PRESTIGE AS THE HIGHEST AMBITION: EMERGING RESEARCH UNIVERSITIES IN TEXAS AND THE NATIONAL RESEARCH UNIVERSITY FUND

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In 2009 the Texas legislature created the National Research University Fund (NRUF), intended to encourage a select group of public doctoral universities in the state, known as emerging research universities (ERUs), to increase their institutional status related to academic research by awarding supplemental financial support for meeting specific policy metrics. Efforts to increase the research status of these universities occurred at a time when public financial support remained stagnate and overall institutional costs increased within the higher education sector. This study utilizes a theoretical approach grounded in strategic action fields and employs panel data and a difference in differences statistical technique to analyze the impact that NRUF policy has in assisting ERUs in achieving R1 status, and how this organizational change impacted access to, and the quality of, undergraduate education.

Results indicate that the NRUF policy intervention was not statistically significant for any part of the study. These findings suggest that policy interventions do not matter as much as specific institutional characteristics and the overall policy environment. Enrollment and tuition revenue predicted institutional performance related to academic research and graduate education, while also assisting these institutions in maintaining undergraduate academic quality and access. These cultural and material resources at the institutional level matter, as does how the overall state field prioritizes various aspects of higher education. Given the amount of resources required of the policy, and the general lack of evidence of its positive or negative effects, these indicate that those resources would be more wisely targeted elsewhere.

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CHAPTER 1

INTRODUCTION

In 2009 the Texas legislature created the National Research University Fund (NRUF), intended to encourage a select group of public doctoral universities in the state to increase their institutional status related to academic research by awarding supplemental financial support based on meeting specific policy metrics. At the time, of the 49 public universities in Texas only two were classified as very high research activity universities (R1) as defined by the Carnegie Foundation classifications. Seven state universities well positioned to obtain R1 status were initially selected by the Texas Higher Education Coordinating Board (THECB) to receive NRUF funding by being classified as Emerging Research Universities (ERUs). These institutions featured large enrollments and established research agendas, making them eligible for additional public funding for meeting benchmarks related to increasing external research expenditures and the production of doctoral degrees (THECB, 2018).

Striving for prestige through seeking research status at American universities receives substantial attention from education researchers. The influence of increasing an institution's academic research capabilities is appealing to many universities. Prestige associated with academic research is generally well received by faculty, students, and administrators as it elevates a university's status amongst peer institutions, and is a core tenet of university higher education. Yet, previous scholarship has demonstrated that transitioning to Tier One, the popular and informal designation referencing R1 institutions, is an incredibly expensive undertaking (Bastedo & Bowman, 2009; Gonzales, 2013). Enticed by the external funding and prestige that such activity generates universities often divert resources away from

undergraduate instruction in response to the rising costs associated with a growing research agenda (Gonzales & Nunez, 2014; Morphew & Baker, 2004).

How states respond to status and prestige seeking on the part of their public universities relies heavily upon the various ideological motives that influence policy and define the local vision of public education. Higher education provides various public and private goods that benefit individuals and communities simultaneously (McMahon, 2009). David Labaree (1997) explains these various benefits comprise three interrelated, yet conflicting goals of US higher education: democratic equality, social efficiency, and social mobility. Local policy environments are shaped by the amount to which individual states emphasize and respond to each of these goals.

Texas public policy is rooted in neoliberal ideology centered on deregulation, individualism, and competition (Harvey, 2005). Within this policy environment, free-market principles are applied towards public goods and services in an effort to increase efficiency, reduce costs, and improve quality. Public universities in the state are provided with some additional autonomy, particularly with regards to tuition setting authority, but generally receive minimal state support. State universities are an unusual public good, in that they can generate large portions of their budgets from tuition and fees. This distinctive feature, along with stagnant public support for higher education, places a larger financial burden on students and their families. This increase in costs for individual students is justified through the private benefit for individuals who earn a degree. According to the Bureau of Labor Statistics (2018), college graduates on average have higher earnings and significantly lower levels of unemployment than individuals with only high school diplomas. Free-market principles are

simultaneously promoted as a way to reduce the overall costs of higher education, while increasing the effectiveness of such services through competition. Within this policy environment, the supplemental financial support provided by NRUF was promoted as a way to allow ERUs to accomplish two specific institutional objectives: First, increase external support in the form of federal funding related to research and raise their institutional status; Second, ensure sufficient resources generated through tuition and fees remained dedicated towards undergraduate education.

Purpose of Study

The introduction of NRUF in Texas provides an opportunity to analyze a policy intervention at the state level that is geared towards a specific type of public institution. ERUs are public institutions that boast large undergraduate enrollments, and historically served as access points to higher education. ERUs hold a distinct position amongst Texas institutions in that they developed from small, regional colleges and universities that primarily focused on undergraduate education, yet they strive for the status and prestige associated with graduate education and academic research most often associated with that of flagship institutions. This transformation occurred at a time when public financial support remained stagnate, while overall institutional costs increased within the higher education sector. As the student price of higher education continued to rise, calls for accountability in the form of student retention and degree completion from state policymakers emphasized demands for increased accountability from state institutions. Closing the Gaps by 2015 (2005), Texas' strategic plan for higher education, emphasized funding colleges and universities by rewarding increases in retention and graduation rates to ensure public accountability. The NRUF policy intervention provides

ERUs with supplemental funding intended to assist these institutions with reaching R1 status, yet these institutions simultaneously exist within a policy environment that requires they are accountable to the public. The purpose of this study is to first analyze whether NRUF has any substantial impact on the ability of ERUs to meet various benchmarks related to R1 status. Second, the study examines whether the inclusion of NRUF funding encourages ERUs to cross-subsidize academic research with resources previously dedicated towards undergraduate education. Finally, this study provides insight into how transitioning to an R1 institution impacts ERU's recruitment of historically underserved student populations.

Research Questions

My analysis is concerned with ERU's ability to meet specific metrics with regards to academic research and graduate education, while maintaining aspects of their historical missions related to undergraduate education. How will calls for prestige and status related to academic research align with demands for public accountability and efficiency? How will the NRUF policy assist ERUs in achieving R1 status, and will this organizational change impact access to, and the quality of undergraduate education? To appropriately address the concerns, my analysis is broken down into three separate research questions that address the effectiveness of the NRUF policy and its subsequent impact on undergraduate academic quality and access. Each question comprises several sub-questions.

Question 1

My first research question is concerned with the impact NRUF has on ERUs ability to meet various policy metrics related to R1 status. Particular questions of interest are related to

shared standards of practice emphasized by an institution's research capabilities and capacity for graduate education at the doctoral level. Texas policy encouraged increased emphasis on research through the procurement of external funding and the production of doctoral degrees, thus this part of my analysis focuses on the following research question:

When compared to similar institutions outside of Texas, were ERUs more successful in meeting goals related to research in states where the NRUF was present than in states where it was not? Particular sub-questions in this part of my analysis include:

- What impact has NRUF had on the amount of External Research and Development expenditures obtained by ERU institutions in Texas from 2009 to 2015?
- What has been the estimated effect of NRUF on the production of doctoral degrees at ERUs in Texas during this time period?
- What has been the estimated effect of NRUF on the number of federally funded graduate assistantships at ERUs in Texas during this time period?

Question 2

My second research question highlights how competitive funding strategies change the behavior of an organization by shaping decision-making processes of public institutions. Dedicating more resources toward academic research and graduate education may require ERUs to shift resources from other aspects of the institution's mission. Because ERUs have historically served as college access points, how do these policies and strive for research status change what these institutions dedicate towards the education of undergraduate students? My specific research question for the second part of my analysis includes:

As ERUs focused extra efforts on their research missions, how has this affected undergraduate education? Sub-questions for this part of my analysis pertain to

- What effect has NRUF had on the percentage of academic personnel that are full-time at ERUs in Texas from 2006 to 2015?
- How has NRUF impacted instructional expenditures per full-time equivalent (FTE) students at ERUS in Texas during this time period ?

Question 3

Finally, my third research question is concerned with the historical role of ERUs as access points for those seeking a quality and affordable undergraduate education. Research universities, on average, are more expensive to operate and maintain. ERUs generate large portions of their operating budgets from tuition and fees, leaving them more susceptible to cross-subsidizing components of their research mission with state appropriations and tuition revenue (McClure & Titus, 2018). Due to this particular attribute, this part of my analysis focuses on the following research question:

Have efforts to increase institutional status related to research impacted the ability of these institutions to recruit and retain diverse student bodies?

- What has been the impact of NRUF policies on the net-tuition per student at ERUs from 2010 to 2016?
- How has access to enroll at the undergraduate level in ERUs changed when compared to other state universities that are institutionally similar? Particular emphasis is placed on:
    - Students of color
    - Low income students
    - Adult learners

Definitions

This section provides basic definitions, particularly regarding how various concepts are

operationalized through the variables in my analysis.

Research Status

For the purposes of this study, status related to academic research is primarily grounded within the Carnegie Classifications of Institutions of Higher Education. Often referred to as Tier One, the classifications are a method of categorizing institutional types for policy and research purposes (McCormick & Zhao, 2005). It is not uncommon to hear policy makers, university administrators, and faculty refer to the Carnegie Classifications as a ranking system, reinforcing the premise that position within a specific category of institutional types delivers advantage and prestige.

The Carnegie Classifications utilize empirical data to provide a framework for describing the institutional diversity of American higher education. First published in 1973, updated classifications are now provided every few years. These classifications provide policy makers and researchers an instrument for understanding change in American colleges and universities. Research universities fall under a larger category of Doctoral universities. To be included in this category institutions must award at least 20 research/scholarship doctoral degrees and have at least $5 million in research expenditures a year. There are three separate categories:

- R1: Doctoral Universities – very high research activity
- R2: Doctoral Universities – high research activity
- D/PU: Doctoral and Professional Universities

Position within various categories is based on an institutional ability related to conducting research and educating graduate students, and is measured through research expenditures and number of doctoral degrees produced per year. There are currently 131 universities classified

as R1. An institution's Carnegie Classification was obtained through the Integrated Post-Secondary Education Data System (IPEDS) for 2005, 2010, & 2015.

Financial Indicators

All financial variables are inflated to 2015 US Dollars utilizing Consumer Price Index data.

External Research Expenditures (External R&D)

External R&D refers to the external funding in the form of faculty grants intended to be utilized for academic research, primarily in fields related to science and engineering. For the purposes of this study, only federally funded grants are included because these make up the bulk of academic research dollars. It is possible to collect this data from the National Center for Science and Engineering Statistics (NCSES). This data includes federally funded grants from such government agencies as the National Science Foundation (NSF), National Institutes of Health (NIH), Department of Energy (DOE), and Department of Defense (DOD).

Graduate Education

For the purposes of this study, graduate education refers to the production of Doctorate of Philosophy Degrees (PhD) awarded during a given academic year. PhDs are the primary method for disciplines to produce future generations of faculty researchers, and are considered an essential component of the American research university. The number of PhDs for each university for each year of the analysis was obtained through NCSES.

Academic Quality

Academic quality refers to the resources an institution dedicates to the education of

undergraduate students. Prior research has demonstrated the benefit of full-time faculty for undergraduate students (Bettinger & Long, 2006; Ehrenberg & Zhang, 2005). For the purposes of this study, academic quality is represented by two variables: Instructional expenditures per full-time equivalent (FTE) undergraduate student, and the percentage of full-time faculty that work with undergraduates. Though there are drawbacks at research universities with regards to the higher cost to educate undergraduates, there are distinct advantages for students who have faculty members who conduct research. Kuh, Chen, and Nelson Laird (2007) analyzed data of 29,444 faculty members and 65,633 students in an effort to understand institutional factors associated with research faculty and student engagement (p. 42). Their study provides insight into the importance of the "teacher-scholar" faculty model, particularly the relationship between faculty who emphasize undergraduate research opportunities and the increased learning outcomes of students who participate (p. 44). The key to this success lies in research faculty interacting with undergraduates through classroom instruction and mentorship. Both of these variables were obtained through IPEDS.

College Access

For the purposes of this paper, the concept of access refers to institutional attempts to be inclusive of students who have historically been underrepresented in American higher education, particularly at research universities and institutions pursing status (Bastedo & Jaquette, 2011). Each student subgroup is represented as percentage of a university's full-time undergraduate population. This data was collected for each university through IPEDS, and are operationalized through the following:

- Students of color: Percentage of FTE undergraduate students at a university that identify as Black, Hispanic, Asian, native Hawaiian, or Pacific Islander.
- Adult learners: Percentage of full-time undergraduate students at a university that are age 25 or older.
- Low socioeconomic status: Percentage of full-time undergraduate students at a university that qualify for Pell-grants.

Limitations

Though the scope of the study includes every school classified as an ERU by NRUF policy, these seven universities represent a limitation for this research study. First, these universities were preselected by the NRUF as members of my treatment group. In an experimental design random assignment to either the treatment or control group is the preferred method of ensuring any differences between and within groups are not systematic from the beginning of the study. Unfortunately, this method is not always possible in research designs, particularly those utilizing secondary data analysis. To account for my inability to randomly assign universities to the treatment (those impacted by the NRUF intervention) or control groups, I am utilizing a quasi-experimental research design and selecti a control group of universities through a statistical matching method known as coarsened exact matching (CEM). By selecting universities that are similar to the ERU schools prior to the policy intervention of the NRUF, I limit the pre-treatment differences between groups allowing inferences to be made about the impact this policy had on institutional structures. I provide a detailed description of my research design, as well as more information on CEM in chapter 3.

The small number of universities included in the ERU treatment group also limits this research study. To account for this small sample size, I utilize panel data that represents 10

years for each observation. The limited number of universities included in the analysis that make up the treatment and control groups only totals 39 schools. The panel analysis approach improves the statistical power of my study, but the small sample size may make the results less generalizable for other institutional types, including established R1 institutions and private universities.

Delimitations

This study focuses on how universities respond to external and internal calls to seek status and prestige. Many aspects of the university mission can be associated with increasing the prestige of an institution (intercollegiate athletics, notable alumni, student selectivity - just to name a few), but the focus of this study is on the relative status of a university's research ability and its capability to produce doctoral students. The NRUF provided an opportunity to witness and understand how state policy can incentivize public universities to seek increased status associated with academic research within the same policy environment that calls on these same institutions to be accountable to the rising cost of higher education for students.

CHAPTER 2

LITERATURE REVIEW

American higher education serves a variety of purposes, as it provides both private and public benefits to individuals and communities. Due to the multitude of benefits this sector provides, various political, market, and institutional pressures influence the coordination and governance of higher education. These policy environments represent continued attempts to balance the responsibility for obtaining a college degree between individuals and society.

This analysis focuses on the behavior of universities concerned with increasing their research abilities, as well as the prestige that accompanies such efforts. This chapter informs readers about the field of American research universities and the various elements that exert influence on public higher education. Universities are responsible to a wide array of stakeholders (students, faculty, trustees, state legislatures, etc.), and institutional decision-making must consider the interests of various groups. This chapter further demonstrates that both policy environments and shared institutional understandings of prestige influence the decision-making of universities. While enrollments significantly increased during the past two decades, diminished state support in Texas has transferred a greater share of public higher education costs to be covered through tuition and fees, contributing to higher prices paid by students. The focus of university administrators shifted to activities that generate additional resources for institutions through external sources of revenue. Within this policy environment the lure of external research funding, as well as the relative status that such activity provides, is an appealing choice for universities. These organizational changes not only reshape institutions, but the relations between universities and the greater field environment of American research

universities. For the sake of clarity, this review of literature is organized by the following:

- *Theoretical starting points:* This section introduces the primary theoretical framework for my analysis.
- *Strategic action fields (SAF):* Major themes and terms of this theory are explained and defined, and I conclude this section by employing these considerations towards a concise explanation of the field of American research universities.
- *Defining field boundaries:* This section illuminates the rules and boundaries of the field of American research universities. As socially constructed arenas, understanding a field's unique history can provide insight about its membership and governance. National and state-level policy provides an understanding of the emergence of this field, how it is governed, and who holds the power.
- *Neoliberalism and destabilization of Texas public education:* Fields are not static – they emerge and change over time. The meso-level social structure of fields leaves them vulnerable to a variety of internal and external pressures. Neoliberal state policy in Texas disrupted the field environment of public universities by deregulating tuition-setting authority, while at the same time allocating less funding per student to higher education. These policies shaped institutional decision-making to be more aligned with securing external revenue, while also pursuing larger undergraduate enrollments.
- *Field dynamics and organizational change:* The mechanics of change in the field of American research universities respond to a variety of institutional, state, and national priorities. To compete within a specific field, institutions often take on the form of other organizations deemed successful. As status seekers and revenue maximizers, ERUs are

susceptible to drifting away from their historical public missions in attempts to appear more legitimate within the greater field environment, and are encouraged into taking on attributes of organizations that are more expensive to operate and maintain.

- *Theoretical framework*: After a formal review of the literature I close out the chapter by providing a cohesive and concise framework guiding my research to determine what I measure and the statistical relationships I look for. Taking into account trends in the research literature on this topic, this framework serves as a bridge from current research to my methods section where I explain how I answer my specific research questions.

Theoretical Starting Points

Utilizing the concept of strategic action fields (Fligstein & McAdam, 2012) this study explains changes in organizations by providing insight into how state policy and institutional practices influence constructed social orders, in this case public universities in the state of Texas. Efforts to increase academic research at state colleges and regional universities demonstrate how the state influences established and emerging fields of higher education. Within this theoretical approach, particular emphasis is placed on how these fields emerged, reproduced, and changed over time (Fligstein & McAdam, 2012). Strategic action fields are defined as "mesolevel social orders, as the basic structural building block of modern political/organizational life in the economy, civil society, and the state" (Fligstein & McAdam, 2012, p. 3).

Though the primary theoretical framework for this study is strategic action fields, it is important to understand the concepts that this theoretical approach is built upon. The concept of *fields* originated with Pierre Bourdieu (1992) which he defined as the structured arena where

practice occurs. While Bourdieu was primarily concerned with how individual actors pursue advantages to achieve status within such fields, strategic action fields extend the analysis to that of groups of actors who organize varying resources to vie for advantage within constructed social orders.

The underlying concern for Bourdieu is how dispositions, objects, and institutions shape our understandings of the world while also serving as sources of domination (Swartz, 1997). Central to the concept of fields is that they serve as the arena where individuals, or groups, struggle for social distinction. Within any given field actors interact with others (through competition and cooperation) in an effort to gain advantage by securing various forms of capital. Bourdieu distances his approach from that of Marxism by extending the idea of capital beyond the purely economic. For Bourdieu, power stands at the center of all social interactions, and it places actors within competitive status hierarchies in which individuals and groups compete for a variety of economic, cultural, and symbolic forms of capital. These various forms of capital help actors maintain and enhance their positions within the social hierarchy of an individual field.

Strategic action fields not only extend the analysis to groups of actors, but also situate these organizations within a variety of fields that have their own boundaries, resources, and hierarchies. Bourdieu's theoretical approach explains human action as a dialectical relationship between agency and structure. Actors are interlocked between a variety of fields simultaneously and must respond to a variety of rules and status hierarchies that exist within each of these fields. The structure of each field is important, but the individual must strategize how they will negotiate advantage in one field that might be at odds with the demands of

another field. Bourdieu's *reflexive* approach aims to rectify the agency/structure problem within the social sciences: Is human action – by either individuals or groups – determined by culture or social structures, or do actors act according to their own set of particular motives?

Strategic Action Fields

Strategic action fields are socially constructed in that they are based on subjective standings, have boundaries that shift based on varying situations, and promote a set of shared understandings amongst their members that are fabricated over time. Strategic action fields are mesolevel in nature, in that they are made up of various fields and sub-fields that are hierarchically structured based on perceived social status. The relative position between, and within various groups determines an institution's legitimacy. All fields are embedded within a complex web of other fields, each possessing varying levels of potential and influence over their own affairs, and the functioning of others (Fligstein & McAdam, 2012).

Membership within a specific field is limited to "those groups who routinely take each other into account in their actions" (Fligstein & McAdam, 2012, p. 168). Fields include incumbent groups, or those who possess disproportionate advantages, against groups of challengers who wield less influence over field dynamics. The aim of incumbent groups is to solidify their advantage within the field, while challengers work to increase their influence and status by taking advantage of opportunities as they arise. Prospects for change consist of political and economic events that can disrupt the order within the field environment.

The state is a set of strategic actions fields that has tremendous influence in shaping the practice and stability in almost every non-state field. The shared understandings that govern individual fields are defined by the state and serve the interests of incumbent members by

reproducing field conditions that will continue to be self-serving, while also setting the standards of prestige. The management of fields are often the responsibility of various internal governance units (IGU), i.e., non-state actors who assist in the reproduction of field conditions (Fligstein & McAdam, 2012). IGUs are internal to the field, are distinct from the jurisdiction of state structures, and "bear the imprint of the influence of the most powerful incumbents in the field and the ideas that are used to justify their dominance" (p. 14).

Field of American Research Universities.

The field of American higher education situates schools within a variety of different sub-fields. ERUs belong to the field of Texas higher education, and have a historical mission to serve the state and its citizens. ERUs are also members of the field of American research universities, and aspire to belong to the elite sub-field of R1. Membership within the coveted R1 category provides a high level of prestige amongst higher education institutions. Membership within various fields can often provide a complicated mix of goals and priorities, as is the case with state universities that are accountable to the public while also coveting status related to their position within the field hierarchy.

A field analysis brings attention to the relationships between groups who compete for position within the particular field, exposing precisely what is of value in these relations. For ERUs in Texas, external research funding is a coveted resource, but it is also a means to achieving prestige associated with R1 status. Strategic action fields provide insight on the impact that state policy has on institutional decision-making when the dynamics of various fields may be at odds with one another. Put another way, ERUs are schools heavily reliant upon the revenue generated by undergraduate tuition and fees, a situation exasperated by stagnate

state appropriations and increased calls for public accountability. Being an elite research university requires resources be directed towards academic research – a costly exercise in terms of both money and personnel. The pursuit of research status takes place within a field governed by internal rankings, and institutional accountability measures that are political in nature. NRUF funding is designed to encourage ERUs to pursue an advanced research agenda, but how will this strive for prestige impact the public mission of these universities to be responsible to their local communities?

Defining Field Boundaries

Fields are social in nature and consists of hierarchies that are relative and situational. Relationships between groups of actors, both within and between fields, define the relative boundaries of a particular field. The material constraints imposed by the particular conditions of a field limit an organization's decision making to options that align with the shared understandings of the field. These boundaries and constraints are historical in nature – all fields began somewhere at some time. To understand how the shared understandings were shaped the following section provides a historical background of the field of American research universities.

Historical Background – Field American Research Universities

According to Roger Geiger (1986), by the turn of the 19th century a distinctive type of American university emerged that emphasized the pursuit of knowledge as a primary institutional objective. In 1900, the presidents of the 14 leading US research institutions formed the Association of American Universities (AAU). These institutions included elements similar to

those found in the leading German universities of the time, but were uniquely American based on their entrepreneurial nature and the vast amount of undergraduate students they educated. By 1917 this group consisted of more than 21 public and private universities located primarily in the Northeast, Midwest, and Western states. Members of the AAU were unrivaled in their status based on the number of Ph.Ds. they produced, the size of their libraries, the amount of external research expenditures, and the value of their faculty under peer review. The AAU was a concerted effort by higher education leaders to solidify their positions within the newly formed field of American research universities by standardizing Ph.D. requirements to gain recognition for American doctoral degrees abroad. It was also concerned with boosting the overall perception of American higher education, both at home and in Europe, by emphasizing academic research as a priority amongst faculty and increasing the selectivity in the admission of undergraduate and graduate students.

Several events were crucial to the development of American research universities. First concerned the procurement of the social resources needed to pursue academic research. With no direction for what a university should or should not include, and very few rules regarding the procurement of resources, rivalries between institutions often took the form of raiding the faculty of opposing institutions. “Accounts of the university builders – a mix of donors and presidents – indicate that the risks and rivalries that defined American business competition of the era were replicated on the American campus” (Thelin, 2011, p. 111).

Compared to their European counterparts, American faculty members were burdened with large teaching loads that focused time away from their academic investigations. It was the hope of faculty to shed these responsibilities as American higher education continued to grow

in reputation and stature, but large enrollments at AAU member schools kept undergraduate instruction a core principle of American research university missions. Undergraduate tuition provided the needed revenue to keep universities conducting research – the small number of AAU schools enrolled 20% of American college students prior to World War 1 (Geiger, 1986, p. 17).

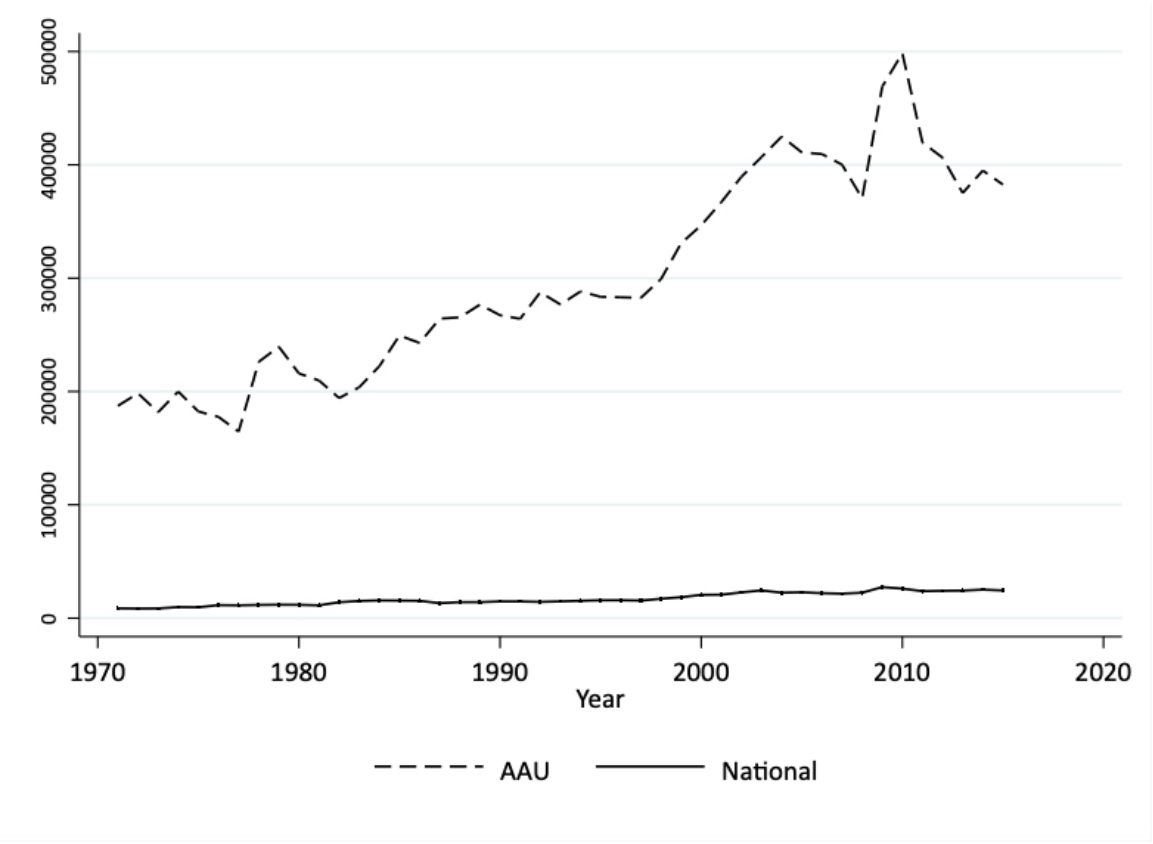
Outside of recruiting and training research-oriented faculty, institutions needed to provide appropriate facilities, as well as time for faculty to conduct their investigations. Further defining the entrepreneurial nature of American higher education, reliance on external sources of funding became a key feature of research universities, as the direct cost of academic research could not be covered by educational funds alone. After World War 1, American research universities became increasingly reliant upon foundations that provided funding directly to university faculty. Federal support for higher education - outside of the Morrill act and related land-grant legislation of the second half of the 19th century - was almost non-existent, leaving funding to private institutions endorsed by individual donors. Philanthropic efforts were no longer concerned with building universities, but with influencing the direction and scope of academic research (Thelin, 2011).

During World War II, the US federal government utilized American higher education for specific national security research, serving as a model for financing research centers on university campuses during the post-war years. The revenue generated through undergraduate student enrollment continued to play a substantial role in the growth of research university capability and influence in postwar America. The Servicemen's Readjustment Act, or GI Bill, was primarily concerned with the influx of soldiers reentering the workforce after World War II.

Providing education benefits to soldiers would divert a tremendous amount of labor from reentering a transitioning economy, while simultaneously increasing enrollments at colleges and universities around the country (Thelin, 2011).

Figure 1

Federal Research Expenditures to American Higher Education Institutions in Thousands of Dollars (2015=100), for Science and Engineering 1972-2015



Data source: Integrated Science and Engineering Resources Data System.

Federal policy towards academic research shifted based on recommendations made through Vannevar Bush's Science, the Endless Frontier in 1945. This report recommended continued federal investment in academic research after the war. This report was a call for a renewal of the scientific talent in the US, and outlined three essential purposes for academic research: battling disease, national defense, and public welfare. Soviet advancements in science

motivated a sense of nationalism, and various federal agencies and departments served as contractors of faculty research in American universities. The report was the initial blueprint for how the federal government would supplement the research conducted by American universities into the 21st century, and was the precursor for agencies such as the National Science Foundation and National Institutes of Health. These agencies, along with other federal departments and agencies continue to provide the bulk of funding to American research universities, with the majority of funds benefiting the incumbent schools that make up the original members of the AAU (see Figure 1).

Texas Policy Efforts in the Early 21st Century

An element to recognize in the historical development of research university capabilities in Texas is the state's location in the southern US. Post-Reconstruction, southern higher education struggled to keep pace with the rest of the nation regarding their financial stature and academic reputations. Entrenchment in the closed society of the old south, and commitment to Jim Crow segregrationialism prohibited southern institutions from maturing. The culture of white supremacy had lasting impacts on the quality of Southern higher education, particularly with regards to graduate education. During the first half of the twentieth century, of the over 200 graduate programs in the US only two southern graduate programs could be considered eminent (Dyer, 2005, p. 288). Texas enjoyed increased higher education enrollment and institutional growth after integration, though most of this development occurred amongst the community college and polytechnic sectors of public higher education. The economy of Texas, historically grounded in the energy and agriculture sectors, branched out and grew in the technology, design, and financial sectors, particularly in large urban areas.

THECB (2005) recognized the connection between higher education and the overall economy, and emphasized the role of research universities in educating an appropriate workforce to assist in attracting companies within these new sectors to Texas.

The State is a field, and policy enacted at this level establishes rules and boundaries that shape all other fields. The increased emphasis on research productivity at Texas ERUS occurs within the same policy environment that demands these institutions are more efficient in their operations while being more affordable for students. In 2003, Texas deregulated tuition at public four-year institutions, transferring authority to determine the cost of tuition from the state legislature to the governing boards of public university systems (THECB, 2010). This shift proved consistent with a broader transition from a liberal policy environment (favoring a mixture of public and private goods) to a neoliberal one (emphasizing private returns via competition and the decentralization of risk) (Gonzales & Nunez, 2014; Harvey, 2005; Slaughter & Rhoades, 2004). Supporters of deregulation stated it "would enable institutions to use tuition decisions to improve the efficiency of operations and to motivate students to finish their education sooner" (House Research Organization, 2003, p. 4). Then-Governor Rick Perry promoted deregulation as a way of potentially lowering the costs of tuition, as it was believed "institutions that don't have their classrooms full, one of the ways to lure people to their institutions will be to lower [tuition]" (Associated Press, May 2003). In essence, policymakers argued that providing colleges and universities the ability to set tuition would allow for immediate responses to shifting environmental conditions. Colleges and universities could raise revenues through tuition when government support declined, and could re-adjust prices downward as competition for students increased.

At the beginning of the 21st century there were only two Texas public universities that would be considered R1, while California, a state often used for comparison with Texas due to its relative population size and GDP, had eight public institutions that were R1. THECB recognized that federal research support was the primary contributor to such activity, and recommended an increase in the proportion of such funding, setting various benchmarks pertaining to science and engineering obligations to Texas universities. In an effort to increase the state university proportion of federal research dollars, THECB (2005) provided formal recommendation to the Texas Legislature with Closing the Gaps by 2015. This report established benchmarks that called for an increase from 5.5% of federal research obligations in 2000, to 6.2% by 2015, amounting to more than doubling total research expenditures during that time period.

Over the next decade, various efforts by the state to support academic research and increase the number of R1 universities in Texas was adopted. Beginning in 2003 with the development of the Research Development Fund, the Texas legislature enacted various initiatives to address the recommendations of the THECB. In 2005, the Texas Emerging Technology Fund was created, which dedicated almost $700 million between 2005 and 2013 to increase research and collaboration between public and private institutions. During the following legislative session, the Competitive Knowledge Fund was initiated, and between 2007 and 2013 more than $300 million in funds were designated to UT Austin, Texas A&M University, University of Houston, Texas Tech University, and UT Dallas. These funds were intended to enhance the support of faculty for the purpose of instructional excellence and research. In 2009 the Research Universities Development Fund was created to enhance the research productivity

of public universities by providing funds for the recruitment and retention of research faculty (THECB, 2015).

Later in 2009, the Texas legislature created the Texas Research Incentive Program (TRIP), providing matching funds to private gifts for a newly established institutional grouping known as ERUs. Later that year, NRUF was established, creating a dedicated and independent fund to assist ERUs in achieving national prominence concerning research status. Again, Governor Rick Perry shared concerns that there were too few R1 universities in the state, and saw NRUF would serve as a "clear road map to help emerging research institutions reach the next level" (Gerber, 2009). To be eligible for such funding various benchmarks would need to be met by designated ERUs, including restricted research expenditures of at least $45 million, commitment to high quality graduate education, and the awarding of at least 200 Ph.Ds. annually (THECB, 2018).

NRUF legislation was an attempt by Texas to enable emerging research universities to reach national prominence. The fund provides money to institutions that meet mandatory benchmarks, as well as complying with a minimum number of optional objectives. Mandatory benchmarks include designation as an Emerging Research University by THECB along with restricted research expenditures of at least $45 million. Institutions would also need to comply with four of the following objectives: $400 million endowment; 200 Ph.Ds. awarded annually; high achieving first-year student class; membership in the Association of Research Libraries, Phi Beta Kappa, or Phi Kappa Phi; high quality faculty; commitment to high quality graduate education (THECB, 2018).

These policy efforts identified the lack of graduate student enrollment as a failure on

the part of higher education to produce appropriate human capital for a knowledge-based economy. Human capital in the context of this analysis can be defined as the expenditures on education and training that provide various skills and knowledge that contribute to both individual, and public well-being. Different from physical or financial capital, these attributes are cultivated within an individual and cannot be separated. Gary Becker (1964) states that "education and training are the most important investments in human capital" (p. 17), the development of which has become increasingly important in post-industrial societies because of the skills and knowledge required for an economy driven by innovation and creativity.

Neoliberalism and Destabilization of Texas Public Higher Education

Change within an established field can be caused by exogenous shocks, or even instability within corresponding fields that send ripples through the greater field environment (Fligstein & McAdam, 2012). Neoliberalism's influence on the political culture of Texas, as well as the US, since the 1980s has shifted popular opinion regarding the purpose of higher education from being a public to a private good. Free-market principles of privatization, deregulation, and competition are believed to lead to improved efficiency, quality, and affordability (Harvey, 2007).

Within the field of public higher education there is a tension between providing a moral education that facilitates democratic equality, and a technical training that promotes social mobility and social efficiency, but the overall process works to produce what Aihwa Ong (2005) refers to as "morally normative and economically productive citizens for the nation-state" (p. 139). Within the context of neoliberalism, American colleges and universities – particularly those seeking status and prestige – are educating an increasing number of students in technical,

scientific, and professional fields, but these students are often unschooled in the humanities meant promote the moral education needed for civic habitus. Status seeking in higher education not only improves their relative position within domestic strategic action fields, but it illuminates the efforts by these schools to position themselves as global knowledge institutions that transcend national and international space (Ong, 2005).

Neoliberalism emphasizes the generation of revenues through competition and maximizing productivity. It is demanded that universities and colleges should minimize unproductive efforts and costs by structuring their operations after that of successful for-profit enterprises. Policy makers expect these institutions to continually improve their operations through elaborate systems of accountability and data-driven reporting, all while reducing public support that makes these schools further reliant on identifying private sources of revenue (Casey, 2017).

Policy decisions at the state level that moved to incorporate such market strategies into public services over the last two decades have not performed to expectations. In 2007, the Texas hired the private consulting firm Accenture to manage the Children's Health Insurance Program and Medicaid programs for the state. As a result of technical problems and mismanagement, these programs suffered massive application backlogs and thousands of families were denied benefits for which they were eligible. Accenture overpromised and underperformed, with Texas ultimately canceling the contract and paying Accenture $244 million. It is estimated that taxpayers were charged $100 million more than when this service was operated publicly, yet this firm continues consulting and managing services for the state. Recent efforts to privatize the operations of Terrell State Hospital, a public psychiatric facility in

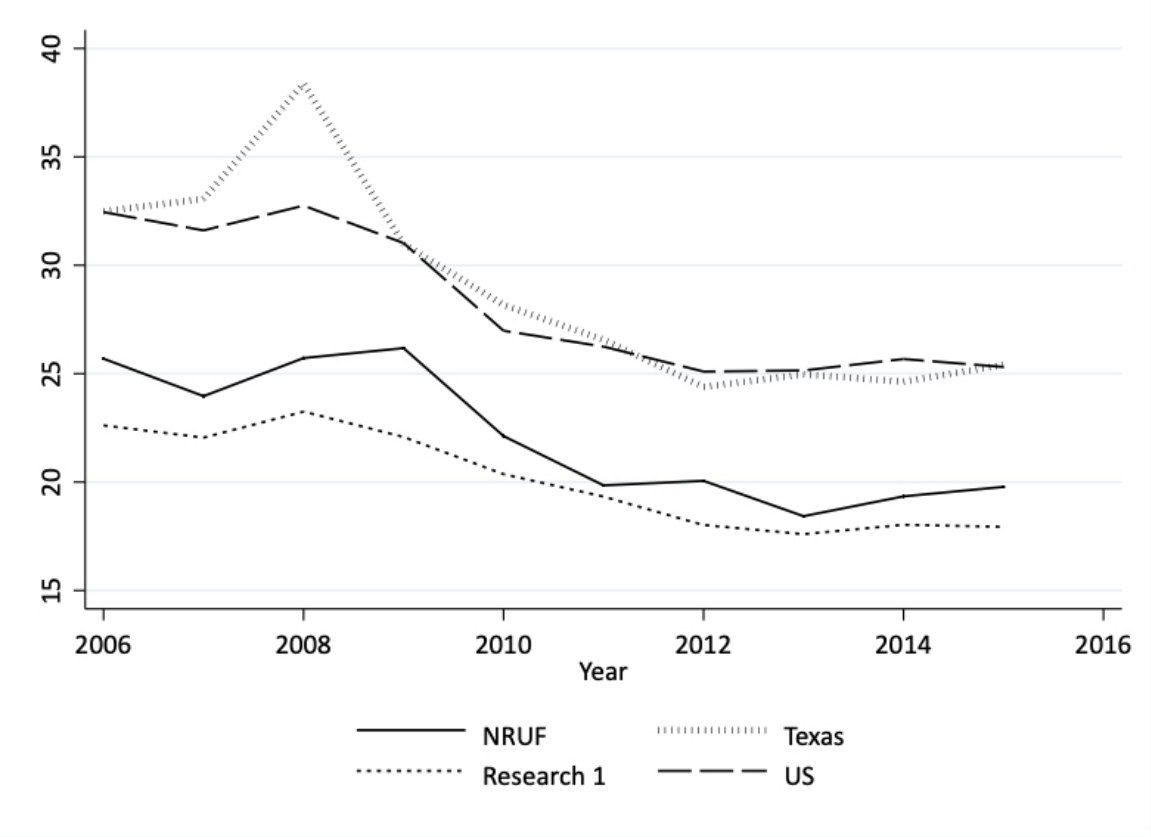
Texas, were only unsuccessful when an audit revealed unethical contracting processes, leading to the Executive Commissioner of Texas Health and Human services Kyle Janek to step down from his position (Strayhorn, 2006; Batheja, 2015; Langford & Ura, 2015).

Neoliberalism calls for efficiency and accountability within higher education policy demonstrates how market forces have shaped the language that dictates and governs the overall mechanics of the field. This has lead to the overall public discourse centered around higher education to be centered on language consistent with neoliberalism's central principles of privatization, competition, and deregulation (Giroux, 2002). Recent research analyzing US Department of Education discourse determined higher education was emphasized more for its role in social mobility and economic advancement, and less for its public role in securing a civil and democratic society. Within the field of higher education, these documents not only convey administrative authority but serve as "vehicles for maintaining and disseminating the dominant discourse" (Suspitsyna, 2012, p. 63).

In the neoliberal political climate, privatization of public higher education occurs through shifting the responsibility of obtaining a college degree to the individual. One of the primary purposes of higher education is to promote social mobility among members of society, as it provides individual students with the skills and knowledge necessary to compete for employment in the marketplace (Labaree, 2005, p. 42). A field governed by a neoliberal policy environment emphasizes social mobility by justifying that because an individual is benefiting from obtaining a college degree, higher education is a private good, thus the responsibility rests upon the student.

Figure 2

State Appropriations as a Percentage of Core Revenues, 2006-2015



Data source: Integrated Postsecondary Education Data System.

This ideological shift had financial repercussions for public institutions through the reduction of state appropriations and the deregulation of tuition setting authority, shifting a larger share of the financial burden to students (Flores & Shepherd, 2014). Since 2003, tuition-setting authority in Texas has been vested with public higher education systems or institutions, allowing universities the ability to raise their price without any oversight by the state. Unlike many public services, higher education is capable of generating a large portion of its operating budget through tuition and fees. Because of this feature, public higher education is often targeted for larger budget cuts during troubled economic times. Being disproportionately

affected by economic cycles, public universities are becoming more reliant on other sources of revenue to maintain operating budgets (Doyle & Delaney, 2009; Jaquette, 2013; Jaquette & Curs, 2015). Figure 2 demonstrates the shift in American university core revenue budgets since 2006. Prior to the 2008 recession, state appropriations made up higher percentages of university core revenues, nationally and in Texas. This funding made up smaller percentages at R1 universities and ERUs, as the budgets of these schools are much larger than institutions that focus less on academic research. Over the course of the decade, the proportion of core revenues made up by state appropriations shrank at all institutional types (see Figure 2).

Public policies that create competitive funding for resources will reward institutions not for efficiency and innovation, but for meeting policy objectives that have little to do with free-market principles or the benefit of public higher education (Marginson, 2013). Colleges and universities compete for both public and private funds in arenas created by policy makers. These quasi-markets did not emerge as a result of free-market exchanges; rather they were created by the state to assist institutions that conduct activities valued by the field (Taylor, Cantwell, & Slaughter, 2013). Quasi-markets lack components essential to free economic markets such as the free flow of producers, open competition for resources, regulation determined by price-based exchange between buyer and seller, and the production of goods that are rivalrous and/or excludable (Marginson, 2014).

The belief that competition will make universities more efficient with public money, while also making them more accountable to so-called consumers, ignores the difficulty of productivity growth within complex personal services such as higher education. Efforts to control costs will likely lead to diminished quality such as increasing class sizes, or raising the

number of courses a faculty member teaches each year. These efforts would generate more semester credit hours per year for the faculty members and departments, but bigger classes and more students will most likely not lead to better education (Archibald & Feldman, 2010, p. 28).

According to David Harvey (2005) neoliberalism proclaims that "individual success or failure are interpreted in terms of the entrepreneurial virtues or personal failings… rather than attributed to any systemic property" (p. 65-66). The environment established by policymakers in which public universities were to compete for awards and prestige, represents a systemic failure built on the belief that competition would produce results associated with higher academic quality and lower cost. In the case of NRUF, competition for additional funding tied to research productivity rewards institutions for efforts that do not directly align with lowering costs or increasing academic quality for undergraduates. Instead, this policy incentivizes institutions to cross-subsidize research with funding generated through undergraduate enrollments. These efforts align with neither increasing the quality of undergraduate education, nor accountability to the public.

Organizational Change

Over the past two decades, on average state appropriations across the US have not kept pace with rising institutional costs, leading to an increased reliance on alternative revenue sources such as tuition and fees (Baum, Ma, Pender, & Welch, 2017). Dependence on enrollment has made many institutions sensitive to overreliance on tuition increases to make up budgetary shortfalls, leading university administrators increasingly focused on establishing a diverse stream of revenue outside of traditional funding sources. With the financial instability

caused by stagnant state appropriations, ERUs saw NRUF funding as a way to offset the cost of pursuing a competitive research mission. Increasing research productivity was viewed by the state, industry, and ERUs as an opportunity to increase university prestige through obtaining various federal and private funds. Dependence on resources partially determines administrative structures, as ensuring a stable flow of revenue from external sources becomes more of a priority to fulfill policy objectives. Administrative differentiation is strongly predicted by dependence on nontraditional revenue streams. Independent of the levels of support that newly prioritized revenue streams generate, universities increase their influence on the structure and decision-making processes associated with procuring these resources (Tolbert, 1985).

Texas understood the lack of R1 institutions as a hindrance to economic and intellectual development, and approached the issue by encouraging state universities to strive for status associated with academic research by rewarding such behavior with the lure of additional funding. The influence of the state on field dynamics can be witnessed in how policy influences institutional decision-making. The desire for status and the revenue associated with academic research provides motivation to universities to adopt characteristics considered prestigious within the greater field environment. ERUs were encouraged to take on attributes of organizations that were more expensive to operate and maintain. Raising capital for costly research endeavors requires the building of complex facilities and the recruitment of specialized faculty in order to compete for advantage within the greater field environment. Research universities suffer from specific types of inefficiencies, particularly in that they have a higher cost in educating undergraduate students. Central administrations, refocused on

securing new resources, rely on a growing administrative bureaucracy that can only react to the convergence of problems, solutions, and participants that stream through the university (Eckel & Morphew, 2009). The policies in place through the NRUF do nothing to address this inefficiency, and instead require universities to strive towards attributes that do not directly benefit undergraduate education (Morphew & Baker, 2004).

Academic Drift and ERUs

The NRUF demonstrates the various ways that states approach the dilemma of academic drift, a phenomenon that often underserves the demands of students while bringing about higher education systems that are more expensive (Morphew, 2009). Texas, on average is increasing its percentage of FTE students, yet appropriates less money per student than the national average (SHEF, 2018). With ERUs possessing relatively small endowments there is increasing reliance on tuition and fees to make up larger percentages of their operating budgets (Ehrenberg, 2007). Higher operating costs and increased emphasis on academic research can shift how faculty perceive their role in a climate centered on increasing institutional prestige. Leslie Gonzales (2013) explored faculty perceptions at a regional public university striving for increased status related to academic research. Her findings conclude that faculty at these universities rely on institutionalized perceptions of legitimacy concerning research universities. Many of the faculty she interviewed understood the pursuit of R1 status as a break from their university's regional teaching mission because academic research requires a tremendous amount of time and energy. Faculty made sense of their university's aspirations based on their previous experiences at other universities, as well as the shared understandings within the field of American higher education about what is considered prestigious and status worthy.

Isomorphism, Ranking Regimes, and Status Seeking

Within an established field, institutional efforts to deal with uncertainty often lead to decisions and policies that make organizations more similar in structure. Facing similar environments, organizational tendencies to resemble one another are understood as isomorphism. This process can result from pressure being exerted by formal and informal stakeholders, or through institutional responses to uncertainty that leads to imitation. Universities, in an effort to seem more legitimate, often mimic other organizations that are perceived to be successful. Status competition also encourages homogenization, as prestige and resources are rewarded for efforts to appear more innovative to stakeholders, and legitimate to peer institutions (DiMaggio & Powell, 1983).

The deregulation of public tuition in 2003 provided the mechanism that shifted funding for education from state resources, as universities could make up public shortfalls through board designated tuition increases (Lyall & Sell, 2006). Faced with an environment in which external funding became synonymous with increasing prestige and legitimacy, a growing administrative bureaucracy shifted resources in directions believed to ensure a stable flow of research revenue (Morphew, & Baker, 2004). Diminished state support has increased the stratification between incumbents and challengers within the field of American higher education, particularly amongst research universities. Institutions well situated within the field continue to benefit, while low-status schools begin undertaking new activities that are perceived as status worthy (Taylor & Cantwell, 2019).

Texas state policy makers emphasized research, being one of the historical purposes of American higher education, as an opportunity to raise prestige and revenue for universities that

had to become less reliant on state appropriations. As institutions dealt with financial uncertainty, decision making tended to the take the form of mimicking the characteristics and attributes of organizations that are understood to be successful. This organizational behavior was fueled by a rankings regime (Gonzales and Nunez, 2014) that promoted increased institutionalization by formalizing standard perceptions of excellence within the field, leading regional public universities to drift from their historic missions and purposes (DiMaggio & Powell, 1983). This academic drift had drastic impacts on the institutional diversity of Texas public higher education, as many regional universities began pursuing research status (THECB, 2010).

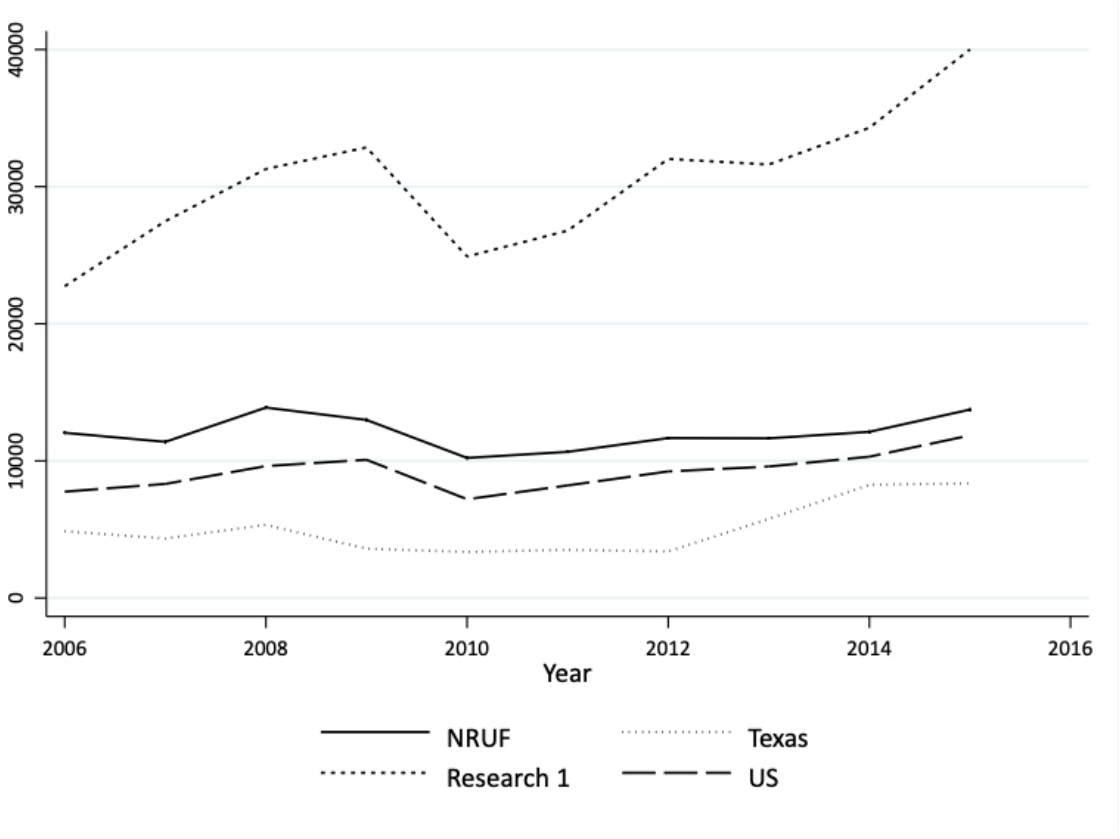
In search of legitimacy universities continue to become more institutionalized through the various ranking systems and the influence these organizations have on external resources. Prior research has demonstrated that research university status had a significant, positive influence on administrative spending at public research universities (McClure & Titus, 2017). Though not an official institutional ranking system, the Carnegie Foundation Classifications serve as a symbolic system that represents institutionalized perceptions of excellence within the field of American research universities. Increasing faculty activities such as research promotes the pursuit of external revenues while also increasing the prestige of the institution. The legitimacy that came along with various Carnegie Classifications influenced decision making at institutions that are vulnerable to "status hierarchy" created by the ranking regime (Bastedo & Bowman, 2009; Taylor & Cantwell, 2019).

A university's reputation as a research-intensive institution requires increasing the amount of federal funding the institution receives for research, an incredibly expensive and

challenging undertaking. In order to be competitive for federal research funds, universities must invest in infrastructure and specialized faculty who will conduct such investigations. As the role of faculty is shifted towards specialized areas of research, the administrative bureaucracy continues to grow as a result of movement away from teaching and shared governance (Morphew & Baker, 2004). The success of R1 universities in maintaining their relative advantage within the field lies in their ability to compete for federal funding and specialized faculty. This advantage is heavily dependent upon the financial advantages that their university endowments provide (see Figure 3).

Figure 3

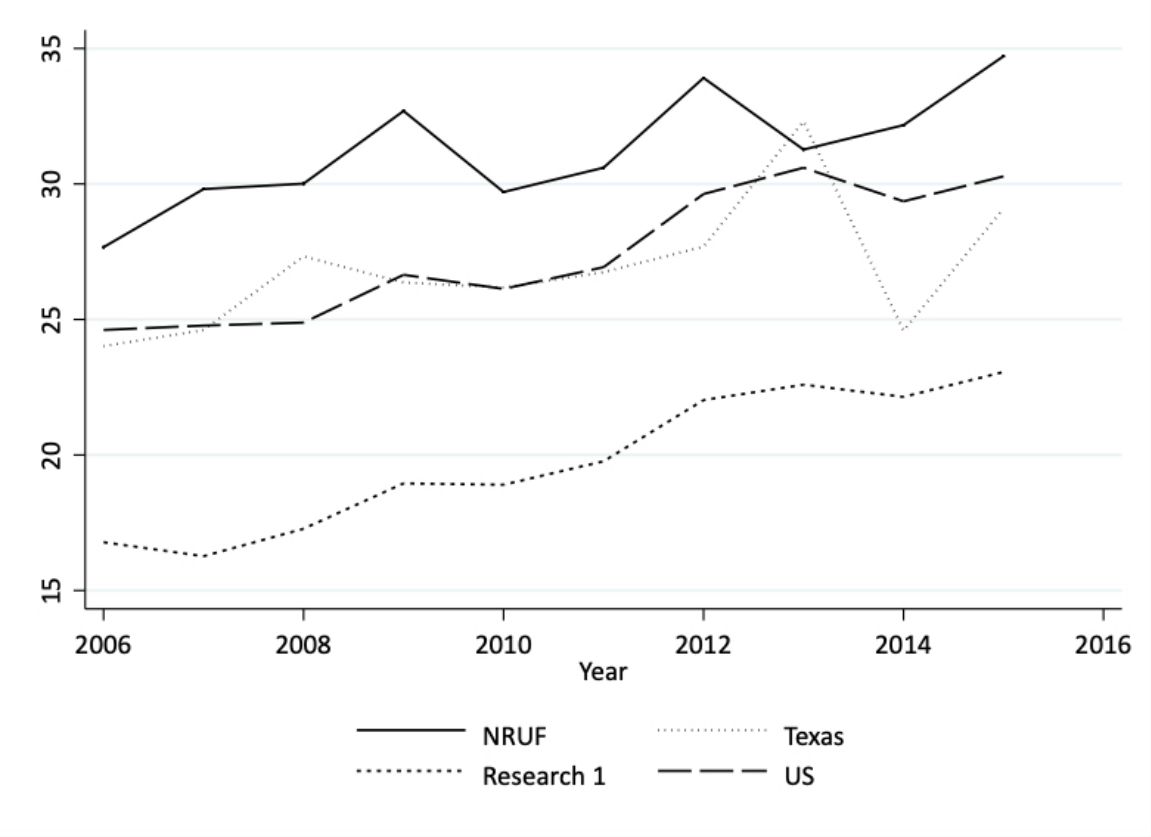
University Endowment per Full-Time Enrolled Students, in US Dollars (2015=100) from 2006-2015



Data source: Integrated Postsecondary Education Data System.

Figure 4

Tuition Revenue as a Percentage of Core Revenues, 2006-2015



Data source: Integrated Postsecondary Education Data System.

Competition for resources has led to an increasing proportion of the cost of research activities to be picked up by the institution itself. According to the National Science Foundation (2018), in 2016 federal support for academic R&D had declined for the fifth year in a row, while universities' share of spending reached 25%, its highest level on record. The outdated funding system for research does not work well for the field of research universities that has grown by a factor of 12 over the past 50 years. Institutional expectations for research generation have expanded, while funds for research have remained flat. Even in the present reality in which universities face increased competition for external resources, while funding an increasing

share of research operating costs, institutions continue to stay the course in fear of being left behind. The cost of such activities falls on core budgets of these institutions that are heavily reliant on student tuition and fees (Stephan, 2012). This is particularly true at ERUs in Texas, where public support in the form of state appropriations remains stagnant, requiring a greater share of rising operating costs be made up by tuition and fees (see Figure 4).

This academic drift in search of prestige is believed to underserve the demands of students while bringing about higher education systems that are less affordable. While there are many benefits for faculty and students at R1 universities, there are also potential drawbacks as more time and resources are directed towards research. The tendency for institutions to become more similar is problematic for American higher education systems in that many different types of colleges and universities allows for greater learning options for students, while providing systems that can adapt and change to specific public needs. Institutions have grown less diverse in past years, even when there has been vast change in almost every other facet of higher education (Morphew, 2009).

As policy makers and administrators attempt to tackle the rise in student cost, policies which are steeped in neoliberal ideology appear as attractive alternatives for a state legislature predominantly elected based on promises of low taxes and small government. The belief that creating competition for resources between public universities will produce higher quality and efficiency demonstrates a lack of understanding about the requirements for a free market, as well as the particular operating characteristics of service based industries. These policies have created an environment that emphasizes generating external revenue and increasing the prestige and ranking of these institutions amongst their national peers. This striving for

institutional legitimacy shapes the labor structure of the university, reprioritizing full-time faculty roles based on policy benchmarks that emphasize research and not teaching. The research priorities of a university also have broad implications for the production of knowledge, as an emphasis on fields of knowledge that represent a financial gain to the university may occur (Gonzales, & Nunez, 2014).

Theoretical Framework

I conceptualize American research universities as a strategic action field made up of various subfields determined by a particular institution's ability to conduct research and educate doctoral students. The boundaries of these sub-fields vary, but are generally determined by one's placement in the Carnegie Classifications. It is important to note that these classifications should not be thought of as rankings, but are intended to provide a framework of comparable institutions for educational and research purposes. These classifications take into account various metrics related to research, and are generally most competitive within the highly regarded sub-field distinction of R1. Within this subfield of research universities, the status hierarchy is most sensitive at the top as competition for resources is fierce between those institutions with the strongest advantages. Those universities located towards the bottom pay close attention to their actions and those of peer institutions most similar to their capabilities. The only thing worse than not reaching R1 status is emerging into this sub-field, and then falling out five years later, as a school's position within the field is affected by perceptions of excellence. Movements down a "ranking" mean less demand for a school's services, hindering an institutions ability to attract quality students (Winston, 1999). The Carnegie Foundation, unintentionally of course, serves as an internal governance unit as its

classifications function as a symbolic system that legitimizes the hierarchical arrangements of the field. It serves the interests of incumbents to have many institutions included, though the rules and standards of the field benefit those with the most advantages, solidifying their presence within the hierarchy.

Within an established field, institutional efforts to deal with uncertainty often lead to decisions and policies that make organizations more similar in structure. Facing similar environments, organizational tendencies to resemble one another is the result from pressure being exerted by formal and informal stakeholders, or through institutional responses to uncertainty leading to imitation. Universities, in an effort to seem more legitimate, often mimic other organizations that are perceived to be successful. Status competition also encourages homogenization, as prestige and resources are rewarded for efforts to appear more innovative to stakeholders, and legitimate to peer institutions. (DiMaggio & Powell, 1983, p. 149-151).

Faced with an environment in which external funding became synonymous with increasing prestige and legitimacy, a growing administrative bureaucracy shifted resources in directions believed to ensure a stable flow of research revenue (Morphew, & Baker, 2001). The generation of revenue through faculty practices has always been a fundamental component of American higher education, as the teaching and academic research that make up the bulk of faculty time contribute large sums to university operating budgets. The difference between the universities of today and those of the later 20th century, lies in the "breadth and depth" of such market-based behaviors (Slaughter & Rhoades, 2004). Movement towards neoliberal policy and more market-based behaviors in Texas can be seen as early as 2003, when the state legislature deregulated tuition setting authority for public universities. It was believed that universities

would behave like enterprises that exist within free-markets, even lowering prices to fill empty seats. The opposite was true, as board designated tuition rose on average 143% at public universities from 2003 to 2017 (THECB, 2018) because institutions saw the ability to set their tuition as a means of increasing revenues during a time of stagnant state appropriations – finances needed to compete for enrollment at institutions that are heavily reliant on tuition revenues.

Deregulating tuition setting authority created opportunities for universities in search of status to utilize student payments to cross-subsidize academic research. In the case of ERUs, additional funding through NRUF further incentivized status-seeking behavior related to the procurement of R&D funding and graduate education. Institutional and state expectations for research generation have expanded, while funds for research have remained flat (Stephan, 2012). Striving for research status is an expensive practice, and competition for stagnant resources has led to an increasing proportion of the cost of research activities to be picked up by institutions themselves (Ehrenberg, Rizzo, & Jakubson, 2007). ERUs must utilize tuition funding and state appropriations to support activities that will advance their position within the field hierarchy related to research status. This academic drift in search of prestige is believed to underserve the demands of students while bringing about higher education systems that are less affordable and accessible.

CHAPTER 3

METHODS

This analysis utilizes observational data to predict the estimated causal effect of NRUF policy on ERUs in Texas. Within the social sciences, randomized experimental design does not always present itself as a viable option for researchers. Policy analysis puts researchers in a particularly peculiar situation because randomization of the treatment, in this case a specific policy intervention, does not occur on the individual level. Instead, policy is implemented at various regional levels or it impacts actors that belong to similar fields/sub-fields. NRUF policy does both of these, in that it directly affects public universities in Texas that also exist within the R2 subfield of American research universities. The NRUF created a category of state universities that were attempting to emerge as very high research activity institutions. These ERUs are the primary focus of my analysis, as these institutions attempted to reach various benchmarks established by policy for economic gain, such as increasing the production of doctoral degrees and the amount of external research expenditures.

The following section first discusses my primary method of analysis including the general covariates that are utilized in all parts of my research design. I then provide a description of my data sources, followed by a discussion of how I developed an appropriate comparison group that control for pretreatment influences. Finally, I describe how I operationalize the overall themes of my analysis through the dependent variables of interest for each of my three research questions.

Method of Analysis

In order to evaluate the causal effect of the NRUF, I am utilizing a difference in

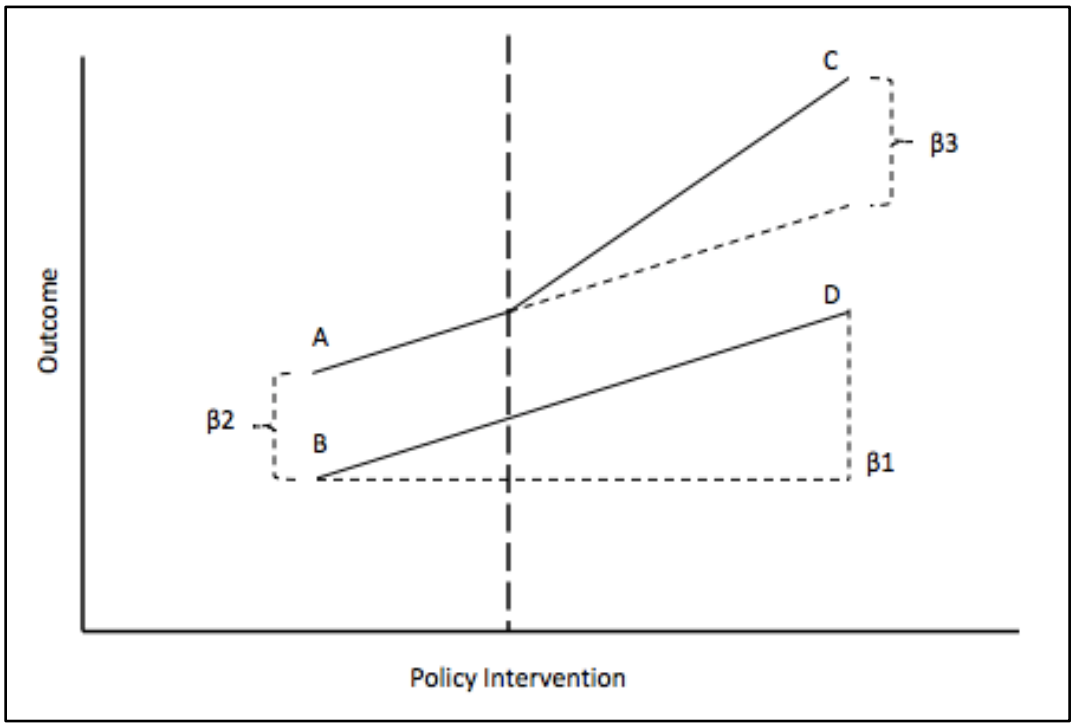
differences research design (DID). This method of analysis is a quasi-experimental design that makes use of longitudinal data to estimate the effect of a specific intervention. This statistical method is useful in determining the effectiveness of policy changes when certain conditions are met. Within this design, longitudinal data tracks similar trend lines between two groups of observations when one group is exposed to a policy intervention (treatment), while the other group is not (control). The intervention creates an appropriate counterfactual timeline for the treatment group that estimates a causal effect of the treatment policy. In other words, DID analysis allows me to compare the average change over time in each outcome variable of my analysis for the treatment group, compared to the average change over time for the control group (Hillman, Hicklin Fryar, & Crespin-Trujillo, 2018; Kelchen, Ochs Rosinger, & Ortagus, 2019). Comparing the changes over time between schools that received funding related to the policy, to those that did not, allows me to estimate the causal impact of the NRUF. Below is the specific equation that mathematically represents the method of analysis, followed by a description of its various elements:

$$Y_{it} = \beta 0 + \beta 1[Time] + \beta 2[Intervention] + \beta 3[Time_i * Intervention_t] + \beta 4[Covariates] + \varepsilon$$

This model represents two time periods – one before and one after the adoption of NRUF. Y_{it} is the outcome variable for each part of my analysis for each institution i in each year t. Invervention is a binary variable equal to 1 for institutions under the influence of NRUF (ERUs), while Time is a binary variable equal to 1 for post policy years. The variable $Time_i * Intervention_t$ represents an interaction that measures the average treatment effect, or the change in slope after the adoption of NRUF. To provide additional clarity, I include a visual resource for the model that graphically represents its functions (see Figure 5).

Figure 5

Difference in Research Design



As represented in Figure 5:

- β0: Calculated as B represents the baseline average.
- β1: Calculated as D-B represents the time trend in the control group.
- β2: Calculated as A-B represents pre-intervention differences.
- β3: Calculated as (C-A)(D-B) represents the differences in changes over time.
- β4: Covariates within model
- ε: Standard error

Model Covariates

Several control variables are included in the analysis to more precisely isolate the interaction term of interest. These control variables all relate to various sources of revenue and

support for institutions. The total student size of a university, the state appropriations it receives, and total tuition revenue are included to estimate the advantage such funds can provide institutions pursuing research status. These control variables also provide insight into how such revenues relate to undergraduate quality and access, as defined by this research study. The model for this analysis is intended to be parsimonious to account for the variables used and relatively small sample size.

Data

I use data from the Integrated Postsecondary Datasets (IPEDS) and the Integrated Science and Engineering Resource Data System (WebCASPAR) to answer my three research questions. IPEDS includes self-reported data from US higher education institutions, while WebCASPAR provides access to statistical data for science and engineering (S&E) and non-S&E fields at US academic institutions. The NRUF legislation occurred in 2009 but was not implemented until 2010, with the first year of viable information regarding the eligibility requirements being 2011. In an effort to observe the effect of the competitive funding policy, my analysis begins in 2008 giving my study several years of information that capture my variables of interest prior to the implementation of this policy. Analyzing the years prior to policy implementation allows for the observance of the treatment effect of the NRUF. In other words, I observe the differences between my treatment and control groups before and after the policy intervention.

Treatment and Control Groups

The designated ERU institutions in the state of Texas from 2008 – 2015 serve as the

treatment group for this study. These institutions include: Texas Tech University, the University of Texas at Arlington, the University of Texas at Dallas, the University of Texas at El Paso, the University of Texas at San Antonio, the University of Houston, and the University of North Texas. Texas State University was not designated as an ERU until 2012, three years after the implementation of the NRUF, so it is excluded from the analysis completely.

The DID methodology intends to moderate the effects of selection bias and extraneous factors that may influence the dependent variables of interest within my analysis. In order for this approach to be effective, the control group of universities in my analysis must be similar to the ERU schools prior to the policy intervention, and must exist outside of the policy environment of Texas. This is important if I hope to demonstrate the impact that NRUF revenue had on ERU institutions.

In selecting my control group, I utilize data from the Integrated Post-Secondary Education Data System (IPEDS). In an effort to control for covariates that may impact the variables of interest in my study, I implement a coarsened exact matching (CEM) technique that enabled me to select a control group of universities to compare with the ERUs in Texas. This matching method controlled “for confounding influence of pretreatment control variables in observational data” (Iacus, King, & Porro, 2011, p. 1). In other words, CEM allows for an exact match on specified variables and an approximate, or coarsened, match on others. I exact match on an institution's 2005 Carnegie Classification, as I want to include universities in the control group that match the research status of the ERUs prior to the intervention of the NRUF policy. This includes institutions that are classified as Research Universities 2: High Research Activity. I also exact match on universities that do not have a medical school, as the presence of such a

program is associated with increased levels of external research expenditures. The "coarsened" variables for the matching technique include the percentage of full-time undergraduate students, endowment size, state appropriations, and external federal research expenditures. Fitting the CEM with Federal R&D as a coarsened matching variable could lead to my analysis for my first research question being somewhat unreliable because I am selecting the sample of control universities based on the dependent variable. I am including this criterion because 2008 is the matching year and I want institutions similar to the ERUs before the policy intervention in 2009. I am trying to determine the influence NRUF policy intervention had on ERUs ability to grow their Fed RD funding, thus the decision to select institutions that are similar to ERUs in terms of these funds prior to the policy is logical because analyzing the change in this variable over time between the ERU and CEM group provides insight into the average treatment effect of the policy.

I am including the number of undergraduate students as criteria for coarsened matching universities because of the revenue that large undergraduate populations can provide an institution. I offer similar justification for endowment size and state appropriations. All of the matched and coarsened variable criteria are for 2008, a year before the implementation of the NRUF policy. The primary goal of any quasi-experimental design is to get as close to the "experimental ideal" (Angrist & Pischke, 2009) as possible, and the selection criteria for this matching allows for a group of control universities that are, on average, similar in stature to the ERUs at the time the policy intervention occurred. This control group is referred to as "CEM matched universities" in this analysis. A full listing of the treatment and control universities can be found in Table 1.

Table 1

NRUF Treatment & CEM Control Universities

Institution Name	State	% FTE	Endowment	State Appropriations	Federal Research Expenditures
University of Houston	TX	70.77%	560000	190000	27614
University of North Texas	TX	69.15%	92500	130000	25205
University of Texas at Arlington	TX	64.71%	57600	111000	19410
University of Texas at Dallas	TX	64.19%	264000	83600	16795
University of Texas at El Paso	TX	59.74%	158000	91400	22528
University of Texas at San Antonio	TX	73.31%	53800	115000	20120
Texas Tech University	TX	87.22%	395000	168000	34493
University of Alabama, Tuscaloosa	AL	84.96%	409000	146000	21454
Northern Arizona University	AZ	67.35%	57900	125000	9249
Georgia State University	GA	67.77%	104000	195000	28540
Boise State University	ID	60.41%	50500	80100	4681
Idaho State University	ID	65.63%	25100	77000	13621
Northern Illinois University	IL	76.33%	2137	153000	12170
Wichita State University	KS	60.22%	120000	70400	7323
University of Louisiana at Lafayette	LA	82.14%	87200	61500	7699
University of Maine	ME	75.07%	57800	92800	28020
University of Maryland, Baltimore Co.	MD	74.52%	676	70500	47941
University of Massachusetts Lowell	MA	59.52%	18800	81300	8359
University of Massachusetts Boston	MA	54.13%	8147	93600	8185
University of Southern Mississippi, The	MS	78.70%	48100	77500	52555
Missouri State University	MO	72.75%	42700	73300	3337
University of Montana, The	MT	81.57%	15000	40300	33699
New Mexico State University	NM	78.43%	64300	148000	101749
UNC at Greensboro	NC	73.49%	138000	117000	7561
University of Akron, The	OH	70.77%	49300	93900	8068

(table continues)

Institution Name	State	% FTE	Endowment	State Appropriations	Federal Research Expenditures
Cleveland State University	OH	56.74%	6650	70000	5324
Kent State University	OH	80.13%	51700	83400	12750
Portland State University	OR	56.22%	30200	62300	15209
University of Rhode Island	RI	78.17%	75900	83200	37877
South Dakota State University	SD	72.85%	52000	58300	22936
University of Memphis, The	TN	67.39%	167000	112000	12805
George Mason University	VA	54.42%	40800	115000	35313
Old Dominion University	VA	57.93%	8868	101000	7452
University of Wisconsin-Milwaukee	WI	75.40%	55100	96900	17104
University of Wyoming	WY	68.30%	110000	150000	27319

Note. All financial indicators in thousands of US dollars.

Research Questions

Research Question 1: Policy Metrics

- What estimated effect has NRUF had on the amount of Federal Research and Development expenditures obtained by ERU institutions from 2008 to 2015?
- What has been the estimated effect of NRUF on the production of science and engineering graduate degrees at ERUs in Texas from 2008 to 2015?
- What has been the estimated effect of NRUF on the number of federally funded graduate assistantships at ERUs in Texas during this time period?

The dependent variables of interest includes data available through WebCASPAR:. federal R&D expenditures, the number of doctoral degrees produced in science and engineering fields, and the number of federally sponsored graduate assistantships. IPEDS offers data related to external funding sources categorized by federal, state, and private grants, and does not distinguish amounts of money used specifically for research purposes.

For the first part of Question 1, the total amount of federal funding provides an important dependent variable of interest in my analysis because it demonstrates a university's financial capabilities to produce academic research. The attainment of additional revenue in the form of Federal R&D was a major piece of NRUF legislation, and is an essential component of research university budgets. The production of research is a costly exercise in resources and time. Faculty must complete extensive grant applications, and the overall process can be prone to a variety of administrative and bureaucratic delays, thus the DID analysis is an appropriate model that accounts for regular application cycles and the time it takes to receive and apply any potential funding towards the production of academic research.

The second part of Question 1 is concerned with the production of doctoral degrees, another key indicator of an institution's position within the Carnegie classifications. Graduate education has played a historical role in the development of American research universities, and these students are instrumental to academic research conducted by faculty. My analysis captures the impact NRUF funding has on ERU capabilities of recruiting, educating, and graduating doctoral students in the STEM fields. According to the National Center for Science and Engineering Statistics (2015), it takes more than six years to earn a doctorate in STEM fields, thus a DID analysis helps account for the time needed to cultivate a graduate student, while providing insight into how NRUF funding impacted all aspects of doctoral degree production (recruitment, admission, education, and completion). To account for the size of each individual university, I created derived variables that are equal to doctoral degrees and federal graduate assistants per 1000 full-time enrolled undergraduate students. The addition of five doctoral graduates at one institution may not be a large increase, but that same amount

of conferred PhDs might be substantial at a smaller institutions.

The third part of Question 1 takes into account institutional abilities in securing federal graduate assistants at a university. A DID method of analysis accounts for the time it takes to apply for the grants associated with these assistantships, while providing time for the onboarding of such students. The number of federally sponsored graduate assistantships provides insight into how much impact NRUF funding has on securing federal funding for such positions.

Research Question 2: Undergraduate Academic Quality

- What effect has the NRUF had on the percentage of faculty that are full-time at ERUs in Texas from 2008 to 2015?
- How has the NRUF impacted instructional expenditures per full-time enrolled (FTE) students at ERUS in Texas during this time period?

For my second research question, the dependent variables of interest include percentage of a university's faculty that are classified as full-time, and instructional expenditures per FTE student. This question is primarily concerned with the influence the NRUF had on labor structures and what universities were willing to dedicate towards undergraduate education. A comparison of faculty type is included in an effort to understand the impact that emerging research status has on faculty structures at each university. Prior research has demonstrated the important role that full-time and tenure-track faculty have on undergraduate graduation and retention rates, as well as the qualitative benefit that faculty-scholars have on undergraduate education (Kuh, Chen, & Nelson Laird, 2007).

Research Question 3: Undergraduate Access

- What has been the impact of NRUF policies on the student cost of public higher education at ERUs from 2008 to 2015?
- How has access to ERUs changed when compared to other state universities that are institutionally similar? Particular emphasis is placed on:
    - Students of color
    - Low income students
    - Adult learners

For the first part of Research Question 3 my dependent variable of interest is student net tuition per FTE. Prior research also demonstrated the impact rising price has on student enrollment at public universities in Texas, particularly in relation to tuition deregulation that occurred in 2003 (Flores & Shepherd, 2014). As the price for students to attend an ERU has risen more dramatically than at peer universities, it is assumed that certain student groups can be priced out of their universities The second part of this research question focuses on the percentage of full-time, first-time equivalent students who identify as students of color, low income, or adult learners. These three student groups are represented as different models in my analysis. I am interested in these particular student groups because they represent populations that have historically been served through the service mission of the ERU institutions. It is often argued that attainment of research university status benefits undergraduates, while also making the university more attractive to prospective students.

CHAPTER 4

RESULTS

Table 2 provides descriptive statistics for the nine outcome variables included in my analysis for both the NRUF and CEM control universities. I also included averages for all public universities that had R1 status in 2006 to provide a reference point that represents the institutions considered high status within the field of American research universities. I limited this to only public R1 schools, as these are the most similar in terms of finances and governance. Many of the outcome variables vary widely between public and private institutions, particularly in the subfield of R1. Only schools that were R1 in 2006 were counted for the R1 public average, and institutions that emerged into this subfield in 2010 and 2015 – some of which were the NRUF institutions themselves – were not counted at any point within the R1 averages.

Table 2

Average Means (SD) of Outcome Variables 2006 – 2015

	NRUF	CEM Control	R1 Public[3]
Federal R&D	28936.811*	19955.044*	204038.55
	(3671.2)	(2610.23)	(23745.89)
Doctoral Degrees	159.071	76.408	341.84
	(23.984)	(6.708)	(13.998)
Federal Graduate Assistantships	111.125*	81.894*	588.461
	(17.719)	(8.34)	(50.74)
Full-Time Faculty (%Total Faculty)	75.389*	66.473*	73.066
	(2.658)	(3.053)	(5.588)
Instructional Expenditures per FTE[1]	7308.962*	8662.151*	13851.902
	(529.643)	(583.999)	925.213

(table continues)

	NRUF	CEM Control	R1 Public[3]
Net Tuition Price[2]	10641.143	13845.251	14980.772
	(749.194)	(733.113)	(568.257)
Students of Color (%FTE)	61.298	27.089	20.615
	(2.893)	(1.746)	(.96)
Pell Grant Eligible (%FTE)[2]	38.161*	34.963*	25.154
	(4.872)	(4.414)	(3.306)
Adult Learners (%FTE)	11.65*	12.579*	7.454
	(.512)	(.635)	(.379)
Institutions	7	32	67

Note. * Mean for NRUF and CEM is NOT statistically different from zero. [1]FTE = full-time equivalent. [2]Net Tuition Price and Pell Grant Eligibility only available 2008 -2015. [3]Averages for schools with R1 status in 2006. [4]All finance variables adjusted to 2015 and are in thousands of dollars

Between 2006 and 2015, NRUF and the CEM control universities generated an average of $28.9 million and $19.96 million in federal R&D per year, respectively. These amounts fell well below the national average of R1 public universities that generated over $204 million a year in federal R&D, though NRUF universities were more productive in securing these funds than the CEM control schools. T-tests were performed for each dependent variable in the analysis to compare whether there was a significant difference between the means of the NRUF and CEM universities. The mean levels of federal R&D funding for NRUF and CEM universities were not statistically different , meaning these groups were genuinely comparable regarding this variable. By contrast, NRUF universities produced a far greater amount of doctoral degrees on average than the CEM control group, and the T-test results indicate the mean differences were statistically significant, meaning the two groups are less comparable for this outcome variable. Finally, NRUF and CEM universities were not statistically different in the average number of federally sponsored graduate assistantships, meaning these groups are comparable

regarding this particular outcome variable.

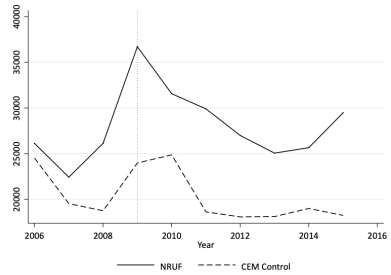
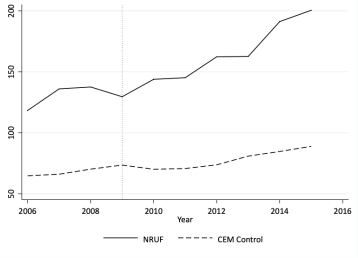
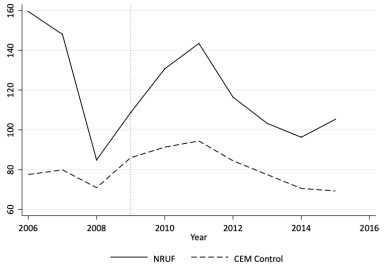
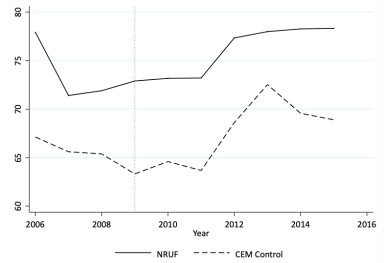
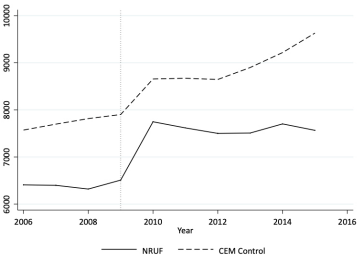
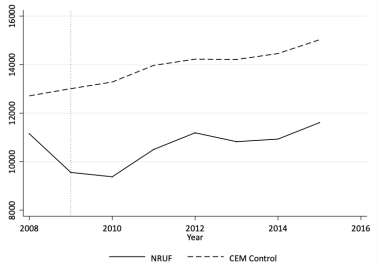
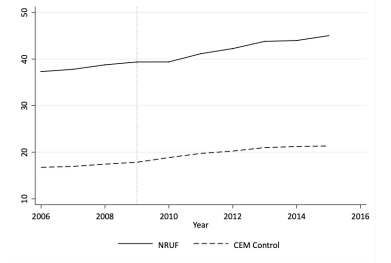
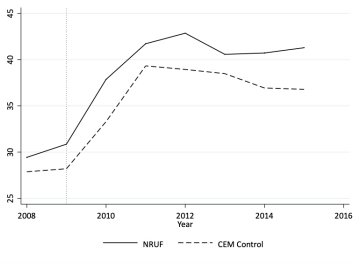
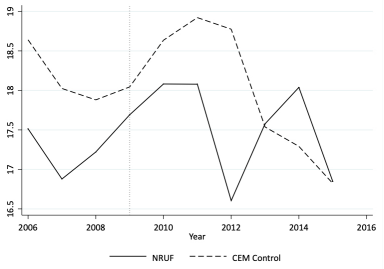
The descriptive statistics for the outcome variables in my second research question, involving the percentage of the faculty that are full-time and instructional expenditures per FTE, are a more consistent. NRUF universities utilize nominally higher percentages of full-time faculty than the CEM control group and R1 public universities, while R1 schools tend to spend more per FTE student than the NRUF and CEM control universities. These differences are not statistically significant, meaning NRUF and CEM control universities are genuinely comparable for these two outcome variables.

Finally, I consider outcome variables for my third research question. From 2006 – 2015 NRUF universities on average charged less tuition, and enrolled larger percentages of students of color, than did CEM control universities. The difference in means between the groups was statistically significant, lending less confidence to the analysis of these outcome variables. The means for the Pell eligible and adult learner variables were not statistically different between the groups, making analyses of these variables more reliable. Nominal differences between the samples show NRUF universities enrolling more Pell grant students, yet fewer adult learners than the CEM control group. Texas historically falls below the national average for public higher education tuition, and because of their location in the American southwest, six of the seven NRUF universities are classified as Hispanic Service Institutions as of 2020. NRUF institutions remain attractive university options to Pell grant recipients due to their proximity to large urban areas in a state with one of the fastest growing populations. CEM control universities led the NRUF schools in the number of adult learners, yet both of these groups led the R1 public universities. Though the prestige of attending a R1 public might be enticing, adult learners are

more price sensitive while often being bound to a location due to their personal and professional lives.

Figure 6

Trends in Average Outcome Variables Pre- and Post-Policy Adoption

Federal R&D	Doctoral Degrees Completed	Federal Graduate Assistantships
		
Full-Time Faculty (%Total Faculty)	**Instruction Expenditures Per FTE**	**Net Tuition Price**
		
Students of Color (%FTE)	**Pell Grant Recipients (%FTE)**	**Adult Learners (%FTE)**
		

Averages provide one indicator on how these groups compare to one another regarding these variables. However, these outcomes changed over time. Figure 6 provides trends in

average outcome variables for both NRUF and CEM control universities, both before and after the policy intervention (2009). An assumption of difference in differences analysis is that the groups are similar enough before the intervention that subsequent changes are due to the policy and not because the groups are different. When visualizing the outcome variable averages between the NRUF and CEM control universities over time, a parallel trend between the groups demonstrate that the differences in these variables are approximately constant over time.

The majority of the trend lines display patterns and similarities between the NRUF and CEM control universities, with a few key differences. Federal R&D peaked for both NRUF and CEM control universities in 2010 and 2011 (most likely due to recession stimulus money). NRUF institutions eventually began recovering their efforts in 2013, while CEM control efforts have remained somewhat flat for the last five years in the analysis. A similar trend is displayed with federally-funded graduate assistants. NRUF and CEM control groups also saw similar trends with the number of adult learners, but in 2013 there was a large increase for NRUF schools that continued for the next two years. By contrast, CEM control universities continued to decline.

Research Question 1: Metrics Related to NRUF Policy

Results for the dependent variables of interest related to Research Question 1 are found in Table 3.

Federal Research and Development

The estimated effect the NRUF policy had on the amount of Federal Research and Development expenditures obtained by ERU institutions from 2006 to 2015 was not significant.

Results in the first column of Table 3 demonstrated that neither being classified as an NRUF nor the DID predictor - that measures the average treatment effect, or the change in slope after the adoption of NRUF - significantly predicted variation in Federal R&D funding. This leads me to believe that any increased amounts of Federal R&D received by NRUF universities was due to factors other than the policy intervention.

Table 3

DID Results for Research Question 1

	Federal R&D (*n* = 346)	Doctoral Degrees (*n* = 346)	Federal Graduate Assistantships (*n* = 350)
Time	-553.452	3.200	-0.104
	(0.28)	(0.54)	(0.87)
NRUF	6,564.947	23.821*	0.298
	(1.93)	(2.33)	(1.44)
DID(Time*NRUF)	2,071.691	15.189	0.216
	(0.49)	(1.20)	(0.85)
Total Enrollment	1,055.106	115.392**	-0.014
	(0.35)	(12.86)	(0.08)
Tuition Revenue	-0.125	0.004**	0.000**
	(0.38)	(4.14)	(3.70)
State Appropriations	0.922**	0.004**	0.000**
	(3.32)	(5.06)	(2.68)
Constant	4,846.132	-1,130.329**	3.284
	(0.16)	(12.30)	(1.77)
R^2	0.07	0.50	0.07

* p<0.05; ** p<0.01

The covariate state appropriations was statistically significant, representing a positive relationship between state funding and Federal R&D. This variable represents state appropriations per FTE undergraduate. On average, for every additional dollar increase per FTE

student an institution receives from the state, leads to an additional .92 dollars in federal R&D. Regardless of the level of support states provide higher education, larger FTE enrollments generate tuition and additional appropriations from that state. Operating at such large scales allows for cross-funding of an institution's research mission.

Doctoral Degrees

The estimated effect the NRUF had on the number of Doctoral Degrees produced at ERU institutions from 2006 to 2015 demonstrated that being a NRUF university was also statistically significant, with those institutions producing, on average, almost 24 additional doctoral degrees per year when compared to the CEM Control universities. Yet the DID predictor that measures the average treatment effect after the adoption of NRUF was not statistically significant. Because difference in differences is an interaction technique, chi squared tests were conducted on this part of the analysis to determine joint significance amongst the DID coefficients. This can determine how likely the observed frequencies would be assuming the null hypothesis was true, in this case that the NRUF policy had no effect on an ERU's ability to graduate more doctoral students. For this particular analysis, the results indicate that the null hypothesis cannot be accepted at .00% ($P < .000$) demonstrating that the DID variables matter in explaining the variation in Doctoral Degrees throughout the analysis. There was meaningful change in the number of doctoral degrees produced, and the source of the change was NRUF status.

Earlier in this chapter, however, the analysis of the difference in means between the NRUF and CEM control groups was statistically significant, lending less confidence to the results for this outcome variable because the groups were not necessarily comparable.

All three covariates were statistically significant in this analysis. On average a 1%

increase in the log of total enrollment predicted a beta unit change of 115.392 in the number of doctoral degrees produced. Put another way, a 1% increase in total enrollment increases the number of doctoral degrees by 1.15%. A one dollar increase of tuition revenue per FTE resulted in a .004 increase in the number doctoral degrees produced, with similar results for state appropriations.

Federal Graduate Assistantships

The estimated effect of the NRUF on the number of Federal Graduate Assistants from 2006 to 2015 was not statistically significant for the NRUF university classification and the DID predictor. The Tuition Revenue per FTE and State Appropriations per FTE covariates were statistically significant, and both reflected a positive relationship with the log of Federal Graduate Assistants, but the effect size related to these variables was rather small and not included in the table due for formatting purposes. The correlation coefficient for Tuition Revenue per FTE was .0000738, meaning that on average for every additional dollar in Tuition Revenue per full-time equivalent student increased the number of federally sponsored graduate assistantships at an institution by .007%. The correlation coefficient for State Appropriations per FTE was .000045, meaning for every additional dollar in State Appropriations per full-time equivalent student increased the number of federally sponsored graduate assistantships at an institution by .004%.

Research Question 2: Undergraduate Education

Results for the dependent variables of interest related to Research Question 2 are found int Table 4.

Table 4

DID Results for Research Question 2

	Percent Full-Time Faculty (*n* = 344)	Instructional Expenditures per FTE (*n* = 346)
Time	5.793**	1,346.493**
	(2.60)	(10.28)
NRUF	11.226**	-883.091**
	(2.92)	(3.89)
DID(Time*NRUF)	1.945	119.600
	(0.41)	(0.42)
Total Enrollment	-5.118	494.499*
	(1.52)	(2.48)
Tuition Revenue	-0.001*	0.348**
	(2.17)	(15.87)
State Appropriations	0.001**	0.435**
	(4.05)	(23.93)
Constant	110.422**	-3,983.438
	(3.20)	(1.95)
R^2	0.14	0.72

* $p<0.05$; ** $p<0.01$

Percent of Full-Time Faculty

The estimated effect of the NRUF policy on the percentage of full-time faculty at ERU institutions from 2006 to 2015 was significant. Time, on average, was a positive indicator regarding the percentage of faculty considered full-time. Schools saw an increase of 5.793 percentage points in this variable for both NRUF and CEM control universities from 2009 to 2015. NRUF university classification was statistically significant as well, with those institutions having over 11 percentage points more of their faculty working full-time, on average, than the CEM Control universities. Yet the DID predictor was not significant. The results of a chi squared

test indicate that all three variables matter in explaining variation in the percentage of faculty that are full-time. However, most of the change observed in this variable seemed to be time and NRUF status. There was little evidence that NRUF status netted a different return before and after the intervention.

The tuition revenue covariate was statistically significant within this analysis, with a .001 point decrease in the percentage of full-time faculty for every additional dollar generated per student. Reversely, the percentage of full-time faculty would increase .001 point for every additional dollar received per student from the state. The size of an institution impacts how a state is going to finance a university. Larger enrollments and more semester credit hours generating additional revenue, yet they simultaneously stress instructional resources.

Instructional Expenditures per Full-Time Equivalent Undergraduate

The estimated effect the NRUF policy had on the Instructional Expenditures per FTE undergraduate continued to follow trends set forth through previous parts of this analysis. Time was a statistically significant variable, with Instructional Expenditures increasing, on average, $1,346 per FTE between 2009 and 2015. NRUF designation continued to be significant as well, with those institutions spending on average $883 less than the CEM Control universities. The DID predictor variable continued not to be statistically significant. The results of a chi squared test indicate the DID variables matter jointly in explaining variation in instructional expenditures per FTE. The sources of the change observed in this variable seemed to be time and NRUF status.

All three of the covariates were significant in this part of the analysis. For every additional dollar generated per student through tuition, instructional expenditures would

increase .34 dollars per student, meaning that two thirds of tuition increases do not go back into direct instruction costs. Finally, every additional dollar received per student from the state led to an instructional expenditure increase of .435 dollars for each FTE student.

Research Question 3: Undergraduate Access

Results for the dependent variables of interest related to Research Question 3 are found int Table 5.

Table 5

DID Results for Research Question 3

	Net Tuition Price (*n* = 280)	Students of Color (*n* = 350)	Pell Grant Recipients (*n* = 280)	Adult Learners (*n* = 350)
Time	680.052	4.557**	10.132**	0.109
	(1.75)	(3.08)	(6.03)	(0.12)
NRUF	-3,732.374**	19.593**	2.639	-0.134
	(5.00)	(7.64)	(0.82)	(0.09)
DID(Time*NRUF)	-925.741	-0.273	0.703	0.485
	(1.10)	(0.09)	(0.19)	(0.25)
Total Enrollment	2,595.021**	8.599**	-1.587	-2.016
	(4.93)	(3.82)	(0.70)	(1.49)
Tuition Revenue	0.580**	-0.001**	-0.001**	-0.000
	(9.86)	(3.34)	(2.85)	(1.16)
State Appropriations	0.084	0.000*	-0.000	-0.000
	(1.71)	(2.34)	(1.77)	(0.53)
Constant	-18,109.069*	-65.102**	52.893*	39.960**
	(3.35)	(2.82)	(2.26)	(2.88)
R^2	0.47	0.41	0.18	0.01

* $p<0.05$; ** $p<0.01$. 2006 – 2007 data note available for Net Tuition Price and Pell Grant recipients

Net Tuition Price

The DID indicator continued to not be statistically significant in this part of the analysis.

The estimated effect the NRUF policy had on the net tuition price paid by students from 2008 – 2015, demonstrated that students at NRUF universities paid, on average, $3,445 less the CEM control universities. Though the DID variable was not significant, results of a chi squared test indicate the DID variables matter in explaining variation in net tuition prices, and the sources of the change observed in this variable was NRUF status but not necessarily the policy intervention itself.

The covariates total enrollment and tuition revenue were also statistically significant. On average, every percentage change in enrollment predicted a $2,595-unit change in net tuition price. Every additional dollar received per student from the state resulted in $.58 increase in net tuition price. Crucially, the prior analysis of the difference in means between the NRUF and CEM control groups was statistically significant (see Table 2), lending less confidence to the results for this outcome variable because the groups were not necessarily comparable.

Students of Color

Time was a statistically significant indicator for the participation of students of color, with sampled schools increasing their enrollment of students of color 4.5% between 2009 and 2015. NRUF status was also significant, with those institutions enrolling almost 20% more students of color than the CEM control universities. Texas lies in the American southwest, a region whose demographics are dramatically shifting due to its economy and immigration. The DID indicator continued to be statistically insignificant. The results of a chi squared test indicate the DID variables matter in explaining variation in the percentage of students of color enrolled, and the sources of the change observed in this variable was both time and NRUF status. Yet, the analysis of the difference in means between the NRUF and CEM control groups was

statistically significant, lending less confidence to the results for this outcome variable because the groups were not necessarily comparable.

All three covariates were statistically significant. On average, every percentage point increase in total enrollment leads to an 8.599-unit change in the percentage of students of color at an institution. Every additional dollar generated per student through tuition led to a .001 decrease in the percentage of students of color at that institution. Finally, state appropriations were also statistically significant, yet the overall effect sizes continued to be small.

Pell Grant Recipients

Just as with students of color, time was a statistically significant indicator of the percentage of Pell Grant recipients enrolled at both NRUF and CEM control universities, with a 10% increase between 2009 and 2015. NRUF status and the DID indicator were not statistically significant for this part of my analysis. The results of a chi squared test indicate the DID variables matter in explaining variation in the percentage of Pell Grant recipients that enroll at an institution, and the sources of the change observed in this variable was time.

Of control characteristics, only state appropriations per FTE student was statistically significant for this part of the analysis. On average, every additional dollar received per student from the state resulted in a decrease of .001% of Pell grant recipients.

Adult Learners

Regarding the results for the final analysis in Research Question 3, none of the DID independent variables or covariates were statistically significant.

CHAPTER 5

DISCUSSION

Summary of Findings

The aim of this study was to examine how state policy that encouraged status seeking impacted university decision making related to academic research and undergraduate academics. NRUF provided an opportunity to analyze a policy intervention at the state level that was geared towards public institutions that historically served as access points to higher education yet strive for the status and prestige associated with graduate education and academic research. NRUF promoted activities that represented forms of excellence within the field of American research universities, while simultaneously these institutions are directed to be more accountable to the public through affordability measures. NRUF reflected a neoliberal policy environment that encouraged diversification of revenue streams, while state financial support remained stagnant and the overall institutional costs increased within the higher education sector as whole. The result was that a majority of those costs were passed onto students.

The NRUF policy intervention provided ERUs with supplemental funding intended to assist these institutions with reaching R1 status, yet these institutions simultaneously exist within a policy environment that requires they are accountable to the public. The purpose of this study was to analyze whether NRUF had any substantial impact on the ability of ERUs to meet various benchmarks related to R1 status. Second, the study assessed whether the inclusion of NRUF funding encouraged ERUs to cross-subsidize academic research with resources previously dedicated towards undergraduate education. Finally, this study examined

how transitioning to an R1 institution impacted ERU's ability to enroll historically underserved student populations.

Rather than analyzing this phenomenon at the individual or organizational level, this study sought to understand how groups of institutions responded to policy interventions and changed over time. The theoretical starting point for this study utilized the concept of strategic action fields (Fligstein & McAdam, 2012). Expanding on Pierre Bourdieu's (1992) concept of fields, which are defined as the structured arena where practice occurs, strategic action fields extend the analysis to that of groups of actors who organize varying resources to vie for advantage within constructed social orders. This theoretical approach is beneficial for studying NRUF and American research universities because it places particular emphasis on how fields emerge, reproduce, and change over time, while emphasizing the socially constructed nature of conflict embedded within this particular field. The state legislature, through NRUF policy, developed a field environment that emphasized competition between schools selected to be ERUs. The quasi-market created through such a policy operates under rules and boundaries that are fundamentally different from how neoclassical economist envision competitive free markets.

This study examines changes in ERUs by situating them within the field of American research universities - a strategic action field made up of various subfields determined by a particular institution's ability to conduct research and educate doctoral students. Within established fields, efforts to deal with uncertainty often lead to decisions and policies that encourage organizations to imitate other organizations that are viewed as successful within the overall field environment. In this case, ERUs, in an effort to seem more legitimate, mimic the

attributes of established R1 universities. This organizational change associated with seeking research status encourages homogenization, as prestige and resources are rewarded for efforts to appear more innovative to stakeholders and more legitimate to peer institutions (DiMaggio & Powell, 1983).

Faced with an environment in which external funding became synonymous with increasing prestige and legitimacy, a growing administrative bureaucracy shifted resources in directions believed to ensure a stable flow of research revenue (Morphew & Baker, 2001). The generation of revenue through faculty practices has always been a fundamental component of American higher education, as the teaching and academic research that make up the bulk of faculty time contribute large sums to university operating budgets. The difference between the universities of today and those of the later 20th century lies in the "breadth and depth" of such market-based behaviors (Slaughter & Rhoades, 2004). The additional funding through NRUF further incentivized status-seeking behavior related to the procurement of R&D funding and graduate education. Institutional and state expectations for research generation have expanded, while funds for research have remained flat (Stephan, 2012). Striving for research status is an expensive practice, and competition for stagnant resources has led to an increasing proportion of the cost of research activities to be picked up by institutions themselves (Ehrenberg, Rizzo, & Jakubson, 2007). This study was concerned with the prospect that ERUs would utilize tuition funding and state appropriations to support activities that advance their position within the field hierarchy related to research status. This academic drift in search of prestige is believed to underserve the demands of students while bringing about higher education systems that are less affordable and accessible.

Responding to the Research Questions

The field of American higher education situates universities within a variety of different sub-fields. ERUs simultaneously belong to the field of Texas higher education and are also members of the field of American research universities. NRUF is a state policy that taps into the desire of ERUs to belong to the elite sub-field of R1. Membership within various fields can often provide a complicated mix of goals and priorities, as is the case with state universities that are accountable to the public while also coveting status related to their position within the field hierarchy.

This study is concerned with ERUs' ability to meet specific metrics with regards to academic research and graduate education, while maintaining aspects of their historical missions related to undergraduate education. How did calls for prestige and status related to academic research align with demands for public accountability and efficiency? How did NRUF policy assist ERUs in achieving R1 status, and will this organizational change impact access to, and the quality of, undergraduate education? To appropriately address these concerns, my study was broken down into three separate research questions that address the effectiveness of the NRUF policy and its subsequent impact on undergraduate academic quality and access.

In order to evaluate the causal effect of NRUF, I utilized a DID design that makes use of longitudinal data to estimate the effect of the NRUF policy intervention. This statistical method is useful in determining the effectiveness of policy changes by analyzing trend lines between two groups of observations when one group is exposed to a policy intervention (NRUF), and the other group is not (CEM control). The intervention created an appropriate counterfactual timeline for the treatment group that estimated a causal effect of the treatment policy. In other

words, DID analysis allowed me to compare the average change over time in each outcome variable of my analysis for the treatment group, compared to the average change over time for the control group (Hillman, Hicklin Fryar, & Crespin-Trujillo, 2018; Kelchen, Ochs Rosinger, & Ortagus, 2019). A CEM approach to developing a control group of 28 universities from outside the policy environment of Texas provided an adequate comparison for the NRUF schools. The NRUF and CEM control groups were fairly comparable on most of the dependent outcome variables - of the nine outcome variables, only the means for doctoral degrees, net tuition price, and students of color were statistically different, meaning these groups were less comparable on these three parts of my analysis. These results are not altogether neglected, rather any interpretation of the results is done recognizing that any differences between the groups was due to pre-treatment institutional characteristics and not the NRUF policy intervention itself.

Question 1

My first research question was concerned with the impact NRUF had on ERUs' ability to meet various policy metrics related to R1 status. The specific questions of interest related to shared standards of practice pertaining to an institution's ability to generate external research expenditures and capacity for graduate education at the doctoral level. Results suggest that NRUF status mattered in relation to the production of doctoral degrees, but so did tuition and state appropriations. Being classified as an NRUF school predicted doctoral degrees, but it was not the policy intervention itself that explained the variance – it was the initial institutional characteristics that were required for these schools to be considered ERUs for the purposes of receiving funding through NRUF. As for federal R&D, state appropriations relative to enrollment

was the only significant predictor. These results indicate that the ability of ERUs to meet policy objectives has most to do with institutional capabilities and resources prior to the policy intervention, as well as their locations in some of the fastest growing urban centers in the US that influenced overall enrollment at these schools.

Question 2

My second research question was concerned with how NRUF changed the behavior of ERUs' decision-making processes in how they prioritize resources towards various institutional activities. It was speculated that dedicating more resources toward academic research and graduate education may require ERUs to cross-subsidize these activities from other aspects of the institution's mission, particularly activities concerning undergraduate education. How did NRUF change what ERUs dedicate towards the education of undergraduate students? Results suggest that NRUF universities improved the percentage of full-time faculty at a greater rate than CEM schools, yet it was a negative indicator regarding instructional expenditures. Total enrollment, tuition revenue, and state appropriations were all significant predictors of instructional expenditures, but ERUs contributed less to instruction than did members of the CEM group. One would think that spending less on instructional expenditures would lead to fewer resources for the hiring of full-time faculty, but ERUs spent almost $900 less per student than CEM universities even though they employed over 10% more of their faculty at full-time status. Though the DID variable indicates the NRUF policy intervention was not significant regarding full-time faculty hiring practices, the additional revenue associated with NRUF no doubt helped to mitigate some of the costs associated with academic research, and it appeared that these schools were investing in their full-time faculty in the process. The hiring of assistant

professors that have entry level teaching loads and research expectations would be one way to generate research and undergraduate quality (as measured by this study), though such appointments have traditionally been associated with higher operating costs. Whether this increase in full-time faculty is due to tenure track faculty positions with research expectations, or full-time lecturers that primarily focus on teaching, or both, is outside the scope of this analysis but would warrant further analysis.

For universities in this analysis as a whole, for every additional dollar generated per student through tuition, instructional expenditures would increase .34 dollars per student, meaning that two thirds of tuition increases do not go back into direct instruction costs. Prior research demonstrates that both the percentage of university research that is cross-subsidized through internal funds, as well as internal research expenditures per faculty member have steadily risen since the 1970s. Specifically, institutions rising to R1 status experience significant changes to their expenditure patterns, as they spend higher proportions of their internal funds on institutional support and research, both before and after reaching R1 status (Morphew & Baker 2004). Additionally, there is evidence that because the costs of academic research is subsidized through internal university funds at these institutions, stresses on instructional capacity require larger student/faculty ratios (Ehrenberg et al., 2007). This cross-subsidizing is only magnified at institutions that generate large portions of their operating budgets through tuition and fees, such as ERUs. Increases in Total Enrollment, Tuition per FTE, and State Appropriations per FTE demonstrate positive relationships with instructional expenditures for institutions in this study. Research is an expensive activity, and larger enrollments provide institutions with resources needed to achieve status within the field. But this is nothing new, as

demonstrated by the emergence of the field of American research universities through the creation of the AAU in the early 20th century. These 14 institutions are recognized as the first American research universities, and enrolled 20% of undergraduate students prior to World War 1. Though institutional size is not an indicator of prestige within the field of R1 universities, it provides the material and cultural resources needed gain status within the field hierarchy.

Question 3

Finally, my third research question was concerned with the historical role of ERUs as access points for those seeking a quality and affordable undergraduate education. Research universities, particularly rising R1 schools such as ERUs, spend proportionally more on administrative costs and less on instructional expenditures than their R2 counterparts (Morphew & Baker, 2004; McClure & Titus, 2018). ERUs generate large portions of their operating budgets from tuition and fees, leaving them more susceptible to cross-subsidizing components of their research mission with state appropriations and tuition revenue (McClure & Titus, 2018). As ERUs drifted towards a mission that placed a larger priority on academic research and graduate education, how would this impact the ability of these institutions to recruit and retain diverse student bodies? Results suggest that students at ERUs spent significantly less than their peers at CEM universities, yet the results for net tuition are less reliable because these groups were generally less comparable for this particular dependent variable. Average net tuition for public universities in Texas has historically been lower than the national average, even with the steep increases over the last 20 years.

Based on these findings, ERU students are paying an average of $3,732 less than peers at CEM control universities. State appropriations do not make up the difference at ERUs either,

as these funds represent smaller shares of these universities' core revenues than the national average. In the last 20 years, a greater share of the cost of higher education has been taken on by students, while population growth in Texas has also led to larger enrollments. Tuition deregulation in 2003, along with enrollment booms have allowed these institutions to raise the net tuition price, but still keep it lower than the national average even as they must cross-subsidize increasing emphasis on research. Every one additional student adds to the overall revenues, but being large has its advantages because institutions can operate at a scale that easily allows for the absorption of any additional cost to educate that student. For example, a small liberal arts college might struggle accommodating an extra 100 students, while such an undertaking would cost very few resources for schools the size of ERUs. This assists these schools with operating at a scale that continues to keep students costs lower than the national average, with a higher percentage of their faculty that are considered full-time, yet they spend less on instructional expenditures than the CEM group. But, there are limitations to enrollment growth as these schools average class size continues to get larger.

NRUF schools are also institutions that continue to get more diverse than the CEM group, yet the DID interaction term did not predict the enrollment of students of color suggesting institutional characteristics associated with NRUF status or being located in the Southwest explain this variance, and not the policy intervention itself. All but one of the ERUs is located in a fast growing, major metropolitan area. The strongest predictor on where a student will attend college is proximity to the student's home region (Chetty et al., 2014). The opportunities to attend a college close to home also varies greatly along lines of race and class,

with low income and students of color having fewer options available within their local communities (Hillman, 2014).

The DID independent variable that measures the average treatment effect, or the change in slope after the adoption of NRUF, was not statistically significant in any part of this study. This variable represents the interaction effect of NRUF status and Time as measured after the policy intervention. The collection of null findings for this variable suggests that single policy interventions do not matter as much as specific institutional characteristics and the overall policy environment. Universities with NRUF status were selected to become ERUs because they met specific characteristics and attributes that made them well position for obtaining R1 status. These cultural and material resources at the institutional level matter, as does how the overall state field prioritizes various aspects of higher education. Policy incentivizing universities' pursuit of research status is not the only thing that impacts institutional decision making. Tuition is lower at ERUs and on average they dedicate less instructional expenditures per student than the CEM control universities. They also derive smaller shares of their core revenues from state support, an attribute that makes them more similar to R1 universities than their CEM peers. A greater share of ERU core revenues is generated through tuition and fees, though the average net tuition price at these schools is much lower than the national average. ERUs make this work through large enrollments, with these revenues going on to cross-subsidize academic research (Morphew & Baker, 2004). As ERUs expand their research capabilities, full-time faculty and doctoral students can not only satisfy the need for individuals capable of conducting academic investigations, but also play a vital role in educating the increasing number of undergraduate students, though transitioning

to an R1 school has been demonstrated lead to larger student/teacher ratios (Ehrenberg et al., 2007).

Significance of Findings

A field analysis brings attention to ERUs' dual priorities - competing for position within the field of American research universities, while also remaining true to their historical mission as broad access institutions in the state of Texas. For ERUs, external research funding is a coveted resource, but it is also a means to achieving prestige associated with R1 status. Strategic action fields provide insight on the impact that state policy has on institutional decision-making when the dynamics of various fields may be at odds with one another. Put another way, ERUs are schools heavily reliant upon the revenue generated by undergraduate tuition and fees, a situation exasperated by stagnant state appropriations and increased calls for public accountability. Being an elite research university requires resources be directed towards academic research – a costly exercise in terms of both money and personnel. NRUF funding is designed to encourage ERUs to pursue an advanced research agenda, while the pursuit of research status takes place within a field governed by internal rankings, and institutional accountability measures that are political in nature.

Utilizing strategic action fields allows this study to conceptualize mission conflict – specifically the conflict between regional state universities dedication to access, versus the standards of excellence required of being an R1 institution. It does this while taking into account the overall conditions of the various fields of action. The concept of a field was first introduced by Pierre Bourdieu, who was primarily concerned with culture and power - specifically how dispositions, objects, or institutions, not only shape our understandings of the

world, but also serve as sources of domination (Swartz, 1997). Central to this concept is the struggle of individuals and groups for social distinction. For Bourdieu, power stands at the center of all social interactions, and it places actors within competitive status hierarchies in which these individuals and groups struggle in pursuit over valued resources. This action takes place within relatively autonomous fields of action where actors interact with others - through competition and cooperation - in an effort to gain advantage by securing various forms of capital.

In the case of NRUF, ERUs competed for a variety of economic, cultural, and symbolic resources in order to advance their position within the hierarchy of American research universities. Increasing external research revenues was required by NRUF, but this metric also represented a standard of excellence within the field of American research universities. Placing more emphasis on graduate education, specifically doctoral students, is another required component of NRUF and is a cultural good produced by research universities. Finally, the legitimation that R1 status provides institutions serves as a symbolic form of capital – it functions as a social relation of power between ERUs and other institutions, and it serves as a valued resource within the field of American research universities.

But actors do not just belong to one field, they are interlocked between a variety of fields that have their own boundaries, resources, and hierarchies. In the case of ERUs, the state exerts a tremendous amount of pressure on these institutions to be accountable to the public through a variety of other policies focused on institutional metrics. This is where Bourdieu's reflexive approach to social science provides insight. It aims to rectify the agency/structure problem within the social sciences: Is human action – by either individuals or groups –

determined by culture or social structures, or do actors act according to their own set of particular motives? His theoretical approach explains human action as a dialectical relationship between agency and structure. ERUs are enticed by the symbolic capital associated with R1 status – along with the various economic and cultural resources that accompany elevated status within the field of research universities. Institutional decision making is influenced by external factors such as the NRUF intervention and other policies, but also by internal forces at institutions, often dictated by the various stakeholders that universities are responsible to. Ultimately it is about leveraging a variety of resources to pursue advantage within a variety of fields.

Null findings for the DID interaction term suggest the policy intervention for each variable in my analysis had no measurable estimated effect. NRUF status – or being classified as an ERU in Texas – was significant for five of the nine dependent variables of interest in this study. Specifically, it was a positive indicator for the production of doctoral degrees, full-time faculty ratios, and the percentage of undergraduates that identified as students of color. NRUF classification was a negative indicator for instruction expenditures per FTE and net tuition price. ERUs, when compared to their counterparts at the control universities, charge a lower tuition rate and dedicate less money towards instruction, while also having a higher percentage of instruction staff being full-time faculty.

The overall policy environment of Texas and the institutional characteristics of ERUs positioned these schools to be successful at meeting policy objectives while maintaining academic quality and accessibility. Tuition continues to contribute larger and larger shares of operating budgets per student nationally, but this is especially true for ERUs in Texas. While

students pay less with regards to net tuition, this particular revenue stream accounts for larger shares of university budgets at NRUF schools. Yet, this analysis indicates that two thirds of tuition increases do not go back into direct instruction costs for all schools in the analysis. This represents two core values of American higher education: entrepreneurialism and autonomy. State appropriations and federal funding are relatively new concepts in the long history of American colleges and universities. Fees generated through enrollment have always made-up large portions of higher education operating budgets. ERUS rely greatly on tuition for large portions of their budgets, and as these universities pursued research status they could absorb the additional expenses by growing enrollments, raising tuition, and cross-subsidizing from other aspects of the university mission.

NRUF schools greatly increased the percentage of full-time undergraduate faculty while spending less in instructional expenditures. These expenditures are not just made up of faculty salaries, but a variety of other expenses such as departmental research, instructional technology, and public service. Whether the increase in staffing favors tenure or non-tenure track appointments is unknown. It could be argued the institution is saving money by hiring fewer non-tenure track faculty instructors, but that seems unlikely given the metric of "faculty excellence" that is part of the NRUF policy. To be successful as a research university requires faculty who conduct such activities. Future research could analyze whether these appointments are tenure track, and if so, how are these hiring practices impacting instructional expenditures?

Student tuition tends to make up larger shares of operating budgets for ERUs, yet tuition at these universities was far less than the comparison group. These prices have increased dramatically in the past two decades, though this is due less to NRUF policy than to

the overall political environment of Texas that emphasizes higher education as a private good. NRUF schools also enrolled nearly 20% more students of color than the comparison group, but this is likely do to their geographic position in one of the fast growing southwestern states.

The DID interaction term that estimates the impact of the NRUF policy was null throughout this study, yet classification as an ERU based on specific institutional characteristics indicates that enrollment, location, and resources contribute to academic research and graduate education, while maintain academic quality and access.

Policy Recommendations

Because the primary outcome variable of interest in this study - the DID policy intervention interaction term - was null throughout each part of my analysis, specific policy recommendations would be difficult to provide. This does not mean that the policy itself had no impact, but it did not provide any measurable causal effect associated with meeting the metrics associated with R1 status, or any measurable impact on undergraduate access and quality. But given the amount of resources that are required of the policy, and the general lack of evidence of its positive or negative effects, the results of this study indicate that those resources would be more wisely targeted elsewhere. Cultural and material resources, along with the overall state policy environment tend to matter most, and not even NRUF was able to transcend those characteristics. NRUF status - being an ERU in the state of Texas - was a significant indicator for a variety of outcome variables in this analysis and represents two separate, but interrelated conditions: First ERUs exist within the greater social and policy environment of Texas, and second this group consists of institutions that were selected to receive the policy intervention because they were well situated to earn R1 status due to specific characteristics related to

research. Concerning the first point, NRUF is just one Texas policy directed at incentivizing research activities at public universities. The political environment of Texas is itself a field, and various policies within these boundaries influence university decision making. For example, recent research demonstrates that the Texas Research Incentive Program (TRIP), the policy that initially created the institutional grouping of ERUs and provides matching funds for any private gifts a university receives, is associated with increases in private gifts and state grants (Hu et al., 2020). The adoption of TRIP was positively associated with ERUs increasing revenues from private gifts, suggesting that such policies are ways for policymakers to leverage public funds to increase private donations at these institutions.

The metrics used to determine which universities could be considered ERUs under TRIP favored institutions that were well positioned to obtain R1 status. Whether the funding provided through NRUF made any significant difference in the ability of these institutions to obtain R1 status remains undetermined, but it is important to remember that the success of ERUs in meeting the objectives associated with R1 status is not about just one policy, but the overall political environment of Texas and specific institutional characteristics that enable certain universities advantages as they look to increase their status related to academic research.

Future Research

This study intended to shed light on the impact of NRUF on ERUs' movement into the subfield of American research universities known as R1, and to understand the impact that such status seeking has on undergraduate education at these institutions. During the course of this study, six of the seven ERUs "emerged" into Tier One status, and the NRUF policy has over 10

years of influence on institutional decision making. Since the implementation of NRUF an additional Texas university has received approval to become an ERU: Texas State University at San Marcos. How states prioritize and leverage specific aspects of higher education, as well how resources are allocated, should continue to be a focus of higher education research. In the case of research universities in Texas I have identified several areas of future research related to how academic research relates to overall university missions.

My study demonstrated that there was a positive association between NRUF status and the number of doctoral degrees produced each year, but what is not clear is the specifics on the types of disciplines and majors of these doctoral students. Future research should drill down into the types of doctoral degrees produced at ERUs by discipline as this will give further insight into how these institutions are meeting objectives related to graduate education that plays a vital role in American research universities. Additionally, the relationship between the number of federally sponsored graduate assistantships and discipline specific doctoral degrees could be explored, as this will provide insight into how ERUs utilize graduate degree production to assist in faculty research. Academic research is an expensive and time intensive process, and the use of qualified graduate students is essential to these activities.

The third part of this study was concerned with how transitioning to R1 status would impact the affordability and access to ERUs. NRUF classification demonstrated a positive association with an undergraduate student body consisting of a higher percentage of students of color than the CEM universities. This dependent variable lumped student demographics into two distinct categories: white and non-white students. This was primarily due to several categorical changes made by IPEDs pertaining to race/ethnicity throughout the years of this

study. With so many diverse perspectives included in the non-white student category, however, it would be beneficial to better understand how status seeking at ERUs impacts specific racial and ethnic groups, particularly Black and Latinx students. These students are historically underserved by American higher education institutions and represent populations that are quickly growing in the state. Our higher education student populations should aim to be representative of the state's population as a whole, so further research should explore the impact that striving for research status has on groups that are specifically underserved in higher education.

As mentioned previously, it is unknown if the increase in full-time faculty at Texas ERUs is made up of primarily tenure or non-tenure track faculty lines. Tenure track faculty appointments require research as a major responsibility, while non-tenure track faculty are primarily concerned with teaching undergraduate students. Further research should explore how ERUs are structuring their faculty lines to understand if rises in the percentage of full-time faculty is directly related to increasing the number of instructional staff that also have research responsibilities.

Finally, this study determined that for every one dollar increase in tuition per FTE undergrad led to only a 34 cent increase in instructional expenditures per FTE. Further research is needed to understand what is being prioritized at ERUs, specifically focusing on the types of activities being cross-subsidized by tuition and fees. Prior research has demonstrated that institutions emerging into the R1 subfield of American research universities have higher administrative costs, larger student/faculty ratios, and must cross-subsidize research activities through internal budgets. This is particularly troubling at institutions that generate large

portions of their operating budgets through tuition and fees, and receive a smaller share of their core revenues through state appropriations than the national average.

Final Thoughts

I selected the topic of this study because of my interests in organizational change and institutional decision making. The foundation of my theoretical framework for this study - the concept of strategic action fields – emphasizes how groups of actors organize resources to vie for advantage within constructed social orders. Competition for fiscal resources and prestige makes the field of American higher education similar to many other types of fields, yet colleges and universities provide a variety of public goods that benefit communities on a range of levels. The private/public role of higher education and the fact that universities exist within multiple fields simultaneously, demonstrates how these institutions are responsible to a variety of stakeholders. The calls for status and prestige seeking influence institutional decision making, while at the same time these universities are asked to be accountable to the public regarding quality and affordability.

When I began this study I expected to see ERUs spending less on instruction and having higher rates of part-time faculty, as tenure-track faculty spent more time focusing on research. This study provided some evidence that ERUs spent less on instruction per student than their CEM peers, and amongst all institutions in the analysis every dollar increase in tuition per student resulted in only a 34-cent increase in instruction per student. This does not mean that money went to directly cross-subsize academic research, rather undergraduate tuition makes up large percentages of overall operating budgets for public doctoral universities whose relative position in the Carnegie Classifications exist on the horizon between R1 and R2 status.

This study also demonstrated that classification as an ERU predicted higher percentages of full-time faculty during the course of the analysis, leading me to wonder if there is a converging of interests between undergraduate instruction and academic research for ERUs, in that newly hired junior tenure-track faculty are an integral part to both an institutions research enterprise, and a bulk of their teaching responsibilities rest with educating undergraduates. If this is the case, ERUs can provide real value to determined undergraduate students as it provides opportunities for the Teacher Scholar model to occur: where faculty bring insights from their research into undergraduate classrooms (Kuh, et al.,2007). This also can provide opportunities for undergraduate students to be involved in faculty led research, another advantage that might not be available on the same scale at other institutions that are not pursuing research status as aggressively as ERUs.

I end this study with an anecdote from my current professional role as an Academic Counselor for an Honors College at one of the ERUs represented in this study. I was attending a recruitment event for "high-caliber" undergraduates - FTIC students who were awarded large merit-based scholarships. Many of these students received similar awards at other public universities around the state, so this on-campus event (pre-COVID) was meant to demonstrate all of the advantages and opportunities available at our campus in hopes of wooing these individuals. The president of the university addressed the students and their families and one of the first things discussed was our school being a Tier One Research university. During the closing social hour, I was talking with a student and their parents and they expressed enthusiasm about the university's research designation: "We are choosing UNT because it is a Tier One university." Status is not something that only university presidents care about, it is

something deeply engrained within the culture of higher education. The distinction associated with high status is alluring to a variety of groups within higher education: attending a prestigious college for undergrad should lead to better graduate school and professional opportunities; working at a research university provides status to faculty within their discipline; and being an R1 school represents a university's ability to generate external expenditures, while also providing advantage in recruiting graduate and undergraduate students. None of these particular groups are at odds with one another, and these efforts could be seen as interrelated. But due to being embedded within multiped fields simultaneously, distinction for one group does not necessarily lead to distinction for the others.

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