT OF THE TRIBAL COLLEGE MOVEMENT ON NATIVE AMERICAN EDUCATIONAL ATTAINMENT

by

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ABSTRACT

This paper looks at the effects of tribal colleges and universities (TCUs) on Native American educational attainment. Using a difference-in-difference-in-difference model, this paper attempts to isolate the effects of these schools on Native Americans living in states with TCUs. First, the results offer evidence that TCUs' effects are not evenly distributed across age groups or between the sexes. The findings show that these schools have significant positive effects on associate's degree attainment for older Native Americans, increasing associate's degree attainment by three percent for Native Americans 35 to 55 while not significantly increasing associate's degree attainment for 25 to 55 year olds. There is also evidence that TCUs lower bachelor's degree attainment levels for Native Americans. An additional TCU per 10,000 Native Americans per state lowers bachelor's degree attainment by 4 to 14 percent for 25 to 55 year olds and by 0 to 13 percent for 35 to 55 year olds. This negative effect appears to be disproportionately felt by Native American men. This paper also finds that TCUs do not appear to significantly increase or decrease the overall years of education for Native Americans in TCU states.

CHAPTER 1

INTRODUCTION

Native Americans have historically attained lower levels of education compared with national averages. In recent decades, the American government and Native American tribal leaders have sought to increase the educational attainment levels of Native Americans. One method that has been tried is the establishment of colleges chartered and governed by individual Native American tribes known as tribal colleges and universities (TCUs). These schools, which began to open in the late 1960's, are defined in the Tribally Controlled College or University Assistance Act of 1978 (TCCUAA) as "an institution of higher education which is formally controlled, or has been formally sanctioned, or chartered, by the governing body of an Indian tribe or tribes, except that no more than one such institution shall be recognized with respect to any such tribe...." [1] TCUs are established to serve a two-part purpose: to increase the availability of higher education to Native Americans and to offer programs that emphasize Native American history and culture. These schools are open to all, but have student bodies that mostly consist of Native Americans. They provide many Native American students with the chance to attend colleges that are close in proximity and geared towards helping non-traditional students.

Over the last 50 years there have been dramatic changes in the educational attainment of Americans, including large changes within the Native American population. These changes can be seen by comparing educational attainment levels in

[1] For the full text of this act, see http://uscode.house.gov/download/pls/25C20.txt.

1960 to attainment levels in 2000. Table 1 shows educational attainment for Native Americans between the ages of 25 and 45 from the 1960 census.[2] Those calculations can be compared to census data from 2000 shown in Table 2. Between those years, the percentage of Native Americans without a high school diploma fell from 66.9 percent to 23.5 percent, the percentage who received at least some college grew from less than 8 percent to over 44 percent, the percentage who earned associate's degrees rose from 2.6 percent to 7 percent, and the percentage who earned bachelor's degrees or higher rose from 2.1 percent to 12.2 percent. The absolute growth in the percent of Native Americans with associate's degrees attainment for Native Americans was the fastest in the nation over this time period, while the absolute growth in Native American bachelor's degree attainment was faster than that of Hispanics, but slower than all other racial groups.

This growth in degree attainment occurred during the same time period that TCUs began to open across the country. However, during that same time period, educational attainment levels of other racial groups were changing as well, especially for black Americans. In every case besides associate's degree attainment, the growth in black educational attainment outstripped Native American educational attainment growth. The other comparable minority group, Hispanic Americans, also had high educational attainment growth during this time, but at most levels this growth was not as fast as that of Native Americans or blacks. Finally, Native American educational attainment grew faster than the national average for most attainment levels with the exception of

[2] Census data was obtained using IPUMS (Ruggles et al., 2010)

bachelor's degree attainment, where the percent of Native Americans with bachelor's degrees increased by 10.2 percentage points compared with national growth of 18.3 percentage points.

With these rapidly changing and often disproportionate national educational attainment patterns across different races, it is hard to discern how much of the change in Native American educational attainment should be attributed to TCUs. This paper attempts to see what role, if any, TCUs have played in increasing Native American educational attainment levels since the start of the tribal college movement. Specifically, it focuses on how TCU presence within states affects degree attainment for Native Americans relative to other groups in the state.

The rest of this paper is organized as follows. In Chapter 2, relevant background material is provided. This includes a brief overview of the community college (or junior college) movement and its connections to the development and growth of TCUs. This chapter also provides background information on TCUs, including an overview of their history, locations, demographic makeup, teachers, staff, and goals. There is a special emphasis on how TCUs are established and funded and how their student bodies (which consist primarily of Native Americans living on or near reservations) are unique. This chapter is meant to give readers a clearer understanding of what these schools are like and how they are different from other colleges. Chapter 3 gives the economic theory behind individuals' educational attainment decisions. Chapter 4 reviews the relevant literature on educational attainment, the effects of community college enrollment on degree attainment, the effects of college proximity on student enrollment, and the

literature on minorities and higher education. Most of this literature does not specifically address TCUs or Native Americans, so much of what this chapter does is draw analogical connections between the community college literature and TCUs. Chapter 5 describes the empirical model used in this paper, and Chapter 6 gives an overview of the different datasets used. The results are presented Chapter 7 for the primary regressions, along with supporting robustness test results and a discussion of the relationship between demand for education and TCU openings. Finally, Chapter 8 offers some concluding remarks, including suggestions for future TCU research.

Table 1. Educational Attainment of 25 to 45 Year Old Individuals – 1960.

	Native American	White	Hispanic	Black	Asian	Other Races	Total
Bachelor's Degree or Higher	2.07%	9.78%	4.19%	3.53%	13.37%	11.03%	9.03%
Associate's Degree	2.64%	6.49%	3.41%	3.00%	7.07%	3.22%	6.05%
Some College, No Degree	2.70%	5.51%	2.91%	2.45%	4.75%	3.06%	5.12%
H.S. Diploma	15.59%	30.94%	15.87%	15.24%	30.74%	25.42%	28.94%
No H.S. Diploma	66.94%	46.82%	66.71%	73.68%	38.48%	54.67%	50%
No Education or Missing	10.06%	0.46%	6.91%	2.10%	5.59%	2.60	0.86%
Total	158,447	59,885,491	2,027,189	6,697,057	383,684	65,056	69,216,924

Source: US Decennial Census, 1960. Compiled using the Integrated Public Use Microdata Series, (Ruggles et al., 2010).
The observation values are the weighted count values.

Table 2. Educational Attainment of 25 to 45 Year Old Individuals - 2000.

	Native American	White	Hispanic	Black	Asian	Other Races	Total
Bachelor's Degree or Higher	12.23%	30.98%	11.20%	15.84%	46.97%	29.82%	27.35%
Associate's degree	6.98%	8.36%	4.77%	6.67%	7.36%	7.21%	7.67%
Some College, No Degree	24.82%	23.62%	16.81%	25.70%	15.34%	21.42%	22.71%
H.S. Diploma	30.70%	27.91%	22.99%	31.34%	15.70%	22.80%	27.22%
No H.S. Diploma	23.36%	8.76%	39.08%	19.46%	11.92%	17.48%	13.92%
No Education or Missing	1.91%	0.37%	5.15%	0.99%	2.71%	1.27%	1.13%
Total	1,135,962	88,952,712	14,904,346	15,161,667	5,575,102	183,736	125,913,5255

Source: US Decennial Census, 1960. Compiled using the Integrated Public Use Microdata Series, (Ruggles et al., 2010).
The observation values are the weighted count values.

CHAPTER 2

BACKGROUND

TCUs and universities began to be introduced in the United States in the late 1960's, starting with Diné College in Arizona in 1968. By 2010 this number had grown to 36 colleges that are generally located on or near reservations in Washington, Montana, Wyoming, North Dakota, South Dakota, Minnesota, Wisconsin, Michigan, Nebraska, Kansas, Oklahoma, New Mexico, Arizona, and Alaska.[3] A chart showing the number of TCUs by state between 1960 and 2000 is given in Table 3. In the fall of 2006, there were 15,795 students enrolled in TCUs across the United States. Of these 8,756 (55 percent) were Native American females and 4,871 (31 percent) were Native American males. There were also 2,168 non-Native American males and females enrolled (AIHEC, 2009). The average TCU student is 31.5 years old. This is older than the average American community college student who, in 2007, had an average age of 28 with a median age of 23 (Wei et al., 2009). Some of this age disparity can be explained by the fact that TCU students are more likely to be part-time students and are also more likely to take semesters or years off throughout the course of their education. TCUs have lower percentages of male students (36 percent) than at other community colleges, where 42 percent of students were male in 2007 (AIHEC, 1999) (Wei et al., 2009).

All TCUs offer associate's degrees and all were founded as two-year schools. However, as they grew several TCUs developed bachelor's and master's programs, so

[3] Of the 36 colleges, 30 are located on Native American reservations.

that by 2010 eight TCUs offered bachelor's degrees and two offered master's degrees.[4] With all of these eight universities, the majority of graduates receive associate's degrees, and in nearly all cases, less than one-third of the graduates earned bachelor's or master's degrees. The seven largest academic disciplines at these schools in the fall of 2006 were, in order of magnitude, liberal arts, business, vocational programs, education, social science, science, and nursing (AIHEC, 2009). TCUs are generally relatively small schools. In the fall of 2009, ten of the 35 schools had fewer than 200 students, 13 had between 200 and 500 students, and nine had between 501 and 1,000 students. Only three schools, Diné College in Arizona, Oglala Lakota University in Oklahoma, and Salish Kootenai College in Montana, had more than 1,000 students enrolled.

Growth of Community Colleges in America

Many similarities exist between TCUs and community colleges, which makes it useful to examine the community college movement in order to draw connections between it and the tribal college movement. TCUs all began as two-year schools and share many of the same goals as community colleges. Cohen and Brawer (2003) list the goals that community colleges were first founded on: offering low tuition, close proximity, flexible scheduling, and programs to support at-risk students from poor backgrounds. Those are all goals shared by the tribal college movement. Community colleges tend to be more flexible than four-year universities, with curriculums in place

[4] The TCUs that offer bachelor degrees are Dine` College, Haskell University, the Institute of American Indian Arts, Oglala Lakota College, Salish Kootenai College, Sinte Gleksa University, Sitting Bull College, and Turtle Mountain Community College. Both Oglala Lakota College and Sinte Gleksa University offer Master's degrees.

that emphasize the needs of the particular demographic groups enrolled in them. TCUs do this as well, although they have the distinction of being more specialized in terms of the demographic group they serve. Many TCUs offer adult education programs and other resources geared towards helping their local communities.

The tribal college movement began in the late 1960's, and grew the fastest during the 1970's and 1980's. During this same time period, there was a rapid expansion in the number of community colleges in America as well. As shown in Tables 3 and 4, the growth in the number of two-year colleges easily outstripped the growth in the number of universities between 1960 and 2000. The real start of the rapid growth in the number of community colleges can be traced even further back than 1960, to changes President Truman put into place to help deal with the rapidly increased demand for college education from returning soldiers from World War II. In 1946, he described the educational situation as "a period of trial" and recognized that there were not nearly enough higher education institutions in place to deal with the high demand for education. Truman, working with his Commission on Higher Education, sought a way to make education more widespread and available to those citizens who could not afford it previously. The main way that the Commission tried to achieve this was by increasing the number of community colleges. They stated,

> The time has come to make education through the fourteenth grade available in the same way that high school education is now available. This means that tuition-free education should be available in public institutions to all youth for the traditional freshman and sophomore years or for the traditional two-year junior college course. To achieve this, it will be necessary to develop much more extensively than at present such opportunities as are now provided in local communities by the two-year junior college, community institute, community college, or institute of arts

> and sciences. The name used does not matter, though community college seems to describe these schools best; the important thing is that the services they perform be recognized and vastly extended. Such institutions make post-high-school education available to a much larger percentage of young people than otherwise could afford it. Indeed, as discussed in the volume of this Commission's report, "Organizing Higher Education," such community colleges probably will have to carry a large part of the responsibility for expanding opportunities in higher education.[5]

While Truman's idea of public community colleges that were free to all did not come to pass, his ideas were still influential in the growth of America's community colleges. The tribal college movement (which would not begin for another 21 years with Diné College) grew out of this community college movement, with the community college movement offering a template in terms of goals and structure. The community college movement also helped the tribal college movement by establishing two-year colleges as a viable and main-stream alternative to traditional universities.

In recent years community colleges have helped close race and gender gaps in higher education.[6] They are relatively inexpensive compared to four-year universities providing students who could not afford four-year universities another viable option for post-secondary education. Nutting (2008) finds that enrollment at community college tends to be much more sensitive to changes in costs than enrollment at four-year universities. Economists have found evidence that this effect may be larger for certain minority groups. Kane (1994) examines how community colleges impact minority educational attainment. He finds that black students tend to have a more elastic demand for education than the average American college student. His findings come from

[5] From ("Higher Education", 1947).
[6] This can be seen by the high percentage of females and minorities enrolled in community colleges. In 2007, 45 percent of community college students were minorities (Knapp, Kelly-Reid, & Ginder, 2008) and 58 percent were female (Wei et al., 2009).

looking at the 1980's, a time when the cost of education was rising nationwide. During this time period a disproportionate percentage of black students stopped enrolling in post-secondary education. That suggests that the availability of close, relatively inexpensive colleges may have large effects on minority educational attainment.

Native Americans and Higher Education

TCUs share the community college goal of supporting at-risk students from poor backgrounds. For TCUs, that goal is focused on Native Americans living on or near reservations, a group that routinely faces high levels of poverty and unemployment (Sandefur, 1989). The unique student bodies that TCUs serve make it important to examine how minority groups may face different challenges to obtaining higher education. Many Native Americans do not go to college, and those who do go tend to be less prepared, having below average proficiency levels in math and in verbal skills. In 2005 58 percent of Native Americans scored below basic on the National Assessment of Educational Progress (NAEP) mathematics test for 12th grade students.[7] These scores are comparable with those of Hispanics and blacks, but are much lower than white or Asian scores. Between 1996 and 2006 Native Americans' SAT verbal and math scores were consistently 15 to 30 points below average, and their ACT scores were between 2.5 and 3 points below average.[8] In 2006 only 72 percent of entering TCU students had high school diplomas (AIHEC, 2006).

[7] The NAEP has four main scoring levels for students: below basic, basic, proficient, and advanced. The basic performance is equated to performance at the level expected for the respective grade. On this test, 36 percent scored at basic, and 6 percent scored above basic.

[8] This information was originally compiled from various sources by KewalRamani et al., (2007).

While it may be beneficial that TCUs are able to set their curriculums to emphasize their primary demographic group's specific needs, the fact that these schools are mostly made up of Native American students with below average levels of college preparedness may have drawbacks as well. In a study focusing on community college students, Calcagano, Bailey, Jenkins, Kienzl, & Leinbach (2008) find that largely minority student populations are negatively correlated with educational outcomes after race is controlled for. Using a two-part probit model, they find that community college students who are enrolled in institutions made up of at least 75 percent minority students are 9 percent less likely to succeed compared with students enrolled at community colleges with 25 percent or less minority populations.[9]

While the Native Americans that enroll in college may be less prepared and face additional hardships compared with the average college student, many of their peers forgo college altogether. Native Americans have always gone to college at lower rates than the national average (although they have made up significant ground in recent years). As seen in Figure 3, the percentage of Native American men ages 18 to 24 who were enrolled in colleges or universities from 1990 to 2004 grew from 8.4 percent in 1990 to 20.5 percent in 2004, although that growth seems to fluctuate highly. While Native Americans still have much lower enrollment levels in both 1990 and 2004 when compared with white males ages 18 to 24 (of whom 35.1 percent were enrolled in a college or university in 1990 and 41.7 percent were enrolled in 2004), their growth is

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Sources: The College Board, *College Bound Seniors*, 1998-2006, and The American College Testing Program, *ACT National Score Reports*, 1995-2005. SAT scores are on a 200-800 scale per section, and ACT scores are on a 1-36 scale per section.

[9] Calcagano, et al. (2008) define success as the "*individual* student probability of completing a certificate or degree or transferring to a baccalaureate institution."

significant. The enrollment growth is not as large over this time period for Native American women, although their baseline enrollment levels in 1990 were much higher than that of Native American men. As seen in Figure 4, 21.7 percent of Native American women ages 18 to 24 were enrolled in colleges or universities in 1990, and this increased to 28.1 percent in 2004. These levels are higher than Native American men in both years (especially in 1990), but are still relatively low when compared with white females and most other minority groups. In 1990, 34.7 percent of white women ages 18 to 24 were enrolled in colleges or universities, and by 2004 this percentage had increased to 45 percent.

Founding and Funding TCUs

As discussed in the previous sections, the student bodies at TCUs, mostly Native Americans living on or near reservations, are unique among America's colleges and universities. To address the needs of this demographic group, TCUs are set up with specific criteria and goals in place, and these criteria and goals likely influence TCU openings. The reasons behind why TCU open where they do are important to this paper because they effect whether or not TCUs' presence can be considered exogenous with educational attainment. To give a better understanding of why TCUs are located where they are, the process of opening and funding TCUs is described below.

An article by James Shanley (2001), the president of Fort Peck TCU, helps shed some light on the reasons behind the locations of TCUs. In it, Shanley says

> Every tribe lives in a unique environment, and the TCUs have developed to reflect the uniqueness of the chartering tribes. As tribal communities

> study whether to start a college, they must consider resource availability, accreditation, and critical mass… Tribes will continue to want to build TCUs for all the same reasons that colleges first developed in the late 1960's and early 1970's. They want to exercise self-determination, provide job training and community development, and preserve and validate their cultural knowledge, language and world perspectives. However, if they lack the resources and the critical mass to make colleges feasible, there are alternatives for them to consider. (p. 48-9)

The quote from Shanley's article emphasizes the reasons behind founding TCUs and hints at the practical considerations that exist in the decision of whether or not to open a school.

The issues of purpose and feasibility are further discussed by the American Indian Higher Education Consortium (AIHEC), which is the governing body for all federally recognized TCUs. This organization was founded in 1972 by the presidents of the first six TCUs.[10] In 1973, their mission statement was

> Maintaining commonly held standards of quality in American Indian education; support the development of new tribally controlled colleges; promote and assist in the development of legislation to support American Indian higher education; and encourage greater participation by American Indians in the development of higher education policy. (AIHEC, n.d.)

It was in a 2007 document (Tippeconnic et al., 2007) that the AIHEC first offered comprehensive guidelines for the process of establishing TCUs. That report is the culmination of over 30 years of experience concerning the founding of TCUs and contains both advice and AIHEC policy for potential founders to consider.[11]

The AIHEC document gives advice and lays out the rules regarding where, when, and by whom TCUs can or should be founded. There are several different levels of

[10] Now, the AIHEC board is made up of a single member from each TCU.
[11] The information given here on founding TCUs all comes from (Tippeconnic et al., 2007) unless otherwise cited.

AIHEC membership that new schools can apply for, although most current schools qualify as regular members. While these schools can be chartered by different groups, they are not considered TCUs without this AIHEC membership. These schools are only to be established and governed by tribal governments or members of a tribal community, with a link between the tribe and the school being one of the elements that makes a school a TCU.[12] The first step that the AIHEC proposes for parties interested in opening a TCU is for them to familiarize themselves with the goals and history of the tribal college movement. If the potential founders do not share the goals on which the tribal college movement was founded or if they cannot abide by the AIHEC bylaws, then the chartering process should not proceed further. The second step involves doing a feasibility study to see if a TCU is needed or not. Interested parties need to determine if there is sufficient demand for a college, and it is during this step that alternative schools in close proximity are accounted for. If demand is sufficient, then it must also be determined that the demographic group the college would serve would have a Native American majority. If there appears to be a "critical mass" for a school and a high enough percentage of potential Native American students, then available funding sources and potential facilities are sought after and members of the community are contacted for support and feedback.

After the feasibility of a TCU has been ascertained, an advisory board is put into place to help guide the founders in establishing the school. This board gives advice on the chartering and founding of the school, appointment of a school board, and the establishment of links with existing colleges. The next step involves the school taking

[12] TCUs may be federally chartered, but they still have Native American governing boards.

steps towards becoming operational: hiring faculty and staff, setting a budget, seeking accreditation, setting up and opening facilities, and beginning to serve students. There is a focus on finding Native American faculty and staff members. This is done to try and help provide jobs in the local communities, strengthen connections between the community and the school, and also to ensure that Native American culture and values are passed on to the students. Subsequently, guidelines for growth and sustainability are laid out.

Although only recently compiled by the AIHEC, this guideline document for founding TCUs is a formalization of the way that the tribal college movement began and represents the goals of the original founders. All TCUs currently in operation must meet these student and board member requirements documented by the AIHEC in order to be considered a TCU by the government. This governmental recognition is significant in determining federal funding for these schools.[13]

Before specific governmental funding sources are examined, it is important to point out how dependent TCUs are on federal funding. This dependency arises from the lack of state and local government funding sources available. TCUs are set up as trust territories, making them ineligible for most state funding even though the majority of them are public schools.[14] Also, they also rarely receive local governmental funding because laws prevent tribal groups from levying property taxes to raise money for the schools. With most state and local funding limited or non-existent, TCUs find themselves very dependent on federal funding for their survival.

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[13] The following information about funding TCUs, unless otherwise stated, comes from AIHEC (1999).
[14] 22 out of the 28 TCUs open in 2000 were public colleges or universities.

The first major piece of legislation determining federal funding for TCUs was the Tribally Controlled College and University Assistance Act of 1978. This act, which came about due to a push from the AIHEC, guarantees federal funding for the establishment and operation of TCUs through different sections, or Titles. Title I provides funds based on the number of Native American students. It authorizes up to $6,000 to be provided per Native American student per year, up to a maximum of $40 million for all TCU students combined.[15] Title II provides funding for Dine` College's core operations, but nothing for any other TCU. Title III authorizes up to a combined $10 million to be provided as matching funds for endowment grants, and Title IV authorizes up to a combined $2 million for economic development. There are typically large gaps between these maximum funding limits and the actual allocated amounts received by the TCUs.

There are several other notable funding sources beyond TCCUAA funding. The American Indian College Fund, a federal non-profit organization established in 1989, helps generate funds for TCU students. In 1994 TCUs received additional funding through legislation that made them into land-grant institutions. Previously, it was only a select group of 55 state schools and 17 historically black colleges that received money as land-grant institutions. This status change resulted in the awarding of equity grants of $50,000 per TCU, along with an equal share in the interest from an endowment fund. This funding is significantly less than the land-grant funding received by state schools.[16]

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[15] TCUs do not receive any Title I funding for non-Native American students enrolled.

[16] All the land-grant funds allocated to TCUs combined are approximately equal to the land-grant funding for a single eligible state university.

Beyond land-grant funding, there are several smaller funds that TCUs can apply and compete for, usually funds specified to go towards special directives such as increasing adult education or environmental education. However, these funds are allocated on an individual school basis with the funds generally being used for specific tasks that may offer little direct financial help to the typical TCU student.

When all government (federal, state, and local) funding sources are aggregated, TCUs receive significantly less in per-student funding than the average community college does. In 2010 most TCUs received $5,523 federal dollars per Native American student (AIHEC, 2010).[17] This per-student funding is significantly less than the governmental funding for the average community college, which also receives state and local funds. In 2008, the average community college received $7,054 per student from state and local appropriations, and an additional $3,213 from either federal appropriations or federal, state, and local grants, for a combined $10,267 in governmental funding per student (Desrochers, Lenihan, & Wellman, 2010). The significant gap between governmental funding for TCUs and governmental funding for community colleges has possible implications related to TCU placement.

TCU chartering criteria and funding levels may be significant when trying to examine their effects on Native American educational attainment. If TCUs are being founded strictly based on educational demand criteria, then their presence would not be exogenous to educational attainment outcomes. Currie and Moretti (2003) had a similar problem in the context of college openings being linked with health outcomes. They describe two different criteria that have been used to open new community colleges. The

[17] That does not include appropriations to agriculture programs or adult literacy and education programs.

first method is placing them in areas where education demanded is expected to increase. The second method is placing them in areas that are undereducated and have few colleges. If TCUs are placed primarily in areas where demand for education is increasing or is expected to increase, then we may overestimate their effects on student outcomes. On the other hand, if TCUs are placed in secluded areas or areas with low levels of education, then the estimates of the effect of TCU openings might be biased downwards because they are being opened in places with low demand and sparse populations. Both concerns are possible for TCUs. On the one hand, educational attainment among Native Americans has grown rapidly in recent years, which suggests that TCU openings may be the result of increased demand for education. On the other hand, TCUs are typically opened in areas with few other higher education options. It isn't clear which, if either, of these reasons best reflects why TCUs are being placed where they are.

A third possibility exists. It could be the case that these schools are being founded to help preserve tribal culture and to allow Native American tribes increased self-determination. The additional steps, procedures, and financial problems associated with establishing TCUs compared to those of establishing community colleges is evidence supporting the idea that TCUs are opened based on more than just proximity criteria or demand for education. If high demand for education, or conversely, low education levels are the only driving forces behind the establishment of TCUs, it would likely be more financially viable in many cases for tribes to push for the establishment of traditional community colleges, which receive more funding on average than TCUs. The fact that TCUs are established instead suggests that something besides demand for

education may be driving their placement. To test this idea that TCUs are opened according to some criteria beyond demand for education, several statistical tests were performed. The results from these tests are shown in Chapter 7.

Table 3. Number of Four-Year Schools by State and Year.

	1960	1970	1980	1990	2000
Alabama	25	31	33	33	33
Alaska	4	5	6	6	6
Arizona	6	8	12	15	16
Arkansas	20	20	20	20	20
California	85	97	104	108	113
Colorado	22	26	26	26	28
Connecticut	21	22	23	23	23
Delaware	5	6	6	6	6
Florida	35	48	50	55	58
Georgia	42	44	46	48	49
Hawaii	3	6	7	7	8
Idaho	7	7	7	7	7
Illinois	65	67	71	78	80
Indiana	37	42	44	44	44
Iowa	35	36	37	38	38
Kansas	22	22	24	24	24
Kentucky	29	30	30	31	31
Louisiana	22	23	23	23	23
Maine	15	18	18	18	18
Maryland	25	27	29	29	30
Massachusetts	63	68	69	69	69
Michigan	47	52	56	60	62
Minnesota	30	33	36	38	40
Mississippi	16	16	18	18	18
Missouri	46	49	50	52	53
Montana	9	9	9	9	9
Nebraska	21	22	22	22	22
Nevada	2	3	3	3	3
New Hampshire	10	12	14	15	15
New Jersey	24	25	26	26	26
New Mexico	8	10	11	12	12
New York	114	126	130	130	131
North Carolina	54	55	57	57	58
North Dakota	8	8	8	9	9
Ohio	70	75	75	77	78
Oklahoma	21	22	22	22	22
Oregon	21	24	25	25	25
Pennsylvania	110	119	119	121	121
Rhode Island	10	10	10	10	10
South Carolina	28	31	31	35	35
South Dakota	15	16	14	15	15
Tennessee	42	44	44	46	47
Texas	62	71	80	81	81
Utah	6	6	6	7	9
Vermont	16	16	17	17	17
Virginia	37	39	42	43	46
Washington	17	17	23	25	25
West Virginia	20	20	21	21	21
Wisconsin	29	33	35	35	35
Wyoming	1	1	1	1	1
	1482	1617	1690	1740	1770

Source: Authors calculations. Dataset comes from Currie and Moretti's (2003) dataset on college openings with missing years appended on using *the Integrated Postsecondary Education Data System* (U.S. Department of Education, 2011). Only schools that met the specific qualifications are included. See data appendix for more on the building of this dataset.

Table 4. Number of Two-Year Schools by State and Year,

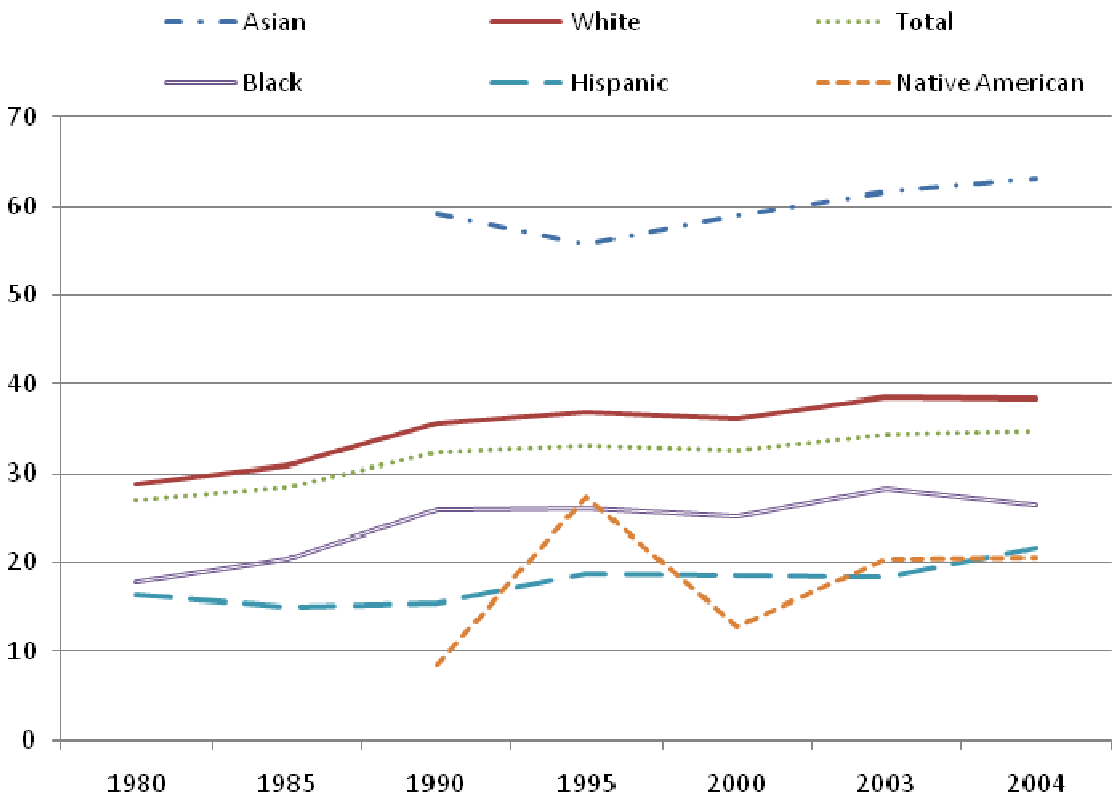
	1960	1970	1980	1990	2000
Alabama	8	28	32	32	33
Alaska	0	0	1	2	3
Arizona	2	10	14	17	17
Arkansas	3	5	12	14	17
California	73	107	123	125	131
Colorado	8	18	20	22	22
Connecticut	3	12	14	14	15
Delaware	0	2	3	3	3
Florida	15	28	33	36	44
Georgia	10	29	35	37	39
Hawaii	5	6	7	7	7
Idaho	2	3	4	4	4
Illinois	19	44	49	50	51
Indiana	5	18	19	24	24
Iowa	4	17	17	17	18
Kansas	14	21	21	22	22
Kentucky	11	21	21	22	24
Louisiana	3	6	10	13	15
Maine	2	7	7	7	7
Maryland	10	17	18	19	21
Massachusetts	9	21	24	23	23
Michigan	15	29	29	28	27
Minnesota	14	33	37	36	38
Mississippi	16	17	18	18	18
Missouri	9	19	19	20	22
Montana	2	4	4	4	5
Nebraska	1	4	7	7	7
Nevada	0	1	4	6	7
New Hampshire	2	6	6	6	6
New Jersey	2	17	19	22	23
New Mexico	6	11	10	11	11
New York	39	59	66	70	71
North Carolina	14	59	61	62	62
North Dakota	4	6	8	8	7
Ohio	8	28	37	38	38
Oklahoma	11	16	10	9	9
Oregon	4	12	13	14	15
Pennsylvania	16	30	37	39	40
Rhode Island	1	1	1	1	1
South Carolina	4	21	21	21	21
South Dakota	0	0	2	2	2
Tennessee	0	11	16	16	16
Texas	34	53	64	69	70
Utah	7	7	7	6	6
Vermont	0	1	1	2	2
Virginia	4	19	23	23	23
Washington	13	29	30	30	31
West Virginia	2	2	3	3	3
Wisconsin	11	17	18	17	16
Wyoming	5	7	7	7	7
	450	939	1062	1105	1144

Source: Authors calculations. Dataset comes from Currie and Moretti's (2003) dataset on college openings with missing years appended on using *the Integrated Postsecondary Education Data System* (U.S. Department of Education, 2011). Only schools that met the specific qualifications are included. See data appendix for more on the building of this dataset.

Table 5. Number of TCUs and Universities by State and Year.

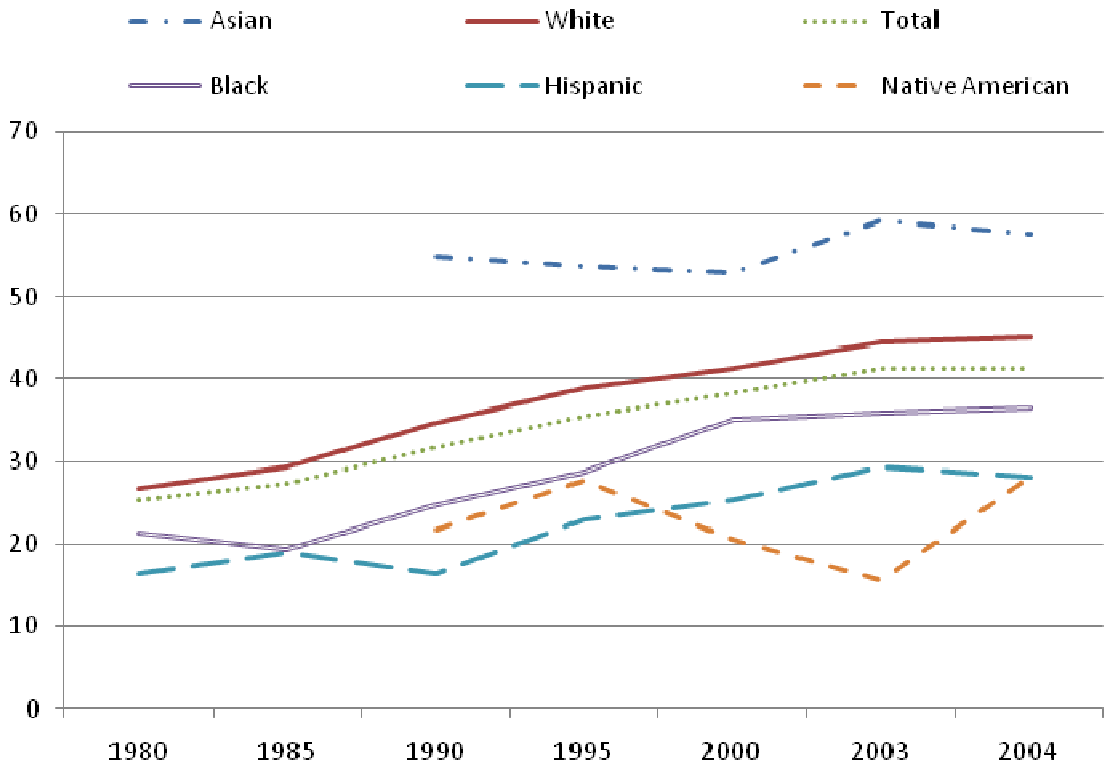
	TCUs 1970	**TCUs 1980**	**TCUs 1990**	**TCUs 2000**	**TCUs 2010**
Alaska	0	0	0	1	1
Arizona	1	1	1	2	2
Kansas	1	1	1	1	1
Michigan	0	1	2	3	3
Minnesota	0	0	2	3	3
Montana	0	6	7	7	7
Nebraska	0	1	1	2	2
New Mexico	0	2	3	3	3
North Dakota	0	4	4	5	5
Oklahoma	0	0	0	0	2*
South Dakota	1	3	3	3	3
Washington	0	0	1	1	1
Wisconsin	0	0	1	2	2
Wyoming	0	0	0	1*	1*
	3	19	26	34	36

Source: Authors calculations. Dataset comes from Currie and Moretti's (2003) dataset on college openings with missing years appended on using *the Integrated Postsecondary Education Data System* (U.S. Department of Education, 2011). Only schools that met the specific qualifications are included. See data appendix for more on the building of this dataset.
*Indicates an associate member TCU.



This information was originally compiled from various sources by KewalRamani, Gilbertson, Fox, & Provasnick (2007).
Sources: US Department of Commerce, Census Bureau, Current Population survey.

Figure 1. Percent of Males Ages 18 to 24 Enrolled in College or University by Race.



This information was originally compiled from various sources by KewalRamani et al., (2007).
Sources: US Department of Commerce, Census Bureau, Current Population survey.

Figure 2. Percent of Females Ages 18 to 24 Enrolled in College or University by Race.

CHAPTER 3

ECONOMIC THEORY

Before discussing how TCUs affect Native American educational attainment, it is important to give an overview of how people respond to incentives regarding higher education decisions. Educational attainment decisions are made at the individual level and are driven by many personal factors unique to a person's specific circumstances. An important driving force behind individuals' college decisions is that education increases a person's lifetime earnings stream. However, there is not a consensus among economists as to how education accomplishes that. Economic thinking about how to value education often falls into the following two schools of thought: viewing educational attainment as human capital which increases worker productivity, or viewing educational attainment as a signal for a person's innate ability. Schultz (1961) was the first economist to formally introduce the idea of valuing education as human capital. Becker (1967) furthered the work on human capital, and in 1967 he proposed a model of wealth maximization where human capital is included as a concrete investment, one that declines in value as a person ages and shows increasing marginal costs. The signaling model was first formally proposed by Spence (1973) and by Arrow (1973). This model suggests that education does not necessarily increase a person's productivity but rather helps to sort workers according to their innate abilities. Education will be relatively less expensive to attain for higher ability individuals, so they will attain more of it. While the two schools of thought disagree on how or if education increases worker productivity, the incentives for

education are the similar for individuals in both the signaling and human capital model, in that the more education they receive, the higher the wages they can expect to earn.

At the individual level, educational attainment decisions are made based on costs and benefits, with a person continuing to get more education until the marginal benefits from an additional year of education equal the marginal costs of that additional year. The economic literature typically looks at educational attainment decisions from a present value viewpoint, in which the current value of a person's expected future wage stream is calculated in order to ascertain the financial benefits to them of obtaining different levels of education. In terms of financial benefits, higher levels of education are correlated with higher earnings and lower levels of unemployment. The financial costs consist of both direct costs and opportunity costs. The direct costs include tuition, books, and fees, while the opportunity costs are the wages a person foregoes while getting their education. There are also possible non-financial benefits and costs associated with getting more education.[18] Examples of non-financial benefits could be the personal pleasure from knowledge or better marriage matching opportunities, and non-financial costs may include mental strain and stress from obtaining education or the disutility that comes from having to move away from home to attend school. This paper (mirroring most of the economic literature) focuses primarily on financial costs and benefits due to the difficulty in measuring and valuing the non-financial costs and benefits.[19]

[18] Weisbrod (1962) discusses possible non market benefits of education.
[19] Gill and Leigh (2003), Kane and Rouse (1995), and Monk-Turner(1994) all look at the returns to education in terms of increases in future wages.

When analyzing the differences in present value of net benefits between getting a high school diploma, an associate's degree, and a bachelor's degree, it is useful to set up three side-by-side present value equations.

$$PV_{HS} = E_{HS} + \frac{E_{HS}}{(1+r)} + \frac{E_{HS}}{(1+r)^2} + \cdots + \frac{E_{HS}}{(1+r)^n} \quad (1.1)$$

$$PV_{AS} = [-E_{HS} - \frac{E_{HS}}{(1+r)} - DC_{AS}] + \frac{E_{AS}}{(1+r)^2} + \frac{E_{AS}}{(1+r)^3} + \cdots + \frac{E_{AS}}{(1+r)^n} \quad (1.2)$$

$$PV_{BA} = [-E_{HS} - \frac{E_{HS}}{(1+r)} - \frac{E_{AS}}{(1+r)^2} - \frac{E_{AS}}{(1+r)^3} - DC_{BA}] + \frac{E_{BA}}{(1+r)^5} + \ldots + \frac{E_{BA}}{(1+r)^n} \quad (1.3)$$

Equation 1.1 is a net present valuation for the decision to forgo college. In this equation E_{HS} is the earnings a person with only a high school diploma can expect to make annually and r is the person's discount rate. The discount rate is determined by both the market interest rate and how present-or-future-oriented a person is. In equation 1.2 the net present value for the decision to get an associate's degree is given. In it, the costs of forgone earnings and the direct costs of attending college (tuition, books, etc.) are first accounted for. The opportunity costs are represented by $-E_{HS} - \frac{E_{HS}}{(1+r)}$, and the direct costs are represented by DC_{AS}. The forgone earnings represent the two years a person could have been working earning the wages of a high school graduate that they instead spent in school. After the two years spent in school have elapsed, that person then earns wages at the higher rate E_{AS}. If the net present value of PV_{AS} is greater than PV_{HS}, then a person maximizing their lifetime financial net benefits will get an associate's degree. Similarly, a bachelor's degree net present value is shown above in equation 1.3 by first

subtracting off the wages a person could have earned during the first two years of education, next subtracting the wages that they would have earned with an associate's level education for the next two years, and finally subtracting off the direct costs of their four years of college education. These combined costs of attending college are measured against the higher earning rate that a person with a bachelor's degree makes. If PV_{BA} is greater than PV_{AS}, then a person will get a bachelor's degree to maximize financial benefits for their lifetime.

These rankings of net present values are a way of showing the rates of returns to different levels of education. This could be further extrapolated out to show how much each additional year of schooling (not just degree attainment levels) increases a person's lifetime earnings stream. When these changes in the earnings for an additional year of schooling are related to money spent for an additional year of schooling, the result is the marginal rate of return to education. A person's marginal rate of return declines as their education levels increase under the law of diminishing marginal returns (Becker, 1967). When the marginal rate of return to an additional year of education is equal to a person's discount rate, then that is their optimal amount of schooling. Any additional years of schooling beyond the point where a person's marginal rate of return equals their discount rate will have financial costs that are higher than the financial benefits.

These net present value and marginal rate of return equations show how individuals determine their financial returns to education. There are many elements that differ at the individual level that influence a person's net present value equation. As mentioned above, a person's discount rate is composed of both the interest rate and their

personal valuations of the future. A person who is very future-oriented will have a lower discount rate and will be more likely to get more years of college education. The college costs that a person faces are also a major factor. If tuition increases, the direct cost of the two or four years of schooling a person gets increases and the aggregate years of schooling will fall. Inversely, grants, subsides and scholarships can shrink a person's college costs and make them more likely to get more years of education. Expected wages can also fluctuate and effect a person's present value equation. If the expected wage gap between a high school diploma level education and an associate's degree level education were to widen, then the net present value for an associate's degree level education would increase. An individual's ability also factors into their decision to go to college.

The signaling model says that college education separates people by their innate abilities (Spence, 1973) (Arrow, 1973). Those high ability individuals receive a college education because the costs to them of getting that education are lower than the costs faced by low ability individuals. A lower ability person would need to expend more time and effort to get the same level of education as a high ability person, making school more costly to them and decreasing their total years of education.

When a person makes college education decisions, the type of school where they initially choose to begin their higher education at can play a large role in their final educational attainment level. Students seeking an academic degree need to decide if they want to begin at a two-year college or a four-year university, a decision that is made based on finances, preferences, and their education aspirations. While college credits

usually transfer from accredited community colleges to universities, a person's initial choice of school type often indicates what their terminal degree will be.

Brint and Karabel (1989) show two separate effects that beginning at a community college can have on a person's likelihood of earning a bachelor's degree. The first effect that they show they call the *diversion effect*. This effect describes students who would earn bachelor's degrees if they began at four-year universities instead stop after getting associate's degrees from community colleges. These students are diverted from obtaining the higher degree they would otherwise earn by settling for a community college associate's degree. The other effect they call the *democratization effect*. This effect describes students who would not attend four-year universities at all, due to costs, distances, or other limitations, except for the fact that they began at community colleges and then moved on to universities when they were better prepared. These students would not get bachelor's degrees without using community colleges as gateways. The two effects move in opposite directions in terms of the number of bachelor's degrees earned, and the net size of these effects is discussed in Chapter 4.

The decision to start at a four-year university also affects a person's terminal degree attainment level. Students that begin at four-year universities are much more likely to go on to get bachelor's degrees, even though the United States Department of Education (2005) shows that 80 percent of the students who enter community college intended to go on to get bachelor's degrees, but only 21 percent actually obtained bachelor's degrees within six years of starting college. However, for marginal students, beginning at four-year schools and dropping out can have detrimental effects on future

wages compared with starting at community colleges and getting associate's degrees as terminal degrees. This means that students who think there is a good chance that they will not finish a bachelor's program may self-select into a shorter associate's degree program. Likewise, students who are confident that they will earn a bachelor's degree will be more likely to begin at four-year schools. This self selection may be based on ability, finances, confidence, or other mitigating factors. When discussing ability, it is expected that community college students will be lower ability students on average compared with four-year university students.

Another factor that influences a person's decision to attend college or the type of school they attend is college proximity. There are many financial costs associated with travel related to college education, and these costs decrease the net present value of college education for a person. These costs include the transportation costs of moving and traveling back home, the room and board costs of living away from home, and additional tuition costs for those students who attend out-of-state schools. There are also other costs that are less easy to quantify. A person may have a high personal cost associated with leaving their hometown. The stresses of moving to a new town which may be far from home and leaving family and friends can be a significant factor in a person's decision to attend college. With all the costs associated with travel, the distance to schools is an important factor in a person's education decisions. This is supported by the economic literature, which shows that college proximity is positively correlated with college enrollment because of lower costs.

CHAPTER 4

LITERATURE REVIEW

Tribal colleges and universities are established with the main goal of increasing educational attainment levels for Native Americans. While student bodies at these schools are not exclusively made up of Native Americans, they do represent the largest student demographic group in every TCU. Although there has been little economic research looking directly at TCUs, the effects of community college enrollment have been widely examined by economists. Since TCUs all began as two-year schools similar to community colleges, valuable comparisons exist between the two. Another significant aspect of TCUs is that they are built on or near Native American reservations. Those areas are oftentimes very isolated with few other higher-education options, so TCUs provide residents around reservations with schooling options that are often significantly closer than the next nearest alternative. This makes the literature on the effects of school proximity on student enrollment another important element to review. Finally, there has been some valuable economic research done on the effects of attending Historically Black Colleges and Universities (HBCUs). These schools are perhaps the closest corollary for TCUs in the United States, and economists have made important findings about the effects of attending HBCUs on black student graduation and wage outcomes.

The Effects of Community College Enrollment on Terminal Degree Attainment and Future Wages

There have been substantial amounts of research done on the effect of community college enrollment on terminal degree attainment. Brint and Karabel (1989) first used the terms *democratization* and *diversion* effects to describe the different effects that enrolling at a community college can have on baccalaureate completion. These effects are explained in the previous chapter. Rouse (1995) offers a summation of the different directions of these two effects. She states that the democratization effect is a non-negative effect in that it does not result in fewer years of education or in fewer bachelor's degrees earned. The result of the diversion effect is unclear, because certain students would be better off starting at four-year schools while others would be worse off. In the end, Rouse finds that that community colleges have helped increase overall years of education while not negatively affecting bachelor's degree attainment (this second point has been widely contested by other economists).

Rouse's discussion of the effects of community colleges helps show the two most common ways of measuring educational attainment in the economic literature. One way is to measure how many bachelor's degrees are awarded, which was the method used by Long and Kurlaender (2004) and Alfonso (2006). The other common method measures the total number of years of higher education students receive, which was used by Leigh (2003) and by Rouse (1995).

When the measurement of educational achievement is the number of bachelor's degrees awarded, there is a consensus in the recent literature that community college

enrollment results in aggregately fewer bachelor's degrees. Long and Kurlaender (2008) use a propensity score matching method that controls for student abilities to test the relationship between community college enrollment and bachelor's degree attainment. Using National Education Longitudinal Study (NELS) data, they find that students who attend community colleges are 14.5 percent less likely to earn bachelor's degrees within 9 years compared with similar ability students at four-year universities. Alfonso (2006) finds that community college enrollment lowers the probability of someone earning a bachelor's degree as well, but she finds a much larger effect than Long and Kurlaender. She uses a two-part probit model in which the probability of attending college is first estimated and then the probability of enrolling in a specific type of college is estimated. Using this model, in which she controls for education expectations and education pathways, Alfonso finds that similar ability students are 28 to 29 percent less likely to receive a bachelor's degree if they begin at a community college than if they begin at a four-year university. The magnitudes of the effects of community college attendance on baccalaureate completion differ from study to study due to differences in models and datasets, but there do not appear to be credible published economic studies that find that beginning at community colleges results in more bachelor's degrees attained compared with beginning at four-year universities.

The other commonly used method of measuring academic achievement measures schooling as the number of years of post-secondary education received. Rouse (1995) uses total years of schooling as her variable of interest and finds that the benefits from the positive *democratization* effect of community colleges outweighs their small *diversion*

effects. Rouse controls for self selection into two-year or a four-year schools with an IV model that factors in a student's probability of attending a two-year or four-year school, which adds student ability into the equation. She finds that the overall gains in the number of years of schooling by students who attend community college who would otherwise not attend any college outweigh the diversion effects. She also finds that most of the students who are diverted from starting at four-year universities by community colleges would not have gone on to get bachelor's degrees. This finding is disputed by Long and Kurlaender (2004) and Alfonso (2006), who find that the diversion effect of community colleges is large and results in significantly fewer bachelor's degrees attained. Leigh and Gill (2003) find that for students with aspirations of getting bachelor's degrees, attending community colleges increases their overall educational attainment by between 0.4 and 1.0 years. This fits with Rouse's findings that community colleges offer a way to increase overall years of education, and it does not directly contradict the findings of authors who found that community colleges divert students away from receiving bachelor's degrees.

Wage Effects of Community College Enrollment

It appears likely that community colleges may increase overall years of higher education for students aggregately, but there is a possible tradeoff in bachelor's degree attainment. In order to understand the effects of this tradeoff, it is important to clarify the cost effectiveness of community colleges and the differences in returns between a

community college education and a university education before strong statements can be made about the benefits of community colleges.

Community colleges are generally cheaper than four-year universities per year of education. In 1990, it was twice as expensive per year to attend a four-year public school compared to a two-year public school (U.S. Department of Education & National Center for Education Statistics, 1990). In 2007-08, the cost differences were even higher. The average tuition cost for a year at a community college was $2,360, while at a four-year public college it was $6,185.

Although community colleges are less expensive, it is important to compare the rates of return to the different types of schools. The real question is whether the benefits (in the form of higher rates of return) to education at universities outweigh the more expensive costs of universities. Gill and Leigh (2003) and Kane and Rouse (1995) both find that students who attend two-year colleges and then transfer to four-year universities and complete bachelor's degrees are not worse off in terms future wages than students who spend all 4 years at a university. Hilmar (1997) focuses on how community college enrollment can lead to access to higher quality universities for transfer students. He finds that students who attend community college first and then move on to four-year universities choose higher quality universities than equivalent students who start their post-secondary education at a university. His results show that the individuals who show the biggest increases in quality of university attended are students from poor families, lower ability students, and students who performed poorly in high school. Hilmar suggests that, especially for people in these disadvantaged groups, attending a community

college first can help students who will go on to get bachelor's degrees attain them from higher quality universities.

However, among students who do not earn bachelor's degrees, there can be significant differences in returns from attending two-year or four-year schools. Monk-Turner (1994) also examines economic returns in the form of increased future wages. She finds a rate of return per year at a four-year university of 7.9 percent, and a rate of return for a year at a community college of 5.4 percent. Even for students who do not earn bachelor's degrees, she finds that a year of education at these two types of schools cannot be treated as homogenous. In contrast to Monk-Turner, Gill and Leigh (2003) find that students who complete terminal training programs at two-year schools are not worse off than students at four-year schools who do not graduate. They also find evidence of positive self-selection for community college students who choose terminal training.

Overall, community colleges are less expensive than universities, but the returns per year at community colleges are also lower. This is unless a person attends a community college and then graduates from a four-year school, in which case the rates of return for their years at the community college does not appear to be lower than if they attended a four-year school all four years. While the returns from an associate's level education may be lower than those from a bachelor's level education, there is evidence that two-year schools may be the better option in terms of returns to education for students who will not go on to get bachelor's degrees.

College Proximity's Effects on Enrollment

Another related issue when considering the effects of TCUs is how proximity of schools affects enrollment levels. Jepsen and Montgomery (2009) find that proximity is highly correlated with enrollment. Using data from over 150,000 25 to 29 year old workers in the Baltimore area, they find that if a person's distance from a community college is increased by three miles, enrollment can drop by up to 14 percent. These results show how elastic the demand for education at these community colleges can be. Rouse (1998) finds that adding an additional community college per 10,000 high school graduates increases two-year enrollment by 11.2 percent. Bedard's (2001) paper on college proximity finds that areas with universities have 10 to 15 percent higher post-secondary participation rates compared to areas without universities. However, she points out that the signaling model predicts that university proximity may also have effects on high school graduation rates. When university access is geographically constrained, more students will pool at the high school graduate level. This is because some students that would otherwise drop out of high school will graduate and stop because the signal a high school diploma sends to employers is then stronger. However, when university access is not constrained, some of those students will go on to college, which would make the signal for having a high school diploma less important. Consequently, some students who would have gotten a high school diploma no longer do because the signal from a high school diploma is no longer as strong. Bedard tests this hypothesis using an ordered probit model, and her results offer support for it. She finds high school dropout rates that are between 4 percent and 31 percent higher in areas with

universities. This leads to the conclusion that, while college or university proximity appear to increase college or university enrollment, there are possible tradeoffs in terms of high school graduation rates.

Card (1993) also looks at the proximity effects of universities. In his paper, he estimates the returns to schooling using college proximity as an exogenous determinant of schooling. Using the NLS data set, he finds that men who grew up in areas near four-year universities have significantly more years of schooling. He uses an IV model, with the instrumental variable controlling for student ability, to predict the level of education per student. His results show that having a college within close proximity increases the years of education for the top 75 percent of predicted achievers by 0.2 to 0.4 years. However, for the lowest 25 percent of predicted achievers having a college in close proximity results in a much more significant increase of 1.1 years. In the same paper, he also looks at the returns to college education. Using proximity as an instrument for schooling, he finds returns per year of schooling of 10 to 14 percent, which are much higher than his OLS estimated 7.3 percent returns per year. It is also significantly larger than the 7.9 percent returns per year that Monk-Turner (1994) finds for universities. Card also finds that children of parents with little formal education tend to have the biggest returns from close proximity to universities. It appears that college and university proximity are positively correlated with enrollment and years of education overall, but that high school graduation rates may be negatively affected by college or university presence.

Historically Black Colleges and Universities

When discussing how TCU presence has affected Native American educational attainment, it is helpful to look at how enrollment at a similar type of institution, Historically Black Colleges and Universities (HBCUs), has affected African American educational attainment. Historically Black Colleges and Universities are a natural comparison group for TCUs. These schools are primarily located in the Southeast, and they are predominantly located in racially diverse rural areas. There are currently 105 HBCUs, with 83 of them offering bachelor's degrees and 38 offering associate's degrees. This differs from TCUs, most of which are smaller two-year institutions. Like TCUs, they were established to meet the needs of a disadvantaged minority group, African Americans living in rural areas, and also like TCUs, over time they have spread to both urban and rural areas (Mykerezi and Mills, 2008). Their student bodies are primarily (but not exclusively) African Americans, and they enroll approximately 15 percent of all black college students and one-third of all black college graduates (Wilson, 2007)

Much of the economic literature on HBCUs looks at either the relative graduation rates of African American HBCU students compared with traditional college students or the long term wage effects of attendance and graduation from HBCUs. There is disagreement among economists of what effect HBCU enrollment has on graduation rates and future wages.

First, there are several studies looking at educational attainment effects of HBCU enrollment for African Americans. Ehrenberg and Rothstein (1994) use data from the 1972 National Longitudinal Survey of High School Students (NLS-72) to compare

college graduation rates of African Americans at HBCUs to African Americans at other comparable schools. They find that HBCU students were 21 percent more likely to graduate by 1979 than African American students who attended comparable schools. Wilson (2007) also looks at how HBCU enrollment affects African American educational attainment. In a study using data from National Center of Education Statistics (NCES), the National Postsecondary Student Aid Study (NPSAS), and the High School and Beyond Survey (HSB), Wilson looks at bachelor's degree attainment in 1980 and 1995. She finds that students who attended at HBCU in 1980 were 16 percent more likely to earn a bachelor's degree within six years compared with African Americans enrolled at non-HBCU schools. In 1995, the effect of enrollment at a HBCU on bachelor's degree attainment was not significant. While the positive effect of enrollment at a HBCU on bachelor's degree attainment may have disappeared by 1995, it is important to note that tuition at HBCUs is significantly lower than at comparable schools.[20] That means that, even in the absence of an effect on educational attainment, these schools appear to be offering African Americans higher education opportunities at significantly lower costs.

There has been some contention among economists regarding the effects of HBCU enrollment on future wages. Ehrenberg and Rothstein (1994) find that, in 1979, enrollment at a HBCU resulted in future wages being up to 11 percent lower than wages earned by non-HBCU black graduates, although their results were not significant. Constantine (1995), using a multinomial logit college choice model, finds a 38 percent

[20] Tuition at United Negro College Fund HBCUs is less than half of that at comparable two-year or four-year institutions (Wilson, 2007). This is one aspect where TCUs and HBCUs differ; TCU tuition levels are approximately the same as those at community colleges (AIHEC, 2010).

increase in wages of African Americans who attended four-year HBCUs compared with those who attend other four-year schools.

Constantine (1998) then looks at the separate male and female effects of attending a HBCU. She finds that African American males who were enrolled at a HBCU had seven percent higher wages compared with African American males at non-HBCUs, and that African American females who were enrolled at a HBCU had 15 percent higher wages than their counterparts at non-HBCUs. Mykerezi and Mills (2008) also looked at separate male and female effects, although their results differed from Constantine's. They find that, after controlling for pre-college attributes, that African American males who enrolled at HBCUs initially had wages that were eight percent lower than those of non-HBCU African American males, but that their wages grew faster. By the end of their 16 year wage profile, the wages of African American who attended HBCUs and African Americans who attended comparable schools were virtually identical. For females, Mykerezi and Mills find that the wages of the African Americans enrolled at HBCUs were not significantly different from non-HBCU individuals throughout the 16 year wage profile.

The results from the different studies on the wage effects of enrollment at HBCUs are often contrary to each other, making it hard to see what the real effect on wages is for enrollment at a HBCU. However, in all cases, the significant difference in college costs should be accounted for when valuing these schools. If African Americans are earning comparable wages (as Mykerezi and Mills find), they are able to reach that higher income bracket with lower direct education costs.

One important difference between TCUs and HBCUs is the differences in tuition costs between the two. Much of the economic literature that finds insignificant wage or educational attainment effects of enrollment at a HBCU points out that even if these schools are not positively affecting future wages or helping to increase bachelor's degree attainment, they are offering higher education institutions that are comparable to traditional schools at significantly lower costs. TCUs are not afforded that same luxury. Since the tuition costs at TCUs are similar to those at public community colleges[21], any negative or insignificant effects on educational attainment are not being offset by lower costs to students.

[21] The average tribal college tuition cost is approximately $2,500 (American Indian College Fund, n.d.). The average community college tuition in 2005 was $2,743 (Delta Cost Project, 2010).

CHAPTER 5

EMPIRICAL METHODS

The main question that this paper seeks to answer is how the presence of tribal colleges and universities effects educational attainment. Looking at individual level census data from before and after the openings of TCUs, this paper uses differencing to examine the effects of TCU presence on Native Americans' propensities to earn college degrees. It includes four different educational attainment measurements: bachelor's degree attainment, associate's degree attainment, attendance at college, and high school diploma attainment. This chapter is organized as follows. First, the reasons for using a triple-difference model are explained. After that, the primary regression equation is given, the different dependent and independent variables are described and their inclusion in this paper is explained. Finally, the regression equation and the triple-difference model are connected, and it is shown how the triple-difference model is imbedded within the regression equation.

This paper uses a triple-difference model in order to control for state, time, and population group specific characteristics. The use of a model that doesn't control for these, such as a simple OLS model, would risk inaccurately attributing changes in Native American educational attainment to TCUs when the changes were actually the result of characteristics specific to a certain time or place. For example, if Native American educational attainment increases nationally before a TCU is opened, then looking at the changes from before and after the TCU opened and attributing any gains to the TCU

would be misleading because those time specific characteristics are not taken into account. Also, state specific characteristics could be present that also need to be controlled. If a state always has lower levels of educational attainment per person than the national average, then that needs to be accounted for if a TCU opens in that state to ensure that the school's effects are not underestimated. A triple difference model can help control for these state and time specific characteristics. The triple difference model used in this paper is

$$\{\{[NA\ educ_{after,\ in\ states\ with\ TC\ openings} - NA\ educ_{before,\ in\ states\ with\ TC\ openings}] - [NA\ educ_{after,\ in\ states\ without\ TC\ openings} - NA\ educ_{before,\ in\ states\ without\ TC\ openings}]\} - \{[NN\ educ_{after,\ in\ states\ with\ TC\ openings} - NN\ educ_{before,\ in\ states\ with\ TC\ openings}] - [NN\ educ_{after,\ in\ states\ without\ TC\ openings} - NN\ educ_{before,\ in\ states\ without\ TC\ openings}]\}\} \quad (2.1)$$

where *NA educ* describes Native American educational attainment and *NN educ* describes non-Native American educational attainment.

The first difference shows how Native American education changes in states after TCUs open in them. The second difference subtracts the change in Native American degree attainment over the same period from states without TCU openings. This difference is used to separate out any trends in education for Native Americans, such as national growth in minority education, over this period. The third difference subtracts the change in non-Native American degree attainment in states without TCU openings from the change in non-Native American degree attainment in states with TCU openings. This is the part of the equation that uses non-Native Americans to control for state

characteristics and trends. If a state had overall educational attainment increase by a certain amount for its entire population over the same time period that a TCU opened in that state, then any growth in Native American degree attainment would need to be examined in context with that statewide growth.

The primary regression equation for this paper (in which the triple difference model is imbedded) has education as the dependent variable, with different educational attainment equations estimated separately. The regression equation is

$$Educ_{i,s,t} = \beta_{0+} \beta_1 X_i + \beta_2 NA_i + \beta_3 Y_{s,t} + \beta_4 Tribal_{s,t} + \beta_5 Tribal_{s,t} * NA_i + \alpha_t + \gamma_s + \varepsilon_{i,s,t} \quad (2.2)$$

in which *i* indicates an individual, *s* indicates which state that individual lives in, and *t* indicates the year. X_i is a vector of demographic variables, $Y_{s,t}$ is a vector of variables controlling for the number and level of colleges and universities within a state along with additional state trend variables, $Tribal_{s,t}$ is a variable controlling for the number of TCUs in a state, and NA_i is a dummy variable for Native Americans. The variable $Tribal*NA_{i,s,t}$ is an interaction effect variable for the $Tribal_{s,t}$ and NA_i variables. The α_t and γ_s components of the regression are vectors of state and time fixed effects.

The $Educ_{i,s,t}$ variable is a measurement of what level of education a person has received. There are several separate regression equations used for the different educational attainment measurements. The first regression has those individuals who have received a bachelor's degree or higher being equal to one and everyone else being equal to zero. This regression shows how the presence of TCUs affects a person's likelihood of getting a bachelor's degree. This is similar to the diversion and

democratization literature summarized in Chapter 4 (Long and Kurlaender, 2004) (Alfonso, 2006) (Rouse, 1995). The presence of two-year colleges, which most TCUs are, may affect Native Americans by either diverting them away from bachelor's programs or by giving those students who would not go to school if they had to start at a four-year school the chance to get started at a community college and then progress on to a four-year school. This paper does not separate out the democratization and diversion effects, but rather shows only the net result.

The second regression is similar to the first, with $Educ_{i,s,t}$ equaling one if an individual has a bachelor's degree or higher, and zero if they have less than a bachelor's degree. However, this model only includes individuals who have at least two years of college education, the equivalent of an associate's degree. By limiting the sample as such, this regression shows the effects of TCU presence on bachelor's degree attainment for individuals who attend college.

The third regression codes degree earning college students (those with at least two years of college) as one, and everyone with less than two years of college education as zero. This regression shows how TCU presence affects the total amount of degrees earned. If TCUs are increasing the number of associate's degrees earned while decreasing the number of bachelor's degrees earned, then that net effect of TCU presence is picked up by this regression.

In a fourth regression, those individuals who have obtained an associate's degree are coded as one and everyone else is coded as zero, with anyone with a bachelor's

degree or higher excluded from this sample.[22] This regression shows how the presence of two-year colleges affects two-year college enrollment and associate's degree attainment, but it will not show any of the potential effects of TCUs on bachelor's degree attainment or on high school graduation rates. This regression is included because it shows the effects of TCU presence on individuals' propensities to earn associate's degrees for the group that does not complete a four-year degree. However, this regression will not show any of the potential effects of TCU presence on bachelor's degree attainment.

A final regression measures educational attainment in total years of schooling completed. This regression is included to show the net effect of TCU presence on years of schooling completed. This sample includes all individuals with at least nine years of completed schooling, and measures educational attainment as a continuous variable from 9 to 17.[23] While this regression does not show degree attainment levels, it does show how TCU presence increases or decreases the overall number of years of education for Native Americans in TCU states.

While the dependent variables are used in separate regressions, in all of these primary regressions the independent variables stay the same. In them, X_i represents a vector of exogenous demographic characteristics of the individuals in the sample. These include race, sex, and age. The race variables are dummy variables equal to one if a person is of a certain race and zero if they are not. $Y_{s,t}$ represents sets of state level trend variables, including the number of colleges and universities, state unemployment levels,

[22] The exclusion of bachelor's degree students was done so that any possible positive or negative effects TCUs may be having on bachelor's degree attainment would not affect the associate's degree results.
[23] Due discontinuity in measurement methods of educational attainment between census years, the sample excludes individuals with less than nine years of completed schooling. That allows for years of education to be measured as a continuous variable.

average state incomes, and the percent of states' populations that live in urban areas.[24] The college and university variables are in terms of the number of colleges and universities per 10,000 individuals.

All of these state level variables are not matched with the census year, but are rather matched with the year an individual was 25 or 35. In these regressions, the age when the state level variables are linked with individuals also defines the bottom age-limit in the sample.[25] That means that a person who was 40 in the 1990 census will have state level variables from 1975 for the age 25 regressions. The average income, number of alternative schools, and presence of a TCU will all be the 1975 values for that individual in those regressions. Then, in the age 35 regressions, that individual will have state level variables from 1985. This is done in order to give accurate estimates of the higher education opportunities and state conditions a person faces when they were of different ages. The age 25 regressions are included because most traditional associate's or bachelor's degree students will have completed their degrees by that age. This allows for comparability between this paper and other economic research that looks at educational attainment. The age 35 regressions are included due to the nature of TCU students. With the average TCU student being 31.5, many will not have completed their college educations by the age of 25. This 35 age regression allows for majority of TCU students time to finish their college educations. While linking education variables with individuals at an older age adds individuals who complete school and are no longer

[24] In separate regressions, state*time dummies were used in place of these state level trend variables. Using them instead did not significantly affect the results.

[25] This was necessary; if individuals were younger than either 25 or 35 respectively, we would be unable to link the state level variables with them.

students, it also limits the number of individuals in the sample because nobody under that age (either 25 or 35) are included in the final regressions.[26] Different methods of school matching with individuals are discussed in Chapter 7.

For the school variables, the coefficients will tell how much an additional school per 10,000 state residents will increase or decrease degree attainment. It is expected that the number of four-year schools will be positively correlated with bachelor's degree attainment and the number of two-year schools will be positively correlated with associate's degree attainment. However, the literature suggests that two-year schools may have negative effects on the number of bachelor's degrees earned, and that the presence of colleges or universities may have negative effects on the number of high school diplomas attained.

Next, the model has elements that look specifically at how TCUs affect educational attainment. In the regression equation, NA_i is a dummy variable for whether an individual is Native American, $Tribal_{s,t}$ is a measurement of the number of TCUs in the state, and $Tribal_{s,t}*NA_i$ is an interaction effect variable for whether a person is Native American and the number of TCUs in their census state. The numbers of TCUs in a state are linked with the year a person was 25 or 35 in the same way that other colleges and universities were linked above. However, the $Tribal_{s,t}$ variable is measured as TCUs per 10,000 Native Americans.[27] The interaction effect variable, $Tribal_{s,t}*NA_i$, is the primary variable of interest for this paper. It shows how TCUs affect Native Americans specifically.

[26] This method of limiting a sample so that most of the individuals in it are old enough to have graduated is common, used by Kane (1994), Rouse (1998), and Currie and Moretti (2003).
[27] Different methods of measuring TCU numbers are used and explained in Chapter 7.

Time and state fixed effects are also included in the model. The time fixed effect variables, represented by α_t, controls for factors common across the country in a given census year *t*. This helps control for years in which education was lower or higher everywhere due to some national factor (higher costs of college during the 1980's is an example). The state fixed effect variables, represented by γ_s,, are used to account for state characteristics that are time-invariant, such as a state which always has relatively high educational attainment levels.

The coefficient β_4 on the variable $Tribal_{s,t}$ shows the difference in educational attainment between non-Native Americans in states with TCUs and non-Native Americans in states without TCUs. A coefficient value that is statistically significant would suggest that TCUs have a significant impact on non-Native Americans' educational attainment. This coefficient represents the value of *Non-Native American degree attainment after* minus *Non-Native American degree attainment before* in states with TCU openings minus *Non-Native American degree attainment after* minus *Non-Native American degree attainment before* in states without TCU openings from the triple-difference model.

The variable $Tribal_{s,t}*NA_i$ is the most important variable in the equation for this paper. This variable will equal zero unless the individual is Native American and there is a TCU in their state. To link equation 2.2 to the triple-difference equation, β_5 is equivalent to the result of equation 2.1. The values of this coefficient will show the effects of TCU presence on specific educational attainment measurements for Native

Americans living in TCU states, after controlling for the average level of education in states and the average level of Native Americans nationally.

CHAPTER 6

DATA

Census Data

The individual level data are from the 1960 to 2000 census.[28] The census data used are all 1 percent samples, and 1960 through 1980 are unweighted. In those years, each individual in the samples represents 100 people. The 1990 and 2000 samples are weighted samples, with weights being used to ensure that small demographic groups are adequately represented. The Census Bureau first offered weighted samples in 1990 in order to more precisely record information from individuals and households in small localities. Native Americans on reservations are a good example of small localities, so these weighted samples were used when available.

The geographical locations of the individuals in this study are reported at the state level. While county data might be beneficial for being able to place a person in the vicinity of a TCU, the census does not record a person's county of residence during this time period. Rather, they use state or large scale areas of 250,000 individuals or more. The states where TCUs are located are relatively large and have low population densities, so the larger scale location measurements would likely not provide additional insights. There are some benefits of using state level data as well. Due to the low population densities that are typical around Native American reservations (especially in Western states), it would be expected that a single TCU would be able to support students from

[28] Census data was gathered using IPUMS (Ruggles et al., 2010).

several counties. Using state level data allows for traveling between counties to attend school so long as it is within the same state. Looking at TCUs is very different from looking at inner city community colleges, which primarily serve the immediate area due to much more dense populations. A potential problem that arises from using census data to determine location is that it only gives a person's place of residence in the census year and does not say how long they have been in that state or where they were living when they were of college age. However, the census provides information on a person's birthplace so that can be used in place of census location in separate regressions to see how the effects differ.

Demographic variables are included in order to separate the effects of TCU from other factors influencing educational attainment. A person's age, sex, and race are all included. In this dataset, the sample is limited by age. This is done in order to exclude those individuals who have not completed their education. Since the state level variables are linked with individuals in the year they were 25 or 35, anyone who was 25 or 35 before 1960 or turned 25 or 35 sometime after 2000 are excluded.[29] Individuals over the age of 55 are also excluded in order to limit the sample to the most relevant population, which is individuals who would be most likely to have access to TCUs when they were of school age. Individuals that are currently listed as students are also excluded.[30]

[29] The selection of sample ages is discussed in Chapter 5.
[30] Gill and Leigh (2003) also limit their sample set by dropping current students.

School Opening Data

The school opening data for this paper measures the number of two-year schools, four-year schools, and TCUs in a state in a given year. The data on the number of schools in each state per year is primarily from Currie and Moretti's (2003), which they generously allowed to be used here. Their dataset lists the number of colleges in a county in a given year and divides these into two-year and four-year schools as well as public and private schools. They used data from the Integrated Postsecondary Data System (IPEDS), in addition to Barron's and Peterson's guides to colleges and universities, to build this data set. Their school data runs from 1960 to 1996 and excludes very small schools (schools with enrollment below 200) and specialty schools. This paper updates that dataset to 2000.[31] In order to do this, a list of schools that had grown, shrunk, opened or closed between 1996 and 2000 was built, and these schools are either added or subtracted from Currie and Moretti's dataset.[32]

Additional Population and State Control Variables

State population data is used to give schools a per-person value. This population data, along with variables for state unemployment rates, average state incomes, and the percent of states' populations living in urban areas is from *The Statistical Abstract of the United States* (U.S. Census Bureau, 2011). A list of summary statistics for the data is given in Table 7.

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[31] For a full description for the building and merging of the data set for this paper and Currie and Moretti's original data set, see the data appendix.

[32] The list of schools was compiled using U.S. Department of Education, (2010).

Table 6. Summary Statistics for Data 1960-2000: Individuals 25 to 55.

Variables	**1960**	**1970**	**1980**	**1990**	**2000**
Avg. Number of C.C. per 10,000	0.0258	0.0368	0.0434	0.0445	0.0444
Avg. Number of Univ. per 10,000	0.0844	0.0805	0.0778	0.0751	0.0728
Avg. Number of T.C. per 10,000	---	0.0001	0.0006	0.0008	0.0009
Percent Sample Native American	0.26	0.4	0.68	0.88	0.98
Percent Sample White	83.92	83.78	79.85	78.72	73.90
Percent Sample Black	10.97	10.47	10.87	9.54	10.59
Percent Sample Asian	0.52	0.97	2.01	2.92	3.91
Percent Sample Other Race	0.23	0.13	0.10	0.06	0.13
Percent Sample Hispanic	4.28	4.26	6.49	7.88	10.48
Average State Income	$2,283	$4,101	$10,205	$19,614	$29,450
Percent of State Population Urban	68.47	71.79	72.96	74.04	74.55
State Unemployment Rate	5.5	4.9	7.1	5.6	4.0
National Population	179,323,000	203,302,000	226,546,000	248,718,000	281,442,000
Native American Population	522,371	792,730	1,420,000	2,067,000	2,664,000
Observations	21,701	268,487	630,693	1,049,811	1,234,397

Source: The number of colleges, universities, and TCUs per 10,000 is from authors calculations. They were derived using the college dataset used in this paper and the census population values from The Statistical Abstract of the United States (U.S. Census Bureau, 2011). The college measurements in the first 3 rows are calculated by taking the population counts from the Statistical Abstract and dividing the number of colleges at the state level by state population counts, then multiplying that by 10,000. The race and Hispanic values and the observation counts are from the author's calculations from the 1960 to 2000 census data using in this paper (Ruggles et al., 2010). The income, percent urban, unemployment, and population variables come from U.S. Census Bureau (2011).

CHAPTER 7

RESULTS

Primary Regressions

Table 7 reports the age 25 regression results from equation 3.2 using the linear probability model, while Table 8 reports the age 35 linear probability results.[33] For both the 25 and 35 ages, separate regressions are run for the different educational attainment levels discussed in Chapter 5.[34]

Bachelor's Degree Attainment

The first educational attainment measurement separates individuals by whether or not they earned bachelor's degrees. These regressions do not limit the sample by college attainment. The results for the full sample age 25 bachelor's regressions can be seen in column I in Table 7, and the full sample age 35 bachelor's regressions are in column I of Table 8. In the linear probability model, the variable of interest, *Tribal*NA,* has a negative coefficient for both age specifications. The coefficient is not significant in the age 35 regression, but value for the age 25 regression is significant at the ten percent

[33] In addition to the regressions that include state trends as well as state and time dummy variables, a set of regressions that add state*time interaction effects are included in Appendix B in Tables 14 through 17. The results from these regressions are very similar to the primary regressions, suggesting that the state and time fixed effects along with the state trend variables are controlling for most of the differences between states.

[34] An additional ordered logit regression is included (shown in Table 11). The ordered logit dependent variable coded as zero if an individual has less than a high school diploma, one if an individual has a high school diploma or higher but less than an associate's degree, two if an individual has an associate's degree but not a bachelor's degree, and three if an individual has a bachelor's degree or higher. Bachelor's degree attainment is the excluded group. The findings do not show statistically significant effects of tribal college presence on any of the reported educational attainment measurements.

level and shows that an additional TCU per 10,000 Native Americans lowers bachelor's degree attainment by approximately four percent for Native Americans living in that respective state.[35] These results suggest that TCUs may be having some diversion effect on Native Americans' bachelor's degree attainment. This effect is significant in the younger age 25 regression.

For both age regressions, the values for the Native American dummy variable (*NA*) are significant and negative. The coefficient for the *Tribal* variable is positive in the 25 age regression and negative in the 35 age regression, but it is not significant in either. This *Tribal* variable shows the effects of TCUs on non-Native Americans living in TCU states, and these findings suggest that these schools are not significantly affecting bachelor degree attainment for anyone besides Native Americans in TCU states. This is encouraging, because it suggests that the significant effects of these schools are being felt mainly by Native Americans. A significant coefficient here would imply that either these schools are having large effects on the non-Native American populations in these states, or that there are things inherently different about TCU states that are not being controlled for in these regressions.

The next set of bachelor's degree regressions in column II limits the samples to individuals with at least two years of college education. The age 25 limited sample regression results are reported in column II of Table 7, and the age 35 limited sample results are reported in column II of Table 8. The linear probability results from the age 25 and 35 regressions both show that TCU presence decreases bachelor's degree

[35] The results from the age 25 logit regression show a larger 11 percent reduction in bachelor's degree attainment, also significant at the ten percent level.

attainment by 13 percent. Both regressions are statistically significant at the one percent level. [36]

Associate's Degree Attainment

Column III in Tables 7 and 8 reports the next attainment measurement used, which separates those individuals who obtained associate's degrees from those who obtained less than an associate's degree, excluding anyone with a bachelor's degree or higher. Here, the signs on the *Tribal*NA* variables are different for the different age specifications: in the age 25 linear probability regression the coefficient is negative but not significant and in the age 35 linear probability regression it is positive and significant at the five percent level.[37] This significant result shows that an additional TCU per 10,000 Native Americans increases associate's degree attainment by approximately three percent for Native Americans ages 35 to 55 in that state.[38]

Another notable feature of these regressions is that, while all the coefficients on the *NA* variable are negative and significant at the one percent level, they are three to five times smaller than those in the bachelor's degree regressions. This relative size difference in the coefficients on NA between these two educational attainment levels may be partially explained by the fact that Native Americans who earn college degrees earn associate's degrees at a much higher rate than national average (see Figure 3).

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[36] If tribal college presence increases the number of students who earn associate's degrees by increasing enrollment among students who would not attend a four-year university regardless of the tribal college presence, then this estimate of the effect of tribal college presence on bachelor's degree attainment may be biased upward in this regression.

[37] The result from the logit regression is positive and significant at the one percent level here, showing a four percent increase in associate's degree attainment for Native Americans in TCU states.

[38] The logit regression results for the age 35 regression shows a slightly larger 4 percent increase in associate's degree attainment. This result is significant at the one percent level.

College Degree Attainment

The next set of regressions combines individuals who earn bachelor's degrees and associate's degrees into one group, and compares them against everyone with less than an associate's degree education. These regressions show the net result of TCUs on degree attainment. The age 25 and 35 regression results are reported in column IV of Tables 7 and 8, respectively. The coefficients on the *Tribal*NA* variables are not significant in either the 25 or 35 regressions. This suggests that TCUs' net effect is not significant in terms of number of degrees earned when type of degree is not specified.[39]

Years of Education

Column V in Tables 7 and 8 reports the results from the years of education regressions. These regressions show the effects of TCUs on the overall number of years of education for Native Americans in TCU states. Years of education is measured as a continuous variable from 9 to 17. The exclusion of individuals with less than one year of high school completed was done due to discontinuity in the census samples, where years of education changed from a continuous variable to a discrete variable. While excluding those individuals with very little education will have an effect on the constant terms in the regressions (biasing them upward), it is not expected that they would affect the coefficients on the *Tribal*NA* variables. The age 25 and age 35 results are reported in columns V of Tables 7 and 8 respectively.

[39] In the logit regressions, the coefficients on *Tribal*NA* are positive for the age 25 and age 35 regressions, but are not significant in either.

The coefficients on the *Tribal*NA* variables are not significant under either age specification, nor are they significant in the logit regressions. This, along with the results above from the bachelor's degree regressions and associate's degree regressions, suggests that TCUs may be diverting some Native American individuals from earning bachelor's degrees, but at the same time they are increasing associate's degree attainment. This finding is supported by the fact that the total years of education regressions and the total degree regressions are both insignificant.[40]

Effects Separated by Sex

The next set of regressions separates out TCUs' effects based on sex. These regressions are included primarily because of the sex disparity at these schools (as discussed in Chapter 2, these schools have much lower male-to-female ratios than the typical American college or university). Because of that, it is possible that Native American females are responding differently to the presence of TCUs, which would be picked up here. This new regression equation is

$$Educ_{i,s,t} = \beta_{0+} \beta_1 X_i + \beta_2 NA_i + \beta_3 Y_{s,t} + \beta_4 Tribal_{s,t} + \beta_5 Tribal_{s,t}*NA_i \quad (3.1)$$
$$+ \beta_6 Tribal_{s,t}*Male_i + \beta_7 Male_i*NA_i + \beta_7 Tribal_{s,t}*NA_i*Male_i + \alpha_t + \gamma_s + \varepsilon_{i,s,t}$$

The coefficients of interest in this new regression are β_5, which shows the effects of TCUs on Native American females, and β_7, which shows the effects of TCUs on Native

[40] An additional educational attainment level that separates individuals into two groups, those who earned at least a high school diploma and those who earned less than a high school diploma, was also run for both age levels. The TCU variable was not statistically significant in either the 25 or 35 age regressions.

American males relative to their effects on Native American females. The linear probability model age 25 regression results for bachelor's and associate's degree attainment and years of education are shown in Table 9, and the age 35 regression results are shown in Table 10.

Beyond the $Tribal_{s,t}*NA_i$ and $Tribal_{s,t}*NA_i*Male_i$ variables, there are two additional main interaction effect variables in these equations. The $Tribal_{s,t}*Male_i$ and $Male_i*NA_i$ control for the relative effects on all males in TCU states and the relative effects of male Native Americans respectively. If males in TCU states earn associate's or bachelor's degrees at a lower rate than the state average, then that would be controlled for by $Tribal_{s,t}*Male_i$. Likewise, if Native American males earn degrees at a lower rate compared with Native American females in all states, then that is controlled for with $Male_i*NA_i$. That leaves $\beta_7 Tribal_{s,t}*NA_i*Male_i$ to represent only the effects of TCUs on Native American males relative to the effects on Native American females.

Bachelor's Degree Attainment
for Males and Females

Column I of Tables 9 and 10 give the linear probability full sample bachelor's degree results for the different age specifications. These results show that TCUs effects on bachelor's degree attainment are very equally spread between Native American males and females, with the coefficients both being negative but not significant. The same holds true for the 35 age regressions, where the results are once again both negative but not statistically significant. The results for the logit model are similar.[41]

[41] The results from the logit regressions differ from the linear probability results here. In the 25 age logit regression, the effect of TCUs on Native American males' bachelor's degree is negative and statistically

The next set of regressions once again measures bachelor's degree attainment, but this time against the sub-sample including only those individuals that earned bachelor's or associate's degrees. The age 25 and age 35 regression results are recorded in column II in Tables 9 and 10. The result from the age 25 regression shows that the negative impact of TCU presence is equal between Native American females and Native American males. The effect on both sexes is also negative in the age 35 regression. However, in the age 35 regressions, the linear probability and logit results both show that the negative effects are not evenly divided between Native American males and females. In the age 35 linear probability model regression, TCU presence lowers female bachelor's degree attainment by 10 percent while decreasing Native American male bachelor's degree attainment by 24 percent. These results suggest that the negative effects of TCU presence on bachelor's degree attainment are being felt more by Native American males than Native American females.

Associate's Degree Attainment
for Males and Females

The associate's degree regression results are presented in column III in Tables 9 and 10. In both age specifications, the effects on Native American males and females are not statistically significant, suggesting that the effects of TCUs on associate's degree attainment are not do not differ significantly between Native American males and

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significant, showing that TCU presence lowers bachelor's degree attainment by 14 percent for Native American men ages 25 to 55. The coefficient on *Tribal*NA*Male* here is roughly twice that of the effect on females (*Tribal*NA)*, which is negative but not significant. The results for the age 35 regressions are similar (except that the coefficient on *Tribal*NA* variable is actually positive, although not significant), showing that TCU presence lowers Native American male bachelor's degree attainment by 12 percent, a result that is significant at the ten percent level.

females.[42] These results differ from the primary age 35 associate's degree regression results from Table 8, which show that TCU presence on associate's degree attainment is positive and statistically significant.[43]

Robustness Regressions

For each of the primary regressions that are included, a series of robustness tests were also run. These regressions are included to test the appropriateness of the specifications in the primary regressions and to see how the coefficients on the *NA*Tribal* variables change when regression specifications are redefined. All of the robustness test regressions have a single element from the primary regressions altered. This method is used because it makes it possible to attribute any changes to the specific element altered without worrying about interactions between multiple changes.

Including Students Enrolled at the Time of the Census in the Dataset

The first robustness regressions included keep current students in the dataset.[44] The level of education for these individuals is recorded by *The Census Bureau* as the highest year of schooling that they had completed at the time of the census. That meant

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[42] In the 35 logit regression, TCUs' effects on associate's degree attainment are positive and significant for both Native American males and females, showing that TCU presence increases associate's degree attainment by four percent for both sexes.

[43] The effects of TCU presence on associate's degree or bachelor's degree attainment for males and females are shown in column IV in Tables 9 and 10. The results for both age specifications and both models show that the effects of TCU presence on Native American male and females' propensities to earn some degree are not statistically significant and do not differ significantly between males and females. The same holds true for the final set of regressions, which shows the effects of TCU presence on the number of years of education for Native American males and females.

[44] The Census Bureau defined someone as being a student if they were enrolled in a school between February 1st of the census year and the date the census was taken, which was April 1st for the census years between 1960 and 2000.

that a student who would earn their associate's degree the same year that the census was given would be listed as having completed some college instead of having completed an associate's degree, and that a student who would be about to complete their bachelor's degree would be listed as having completed an associate's degree as their highest education level. A problem with including these individuals is that their educational attainment information often does not accurately show the final degree they will earn. A benefit of including current students is that it doesn't underestimate educational attainment levels as badly for groups that start college at older ages than the regressions that exclude students might. For Native Americans attending TCUs, this effect could be large given that these students are, on average, relatively older.

The results from these regressions show that keeping in current students does not have large effects in most cases. There are several cases where including students make the results less significant, although the magnitudes of the coefficients change only slightly.[45] Overall, it does not appear that including current students in regression samples makes a large difference in terms of degree attainment.

Exclusion of Certain
States from the Dataset

A second set of robustness tests limited the states included in the sample. In separate sets of regressions, two different types of states are excluded: states that do not have Native American reservations and states in which Native Americans did not make

[45] The coefficient on $Tribal_{s,t}*NA_i$ from the Associate's degree regression for 35 to 55 year olds goes from a five percent significance level to a ten percent significance level, and the results from the bachelor's degree regression for 25 to 55 year olds goes from a ten percent significance level to being insignificant. In both cases, the coefficients stay virtually the same and the standard errors increase slightly.

up at least 1 percent of the population in 2000. These regressions were run because they show if states with reservations or states with relatively large Native American populations are systematically different than those without reservations or those with few Native Americans. Due to the fact that the states that do fulfill one or both of these criteria are often large Western states, it is logical that there may be some inherent differences with these states and within these states' Native American populations. If Native Americans in these states are inherently different from Native Americans living in states without reservations or states that have very small Native American populations, then these regressions might more accurately depict the impact of TCUs. With states that do not fulfill the criteria excluded, the remaining sample would be composed of a more homogenous group of Native Americans, so that we are then comparing those Native Americans living in TCU states against a more similar control group.

As with the robustness regressions that keep students in the samples, the results are very similar between these state-exclusion regressions and the primary regressions. There is only one case where the one of the coefficients in the primary regression becomes insignificant in the state-exclusion regressions.[46] Overall, the findings from these regressions are similar enough with the primary regression results to suggest that these states (and these states' Native American populations) are not significantly different

[46] In the bachelor's degree regression for 25 to 55 year olds, the coefficient on $Tribal_{s,t}*NA_i$ goes from being significant at the ten percent level to being insignificant. In this case, the value of the coefficient changes from .04 to .03 in the regression that excludes states without reservations, and .03 in the regression that excludes states without at least one percent of their population being Native American. That shows that the negative effects of TCUs on bachelor's degree attainment shown in the primary regression becomes insignificant when the sample is limited to states with reservations or relatively high ratios of Native Americans to total state populations.

from states that did not fulfill one of these two different exclusion criteria after state trends and state fixed effects are controlled for.

Changing the Measurement
Method for TCUs

An additional set of robustness regressions tested if redefining the way TCUs are measured alters the final results. In these regressions, TCUs are measured in terms of the number per 10,000 state citizens rather than in terms of number per 10,000 Native Americans in a state. The results were not significant in any of these regressions. In general, the coefficients grow dramatically, but the standard errors increased much faster. Due to the fact that Native Americans made up between 0.4 and 1.0 percent of the national population, measuring TCUs in terms of the number per state residents is comparable to measuring the number of TCUs per 100 Native Americans. The demographic makeup of TCUs makes it likely that measuring their numbers in relation to the number of Native Americans in a state a better approximation of their availability than measuring their numbers in terms of state resident of all races.

The findings from these additional regressions show that the results from the primary regressions are robust to changes in the sample specifications.[47] This allows us to be more confident in the results from the primary regressions. There are a few main

[47] An additional set of robustness regressions tested if redefining the way TCUs are measured alters the final results. In these regressions, TCUs are measured in terms of the number per 10,000 state citizens rather than in terms of number per 10,000 Native Americans in a state. The results were not significant in any of these regressions. In general, the coefficients grow dramatically, but the standard errors increased much faster. Due to the fact that Native Americans made up between 0.4 and 1.0 percent of the national population, measuring TCUs in terms of the number per state residents is comparable to measuring the number of TCUs per 100 Native Americans. The demographic makeup of TCUs makes measuring their numbers in relation to the number of Native Americans in a state a better approximation of their availability.

findings from the primary and male and female regressions. First, it appears that TCUs are increasing Native American associate's degree attainment for 35 to 55 year olds by three to four percent. Next, the results suggest that, when bachelor's degree attainment is measured against the entire sample, TCUs may be having a diversion effect on bachelor's degree attainment for Native Americans ages 25 to 55. It is notable that this diversion effect is no longer significant in the age 35 full sample regression. It is possible that a portion of TCU students who will go on to earn bachelor's degrees are still enrolled in college (thus excluded from the sample) in the 25 to 55 year old bachelor's regression. This seems likely given that TCU students are relatively old compared with their community college counterparts. In the bachelor's degree attainment regressions where only individuals with at least two years of education are included, the effects are much larger and are significant in both age specifications. However, there is a possible upward bias on these results due to the fact that some of the students who start at TCUs and go on to earn associate's degrees would not have gone to college at all if the only alternative was a four-year program. Rouse (1998) finds this same problem with limiting a sample to individuals who have already begun college, suggesting that doing so ignores positive democratization effects of community colleges and creates a bias on the diversion effect results, making it look like community colleges are having a larger negative effect than they actually are. This hypothesis is supported by the fact that in the robustness regression that includes current students, the results from the age 25 bachelor's degree regression become insignificant.

Tribal College and University
Exogeneity Regressions

The interpretation on all of the results from above is conditional on the fact that TCU presence is exogenous with demand for education. If it is not, if TCU openings are determined by high demand for education, then all of the findings above would show effects that are overly large. That makes answering the question of exogeneity not only an important element of this paper, but a crucial part of any quality economic research that looks at the effects of colleges or universities on educational attainment.

The methods that economists have used to determine the exogeneity of colleges and universities vary widely according to the intent of their research and the type of data used. Research done using panel data often allows for exogeneity tests that are impossible with cross-sectional data (like the pooled cross-sectional dataset from this paper). The available variables and the time range of a dataset also define the parameters of any exogeneity tests. For example, Currie and Moretti's (2003) dataset is made up of individual level birth certificate information from the Vital Statistics Natality files from 1970 to 1999. With this data, they show that college openings increase educational attainment due to more than the initial demand for education. Looking at data from the ten years before a college opening and comparing it with data from the ten years following a college opening, they find no clear trend in mother's education or in birth outcomes from before the college opens, but a steady improvement in both in the ten years following the college opening.

Certain types of data make it hard to find short-term trends. With census data, looking at trends from before and after a college opens is much more difficult because the data is only available at ten year intervals. In those cases, other strategies are used. Rouse (1998) also uses census data in her paper. In order to control for exogeneity, similar to this paper, Rouse adds average state income and state fixed effects into her model. This is similar to Mykerezi and Mills (2004), who look at HBCUs. In their paper, they address the exogeneity problem by looking at average incomes in HBCU counties and comparing them with other comparable counties. They find that average incomes in HBCU counties are actually lower than those in non-HBCU counties, which suggests that HBCUs are not being opened in counties with high incomes or high levels of education.[48] They also cite that opening HBCUs in areas with already high educational attainment and income levels would violate the HBCU mandate of serving disadvantaged groups. They take a third step by differencing the increases in educational attainment in a county by subtracting the change in educational attainment of non-black individuals from the change in educational attainment of black individuals.

This method is very similar to the differencing done in this paper, and the non-significant $Tribal_{s,t}$ variable here shows much the same thing that Mykerezi and Mills find; the presence of these schools does not significantly affect demographic groups besides the group of interest. However, this control method is taken a step further in this paper by adding another difference which controls for Native American and non-Native

[48] This holds true for tribal college locations, which are often on or near reservations with high levels of unemployment and poverty.

American educational attainment in non-TCUs as well. This method is well suited for isolating the effects of TCU openings on specifically on the Native Americans.

This paper uses additional approaches to see if TCU locations are endogenous to educational attainment. The first is a series of state level regressions, with TCU presence within a state as the dependent variable. This regression is included to see if TCU presence is determined at the state level by exogenous factors or if they are opened according to other factors unrelated to demand for education. In order to limit the dataset to states that are somewhat likely to develop TCUs, only states with reservations are included. The dataset has 37 observations, one per state with a reservation. The year 1970 is used as the year of interest because it represents the census year which most closely coincides with the beginning of the tribal college movement, making it a good baseline indicator for state conditions during the time when many TCUs were beginning to open. In these regressions, the TCU variable is either coded as a dummy variable (with states that had TCUs being listed as one and all states without being listed as zero) or as a continuous variable that shows the number of TCUs in states as of 2010. These are referred to as the binary variable model for the regressions where dummy variables are used and as the continuous variable model in the cases where TCUs are counted. The end result is two sets of regressions. The primary regression equation for both is

$$Tribal_s = \beta_{0+} \beta_1 X_s + \beta_2 Pop_s + \beta_3 Y_s + \beta_4 Controls_s + \varepsilon_s \quad (3.2)$$

In this equation, X_s represents a group of variables that measure the number of reservations in a state. It gives the total number of reservations listed by *The Census Bureau* and the number of reservations with a population of at least 1,000 in 1970 in each

state. The next element of the equation, Pop_s, gives the state Native American population in 1970. Finally, Y_s is a variable that gives the number of two and four-year schools in a state in 1970 and $Controls_s$, is a group of variables measuring unemployment, the percent of the population living in urban areas, and average income, all of which are measured at the state level and are also from 1970.[49] The results are given in Table 11, with the regressions in which TCU presence is a zero-one dummy variable listed in columns I and II, and the regressions in which TCU presence is measured as a continuous variable given in columns III and IV.[50]

In the dummy variable model, the significant predictors of TCUs are the number of reservations with at least 1,000 residents and the state income. Both of these variables are positively correlated with the number of TCUs, and both are significant at the ten percent level. In the continuous variable model, the most important predictors of TCU presence at the state level is the number of large state reservations and the percent of the state living in urban areas. The variable measuring the number of reservations with at least 1,000 individuals is positively correlated with TCU presence at the one percent level, and the variable measuring the percent of a state living in urban areas is negatively correlated with TCU presence. The continuous variable model suggests that a TCU is most likely to open in states with large reservations and a high percentage of their populations living in rural areas.

The next set of regressions looks at the 24 largest reservations in 1970. Reservation level census data is available for only these 24 largest reservations, all but

[49] See the data appendix for more information about these datasets.
[50] The dummy variable model uses a logit regression, and the continuous variable model uses a poisson regression.

one of which are located in states that have at least one TCU by 2010 (U.S. Census Bureau, 1973). Of those 24 reservations (all of which had Native American populations over 2,300 in 1970), 13 develop TCUs by 2010 and 11 did not. [51] The reservation level regression equation is

$$Tribal_r = \beta_0 + \beta_1 Labor\ Market\ Controls_r + \beta_2 Population\ Descriptors_r + \beta_3 Education\ Controls_r + + \varepsilon_s \quad (3.3)$$

In this regression, $Tribal_r$ is a variable for if a reservation develops a TCU. The next set of variables, $Labor\ Market\ Controls_r$, include the mean and median family income, the average per capita income, the reservation unemployment levels and the percent of the reservation population that lives below the poverty level. The population descriptors include Native American population, the percent of families with children under the age of 18, the percent that live in urban areas or on rural farms, and the percent of the population under the age of 20. The education controls include the percent of the reservation citizens 25 and older who have high school diplomas and the median years of education for reservation citizens. The percent of individuals under the age of 20, the high school graduation rates, and median years of education are included to help indicate demand for education on the reservation. The regression results can be seen in Table 12. There are two different equations estimated. As shown in the table, there are few significant coefficient values in the regressions with all the explanatory variables included. In that regression, which is shown in column II, only reservation population is a statistically significant predictor of TCU presence. Elements which are likely

[51] The Navajo reservation supports two TCUs. Any TCUs that the AIHEC indicated as not being linked with a specific reservation were not included.

correlated with demand for education such as the percent of the population under the age of 20, average income, and average educational attainment are all insignificant in this regression. Although this model has a very small sample size (an unfortunate limitation of regressions done at the tribal or reservation level), the lack of strong correlations between any of the education variables and the presence of a TCU offers more support to the idea that these schools are being opened based on different sets of criteria.

If TCUs are not being opened primarily due to demand for education, we would expect that their openings would be influenced by changes in funding levels. To examine that, the number of TCU openings was looked at before and after the two major changes in TCU funding; after the TCCUAA of 1978 which guaranteed TCUs Title I funding for their Native American students and after the 1994 act which granted TCUs land grant status. If these schools were opened based more on financial constraints rather than demand for education, it is expected more schools would open after the passage of these acts than before.[52] Openings were tabulated for an equal number of years before and after the passage of the two acts. School openings were tabulated for two, three, four, five, and ten years before and after the passage of these acts. In all five cases, the number of openings after the passage of the acts exceeded the openings from before their passage.[53]

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[52] This is not to say that demand for education is not a consideration, rather that it may not be the largest one.

[53] The possibility that tribal members would have known the acts were going to be passed is a possibility which would suggest that TCUs that opened immediately before the act were passed may have been on the founded on the knowledge that future funding was coming. To test for that, school openings were counted for the year before, year of, and year after the passage of these acts and compared against the number of openings from the three years before that. The number of openings from the time immediately around the passage of the act was more than twice that of the openings in the years before.

Although these simplistic regressions do not unequivocally answer the exogeneity question this paper faces, they add statistical support to the anecdotal evidence from Chapter 2 that TCUs are founded based on more than just demand for education. These reasons could be either Native American tribal members trying to preserve their culture and heritage, or it could be a reflection of their desire for self-determination. Cultural placement is also supported by individual TCU mission statements, most of which include preservation of tribal history and culture as a reason for their founding. The idea of cultural reasons for establishing TCUs makes their placement more exogenous with educational attainment, which allows us to be more confident with that the results are causal.

Table 7. Educational Attainment for Individuals 25 to 55 – Linear Probability Results.

Dependent Variables	(I) Bachelor's	(II) Bachelor's	(III) Associate's	(IV) Bachelor's or Associate's	(V) Years of Education
Sample	*Full Sample*	*Associate's or Higher*	*Associate's or Lower*	*Full Sample*	*Full Sample*
NA	-0.15***	-0.17***	-0.04***	-0.16***	-0.86***
	(0.010)	(0.013)	(0.005)	(0.013)	(0.066)
Tribal	0.00	-0.05	0.03	0.03	0.09
	(0.014)	(0.035)	(0.022)	(0.022)	(0.092)
Tribal*NA	-0.04*	-0.13***	-0.01	-0.04	-0.26
	(0.024)	(0.039)	(0.023)	(0.035)	(0.182)
Unemployment[1]	0.13*	-0.11	0.15***	0.22***	0.85**
	(0.067)	(0.078)	(0.028)	(0.069)	(0.369)
Average Income[2]	0.03***	0.08***	-0.03***	0.00	-0.00
	(0.009)	(0.020)	(0.012)	(0.012)	(0.056)
Percent Urban	0.36***	0.34**	0.05	0.36**	2.00***
	(0.090)	(0.143)	(0.104)	(0.143)	(0.687)
Age	0.00***	0.01***	-0.00***	0.00	0.01*
	(0.001)	(0.002)	(0.001)	(0.001)	(0.004)
Male	0.02***	0.04***	-0.01***	0.02***	0.09***
	(0.002)	(0.003)	(0.002)	(0.003)	(0.013)
Other Race	-0.05*	-0.00	-0.02**	-0.06**	-0.20
	(0.026)	(0.021)	(0.011)	(0.029)	(0.142)
Hispanic	-0.20***	-0.10***	-0.08***	-0.24***	-1.13***
	(0.020)	(0.021)	(0.008)	(0.024)	(0.121)
Black	-0.13***	-0.10***	-0.04***	-0.15***	-0.72***
	(0.006)	(0.007)	(0.003)	(0.006)	(0.031)
Asian	0.14***	0.08***	0.01	0.13***	0.69***
	(0.019)	(0.011)	(0.006)	(0.018)	(0.096)
Two-Year Schools[3]	0.47**	-0.90*	0.79***	1.05***	4.23**
	(0.229)	(0.488)	(0.289)	(0.367)	(1.678)
Four-Year Schools[3]	0.38*	-0.81**	0.72***	0.87***	3.69**
	(0.216)	(0.327)	(0.223)	(0.316)	(1.496)
Constant	-0.26***	0.30***	0.03	-0.12	10.82***
	(0.071)	(0.090)	(0.064)	(0.094)	(0.454)
Observations	2,432,509	777,215	1,857,584	2,432,509	2,303,494
R-squared	0.04	0.03	0.02	0.05	0.06
Adj. R-squared	0.04	0.03	0.02	0.05	0.06

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

[1] The unemployment results are scaled up by 100.
[2] In thousands of dollars.
[3] In terms of schools per 10,000 state residents.

Table 8. Educational Attainment for Individuals 35 to 55 – Linear Probability Results.

Dependent Variables	(I) Bachelor's	(II) Bachelor's	(III) Associate's	(IV) Bachelor's or Associate's	(V) Years of Education
Sample	*Full Sample*	*Associate's or Higher*	*Associate's or Lower*	*Full Sample*	*Full Sample*
NA	-0.14***	-0.15***	-0.03***	-0.15***	-0.82***
	(0.011)	(0.011)	(0.006)	(0.014)	(0.075)
Tribal	-0.01	-0.05	0.02	0.00	-0.03
	(0.023)	(0.053)	(0.018)	(0.016)	(0.083)
Tribal*NA	-0.03	-0.13***	0.03**	0.00	-0.06
	(0.024)	(0.036)	(0.015)	(0.029)	(0.139)
Unemployment[1]	0.41***	0.29***	0.06	0.42***	2.46***
	(0.080)	(0.061)	(0.037)	(0.093)	(0.507)
Average Income[2]	-0.02	0.01	-0.02	-0.04	-0.23**
	(0.015)	(0.017)	(0.016)	(0.022)	(0.103)
Percent Urban	-0.20	0.07	-0.11	-0.27	-1.55*
	(0.125)	(0.123)	(0.104)	(0.180)	(0.847)
Age	-0.00***	0.00***	-0.00***	-0.01***	-0.04***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.008)
Male	0.05***	0.06***	-0.00	0.04***	0.25***
	(0.003)	(0.002)	(0.002)	(0.003)	(0.017)
Other Race	-0.04**	0.01	-0.02	-0.05**	-0.19*
	(0.020)	(0.023)	(0.014)	(0.024)	(0.112)
Hispanic	-0.19***	-0.09***	-0.07***	-0.23***	-1.06***
	(0.022)	(0.022)	(0.010)	(0.027)	(0.132)
Black	-0.12***	-0.09***	-0.03***	-0.14***	-0.73***
	(0.006)	(0.006)	(0.003)	(0.006)	(0.032)
Asian	0.13***	0.08***	0.00	0.11***	0.64***
	(0.022)	(0.011)	(0.006)	(0.022)	(0.120)
Two-Year Schools[3]	0.23	-0.44	0.29	0.48	1.91
	(0.327)	(0.345)	(0.316)	(0.530)	(2.245)
Four-Year Schools[3]	0.04	-0.97***	0.56***	0.48	1.62
	(0.211)	(0.288)	(0.198)	(0.304)	(1.302)
Constant	0.46***	0.61***	0.33***	0.71***	13.90***
	(0.092)	(0.082)	(0.043)	(0.103)	(0.490)
Observations	1,788,199	548,276	1,375,145	1,788,199	1,666,074
R-squared	0.04	0.03	0.01	0.05	0.06
Adj. R-squared	0.04	0.03	0.01	0.05	0.06

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

[1] The unemployment results are scaled up by 100.
[2] In thousands of dollars.
[3] In terms of schools per 10,000 state residents.

Table 9. Male and Female Educational Attainment for Individuals 25 to 55
Linear Probability Results.

Dependent Variables	(I) Bachelor's	(II) Bachelor's	(III) Associate's	(IV) Bachelor's or Associate's	(V) Years of Education
Sample	*Full Sample*	*Associate's or Higher*	*Associate's or Lower*	*Full Sample*	*Full Sample*
NA	-0.13***	-0.16***	-0.02*	-0.13***	-0.68***
	(0.023)	(0.049)	(0.012)	(0.029)	(0.172)
Tribal	0.02	-0.04	0.04	0.05	0.19
	(0.015)	(0.029)	(0.025)	(0.030)	(0.114)
Tribal*NA	-0.04	-0.12*	0.01	-0.03	-0.22
	(0.025)	(0.071)	(0.030)	(0.039)	(0.184)
Male*NA	-0.02	-0.02	0.00	-0.02	-0.14
	(0.017)	(0.047)	(0.010)	(0.021)	(0.113)
Tribal*Male	-0.04	-0.03	-0.01	-0.05	-0.20
	(0.026)	(0.022)	(0.010)	(0.029)	(0.140)
Tribal*NA*Male	0.00	-0.00	-0.02	-0.02	-0.01
	(0.030)	(0.095)	(0.017)	(0.032)	(0.139)
Constant	-0.26***	0.30***	0.03	-0.12	10.82***
	(0.071)	(0.090)	(0.064)	(0.094)	(0.456)
Observations	2,432,509	777,215	1,857,584	2,432,509	2,303,494
R-squared	0.04	0.03	0.02	0.05	0.06
Adj. R-squared	0.04	0.03	0.02	0.05	0.06

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In these regressions, the unemployment, income, urban, age, race, and college and university counts are included but not reported. Interaction effects are included here for Native Americans and males on the number of two and four year schools with the same methodology as the Native American and male interaction effects with TCUs.

Table 10. Male and Female Educational Attainment for Individuals 35 to 55 Linear Probability Results.

Dependent Variables	(I) Bachelor's	(II) Bachelor's	(III) Associate's	(IV) Bachelor's or Associate's	(V) Years of Education
Sample	*Full Sample*	*Associate's or Higher*	*Associate's or Lower*	*Full Sample*	*Full Sample*
NA	-0.13***	-0.17***	-0.03*	-0.13***	-0.70***
	(0.021)	(0.034)	(0.016)	(0.031)	(0.178)
Tribal	0.01	-0.04	0.03	0.03*	0.12
	(0.017)	(0.047)	(0.021)	(0.019)	(0.085)
Tribal*NA	-0.02	-0.10***	0.04	0.02	-0.05
	(0.031)	(0.033)	(0.025)	(0.044)	(0.199)
Male*NA	-0.05**	-0.03	-0.00	-0.05**	-0.25**
	(0.019)	(0.048)	(0.012)	(0.022)	(0.125)
Tribal*Male	-0.05*	-0.02	-0.03**	-0.06**	-0.30**
	(0.025)	(0.018)	(0.010)	(0.029)	(0.144)
Tribal*NA*Male	-0.03	-0.14**	-0.01	-0.04	-0.08
	(0.027)	(0.061)	(0.021)	(0.033)	(0.150)
Constant	0.46***	0.61***	0.33***	0.71***	13.91***
	(0.092)	(0.083)	(0.043)	(0.104)	(0.493)
Observations	1,788,199	548,276	1,375,145	1,788,199	1,666,074
R-squared	0.04	0.03	0.01	0.05	0.06
Adj. R-squared	0.04	0.03	0.01	0.05	0.06

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

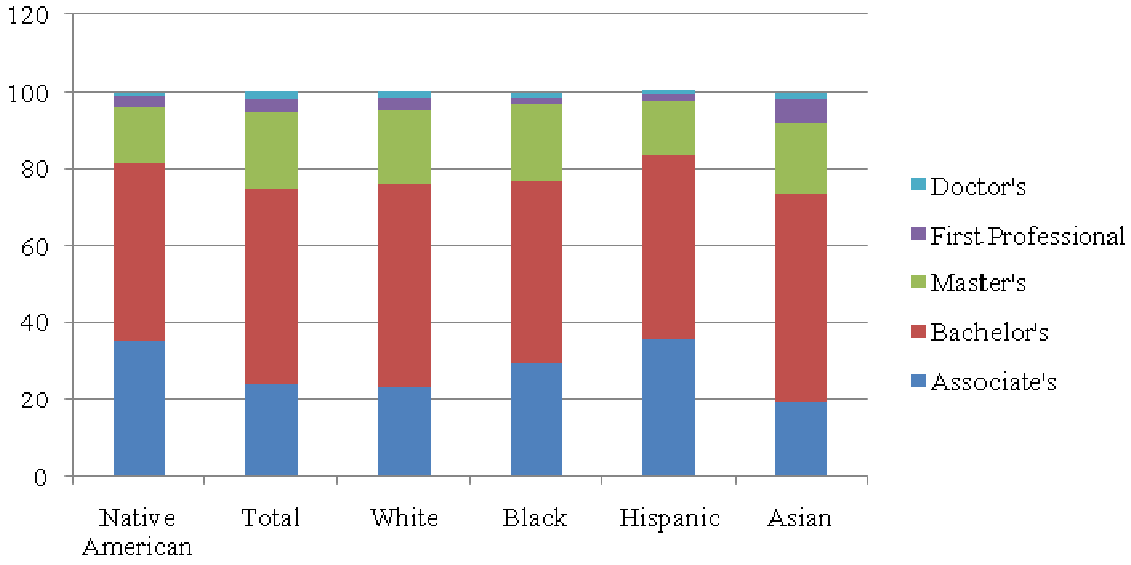
In these regressions, the unemployment, income, urban, age, race, and college and university counts are included but not reported. Interaction effects are included here for Native Americans and males on the number of two and four year schools with the same methodology as the Native American and male interaction effects with TCUs.

Table 11. Ordered Logit Regression Results.

Variables	No H.S. Diploma	H.S. Diploma & Some College, No Degree	Associate's Degree
	(25)	(25)	(25)
NA	0.15***	0.00	-0.04***
	(0.012)	(0.006)	(0.004)
Tribal	-0.00	-0.00	0.00
	(0.012)	(0.007)	(0.008)
Tribal*NA	0.04	0.02	-0.01
	(0.001)	(0.017)	(0.008)
	(35)	(35)	(35)
NA	0.15***	-0.11***	-0.04***
	(0.025)	(0.021)	(0.004)
Tribal	-0.00	0.00	0.00
	(0.017)	(0.009)	(0.008)
Tribal*NA	-0.01	0.01	0.01
	(0.045)	(0.025)	(0.020)

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Gives the marginal effects from the ordered logit regression. The 25 regressions are for the 25 to 55 year old group, and the 35 regressions are for the 35 to 55 year old group. In these regressions, the unemployment, income, urban, age, race, and college and university counts are included but not reported.



Data compiled by Aud and KewalRamani (2010).
SOURCE: U.S. Department of Education, National Center for Education Statistics, Digest of Education Statistics, 2005 (NCES 2006-030), tables 259, 262,265, 268, and 271, data from Integrated Postsecondary Education Data System (IPEDS), Fall 2004.

Figure 3. Degree Attainment for 2000 by Race among Degree Obtaining Individuals 25 and Older.

Table 11. State-Level TCU Exogeneity Regression Results.

Variables	TCU Binary Variable Linear Probability Model		TCU Continuous Variable Poisson Model	
Reservations with Populations>=1,000.	0.08**	0.07*	0.32***	0.27***
	(0.033)	(0.038)	(0.092)	(0.106)
Total Number of Reservation.	-0.01	-0.00	-0.05	-0.01
	(0.005)	(0.007)	(0.040)	(0.029)
Native American Population[1]	0.01	0.01*	-0.00	0.01
	(0.004)	(0.004)	(0.009)	(0.010)
Unemployment Rate		0.02		-0.04
		(0.049)		(0.121)
Percent Urban		-0.01**		-0.06***
		(0.007)		(0.019)
Average Income[2]		0.31*		0.91
		(0.168)		(0.568)
State Two-Year School Counts[3]		-0.00		-0.01
		(0.008)		(0.024)
State Four-Year School Counts[3]		-0.00		-0.00
		(0.005)		(0.019)
Constant	0.21**	0.02	-0.37	-0.13
	(0.088)	(0.520)	(0.261)	(1.544)
Observations	37	37	37	37
R-squared	0.33	0.50		
Adj. R-squared	0.27	0.36		

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

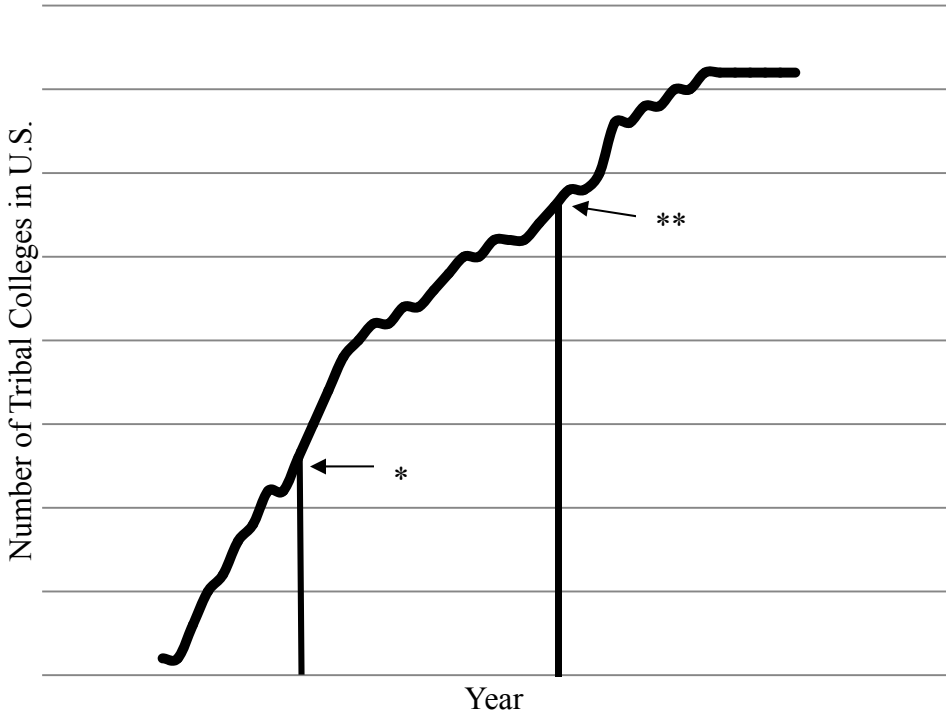
[1] In thousands of Native Americans.
[2] In thousands of dollars.
[3] In number of two or four-year schools per 10,000 state residents.

Table 12. Reservation Level Exogeneity Regression Results – 1970.

Variables	(I) Linear Probability Model	(II) Linear Probability Model
Median Family Income[1]		0.10
		(0.465)
Mean Family Income[1]		0.08
		(0.377)
Percent of Families Below Poverty Level		0.02
		(0.039)
NA Population[2]	0.03***	0.03**
	(0.010)	(0.011)
Percent of Families with Children <19		-0.01
		(0.017)
Percent Urban		-0.01
		(0.009)
Percent Rural Farms		0.02
		(0.014)
Average Per-Capita Income[1]		0.00
		(0.001)
Percent Under 20	0.00	0.04
	(0.025)	(0.032)
Percent HS Grads		0.01
		(0.027)
Median Years Schooling		-0.06
		(0.119)
Unemployment Rate		0.02
		(0.014)
State Two-Year Schools[3]	-2.47**	-0.73
	(1.098)	(1.169)
State Four-Year Schools[3]	2.67*	2.21
	(1.330)	(1.445)
Constant	0.27	-4.53
	(1.377)	(4.259)
Observations	24	24
R-squared	0.43	0.79
Adj. R-squared	0.30	0.47

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

[1] In thousands of dollars.
[2] In thousands of Native Americans.
[3] In number of two or four-year schools per 10,000 state residents.



Sources: Authors calculations based on TCU opening dates from individual TCU websites.
* Shows the date of the Tribally Controlled College or University Assistance Act of 1978.
** Shows the date that TCUs were first granted land-grant status (2004).

Figure 4. TCU Growth over Time with Dates of Changes in Funding Shown.

CHAPTER 8

CONCLUSION

This paper adds to the education literature by focusing on a type of school that has not been closely examined from a formal economic perspective. It specifically looks at how tribal colleges and universities affect Native American educational attainment, with different attainment measurements selected to help show the different possible effects that these schools may be having. This paper uses a difference-in-difference-in-difference model to isolate these schools' effects on Native Americans living in states with TCUs. The triple difference model allows the treatment group, Native Americans living in states with TCUs, to be compared against two different control groups, Native Americans in states without TCUs and non-Native Americans in states with and without TCUs. This method helps to control for state and time specific characteristics.

One issue that this paper has to address is the reasons behind TCU placement. Specifically, the question is whether TCUs' locations can be considered exogenous or whether they are determined by demand for education. Anecdotal evidence suggests that TCUs are opened at least in part for cultural reasons besides demand for education. In Chapter 7, statistical evidence is presented that suggests that TCUs are opened based on reservation presence and Native American population levels rather than based on income or education levels. While the issue of exogeneity is not closed, this paper presents both statistical and anecdotal evidence suggesting that these schools are opened at least partially due to cultural reasons rather than strictly because of demand reasons.

The results show that an additional TCU per 10,000 Native Americans increases associate's degree attainment for 35 to 55 year olds by three percent, while having insignificant effects on 25 to 55 year olds. They also show that TCU presence lowers bachelor's degree attainment for 25 to 55 year olds by 4 to 13 percent, and that they lower bachelor's degree attainment for 35 to 55 year olds by 0 to 13 percent. The results also show that this negative effect on bachelor's degree attainment disproportionally affects Native American men. This positive effect of TCUs on associate's degree attainment and their negative effect on bachelor's degree attainment appear to cancel each other out in terms of net years of education.

APPENDICES

APPENDIX A

DATA

DATA

The Placement Regressions

The primary datasets for the state level regressions with years matched at 1970 and 1980 were built for this paper using various sources. The population counts, unemployment rates, average income levels, and the percent urban levels all came from the Statistical Abstract of the United States. These were all given for the regression year. The school counts originally came from Currie and Moretti (2003). Information on building the school dataset is given in the next section of this appendix. The reservation counts came from (Census Buerau, 2011), and the population counts are from 1999. Reservations with populations over 1,000 that crossed state lines were listed as having 1,000 for each state they were in. Later, the populations were divided by the number of states the reservation was in if reservations averaged at least 1,000 individuals per state.

The reservation level dataset was built using data from the 1970 census U.S. (Census Bureau, 2011).

Building the College and University Data Set

The base dataset for the number of schools is from Currie and Moretti (2003). This data helps control for the availability of schools to potential students. Their dataset which runs from 1960 to 1996, is at the county level, but I aggregated it up to the state level by combing all counties within a state. It is important to note that their dataset runs from 1960-1996, and here it needed to be updated to run through 2000. However, because of the way they constructed the original data set by starting in 1996 and working

backwards (while dropping any schools that were open during part of that time period but closed prior to 1996), the additional years could not just be appended on. Rather, 2000 had to set as the new starting point. First, a dataset from IPEDS reported enrollment in 2000 and in 1996. Since Currie and Moretti's dataset dropped any schools that had fewer than 200 students in 1996, the same criteria to exclude schools for the year 2000 was used. There were three separate sets of schools that needed to be added or subtracted to the original data set to keep this papers dataset consistent with Currie and Moretti's: schools that had at least 200 students in 2000 but had fewer than 200 in 1996 and new schools that opened after 1996 and had at least 200 students by 2000 were both added, while schools that had at least 200 students in 1996 but had fewer than 200 in 2000 were subtracted off. By adding and subtracting these 3 groups of schools, this paper's dataset closely mirrors Currie and Moretti's, but it changes the base year to 2000.

The three separate lists of schools were developed with IPEDS data with 2000 and 1996 school enrollment levels. Schools that had 200 or more students in 2000 and had fewer than 200 students in 1996 were added as either growing schools or new schools. Schools that had fewer than 200 students in 2000 but had 200 or more students in 1996 were made up the list of shrinking schools. Taking that list, I then used several college reference books to find out when the specific school opened and whether it should be included according to whether or not it fit the criteria that Currie and Moretti used. In their dataset, schools were removed if they were strictly psychology schools, law schools, seminaries or bible colleges, online-only schools, medical schools, medical centers, graduate schools, research facilities, foreign universities within the United States,

and hairdressing and beauty schools. If any of the colleges on the append list fit in one of those categories, it was removed from the dataset.

The college reference books that were used to find opening dates for the schools were chosen to mirror the methods used by Currie and Moretti as closely as possible. First, the *Peterson's Guide to Four-Year Colleges* (2004) and the *Peterson's Guide to Two-Year Colleges (2008)* were used. To fill in any missing schools, the next step was to use the *Barron's Profiles of American Colleges (2011)*, followed by the *2010 Higher Education Directory*, and the *American Universities and Colleges 15th edition*. The internet was used to find opening dates and college information if the colleges did not appear in any of these guides, if information between two guides conflicted, or if the guides listed the school but with no opening date.[54] The first step was to find contact numbers for these schools on the internet and try to contact them directly to get opening dates. However, because many of the schools of interest closed five to ten years ago, there was often no contact information available. In those cases, online archived newspaper articles and other internet sources were used to find opening dates. The decision to use an additional set of college reference books in order to find starting dates (a step that Currie and Moretti skipped; if they did not find the colleges in the *Peterson's Guide to Four-Year Colleges* (1999) and the *Barron's Profiles of American Colleges* (1996), they went straight to the internet) was done because of the elapsed time between when these colleges closed and now. The final count was 121 growing schools added, 36 new schools added, and 81 shrinking schools (which includes closed schools) removed.

[54] If information was found in the first two sources, then that information was accepted. If it was not listed in these first sources, then the subsequent guides were used, and if information wasn't found in those, then the internet was used.

After the lists had been compiled, they were merged in with the original data set from Currie and Moretti. First, Currie and Moretti's college counts were updated from 1996 to 2000. This was done by taking 1996 counts, and copying them through 1997, 1998, 1999, and 2000, giving 1996 through 2000 identical count numbers. Next, the growing and new school files were merged in so that, if a growing school had opened in 1990 was added to the dataset, then the college counts for that state would increase by one from 1990 to 2000. A similar method was used for shrinking schools, but these were subtracted off. That meant that if a state had a school that had opened in 1980 that shrunk below the 200 threshold sometime after 1996, then that state would have one less school from 1980 through 2000. These appended schools were separated into two-year or four-year schools, and into public or private schools.

Tribal Colleges and Universities

In Currie and Moretti's college opening data, TCUs were not separated from other schools. For this paper, it was beneficial to separate out TCUs from other schools. This was done by using the same method as above to subtract shrinking schools. A list of TCUs was created that showed enrollment levels in 2000. Of the 32 TCUs listed, two were removed due to the fact that they had not opened yet (zero enrollment in 2000) and 9 additional schools were removed for having attendance levels below 200. Of the nine excluded TCUs removed, attendance was below 60 in five of them, so most of the schools were not close to the 200 threshold. The final list of 21 colleges was then subtracted from the counts in the college data. These schools were then added back in as

a separate type of institution. The removal of them from the college data and reinsertion as TCUs keeps double counting from occurring.

Statistical Abstract Data

Population and Native American populations came from the statistical abstract. The state population data was available for each year from 1960 through 2000. The Native American populations were only available for the census years though, so those figures had to be linearly imputed. Along with population data from the statistical abstract, variables for the percent of the population that was urban, the average annual income by state, and unemployment rates for states were included. The percent urban variable and the average annual income variable were only available in census years, and the values in between were imputed with liner values between the census values. The values for unemployment rates were pulled up annually, but several missing years of data were present, and these were left as missing.

Census Data

This is a list of the specific census samples used for each year.

1960 1% sample

1970 1% Form 1 State sample

1980 1% Metro sample

1990 1% Metro sample

2000 1% sample

These samples were chosen from IPUMS according to several criteria. First of all, only 1 percent samples were included due to constraints on the size of the final data set. With 5 percent samples, the final data set was too cumbersome to work with. Next, when available, weighted samples were used in place of unweighted samples. This was the case for the 1990 sample and the 2000 sample.

The biggest criteria for choosing samples was picking samples where the variables of interest were included across all the sample years and, when possible, unaltered across time. Having consistent variables was the biggest reason for choosing one sample over another. One variable that was originally an important criterion was geographic area. However, geographic area was a variable that was very inconsistent across samples. County level data was not available from IPUMS for each year. In 1960, the smallest geographic area measurement was at the state. Further samples narrowed down geographic areas according to metropolitan areas or regions, but they were areas of 250,000-400,000 people. Due to the fact that most TCUs are in rural areas with low population densities, and the fact that the size of the geographic areas changed significantly from sample to sample, I decided to use state level data.

The variables measuring education are not consistent across all of the sample years. The main shift occurred between 1980 and 1990. Before 1990, education was measured as a continuous variable by years of education. In 1990 and beyond, education came to be measured by degree attainment and was less of a straight continuous variable. Instead of four years of college, a person was now listed as having a bachelor's degree, and instead of two years of college, an associate's degree. The decision was to either

alter the 1990 and 2000 data set to look like 1960 through 1980 by changing degree attainment back to a continuous years of education variable, or to change 1960 through 1980 to look like 1990 and 2000. I chose to alter 1960 through 1980 and make degree attainment the variable of interest. The main reason behind this is degree attainment is a more widely used measurement of college education than years of college is in current economics literature. Using degree attainment allows me to examine the tradeoff between getting an associate's degree and getting a bachelor's degree. To make this change, I created categories with the 1960 through 1980 education variable. One year of college or two years of college without a degree were now treated as some college, two to three years of college are treated as an associate's degree, and 4 or more years of college are treated as having a bachelor's degree. I did not separate out master's degrees and PhD's for several reasons. First, Native Americans earn higher degrees at a very low rate, so I did not feel that my sample size was going to be sufficient to say much about Native Americans and degrees beyond bachelor's degrees. Second, because TCUs are primarily two-year schools, looking at attainment levels beyond the bachelor's level was less likely to capture these schools effects.

APPENDIX B

ADDITIONAL RESULTS

Regressions with *State*Time* Fixed Effects

As mentioned in Chapter 7, additional regressions were run that included *State*Time* fixed effects. These additional controls are included to test and see if the state trend variables included in this paper adequately control for differences in states over time. In these regressions, the coefficients on the variables of interest stay very close to the values of the coefficients in Tables 7 through 10. In fact, none of the coefficients change by more than 0.01, or a one percent change in their interpreted values. However, there are a few cases where the significance levels change.

In the age 25 linear probability regressions in Table 14, the value of the *Tribal*NA* variable in the regression measuring bachelor's and associate's degree attainment together against everyone with less than an associate's degree (column IV) becomes significant and shows that an additional TCU lowers the total number of bachelor's and associate's degrees by five percent. However, this effect disappears in the age 35 regression in Table 15. In the age 25 regression measuring years of education (given in column V) the coefficient on the *Tribal*NA* variable also becomes significant, and shows that an additional TCU lowers the overall years of education for Native Americans ages 25 through 55 by 0.26 years. This effect also disappears in the age 35 regression.

In the age 35 linear probability regressions (Table 15), the *Tribal*NA* variable becomes significant in the full sample bachelor's degree regression (shown in column I), showing that an additional TCU lowers bachelor's degree attainment by 3 percent for Native Americans ages 35 to 55. In the associate's degree regression (column III), the

value on *Tribal*NA* becomes significant at the one percent level (from being significant at the five percent level in the primary regressions) and shows a one percent larger positive effect of TCU presence on associate's degree attainment.

In the male and female age 25 regressions (given in Table 16), the effect of TCUs on female bachelor's degree attainment in the full sample (column I) becomes significant, showing a four percent drop in bachelor's degree attainment from an additional TCU. In the years of education regression (column V), the effects of TCU presence on the overall number of years of higher education becomes significant for both males and females. In the age 35 male and female regressions (given in Table 17), the effect of TCU presence on Native American female associate's degree attainment (shown in column III) becomes positive, showing that an additional TCU increases female associate's degree attainment by four percent.

Table 14. Educational Attainment for Individuals 25 to 55 - Linear Probability Results with *State*Time* Fixed Effects.

Dependent Variables	(I) Bachelor's	(II) Bachelor's	(III) Associate's	(IV) Bachelor's or Associate's	(V) Years of Education
Sample	*Full Sample*	*Associate's or Higher*	*Associate's or Lower*	*Full Sample*	*Full Sample*
NA	-0.15***	-0.16***	-0.04***	-0.16***	-0.85***
	(0.003)	(0.008)	(0.002)	(0.003)	(0.015)
Tribal	0.01*	-0.05***	0.04***	0.04***	0.16***
	(0.005)	(0.010)	(0.005)	(0.006)	(0.026)
Tribal*NA	-0.05***	-0.13***	-0.00	-0.05***	-0.26***
	(0.016)	(0.040)	(0.012)	(0.017)	(0.076)
Unemployment[1]	0.12***	-0.09***	0.15***	0.21***	0.80***
	(0.017)	(0.032)	(0.015)	(0.019)	(0.083)
Average Income[2]	0.02***	0.09***	-0.03***	-0.01***	-0.06***
	(0.003)	(0.005)	(0.002)	(0.003)	(0.013)
Percent Urban	0.34***	0.34***	0.03	0.33***	1.88***
	(0.025)	(0.048)	(0.022)	(0.028)	(0.124)
Age	0.00***	0.01***	-0.00***	-0.00*	0.00***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Male	0.02***	0.04***	-0.01***	0.02***	0.09***
	(0.001)	(0.001)	(0.000)	(0.001)	(0.003)
Other Race	-0.05***	-0.00	-0.02***	-0.06***	-0.20***
	(0.008)	(0.015)	(0.007)	(0.009)	(0.042)
Hispanic	-0.20***	-0.10***	-0.08***	-0.24***	-1.13***
	(0.001)	(0.003)	(0.001)	(0.001)	(0.005)
Black	-0.13***	-0.10***	-0.04***	-0.15***	-0.73***
	(0.001)	(0.002)	(0.001)	(0.001)	(0.004)
Asian	0.14***	0.08***	0.01***	0.13***	0.69***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.008)
Two-Year Schools[3]	0.60***	-0.67***	0.71***	1.09***	4.85***
	(0.061)	(0.116)	(0.051)	(0.067)	(0.297)
Four-Year Schools[3]	0.59***	-0.42***	0.60***	0.97***	4.47***
	(0.066)	(0.120)	(0.056)	(0.072)	(0.319)
Constant	-0.19***	0.07	0.17***	-0.00	11.29***
	(0.023)	(0.043)	(0.020)	(0.025)	(0.112)
Observations	2432509	777215	1857584	2432509	2303494
R-squared	0.04	0.03	0.02	0.05	0.06
Adj. R-squared	0.04	0.03	0.02	0.05	0.06

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

[1]The unemployment results are scaled up by 100.
[2] In thousands of dollars.
[3] In terms of schools per 10,000 state residents.

Table 15. Educational Attainment for Individuals 35 to 55 - Linear Probability Results with *State*Time* Fixed Effects.

Dependent Variables	(I) Bachelor's	(II) Bachelor's	(III) Associate's	(IV) Bachelor's or Associate's	(V) Years of Education
Sample	*Full Sample*	*Associate's or Higher*	*Associate's or Lower*	*Full Sample*	*Full Sample*
NA	-0.14***	-0.15***	-0.03***	-0.15***	-0.81***
	(0.004)	(0.009)	(0.003)	(0.004)	(0.019)
Tribal	0.00	-0.04**	0.02***	0.02**	0.09**
	(0.008)	(0.015)	(0.006)	(0.008)	(0.038)
Tribal*NA	-0.03*	-0.13***	0.04***	0.00	-0.06
	(0.018)	(0.040)	(0.014)	(0.020)	(0.090)
Unemployment[1]	0.36***	0.25***	0.05***	0.37***	2.18***
	(0.020)	(0.037)	(0.016)	(0.022)	(0.101)
Average Income[2]	-0.06***	-0.00	-0.03***	-0.08***	-0.48***
	(0.003)	(0.006)	(0.003)	(0.004)	(0.017)
Percent Urban	-0.43***	0.00	-0.20***	-0.55***	-2.95***
	(0.032)	(0.061)	(0.026)	(0.035)	(0.163)
Age	-0.01***	0.00***	-0.01***	-0.01***	-0.06***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)
Male	0.05***	0.06***	-0.00**	0.04***	0.25***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)
Other Race	-0.04***	0.01	-0.02**	-0.05***	-0.20***
	(0.010)	(0.019)	(0.009)	(0.011)	(0.054)
Hispanic	-0.19***	-0.09***	-0.07***	-0.23***	-1.06***
	(0.001)	(0.003)	(0.001)	(0.001)	(0.007)
Black	-0.12***	-0.09***	-0.03***	-0.14***	-0.73***
	(0.001)	(0.002)	(0.001)	(0.001)	(0.005)
Asian	0.13***	0.08***	0.00**	0.11***	0.64***
	(0.002)	(0.003)	(0.002)	(0.002)	(0.010)
Two-Year Schools[3]	0.18**	-0.10	0.08	0.25**	1.22***
	(0.090)	(0.178)	(0.072)	(0.098)	(0.455)
Four-Year Schools[3]	0.30***	-0.73***	0.47***	0.64***	2.66***
	(0.097)	(0.188)	(0.079)	(0.106)	(0.492)
Constant	0.94***	0.66***	0.48***	1.25***	18.34***
	(0.029)	(0.056)	(0.024)	(0.032)	(0.147)
Observations	1788199	548276	1375145	1788199	1666074
R-squared	0.05	0.03	0.01	0.05	0.06
Adj. R-squared	0.05	0.03	0.01	0.05	0.06

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

[1]The unemployment results are scaled up by 100.
[2] In thousands of dollars.
[3] In terms of schools per 10,000 state residents.

Table 16. Male and Female Educational Attainment for Individuals 25 to 55
Linear Probability Results with *State*Time* Fixed Effects.

Dependent Variables	(I) Bachelor's	(II) Bachelor's	(III) Associate's	(IV) Bachelor's or Associate's	(V) Years of Education
Sample	*Full Sample*	*Associate's or Higher*	*Associate's or Lower*	*Full Sample*	*Full Sample*
NA	-0.12***	-0.16***	-0.02**	-0.13***	-0.67***
	(0.013)	(0.034)	(0.010)	(0.014)	(0.062)
Tribal	0.03***	-0.03***	0.04***	0.06***	0.26***
	(0.006)	(0.011)	(0.005)	(0.007)	(0.030)
Tribal*NA	-0.04*	-0.13**	0.01	-0.03	-0.21*
	(0.023)	(0.058)	(0.018)	(0.026)	(0.113)
Male*NA	-0.02	-0.02	0.00	-0.02	-0.14
	(0.018)	(0.047)	(0.014)	(0.019)	(0.088)
Tribal*Male	-0.04***	-0.03***	-0.01**	-0.05***	-0.20***
	(0.005)	(0.010)	(0.005)	(0.006)	(0.026)
Tribal*NA*Male	0.00	-0.00	-0.02	-0.02	-0.01
	(0.033)	(0.084)	(0.025)	(0.036)	(0.160)
Constant	-0.19***	0.07	0.17***	-0.00	11.29***
	(0.023)	(0.043)	(0.020)	(0.025)	(0.112)
Observations	2432509	777215	1857584	2432509	2303494
R-squared	0.04	0.03	0.02	0.05	0.06
Adj. R-squared	0.04	0.03	0.02	0.05	0.06

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In these regressions, the unemployment, income, urban, age, race, and college and university counts are included but not reported. Interaction effects are included here for Native Americans and males on the number of two and four year schools with the same methodology as the Native American and male interaction effects with TCUs.

Table 17. Male and Female Educational Attainment for Individuals 35 to 55
Linear Probability Results with *State*Time* Fixed Effects.

Dependent Variable	(I) Bachelor's	(II) Bachelor's	(III) Associate's	(IV) Bachelor's or Associate's	(V) Years of Education
Sample	*Full Sample*	*Associate's or Higher*	*Associate's or Lower*	*Full Sample*	*Full Sample*
NA	-0.12***	-0.17***	-0.02*	-0.13***	-0.67***
	(0.015)	(0.039)	(0.011)	(0.017)	(0.078)
Tribal	0.03***	-0.03	0.03***	0.05***	0.24***
	(0.008)	(0.016)	(0.007)	(0.009)	(0.040)
Tribal*NA	-0.02	-0.10*	0.04**	0.02	-0.04
	(0.027)	(0.059)	(0.021)	(0.030)	(0.137)
Male*NA	-0.05**	-0.03	-0.00	-0.05**	-0.26**
	(0.021)	(0.055)	(0.016)	(0.023)	(0.112)
Tribal*Male	-0.05***	-0.02*	-0.02***	-0.06***	-0.30***
	(0.006)	(0.011)	(0.005)	(0.006)	(0.030)
Tribal*NA*Male	-0.03	-0.14	-0.01	-0.04	-0.07
	(0.038)	(0.091)	(0.029)	(0.042)	(0.193)
Constant	0.94***	0.67***	0.48***	1.26***	18.35***
	(0.029)	(0.056)	(0.024)	(0.032)	(0.147)
Observations	1788199	548276	1375145	1788199	1666074
R-squared	0.05	0.03	0.01	0.05	0.06
Adj. R-squared	0.05	0.03	0.01	0.05	0.06

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In these regressions, the unemployment, income, urban, age, race, and college and university counts are included but not reported. Interaction effects are included here for Native Americans and males on the number of two and four year schools with the same methodology as the Native American and male interaction effects with TCUs.

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