DISSERTATION

RELATIONSHIPS BETWEEN ECONOMIC, POLITICAL, DEMOGRAPHIC, AND

EDUCATIONAL CLIMATE VARIABLES AND STATE APPROPRIATIONS TO

RESEARCH I UNIVERSITIES

Submitted by

Rebecca L. Frantz

School of Education

In partial fulfillment of the requirements

For the Degree of Doctor of Philosophy

Colorado State University

Fort Collins, Colorado

Summer 2021

Doctoral Committee:

    Advisor: Linda Kuk

    Vickie Bajtelsmit
    Gene Gloeckner
    Rodney Hughes

ABSTRACT

RELATIONSHIPS BETWEEN ECONOMIC, POLITICAL, DEMOGRAPHIC, AND

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Higher education appropriations have been a widely studied topic by researchers and became more of a concern after the Great Recession. Assessing factors influencing appropriations to Research I institutions is of particular interest as they possess substantial enrollment capabilities but can create great inequities and access issues without state subsidization (Weerts & Ronca, 2006). Two measures of appropriations were crafted using data from the Integrated Post Secondary Data System (IPEDS) for two year and above institutions from 2010 to 2015. Using fixed effects modeling, a series of twelve independent variables across four different categories (economic, political, demographic, and educational climate) were evaluated for predictive power on appropriations. Submodels where constructed on a set of the sample only including Research I institutions.

A number of statistically significant effects on appropriations were found in the results and were largely consistent with findings in past research (Tandberg & Griffith, 2013). The largest statistically significant R^2 value was found in *need to pay* overall model. When focusing on this research project's focus evaluating factors influencing appropriations at Research I institutions both Income Disparity (β=-161.951, *p*<.05) and Citizen Ideology (β=85.50, *p*<.01) stood out in the results with notable effect sizes. Personal income, citizen ideology, and tuition were significant in three of the four regression models.

ACKNOWLEDGEMENTS

First, thank you to my partner Joey for feeding me, taking the extra dog walks, and letting me sit in silence for hours when I needed to. Thank you to my kiddo for appreciating me working towards something big and understanding my changing priorities. I love you both so much. I give much gratitude to my doctoral committee. First, to my advisor Linda Kuk. She has been a consistent presence during my entire doctoral career—patience when I needed it or the push when that's what was called for. Thank you to Gene for the extra hours of practice and counsel, to Rodney for the specific expertise and years of discussion on this topic, and to Vickie for the outside economic perspective. All views were necessary to guide my work to this place.

I give much gratitude to my friends and family, especially Cady, Jackie, Devon, Charlotte, Katie, Aunt Julie, and Aunt Beth.

Then lastly, and perhaps where I want to find my most sincere words, to my care teams. A PhD is always an accomplishment but a PhD post-brain injury and during a pandemic takes an investment from professionals who are earnestly committed to an individual's recovery. In the truest way, I could not have finished this work without their support and commitment to my health. Dr. Louie, or Sam as he genuinely prefers, gave me a talk about looking in the mirror and finding a reason each and every day to keep going. While I am not a medical doctor and I am not in the business of saving lives I work to fund the next generation of individuals who can. Thank you to the individuals below who show up for me and every other patient with whom they interact. You don't treat illnesses. You treat people who do great things.

Dr. Sam Louie (and the Celestes!)	Dr. Bradley Sanville
	Dr. Lindsey Malik
Shana Urban, DPT	Dr. Jacqueline Theis
Dr. Heidi McNulty	Dr. Mustafa Ansari

DEFINITIONS OF TERMS

Appropriations: the authorization of funds from a specific place to directed to another specific agency in order to spend or meet their obligations. *Appropriations* also typically contain a unit of time associated with the funding (State of California Department of Finance, 2018).

Allocation: a less prescriptive in nature with it only being defined as a distribution of fund or an expenditure limit for a unit or function (State of California Department of Finance, 2018).

Discretionary spending: Spending set by the annual appropriations process determined by the legislature. The majority of state appropriations to higher education comes from the discretionary portion of the state budget meaning by law the amount of state support to higher education is flexible and not legally mandated (Mandal, 2007, p. 140).

Mandatory spending: components of the budget not determined by the appropriations process but rather via pre-existing laws, most commonly recognized as entitlement programs. Examples of mandatory spending include funding public health care or pensions based on the number of individuals who qualify. (Mandal, 2007, p. 278).

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CHAPTER 1: INTRODUCTION

Higher education provides an opportunity for upward mobility. The affordability of an institution is connected to economic mobility by providing an education at a reasonable cost to the student. State appropriations to higher education serve to drop the net price of college education to in-state students (Chetty et al., 2014). Many authors have cited the social relevance of funding higher education due to funding's relationship to quality and accessibility (e.g., Kane, Orszag, & Gunter, 2003; Koshal & Koshal, 2000; Heller, 1999; Volkwein, 1989). Research I institutions are not known for being accessibility and equity focused which draws importance to understanding what variables or conditions influence state funding provided to research I institutions (Weerts & Ronca, 2006).

In a recent report from the Institute for Higher Education Policy (Mugglestone, Dancy, & Voight, 2019), the authors found only six flagship institutions to be affordable for families not coming from high-income. This metric is alarming not only because so few institutions qualify but also because the affordability concern applies to low and middle income families. Two recommendations from this report relevant to my research is the return of state investment as well as the re-direction of state merit-based aid programs to students with financial need. 41 out of the 50 states have appropriated less per student than they did before the Great Recession (December 2007 – June 2009). More alarming is that 17 of the states have dropped those appropriations by over 20%. The impacts of research I institutions being unaffordable are far-reaching. While doctoral institutions with the highest research activity represent only three percent of higher education institutions they host nearly 20% of college enrollees (Indiana University Center on Postsecondary Research, 2015).

Many reasons, such as need to support an aging Baby Boomer generation, corrections, K-12 education or other social programs have been cited as reasons for decline in state support to higher education. When evaluating which institutions can 'afford' reductions in state support, public research institutions are typically at the top of the list because of other revenue streams such as research dollars and alumni giving (Weerts & Ronca, 2006). However, Vedder (2007) explains how the increase in revenue streams and subsidization channels at larger research institutions make it more challenging for institutions to develop an accurate financial plan and therefore, accurately price the cost of education.

Appropriations decisions have significant ripple effects in institutional planning as well as college choice and accessibility. My hope in applying a critical accounting lens is that this research will de-privilege knowledge. The availability and understanding of these relationships can provide freedom and power to administrators when financially negotiating as well as families when voting and exploring higher education.

Understanding what influences appropriations to higher education is critical to institutions as state backing to public higher education has dwindled over time. Across the United States cuts to higher education began during recessions in the 1980s and continued through the 1990s (Schuh, 1993). Appropriations declines continued with support per student dropping to $650 by fiscal year 2004 (Jenny & Arbak, 2004). State support to higher education was again hit by the economic downturn of 2008 and many states were not able to return to pre-recession levels many years later (Mitchell & Leachman, 2015). Continuous declines without reprieve have created a challenging situation for institutions. Tightened budgets have forced increases in tuitions and barriers to enrollment which are unpopular decisions in the eyes of the public and state officials (Serban & Burke, 1998). The reduction in subsidy for in-state students

via appropriations have forced institutions, including state flagships, to have an identity shift as they are forced toward a more privatized financial structure (Gose, 2002). Large public institutions who have in their mission to support the students and economies of their state through education, research, and often service struggle with how wide their doors can be open if the tuition is not affordable. Decreasing state support further contributes to the idea that higher education is a private good versus a public good with students and families being more responsible for the cost of attendance (Selingo, 2003).

Changes in Appropriations

State appropriations to public higher education are an essential component in reducing the cost of a college education for state residents. While institutions, especially research institutions derive funding from many resources such as tuition, research, private gifts, and auxiliary services, money from the state has been a way of subsidizing public education for students (Maria & Bleotu, 2013). Therefore, understanding trends associated with appropriations helps highlight potential issues with college affordability. During the mid-2000s there were significant declines in appropriations but the declines halted or slowed in 2013. During that time community college and public master's institutions were less impacted than research I institutions which saw a 28% decline between 2008 and 2013. While the one year decline of nearly two percent in 2013 was the smallest since the declines began the funding, still had not returned to post-recession levels. Relevant to the particular questions in this study, Jacquette and Curs (2015) found declines in appropriations led to increases in nonresident freshman enrollment, particularly at research universities. The changes in enrollment often occur because more affordable options are available for in-state residents and nonresidents are required to buoy revenue.

There are public tensions between the cost of education and state governments. Public doctoral institutions demonstrated reduced percentage increases in costs (2.4%) between 2017-18 to 2018-19 compared to master's (2.7%) and bachelor's (3.9%) institutions (The College Board, 2018). Between increasing costs as well as declining state support the state subsidized portion of education related costs at research I institutions dropped from 56% to under 38% between 2003 and 2013 (Delta Cost Project, 2013). While individual states have experienced a variety of individual patterns very few states saw funding increases and researchers have found those increases to be unpredictable.

The funding 'roller coaster' is a commonly used metaphor to describe education appropriations in some states. This volatility brings to light the stress in the appropriations process and how research outcomes can help improve understanding of unpredictable funding climates (Doyle, 2013). A less abrasive metaphor, first posed by Hovey (1999), describes higher education as the 'balance wheel'. In strong economic times higher education tends to see increases in state appropriations with the opposite happening in economic downturns. Historically, Adams (1977) and Humphreys (2000) highlighted the impact of business cycles on funding higher education compared to other state budget areas. The effect is most noticeable when examining funding per FTE (full time equivalent) as enrollment trends are also tied to business cycles (Weerts, Sanford, & Reinert, 2012).

While business cycles and the state of the economy are important another important piece of the puzzle is recovery. Because of higher education being largely a discretionary item in the budget, appropriations to higher education do not tend to recover after economic downturns until there has been enough time passed and stabilization to restore funding to mandatory budget items (Weeden, 2015). A changing economy and prior research provide a positive indication for the

review and inclusion of economic variables as a specific focus in continued higher education funding research (Delaney & Doyle, 2011).

Public vs. Private Good

Public research universities hold a particularly challenging place in the higher education market. These institutions have had to resort to tuition hikes to compete with private research universities as well as negotiate for appropriations even with a greater mix of revenue streams (Yudof, 2002). In addition to the burden of increase tuition, some critics of privatization caution against the increase reliance on private money due because of increasing private interest (Morphew & Eckel, 2009).

Research universities certainly have a private benefit to individuals via educational opportunity earnings. However, institutions must work to share the social benefits of higher education, especially from research universities. These institutions contribute significantly to the public via research as well as serving as places of employment. Additionally, graduates from the institutions are able to earn better incomes which contributes to the tax base and stimulates the economy (McMahon, 2009). Research universities also contribute to the academy by creating more scholars via doctoral degrees and research opportunities. This innovation serves a national interest as well as stimulates the concept of innovation in an economy (American Academy of Arts & Sciences, 2015). The governance and financial institutions supporting public research universities have begun to break down and institutions must find a way to share their public contribution and garner support in public finance and public opinion (Fethke & Policano, 2012). In order to redirect the trend toward privatization, researchers and need to explore political relationships as well as other environmental drivers (Fryar, 2012; Kwiek, 2017. This kind of research can provide understanding to higher education administrators to be more prepared for

the budget process, better serve their constituency, and engage in productive conversations with legislatures and advocacy groups.

Statement of Research Purpose

The purpose of this study was to explore the relationships between economic, political, demographic, and educational variables and appropriations to public research I institutions. These institutions are doctoral granting institutions with the highest research activity as defined by the Carnegie Classification system (Carnegie Foundation for the Advancement of Teaching, 2015). The goal is to compare differences across political environments in order to expose factors that may be influential in the appropriations process. The power of this information can contribute understanding to administrators navigating the appropriations process and families voting and making college choices. Public doctoral universities are of particular interest as they become priced out of public support per FTE and have to consider long-term financial planning. Recognizing previously done research on this problem, I will be investigating similar variables post-The Great Recession to add an evaluation relevant to the current social, political, and economic climate. Appropriations will be studied on a need to pay and an ability to pay basis. This is to say that variables will be assessed for their predictive power when it comes to fulfilling demand for higher education (need to pay) as well as acknowledging the constraints of a tight state budget (ability to pay).

Research Questions

The following twelve research questions were developed to guide the study of appropriations to public research I institutions:

1. To what extent do economic variables predict higher education appropriations as a need to pay measurement?

1.1. To what extent does unemployment predict state appropriations measured per FTE?

1.2. To what extent does personal income predict state appropriations measured per FTE?

1.3. To what extent does income disparity predict state appropriations measured per FTE?

2. To what extent do political variables predict higher education appropriations as a need to pay measurement?

2.1. To what extent does legislative professionalism predict state appropriations measured per FTE?

2.2. To what extent does party competition predict state appropriations measured per FTE?

2.3. To what extent does citizen ideology predict state appropriations measured per FTE?

3. To what extent do demographic variables predict higher education appropriations as a need to pay measurement?

3.1. To what extent does race predict state appropriations measured per FTE?

3.2. To what extent does population in rural area predict state appropriations measured per FTE?

3.3. To what extent does population aged 65 and over predict state appropriations measured per FTE?

4. To what extent do educational climate variables predict higher education appropriations as a need to pay measurement?

4.1. To what extent do merit-based state grant programs predict state appropriations measured per FTE?

4.2. To what extent does tuition predict state appropriations measured per FTE?

4.3. To what extent does educational attainment predict state appropriations measured per FTE?

5. After considering covariance, to what extent do remaining economic, political, demographic, and educational attainment variables collectively predict appropriations as a need to pay measurement?

6. Are there differences between significant factors (economic, political, demographic, and educational attainment variables) and their predictive relationships with appropriations as a need to pay measurement when comparing all public institutions to research I institutions?

7. To what extent do economic variables predict higher education appropriations as an ability to pay measurement?

7.1. To what extent does unemployment predict state appropriations measured as a share of the state budget?

7.2. To what extent does personal income predict state appropriations measured as a share of the state budget?

7.3. To what extent does income disparity predict state appropriations measured as a share of the state budget?

8. To what extent do political variables predict higher education appropriations as an ability to pay measurement?

8.1. To what extent does legislative professionalism predict state appropriations measured as a share of the state budget?

8.2. To what extent does party competition predict state appropriations measured as a share of the state budget?

8.3. To what extent does citizen ideology predict state appropriations measured as a share of the state budget?

9. To what extent do demographic variables predict higher education appropriations as an ability to pay measurement?

    9.1. To what extent does race predict state appropriations measured as a share of the state budget?

    9.2. To what extent does population in rural area predict state appropriations measured as a share of the state budget?

    9.3. To what extent does population aged 65 and over predict state appropriations measured as a share of the state budget?

10. To what extent do educational climate variables predict higher education appropriations as an ability to pay measurement?

    10.1. To what extent do merit-based state grant programs predict state appropriations measured as a share of the state budget?

    10.2. To what extent does tuition predict state appropriations measured as a share of the state budget?

    10.3. To what extent does educational attainment predict state appropriations measured as a share of the state budget?

11. After considering covariance, to what extent do remaining economic, political, demographic, and educational attainment variables collectively predict appropriations measured as appropriations as an ability to pay measurement?

12. Are there differences between significant factors (economic, political, demographic, and educational attainment variables) and their predictive relationships with

appropriations as an ability to pay measurement when comparing all public

institutions to research I institutions?

Understanding Processes

State Budgets

Appropriations to higher education, the dependent variable in my research question, is a

component of the state budget and like other budget components it is a part of a budget request

and budget cycle. Below I will briefly describe budget components, processes, and cycles in

order to highlight the political nature of appropriations as well as provide foundational

knowledge.

Budget assembly and process. An important component of a state budget request is

understanding how program leaders must assemble and present their budgets to the state.

Budgets are typically prepared in five ways with very few states dabbling in a sixth

method, zero-base budgeting (NCSL, 1999).

1. Thirty states use *incremental budgeting* where explanation is only needed for changes

   in funding compared to recent years.

2. A dozen states employ *program budgeting* which breaks funding requests into

   activities which often creates a more digestible picture for the legislature and governor

   when it comes to policy implications and aligning funding with goals.

3. *Line-item budgeting* is a more focused and detailed approach to budget

   development which breaks out budget items based on objects and authorization.

4. *Performance budgeting* which is closest to program budgeting aligns funding to

   specific program goals set in prior and current year cycles.

5. As of 2015, only three states used *performance based budgeting* for the entire budget

   but many states have piloted performance funding or implemented it within specific

programs (NASBO, 2015).

6. Finally, a few states have experimented with *zero-base budgeting* which is where

   budgets are assembled without consideration for prior year budgets with all spending

   requiring justification (NASBO, 2014).

Outside of special and urgent conditions, all but one state (Vermont) must pass a balanced

budget (NCSL, 1999). Because of the balanced budget requirement, the focus of the budget

process tends to be the items from the general fund going to discretionary items. Another

element of the state budget process different from the federal budget is the ability for governors

to have a line-item veto. Most states allow for line-item veto but there are also provisions for the

legislature to overrule a veto which make party alignment within the state government important

(NCSL, 2008). This element of the budget process has clear implications for the timeliness of

the budget working through the budget cycle as well as hearing and negotiations before the

budget reaches the legislature for approval or governor for signature (NCSL, 2018).

   Budget cycle. While many individuals think of budgets within the framework of opening

and closing the fiscal year there is significant activity between those benchmarks. In July and

August budget guidelines are sent to agencies and through November agencies submit and

review their requests with the executive branch of the state government. By the end of January

the governor submits the state budget request to the legislature. There may be extensions when

new governors are taking office or if there is a change to the legislative session calendar.

Between February and May the legislature will hear from many of the agencies within the state

budget regarding their request for allocation or appropriation. In higher education this is

typically where there is news surrounding institutional leaders visiting the state capitol for

appropriations hearings. Pending the timelines and schedule for the state, most states will pass

their budgets between March and June of the fiscal year. Most states only require a majority vote

to pass the budget but Arkansas, Louisiana, Nebraska, and Rhode Island have majority percentage requirements to pass the budget to the executive office. Once the budget is approved, state budget officers will work to execute the budget through contracts, accounting, auditing, and other cash flow measurements. There are a handful of states that have fiscal years outside of the typical July-June schedule (NASBO, 2015). While the budget schedule looks predictable and repetitive between 2002 and 2017 at least 25 states did not have a budget in place for the start of a new fiscal year. A late budget is more likely in times of recession or financial strain. The incidents of late budgets increased post-2007 which created strain for agents within discretionary budget items such as higher education (MacKellar, 2017).

Background of Recent Appropriations Issues

Recent Economic History of Higher Education Appropriations

Across all states, public spending on mandatory and discretionary items has increased. (Kearney, 2018). The increase in spending is largely due to increasing tax revenues. Most of the revenue collected by the state is from taxes which makes it important to understand the connection between unemployment, income, and appropriations to higher education. The relationship between appropriations and income is bidirectional in the sense that income funds taxes toward appropriations and appropriations support reducing the price of higher education. This bidirectional relationship is important and specifically why I am taking a critical approach to studying appropriations. One of the biggest drivers to the expanding wealth gap, especially the racial wealth gap is achieving a college education. While college achievement rates have improved across some underrepresented populations (i.e. racial minorities, first generation students) (Zinshteyn, 2016). There is also research which highlights families who spend more on education have increased long-term earnings (Shapiro, Meschede, & Osoro, 2013; Pfeffer, 2018). In 2017 the Institute for Higher Education Policy released a report indicating as many as

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95% of college are unaffordable for low-income families (Matthews, 2017). The affordability index used was developed by the Lumina Foundation and took into account student employment, savings, and family contributions (Lumina Foundation, 2015). Because of the inclusion of a family's ability to save, family wealth versus just income has come to the forefront (Braga et al., 2017).

Appropriations, wealth gap, and institutional type are all connected and there are important differences in student success associated with appropriations. Each $1,000 of state appropriations per FTE is associated with a one percentage point increase in graduation rates among research institutions (Zhang, 2006). While some states has focused on community colleges as accessibility focused institutions many states support research institutions at greater rates per FTE (McLendon, Mokher, & Doyle, 2009). The relationship between funding decisions and education creates a connection between politics, the wealth gap, and higher education. Furthering the concern, research indicates politicians respond more readily to higher income populations (Flavin, 2012). These trends make it increasingly important to study how wealth and politics impact appropriations because without study or interruption the problem is likely to perpetuate.

Recent Political History of Higher Education Appropriations

Higher education's time in the political limelight has only increased over the past decade. The increase in attention can be associated with public finances as well as conceptual differences in how the political parties view higher education. An important question in the political struggle within higher education is considering how much policymakers think their state will benefit from higher education (Delaney & Doyle, 2011). In recent years, Republicans have shifted their view of colleges as problematic but understand their importance in workforce preparation while Democrats have consistently view higher education as an important part of personal and

intellectual growth (Fingerhut, 2017). While the values of higher education differ, both parties have increasingly started to say the United States system of higher education is heading in the wrong direction. Republicans tend to be more concerned about the academic environment and professors bringing views into the classrooms while Democrats are more concerned with the cost (Brown, 2018). This aligns with a growing anti-elite sentiment and view of education the world has seen in other nations and during other time periods (Judis, 2016). It is likely that the increase in income inequality in addition to the experience of the Great Recession increased political polarization and that polarization is becoming more apparent in higher education (McCarty, Poole, & Rosenthal, 2016). Research universities hold a significant amount of political economy given the funding, governance structure, contributions to economy, and personal connection with their students and alumni (Lowry, 2007). Because of this it is important to consider politics in concert with other economic and social variables when exploring funding to higher education.

Demographic History

When discussing the connection between politics, economics, and higher education funding it is imperative to include demographic variables such as race, gender, and age in the discussion. Isabel Sawhill, an economic scholar out the Brookings Institution, stated, "Education is the quintessential way in which people move beyond the circumstances of one's birth." However, systemic oppression has created barrier for access to and successful engagement in education at many levels for people of color (Alford, 2016). The outcome of the Great Recession has made debt disproportionately problematic for millennials of color as well as working mothers (Cruz-Cerdas, 2017). This calls to question whether education truly is the great equalizer. Democrats focus on accessibility and equity within education higher education has been forced to offer more reasons for public support than individual circumstances often assigned at birth (Martin, 2017). The question how the public should fund higher education is

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often connected to the educational climate of the state and further discussion of public versus private good.

Budgets Meet Appropriations Issues

Due to the strong connection and changing funding climate, policymakers have worked to create guidelines and recommendations for improving the budgeting process as it relates to higher education. Some of these guidelines have even turned into policy recommendations. Exploring the relationship between policymakers, state budgets, and appropriations to higher education exposes important trends and perspectives to consider. In 2013 the National Association of State Budget Officers released an analysis of higher education finance. Policy recommendations in this report included continuing to move toward performance funding with a focus on retention and graduation, adjustments to need-based aid, and shifts in institutional funding of coursework by undergraduate and graduate levels (NASBO, 2013). Performance funding is becoming more popular and many states have found ways to begin implementation. However, other recommendations would require a significant amount of cooperation and increased accountability. Allowing policymakers to recommend changes to institutional accounting also creates a complicated space where the legislature is providing very specific instruction to university administrators (Kelderman, 2013). The report also discusses an important communication disconnect between higher education advocates and policymakers which highlights the importance of studying the political relationship between appropriations to higher education and the state government (Lederman, 2013).

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Delimitations

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This study was delimited by needing to choose institutions within states with valid, comparable data from the research time period. This study examined public research I

institutions in the United States, as defined by the Carnegie classification system (Carnegie Foundation for the Advancement of Teaching, 2015). In this classification research I institutions are doctoral granting universities with at least 20 research or scholarly doctoral degrees (not professional degrees) with the highest research activity. Finally, the time period included in the analysis spanned the 2007-2008 academic year through 2015-2016. Not all states had institutions in that classification or a consistent legislative structure. Some institution Carnegie Classifications changed during the study time period. More details are provided in the population definition in Chapter 3.

Limitations

The most significant limitation to the study was reducing the population to states and institutions with research I institutions. Further reducing the population, in order to be included in the institutions in the analysis the university had to maintain the same Carnegie classification through the entire time period of the study. Nebraska was removed due to the political structure of their government. It is a unicameral structure. Additionally, because this research focuses on research I institutions and the results cannot be generalized across states and other institution types.

Significance of the Study

Changes in higher education appropriations can be difficult to unpack and understand. This research will build upon prior research by revisiting connections between appropriations and economic, political, demographic, and educational climate variables. My study will bring additional novelty to the body of research by focusing the conversation on public research I institutions which have been increasingly privatized. The research provides further significance by evaluating appropriations post The Great Recession and during a tumultuous and notorious

presidential campaign. Finally, unlike other appropriations research, this work will be framed, constructed, and discussed using critical accounting theory.

<div align="center">**Researcher's Perspective**</div>

For my dissertation I am approaching my research with the critical accounting theory framework applied to a quantitative study. Critical accounting theory acknowledges there are institutions, politics, and power structures in financial decision making and budget preparation. And given critical accounting theory holds similar principals and desired outcomes as critical theory I also need to understand my motivations for exploring research and what biases I have in creating research questions and analyzing data. I believe in the power of numbers and the value in analyzing data. My personal tenant in quantitative research is to engage in math with meaning. I want my analysis to have purpose and not to be taken as truth. Rather, I want my work to be explored and to cause further questioning and evaluation of power structures in order to promote equity and social justice within and beyond higher education.

View of Paths and Opportunity

I am a cis-gendered white female living in California but from the mid-Atlantic. I was raised in an upper middle class family where watching the news and reading the paper was an everyday part of life. I was taught these practices at an early age and I realize that is a very different experience from most individuals. My parents both have college degrees, one with two bachelor degrees and one with a master's degree. My mother pursued her second bachelor's degree as an adult student. I often reflect on how challenging that must have been while raising two kids and think about how difficult it must be for individuals who attempt the same path and have way fewer resources at their disposal. I am the proud sister of a marine which means that

political decisions often have a significant personal impact. My brother also has a nontraditional educational experience because he only attended two years of college then choice to join the Marines. Overtime I have seen where my parents have impacted how I view work and issues is that they both had quantitatively focused degrees (accounting and economics) but used their knowledge in the fields of public service.

Wealth, Whiteness, and Education

I spent most of my time in a college town in Pennsylvania which carries two significant characteristics that are relevant to my belief and this research. First, growing up on a college town means that education was understood, appreciated, accessible, and attainable by most of the community. I do acknowledge that most of that town was white upper middle class who carried a significant amount of privilege with the most salient identities. I am not too naïve to realize that while the town was community driven, there were certainly forgotten, isolated, and underserved populations and at times, even before adulthood, I am sure I contributed to creating that distance. The wealth in the town did help in some areas. For example, the community funded its own open access preschool instead of relying on a Head Start type program that relied on grants and had a significant application and administrative process.

Work Exposure

My entire adult career has been working in higher education and I have only worked at research I institutions. Two have been public and one has been private. I am personally passionate about public research I institutions, especially land grants, and all that they are able to provide to their communities While I see a significant amount of public good coming from research I institutions I acknowledge that they have histories tangled with oppression and

continue to have issues and structures in place related to systemic suppression of voices and representation.

Conclusion

My work is complex in the sense that it involves the applying knowledge from education, politics, economics, and even elements of sociology. I am driving to perform quantitative work not only because of my skills but because of the power a quantitative study can hold to qualitative studies focusing on higher education and politics. I am driven to this research not only because of my upbringing, but also my career in higher education finance. While most quantitative studies have been performed using a positivist or post-positivist framework, I will be applying critical accounting theory to my research. This is important to me because of how I view applied statistics and the consideration that must go into exploring relationships between demographics, politics, economics, and higher education funding. Many researchers (i.e., Archibald & Feldman, 2006; Dar & Franke, 2010; Tandberg, 2010a) in this area have approached higher education appropriations studies using methods I plan to employ. My hope is that the novel approach using to higher education appropriations research using Critical Accounting Framework will provide a different perspective on the challenges facing states and their public institutions.

CHAPTER 2: LITERATURE REVIEW

With the cost of higher education increasing state appropriations have become even more essential to keeping college affordable and accessible. Higher education appropriations are mostly a discretionary item in the state budget which makes understanding and navigating the political landscape important to predicting appropriations outcomes. There are often cyclical conversations between the state governments and institutions surrounding the cost of higher education and how much costs can be reduced (Doyle, 2013). The struggle between funding higher education and support from the state begs us to develop a further understanding of critical measurements or variables that impact state appropriations to public higher education. This review of literature will examine a quantitative research studies investigating the relationships between demographic, economic, educational, and political variables and the state support to public higher education. The review is organized by categories of variables in order to identify relationships and make comparisons across authors and methods. After the review of empirical work, I will then provide a more condensed review of literature regarding conceptual frameworks applicable to this study, making a case for the application of stewardship theory and critical accounting theories compared to other theories often referenced in higher education appropriations research.

Review of Empirical Literature

Economic

Unemployment. The unemployment rates have generally been accepted as a measure of economic prosperity. They are even more connected to higher education as individuals may associate the ability to get a job with having a college education. Due to the availability of the data and relevance to the tax base unemployment has often been included in higher education

appropriations research. McLendon et al. (2009) ran a series of cross-sectional time series fixed effects analyses utilizing different combinations of variables. The authors found unemployment to have a negative statistically significant relationship with state appropriations in their second to the last model. While it did not make the final model, the variable's practical significance was also important. For every percentage point increase in the unemployment

rate, there was a $0.20 decrease in appropriations per $1,000 of state appropriations. This variable was removed in the final equation after assessing for collinearity. While considering political and economic implications, it is important to remember that this study found significant relationships between unemployment and the Republican legislature, gubernatorial power, and the presence of term limits. Unemployment was not shown to have statistical significance in the final model but seeing the relationship to other variables there was practical significance as unemployment rates were highly discussed in the media and was an important measure of economic stability.

McLendon et al. (2009) found a significant negative relationship between unemployment and higher education appropriations. Kane, Orszag, and Apostolov (2003) also explored unemployment related to higher education appropriations using fixed effects modeling. Due to the span of their study they were able to provide additional interesting analysis. Their study spanned twenty years, 1981-2001, and included a small recession. The results indicated a single point increase in unemployment would yield a 2.6 percentage point decline in higher education spending or $3.94 per capita. To compare, with the same increase in unemployment K- 12 saw a $2.78 decrease in per capita funding and $4.90 in capital spending. Furthermore, a one percent increase in unemployment resulted in statistically significant impacts for two years after with a 0.8% decline in appropriations the year after and 0.6% decline in another year. Examining

years following an uptick in unemployment is important insight when considering recovery from recessionary periods and the availability of public subsidy to higher education.

Dar and Lee (2014) performed a longitudinal analysis including years 1977-2004 using fixed effects modeling. Their research specifically focused on how partisanship interacted with political and economic conditions impacting appropriations. They found unemployment to have a very slight positive significant relationship. Dar and Lee also used unemployment as an interaction variable with polarization which demonstrated that the Democratic Party had less of a significant relationship on appropriations as unemployment increased.

Lyddon (1989) performed a longitudinal study of appropriations spanning 1960-1985 and included many political, economic, and demographic variables. Lyddon choose to create models for each state to examine for differences across states or to pick up on new patterns in states with comparable characteristics. In Lyddon's study unemployment was statistically significant in five states but in one state the relationship was positive while the rest were negative. It is possible that unemployment limits the state's ability to fund education, however, there could be a mentality shift to improve funding to higher education in order to meet employment goals.

Rizzo (2004) studied appropriations as a share of the state budget and interestingly unemployment had a statistically significant relationship to higher education appropriations but not complete education appropriations which included K-12 education. When unemployment increased by one percentage point higher education's share of the state budget decreased by 0.22%. The study included data from 1977-2001 and the authors noticed that when examining narrower date ranges unemployment has become a more critical factor over time. A one percent increase in unemployment from 1977-1982 resulted in a 0.1 decrease in higher education share of the state budget. When looking from 1993-2001 the same one point increase in unemployment

resulted in a 0.5 decrease in appropriations. These results validate further exploration of continuous study of higher education appropriations as a share of the state budget, especially after volatile economic conditions.

Strathman (1994) found unemployment to be significant in predicting higher education appropriations but in a different context and using different methods (three-stage least square parameter estimates). Strathman was specifically focused on public spending based on migrations patterns within a state. The study found unemployment to be impactful because unemployment led to greater outmigration as workers left in search of jobs. As individuals and families left and was not balanced by immigration then the overall ability to fund programs is diminished due to a lower tax base. This finding is an important consideration to draw connections between individuals and families moving for unemployment and then also perhaps settling elsewhere. This migration patterns improves a tax base in another state as well as potentially contributes to higher education enrollment in another state.

A creative review of the importance of income to higher education funding is the interaction of income with political party strength in predicting appropriations. In another project using fixed effects modeling, Dar and Franke (2010) found appropriations to higher education increased as the strength of the Democratic Party in the state house increased. However, the strength of the Democratic Party became less important as unemployment increased. The researchers hypothesized, in line with Doyle (2007) and Tandberg (2008) that as there are limited resources there is greater distributions amongst public assistance programs and higher education funding drops in priority. Dar and Lee's work is especially important for this research study as this project will explore political and economic relationships to higher education funding.

Personal income Peterson's (1976) cross-sectional analysis found income to have a statistically significant positive relationship when evaluating appropriations per student but not when building a model with appropriations per capita as the dependent variable. Peterson's research also included an affluence score developed by Hofferbert (as cited in Peterson, 1976) which included other wealth indicators in addition to income such as property value and motor vehicle ownership. These results allude to how increased income can create a stronger tax base and allow for increased funding of higher education through the state budget.

In another early study, Coughlin and Erekson (1986) hypothesized increases in income would encourage higher appropriations because individuals would want to attend college and more revenue would be available to provide a state subsidy. Using ordinary least squares regression, they had results outside of the expected when examining capital contributions from the state. One could technically say contributions to higher education were greater however, that increase was directed to capital projects. In discussion this makes sense because capital projects require significant, planned commitment of resources that often come from economic prosperity.

In Bailey, Rom, and Taylor's (2004) fixed effects regression work median income was found to have minor significant effects in predicting higher education spending per capita. The authors hypothesized higher incomes would lead to higher appropriations however the results indicate a 10% increase in state median income would only lead to a 0.4% increase in public appropriations per capital. The other results found in their work indicated competition whether with private schools or neighboring states had a greater impact than the economic conditions within the state in predicting appropriations.

Cheslock and Gianneschi (2008) also explored the per capita income and the impact on generating private support which is relevant to higher education appropriations. Like mentioned

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in other variables, certain economic trends do not necessarily have consistent impacts on all sources of institutional revenue. The authors found private giving decreased as personal income increased likely because as broad income measures in the state improved those with higher incomes were less likely to worry about the need to redistribute income via making private gifts to institution. Toutkkoushian and Hollis (1998) found conflicting results across their statistical analysis. When using ordinary least squares (OLS) models increases in median income had a negative and significant impact on higher education appropriations with a one percent rise in median income lead to a 0.5% decrease in appropriations. However, when using fixed effects modeling the researchers found a positive significant relationship between income and appropriations. The different in results based on methods is an important considering when evaluating other variables included in the research models and the validity of analytical approaches based on the research questions.

These findings are important given legislators and the public may think that better economic conditions within a state may lead to improved conditions for higher education, which would then reduce the relative important of state appropriations. As institutions present their budgets to their state government it is important to highlight these conditions so assumptions are not made about institutional financial stability.

Part of this research project is to explore how higher education appropriations adjust with economic downturn. Humphreys researched business cycles such as economic booms, recessions, and steady state or recovery periods. In one study using fixed effects modeling Humphreys (2000) found that a one percent decrease in personal income per-capita resulted in a 1.39% decrease in appropriations per FTE. In alignment, with their hypotheses, appropriations fall more during recessionary years than the increase in growth years. In economically challenging times individuals may look to move for better employment or educational

opportunities. Strathman (1994) specifically investigated outmigration and funding to higher education appropriations. His work indicated increases in per capital income did have a positive and significant impact on state appropriations. While the debate on higher education is often centered around discussing private or public good the Strathman research indicates legislatures act in interest of the state and specifically the state budget.

Related to income, Dar and Lee (2014) included state revenue per capita in their model. While this is not purely individual driven a large portion of state revenue does come from various individual and consumer taxes such as income, sales, and property. Revenue was statistically significant in all models that included 44 states. When the researchers were testing alternative 43 state models, revenue per capita was no longer statistically significant. McLendon et al. (2014) found the gross state product (GSP) to be statistically significant in predicting increases in merit-based aid per FTE within the state as well as appropriations for FTE.

Another reason to explore the significance of median income on higher education appropriation is seeing that the relationship between the income, tuition, and appropriations has not been a one to one to one ratio. Using two-stage least squares regression analysis, Koshal and Koshal (2000) found tuition rose almost three times the rate of the median family income and the consumer price index. State aid did increase but not at the same rate. Overall, increased tax revenue via higher income was statistically significant in increasing appropriations but was also mitigated by enrollment and political factors.

Rizzo (2004) provided a progressive and critical review of factors influencing appropriations to higher education which will be discussed in greater detail in the demographic

and educational climate sections of the literature review. Regarding income, Rizzo evaluated appropriations as the share of the state budget which is more reflective of the ability to pay for higher education than need to pay (enrollment focused). Rizzo's research found for every $1,000 increase in household income the higher education share of the budget dropped by 1.3%. However, the researched showed the relationship to be nonlinear and is not impactful once household income drops to $58,000 annually.

There are many conflicting, yet explainable results when evaluating income and higher education appropriations which further encourages research at different periods of time under differing economic conditions. Income could reflect economic stability in a state but could also change the political situation and ideology of a state when it comes to determining the amount of public funding directed toward higher education.

Income disparity. While not a direct measure of income equality, the top marginal tax rate could be an indication of how a state views income redistribution. Whether the view is limited to the legislature or the representatives are truly reflecting the ideology of the state, a higher top marginal tax bracket could hint at attitudes toward correcting or addressing income equality and support of the general welfare. Kane, Orszag, and Gunter (2003) found a higher top marginal tax rate, even when controlling for overall revenue, was statistically significant in predicting higher appropriations for higher education in their fixed effects regression analysis.

Tandberg (2010a) used *percentage of population below Pell Grant level* in his multiple regression analysis. This analysis demonstrated a significant negative relationship between appropriations and percent below Pell Grant. This result was contraire to Tandberg's hypothesis. In his discussion Tandberg speculated a reason for this may be the measure of appropriations also used a measure of personal income. Tandberg (2008) included inequality as a variable in

one of his studies and defined it as the ratio between household income at the 75th and 25th percentiles. In this study inequality was found to have a positive significant relationship on higher education appropriations. Tandberg speculated that states were not encouraging income inequality in order to fund higher education but rather if there is income inequality there might be attitudes to encourage redistribution through higher education. Less conservatively, Dar and Lee (2014) included an inequality variable in their model which was the ratio of the income of the 90th percentile of the total family income in the state to the 10th percentile. This variable did not show any statistical significance in either of their models, but it is worth noting its inclusion given its uniqueness and critical lens compared to other quantitative studies. Inequality seems like a worthy consideration given higher education's place in generating wealth for individuals while also having barriers to access.

A few studies have focused on the impact of income inequality and K-12 education while also drawing in arguments and comparisons with post-secondary environments. The widening wealth gap leads to issues in the ability to public education to make it accessible for all. Families with substantial income may not see the value of tuition prices subsidized through appropriations. Meaning they may prefer to have lower taxes or have state revenue directed elsewhere if tuition is affordable. While less noticeable than K-12 education, often funded by property tax, higher education's nebulous position on the public and private good spectrum leave its funding in a challenging position with not all able to pay and not enough financial aid to go around (Duncan & Murnane, 2014). This cycle perpetuates across decades and generations of higher education funding. A lesser funded higher education system leads to greater debt by those who choose to attend or a lower income if attending higher education is not even an option. That

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then perpetuates views on the value of higher education and the ability to save and afford higher education for the next generation (Bailey & Dynarski, 2011).

de Oliver and Briscoe (2011) referred to this phenomenon as the budget vortex. In their quantitative study covering all fifty states from 1992-2007 the authors found changes in tuition and appropriations were unfortunately not appropriately compensated for when compared to the widening wealth gap. Some states fared better than others but across the board, the average increase in tuition as a percentage of state revenue for all 50 states was 28.7% while the equivalent average for higher education increase as a percent of state expenditure was only 4.2%. de Oliver and Briscoe also cited the importance of considering politics, educational climate, and economics when examining the issue. The authors found tax incentives, degree attainment, institutional availability, and regional employment changes all played important roles in the financial accessibility and funding prioritization of public higher education. The results of their study indicate the challenges for those in lower and even middle class to have affordable access to higher education.

Political

Legislative professionalism. Legislative professionalism is typically measured as an index used to measure capacity for policymaking by individuals or organizations. The measure has been used in research to evaluate whether staffing and outputs creates any sort of significant relationship to appropriation dollars directed to public higher education. Research outcomes have been mixed depending on the focus of the research. Some research has shown that increases in legislative professionalism decrease spending toward more redistributive programs (Peterson, 1995; Barrilleaux & Berkman 2003), however, higher education has an interesting spot as a public and private good.

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In Peterson's (1976) hallmark research he combined the idea of legislative professionalism and local reliance into one variable to reflect how greater local reliance for funding versus federal or state funding could create greater state resources to spend on higher education. *Legislative professionalism-local reliance* did have a statistically significant positive relationship on higher education appropriations in one of the time periods studied. With the political climate changing between 1960 and 1969 Peterson hypothesized these results indicated a more professional legislature will lean toward subsidizing higher education but the type of school supported may change over time.

In various recent quantitative studies legislative professionalism had a significant positive relationship specifically with higher education funding. McLendon, Hearn, and Mokher (2009) conducted empirical research focusing only the relationships between certain political variables and appropriations to higher education. Their research yielded a statistically significant positive result between legislative professionalism and higher education appropriations. In a quantitative analysis performed by Tandberg (2010a) legislative professionalism had the largest effect size (0.317) of the other statistically significant variables. The results indicated a $10,000 increase in legislative salary results in a $0.129 increase in appropriations per $1,000 of personal income. When looking at higher education appropriations as a share of the state budget, Tandberg (2010b) found a $10,000 increase in legislative salary (this study's measure of legislative professionalism) to result in a 0.007% increase in the share of the budget. Tandberg and Ness (2011) performed research looking only at state capital expenditures on higher education and found legislative professionalism was still important. Capital expenditures are a smaller portion of the budget compared to overall appropriations to higher education but are often related to housing, modernity, and institutional competitiveness. The authors hypothesized legislative

professionalism would still be statistically significant but were not sure to what effect given appropriations are more often conceptually tied to tuition expenses for students compared to funding capital expenditures which have financial restrictions.

In a slightly different study examining the role of governing boards and tuition Nicholson-Crotty and Meier (2003) the researchers found a one percent increase in legislative professionalism with a 0.0437% decrease in tuition per student when the institutions had consolidated governing boards when using fixed effects modeling. However, when the institutions had coordinating governing boards a one percent increase led to a 0.058% increase in tuition costs per student. While these results are based on a two-way interaction the choice of governance structure could also be a reflection of politics or ideology creating a three-way or four-way interaction.

Seeing mixed results led McLendon et al. (2014) to explore the, role of legislative professionalism with higher education funding as appropriations as well as merit- based aid programs. Like their hypothesis predicted, the authors found legislative professionalism to be statistically significant positive relationship with appropriations per FTE but a negative relationship with merit-based aid per FTE. These results indicate for a continued conversation on legislative professionalism while also researching other higher education policy elements or ideology.

It is a bit uncertain why exactly legislative professionalism would lead to increases in appropriations to higher education. According to Lowry (2001), when greater resources are available such as staffing as well as pay, legislators are able to engage with those they are representing in a more equitable way. The time and skills of legislative staff could provide for a greater ability to review analytical and funding reports which influence policy decisions (Squire,

2000). Higher education's place in the public perspective and market are relevant when examining legislative consideration and attention. Ryu (2011) found different budget categories (general, business, mandatory) experienced budget punctuations differently based on the state's legislative professionalism. The limits of human capacity to gather and evaluate information leave legislative staff left to prioritize and make decisions on what information is available.

More staff could also lead to increases in time available to be spent with higher education governing boards. Though Tandberg (2010a) found political culture did not have a statistically significant impact when considering appropriations and legislative professionalism more research on ideology and culture is warranted. Barrilleaux and Berkman (2003) found increases in legislative professionalism to be related to increases in legislative competition which also encourages more research on partisanship and party competition.

Party competition. The amount of control a single party has in the state government has implications for budgetary and policy decisions. Having a divided government where the two major political parties have shared control of the government was statistically significant in predicting late state budgets (Klarner, Phillips, & Muckler, 2012). Party competition has been viewed a few different ways as it relates to higher education appropriations. Percentage of seats, supermajority required for budget, and gubernatorial budget power have all been ways to evaluate the control of a single party in the state government. Lyddon (1989) included the strength of political structures and power in her dissertation. The percentage of seats in lower house held by the majority party and percent of the population within voting age were both shown to have statistical significance. The R-squared values for both percent held by the majority party and percent of the population within voting age fell between 0.1 and 0.5 and when the variables were ranked they held low value compared to economic, education, and

demographic variables. In most cases the relationship between those two political variables and state appropriations to higher education were positive.

Francis' centralization index (as cited in Peterson, 1976), used to measure legislative party head influence, had a medium negative relationship on appropriations overall and specifically senior institutions. Alternatively, when looking at variables that only had significance for senior institutions, Peterson found a medium positive relationship between governors' powers and appropriations. While not measuring appropriations, McLendon, Heller, and Young (2005) used legislative party competition as a measure of higher education policy innovation. The researchers hypothesized states with legislative body controlled by one party are more likely to adopt measures than those with split party competition. They found Republican-controlled legislative branches were 25% more likely to pass new policy measures. These policy innovations included prepaid tuition programs, college savings, and merit-based aid programs.

A supermajority requirement to raise taxes is often motivated by fear of growth of the government. While raising taxes and a larger government are often associated with the Democratic Party, the supermajority majority requirement as a variable in research typically does not take party affiliation into consideration. Supermajority requirements are fairly recent and still uncommon throughout the United States making broad, longitudinal research challenging. In their study using fixed effects models Archibald and Feldman (2006) found supermajority requirements had a significant adverse effect on higher education appropriations per $1,000 of state personal income. The authors continued to discuss how the impact of supermajority requirements may be even greater than their results indicated. Supermajority requirements are often part of a state's constitution meaning the barrier to change in either direction is significant.

Gubernatorial power has been widely used in higher education funding research as a measure of party competition due to the indices available and the relationship to the passing of the state budget. Gubernatorial power is also of specific interest to study because governors may be more interested in merit or need-based grant programs versus appropriations due to their political popularity (McLendon et al., 2014). Contrary to their hypothesis, McLendon, Tandberg, and Hillman found a negative relationship between gubernatorial power and spending on merit aid. In their fixed effects model McLendon, Hearn, and Mokher (2009) found increases in gubernatorial power led to statistically significant in decreases in higher education appropriations per $1,000 personal income. In their research, McLendon et al. also examined the proportion of legislators who are Democrats as well as gubernatorial budgetary power using random-effects modeling. The proportion of legislators who are Democrats had a positive statistically significant relationship on appropriations when measured per FTE. Gubernatorial budgetary power had a negative statistically significant relationship on appropriations.

Tandberg used *unified institutional control* as he measure of one house controlling both parties of the legislature. Having a single party competition both sides of the legislature seems to create alignment when necessary in order to pass budget or other policy resolutions. In his 2010 (a, b) research found unified institutional control have a significant negative relationship with appropriations when measured as the share of the state budget as well as per $1,000 of personal income.

Citizen ideology. It is important to distinguish measures of citizen ideology from the concepts of partisanship and polarization. Citizen ideology is being included in this study in order to reflect attitudes and priorities of people within the state. This is an important distinction

from government ideology and partisanship as policy decisions may not always represent the true leanings of the state's populace. Peterson (1976) used innovation and antidiscrimination to measure political climate and priorities. In his work there was a weak negative relationship between innovation and appropriations. To measure anti-discrimination Peterson used an index developed by McCrone and Cnudde (as cited in Peterson, 1976) which assessed the difficulty in passing anti-discrimination laws in the states. Peterson expected there to be some link for junior colleges but also speculated that senior colleges could also have a significant relationship with antidiscrimination given their place as agents for change and social awareness. The correlation statistics did not yield any significant results, but supplied a valuable measurement for this point in history. A similar index could be relevant in other political climates as various social issues are brought to the political forefront and states create different legislation on discrimination and protected classes.

Nicholson-Crotty and Meier (2003) included citizen and government ideology in their quantitative analysis to assess for any differences in relationships between mass preferences and those in place in the legislatures. Both measures of ideology had significant relationships with logged appropriations when on their own as well as interaction with governing boards and other political structures. However, both ideologies varied greatly in effect size and direction of relationship with interactions. The results of their study indicated politics matter but the relationships are unclear pending the power and structures in place. This lack of clarity aligns with the stress and struggle of the appropriations process within the state budget. It is unclear which political conditions mediate or create tension when desiring more appropriations from the state government for higher education.

Additional researchers did look beyond political parties and to consider citizen ideologies as separate variables in their studies. Archibald and Feldman (2006) found citizen ideology to be stable in its predictive relationship on appropriations across other political-economic considerations such as tax expenditure limits. McLendon et al. (2009) included citizen ideology in their fixed effects analysis of higher education appropriations per $1,000. Unexpectedly, they found no statistical significance. The researchers dove deeper and further hypothesized legislative control and government ideology may be clouding the ability of the citizen ideology to be significant.

Tandberg (2010a) used the share of the budget as the measure of higher education support and found citizen ideology to be significantly related to increases in higher education's share of the state budget. Interestingly, in this study no other mass political variables (electoral competition and voter turnout) were statistically significant. When Tandberg (2010b) measured appropriations as per $1,000 of personal income citizen ideology was again statistically significant and had a large effect size. Each unit increase on the ideology scale resulted in a .019 increase in appropriations. Noticing differences in results encourages my research in exploring relationships across two different measures of appropriations, especially when those measures are calculated based on different state characteristics.

Tandberg and Ness (2011) revisited citizen ideology in a longitudinal study analyzing capital expenditures from 1960 through 2005. This broad time period includes changes in many in political leaders and social movements. In their fixed effects model political ideology was only significant when political variables were included. When the model expanded to include education variables ideology was still significant but had an extremely small effect size compared to other variables. When economic and demographic variables were included in

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addition to the education variables citizen ideology was no longer statistically significant. This is contraire to prior research which highlights the nuance of political relevance for capital spending compared to overall appropriations which many individuals conceptualize as the subsidy for in-state students.

McLendon et al. (2014) revisited the topic hypothesizing a positive relationship between liberalism and appropriations, a positive relationship between liberalism and need-based financial aid, and a negative relationship between political liberalism and merit aid. The researchers did find a positive relationship between need-based education support and political liberalism which does align with concepts of redistributive funding and liberalism. These results indicate, outside of specific individuals in office and governors who ultimately sign the budget, understanding and appealing to the state's populace ideology can create positive movement in appropriations.

Demographic Variables

Race. A commonly included demographic variable in higher education finance studies is race. Race is an important part of the higher education funding discussion as research has showed improved affordability of higher education has especially meaningful impacts on traditionally disadvantage groups (Dynarski, 2008; St. John, 1991; Heller, 1999). A few authors explored race as an indicator variable other authors conducted research using heteroethnicity as a measure of race. Doyle (2007) found few statistically significant variables in his study using two-stage least squares regression. Doyle did find in one of the models African Americans were less likely than other races to believe that colleges were efficient. Most noticeably there was a 49% chance that a White person would respond to the survey saying that colleges are efficient while there was only a 19% probability that an African American person

would respond the same way. Tandberg (2008) found the ratio of non-white-college age

population to K-12 non-white in the population to be a statistically significant factor in

increasing public higher education funding. However, race was not a significant variable in his

2010 and 2013 publications. Rabovsky (2012) found statistically significant results in both

changes in the black student and Hispanic student population and state funding. Every one

percent increase in black students was associated with a $98,000-$132,000 decline in state

support. More dramatically in the same study, a one percent increase in Hispanic students

yielded $583,000-$721,000 less in state appropriations.

Related to political results already discussed, Brunner and Johnson (2016) found support

for higher education diminished as the distribution between white and non-white, and more

specifically Hispanic, populations shifted. White voters were less likely to support measures

increasing higher education funding as the population of college-aged individuals became more

Hispanic. Brunner and Johnson also found the timeliness of their research impactful as more

states are supporting in-state funding models of undocumented students. Rizzo (2004) found

similar results where racial heterogeneity became statistically significant in predicting lower

levels of higher education funding as the racial homogeneity of the non-college age population

increased. In Rizzo's study the homogeneity referred to increasing "whiteness" in the population

meaning as the whiteness in an age demographic increased and diversity in college-aged students

increased, higher education funding decreased.

Researchers have found these trends to be alarming and studies specifically focused on

heteroethnicity or racial homogeneity and higher education funding have gained notoriety and

uncovered important results. As diversity increases and polarization has become more apparent,

Foster and Fowles (2017) speculate statistical models examining higher education funding and

race may not find significant results if the studies do not include ethnic share measures. Unfortunately, there is a concept of "taste" for public spending outside of one's own ethnic group (Vigdor, 2002). This speaks to the idea of limiting preference to funding that to supports other ethnic groups without knowing if there are appreciable consequences for one's own ethnic group. Though the research did not focus only on higher education, Brunner et al (2011) found significant differences in support of public funding redistribution measures between African-American and Hispanic voters even though both populations tended to be registered in the Democratic Party. This is why applying a Critical Accounting framework can provide value to quantitative research. There are clearly differences when looking at race as bi-dimensional (white vs. BIPOC) and racial diversity as a political and polarizing topic.

Race has also been an important part of the recent higher education discussion particularly when it comes to flagship institutions. There are significant enrollment and achievement gaps when comparing state high school minority populations to those enrolling in higher education, especially at larger public research I institutions. Mississippi has displayed a notable gap with 50% of the high school graduate population identifying as African-American. In 2015 only 10% of the Ole Miss student body was African-American, which was a drop even from 2010 (Kolodner, 2018). While the focus of this research is not on enrollments and access, applying a critical lens to the appropriations of funds leads to the question of which people support particular politics and candidates, under what conditions, to make college affordable for which kind of student? While higher education in the United States was once seen as a main vehicle of social mobility, due to policy changes and political dynamics, institutions supporting students in upward mobility are now the exception (Mettler, 2009). Student under-placement and affordability issues have created clear racial divides in populations in community college

compared to flagship institutions. Institutional leaders and researchers are seeing institutional type as a segregation mechanism which is why narrowing the study to research I institutions should yield interesting discussion (Kolodner, Racino, & Quester, 2017).

Rural population. Since the 2016 Presidential election the political and educational differences between rural and urban or suburban populations has risen in discussion. Rural students have been a research topic within higher education but there is limited academic research on the impact of the rural population influencing state higher education funding. The discussion in most of the prior appropriations research has focused heavily on the overall population of a state as well as the population within the traditional college-aged population. These are important considerations connected to the ability to pay from the tax base as well as the need to support higher education enrollment. Peterson (1976) included industrialization as a variable which was a calculated variable including population density as well as technology access and revenue from manufacturing. Because of the rural population's struggle with poverty, access, and modernization, I am interested in what patterns are unfolding in how a state's percent of rural population may have an impact on higher education appropriations.

In 2018 NPR (Marcus & Krupnick), published an article highlighting the discrepancy between rural student high school graduation rates and college attendance. Rural students have the highest graduation rates at 87% but have the lowest college attendance rates (59%), even lower than black males in urban environments (Krupnick, 2018). The interviews with rural students conducted share students thoughts of lack of belief in college and family attitudes toward attendance. With family attitudes having that much importance on student attendance it is worthy to investigate connection to appropriations.

The Pew Research Center supplied a report (2018) on social and demographic trends that encourage the exploration of connections between population density, economics, politics, and education. Most registered voters in rural areas identity as Republican and rural communities are the most likely compared to urban and suburban communities to feel not understood by other communities. Rural residents are also more likely to have lived in the same community for over a decade as well as decline a chance to move. Most relevant to the application of higher education appropriations were Pew's findings on public support and financial optimism. Rural students, especially those without a college degree were the least likely to feel optimistic about their financial future. Also, all community types also feel that rural communities get less than their fair share of public dollars. John Judis (2016) connected all of these concepts to highlight how a united, misunderstood, and politically aligned rural population can make big changes in elections as well as policy and financial decisions.

The specific topic of rural population impacting appropriations is relevant because rural students are not attending college at the same rate as their peers but affordability plays a significant role in rural in that dilemma. Community colleges are either not available or not well funding to provide enticing opportunity to students in rural areas (Fluharty et al., 2007). While many think higher education is pervasive and the internet omnipresent it is estimated that 41 million American adults live 25 miles or more from a college or university or live somewhere where a there is only one community college. These are often the same areas where broadband internet access is limited so distance education is not always a viable solution (Rosenbloom & Blagg, 2018). Therefore, in order to attend higher education rural students must relocate and very closely examine their college choice. Heller (1999) found reductions in state funding as well as increases in college price were statistically significant in declining enrollments with a more

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sizeable impact on community college students. It is worth further exploring how the size of the rural population impacts higher education appropriations when funding is important but enrollment is low for reasons beyond funding.

Age 65+. A handful of higher education appropriations researchers have included studying the elderly population in their projects and found significant results. The elderly population is often included in higher education finance because of the consideration of mandatory funding elements required for that audience such as health care and pensions (Mandal, 2007). Because of the notion of competition for scarce resources within a state budget, especially as demographics shift and the elderly population grows in proportion to the population researchers want to explore their impact on appropriations.

In their fixed effects model Bailey et al. (2004) found elderly population to be statistically significant in predicting appropriations per student and per capita. The researchers were surprised to see their results indicated a 10% increase in the percentage of the population over age 65 would contribute to a 0.5% increase in public appropriations per student and a 0.34 percent increase in public appropriations per capita. In another regression analysis Lowry (2001) also studied the relationship between the elderly population and appropriations. Unlike Bailey et al., Lowry found a negative predictive relationship between the elderly population and appropriations like he hypothesized. Interestingly, Lowry's study also included a smaller sample from a time period where the changing demographics of the aging Baby Boomers were not as obvious. In a study with similar design to Bailey et al., McLendon et al. (2009) also included the share of the elderly population in their appropriations research. Like Lowry (2001) they found a negative predictive relationship between the elderly and their measure of appropriations which was per $1,000 of personal income. Their sample and scope of their study

was quite robust spanning twenty years which allowed for quite a few political and economic climates during the span of the study.

While it is not an exact measure of the elderly population Kane et al. (2003) evaluated the role of Medicare appropriations on two different measures of higher education appropriations. Like in this project, the researchers were trying to measure appropriations in some sort of per person basis (they utilized per capita) as well as a portion (they measure as share of GSP) in order to conceptualize funding as a more raw number as well as a limited resource within a state budget. In their fixed effects analysis with a sample covering 48 states over 20 years the researchers found Medicare appropriations to have a negative predictive relationships with both measures of appropriations. In more simplistically designed, but still valid, study Okunade (2004) measuring a single year the researcher also found a significant negative predictive relationship between Medicare appropriations and higher education appropriations. Okunade offered an interesting policy discussion not mention in other literature regarding how federal funding decisions for other state programs would be extremely impactful for higher education as they could relieve state budgets. Often as education researchers we are focused on the status of the federal policy surrounding higher education funding however other federal funding initiatives could provide considerable fiscal relief creating a windfall for higher education.

Educational Climate

Merit-based scholarship. When considering the state budget and support of higher education it is important investigate how merit-based grant programs may be related to appropriations decisions. While merit-based grant programs are a means of supporting students pursuing higher education, the types of programs and who they support often influence access

and affordability in different ways than appropriations. Through the 1990s and early 2000s funding for merit-based programs grew faster than the financial support for need-based programs (Heller, 2002). Rizzo (2004) highlighted part of the reason for the decline in higher education appropriations going directly to institutions was because of the increase in merit-based programs. In his study Rizzo found movement to a merit-based aid program reduced the share of higher education appropriations by three percentage points. Because a significant concern of merit-based programs is who within a state's population is supported Rizzo included an interaction variable of merit aid, college-aged race ratio, and income level. Sadly and not surprisingly, states only favor institutional support when income is low but when incomes increase student support becomes more popular. The author hypothesizes this could be related to political popularity and the general appeal of the program to the majority of the population compared to the limited political influence of the minority populations.

Part of the argument for merit-based aid programs is that students who feel rewarded by their state are more likely to want to go to school in the state as well as stay after graduation which would contribute to economic growth (Dynarski, 2004). In their fixed effects model using panel data Toutkoushian and Hillman (2012) found appropriations and need-based aid increased the college going rate in the state and encouraged students to stay within state for graduation. There was no evidence that need-based programs increased college attendance or migration decision for college. This is critical research to consider as appropriations, need-based programs, and merit-based aid are all methods of adjusting cost but choosing the financial distribution method should depend on the goals of the state when it comes to access and achievement.

McLendon et al. (2014) included appropriations, need-based aid, and merit-based aid in their analysis in order to compare and analyze the types of funding as they

could potentially coexist. The authors did find some evidence for the crowding out of need-based aid. As merit-based aid increased, spending on need-based aid decreased. The researchers also found increases in income led to greater appropriations dollars as well as spending on merit aid but there was not a significant impact on need-based aid. McLendon et al. reasoned the increases could simply come from more funding being available for the state to spend due to a greater tax base however, because need-based aid did not have the same experience there is likely a connection to preferences on redistribution.

Though the focus was not appropriations, Perna and Titus (2004) highlighted the importance of viewing state policies and support collectively when evaluating student choice of higher education institution. A significant purpose of state appropriations to higher education is to make higher education accessible and affordable for in-state residents. However, merit-based programs are often found to be politically popular but do not necessarily contribute to the accessibility of education if the aid is directed to students who were likely able to attend.

Outside of connections to appropriations and spending, a purpose of this literature review is to tie the importance of variables to critical issues impacting equity and social justice. As a part of the Civil Rights Project out of UCLA researchers found many connections between shifts to merit-based aid and social consequences. Heller and Marin (2004 found as state dollars moved to merit aid instead of need-based aid higher education funding moved away from supporting racial and demographic minorities. Heller (2003) also found research where the students utilizing merit aid may not be likely to stay in-state due to their achievements and ability to be nationally competitive after graduation. In very recent research Lowry (2019) found merit- based aid was statistically significant in increasing college attendance in low-income students but in the model need-based aid was also significant and had a stronger effect size. The mixed

research leads to more questions on the relationship between demographics, politics, and economics when it comes to how to higher education students using state dollars.

Tuition. The cost of tuition is a perplexing factor when assessing its relationship with state appropriations to higher education. State appropriations are mostly used to subsidize the cost of tuition for in-state students. However, because of reputation or popularity some institutions may be able to draw higher tuition due to competition. When institutions are able to secure enrollment while having a higher tuition than other institutions, state legislatures may be less likely to direct resources via appropriations to those institutions (Coughlin & Erekson, 1986). This is more often seen in research universities that have the greater capacity to secure funding from other resources (Weerts & Ronca, 2006). Generally, researchers hypothesize and find state aid decreases with increases in tuition. Another view on this hypothesis is that as state appropriations increase tuition will decrease. In their quantitative study measuring appropriations per FTE, Coughlin and Erekson (1986) found tuition to have a small, negative but statistically significant relationship with appropriations per FTE.

Looking more recently, Koshal and Koshal (2000) investigated the relationship between appropriations and tuition while also factoring regional influences and income. The authors found as state appropriations increased by 10% tuition decreased by 10.1% making the appropriations almost a direct subsidy. In Dar and Lee (2014), the authors found the previous year's tuition was a statistically significant predictor of state support to higher education when measuring per $1,000 of personal income. However, it was not significant when looking at their other measurement, the natural log of appropriations to higher education.

Okunade (2004) also performed an ordinary least squares regression analysis where appropriations were measured as the share of the state budget. Despite using different methods

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and measures, Okunade also found a negative statistically significant relationship between tuition and increasing appropriations. The results indicate a 10% increase in tuition and fees would create a 3.1% reduction in share of the state budget going to higher education appropriations. Tandberg (2010b) also used shared of the state budget as a measure of appropriation and found increasing tuition was significant in decreasing higher education appropriations. With the consistent findings over time, Tandberg indicated increasing tuition with declining appropriations is a reflection of the privatization of higher education and not a temporary state due to other conditions.

Tandberg and Ness (2011) found a similar relationship between tuition and capital expenditures for higher education which was surprising when enrollment and other higher education variables were not significant. The authors discussed how state structures, negotiations, and other policy decisions make be more impactful in funding decisions than the demand to support higher education. There are cases where institutions have increased tuition and states then "punished" the institution for the increase in price by reducing appropriations and forcing states to work on a tight budget (Tandberg, 2008). Case study analysis or other qualitative methods could be beneficial in evaluating how legislative perspectives and negotiations play a role in appropriations decisions.

Education attainment. As previously discussed, higher education in the United States serves two large purposes—social equity and economic gains. The economic contribution of higher education serves individuals to support income and purchasing power supports public economics. The social equity component does not necessarily have consensus as an important purpose. Higher education's shift to career preparation creates an individual focus that appears to be a private good. However, an education populace and mobility remain at the forefront for those

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who see higher education as public good. There are varying elements that could influence an individual's values toward higher education.

In their research focusing on financial aid and college attendance, Bettinger et al. (2012) highlighted how inexperience with the higher education environment and funding avenues would influence college decision making. Kane (2004) found family degree attainment and income impact college attendance even when academic performance was held constant. Since the 1970s, students from lower-income families continue to cluster in two-year institutions. Enrollment patterns in four-year colleges and universities indicate educational services and opportunities are distributed to those whose families have degrees and wealth. These enrollment patterns combined with declining state funding mean that higher education is reverting to a meritorious pattern and contributing to inequities instead of social good (Havemen & Smeeding, 2006). Higher education continues to provide access but in a stratified way where students from families with lower income and a lack of degree attainment are more likely to attend two-year institutions and additionally, not complete a bachelor's degree (Roska, 2011). The findings thus far support investigating how average educational attainment in a state could create different value systems and funding patterns for higher education, especially, large, public research institutions.

Peterson (1976) measured educational attainment by assessing the average time spent in education and the percent of individuals in the population already educated. Peterson found the median years spent in school to have a statistically significant positive relationship on public higher education appropriations per capital overall model as well as in the four-year college and two-year college per capita models. More recently McLendon et al. (2014) found negative statistically significant relationships between percent of adults with baccalaureate degrees and funding for merit-based and need-based aid. There results were interesting as they do not fit with

other research and the authors did not find any statistically significant results between percent of adult population with baccalaureate degree and appropriations per FTE.

Doyle (2007) found experience with higher education made a statistically significant difference in view on tuition increases. Survey respondents were asked if they thought colleges tried to keep tuition low or raised tuition when possible to generate more revenue. With other variables held constant, the research indicated there was a 70% probability for high school graduates to indicate colleges raise their prices while there was only a 53% probability indicated for college graduates to have the same response.

Studying Appropriations Across Time

Part of the novelty of the research I will be proposing is that the time period included (to be described in methods) falls post-recession. Recessions not only reduce tax revenue available but can also significantly impact a student's ability to make a personal financial contribution toward their education. Coming out of a recession the hope is funding conditions return to "normal" but research indicates that is not only the case. The time period being proposed also spans politically interesting times in the United States where partisanship became evident. While appropriations to higher education are largely a state-based budget item affordability of higher education became and still is a discussion topic in federal elections. Politicians have varied various perspectives and plans on tuition and debt relief drawing more discussion to higher education at a national level.

Political epochs. Delaney and Doyle (2018) chose two ways of creating political time groupings in their longitudinal study. First, they created time periods using changes in political party at the Presidential level. Second, the authors created narrower ranges by giving each president their own model. While funding for higher education is largely determined at the state

level and the dependent variable is state appropriations, a change in political leadership in the

Executive Branch at the national level could indicate changes in political climate and ideology.

Like other models in their study, personal income and the number of state employees were

statistically significant. Across the presidential and party-line periods there were inconsistent

results. Many of the presidents had different relationships with the state funding of higher

education and there were not clear connections to parties. Many of the models did not follow the

balance wheel pattern supported by models using other measures of time. This is interesting to

explore because a variety of research indicates political variables impact state spending on higher

education but measuring national changes as a unit of time may not indicate any clear

connections.

Breakpoints and incrementalism. Lyddon (1989) offered the most

thorough investigation of prior year funding using breakpoint analysis and the calculation of

incrementalism. The model was built to identify significant shifts in the prior year funding and

current year funding. Not all states had significant breakpoints, but in the states that had

breakpoints, the breakpoints did explain a sizeable and statistically significant difference in state

funding to higher education. 19 of the 39 states that had breakpoints showed R-squared values

above .99 indicating a strong relationship between changes in prior year funding and current

funding. Delaney and Doyle (2018) also discussed the importance of volatility and distinct time

periods. Rather than using breakpoints like Lyddon to create time periods, Delaney and Doyle

utilized decades as digestible time periods long enough to provide analysis for the models. The

authors did acknowledge decades as a unit of measure may not create comparable timeframes.

Recessionary period. In their research spanning 1951-2006, Delaney and Doyle (2018)

specifically separated recession years for separate analysis. The number of state employees and

personal income were the only variables with statistical significance. Interestingly, both of those variables were significant in the linear, quadratic, and cubic models developed to assess the balance wheel (Hovey, 1999) fit. The authors did not find a significant relationship between state total expenditures and appropriations to higher education during recessions. Delaney and Doyle suggested this indicates during recessions the higher education appropriation is not treated differently than state spending for other public budget areas. However, in a policy brief which included data from the Great Recession, Delany and Doyle (2011) found states with higher tuition and tighter governing boards had a harder time rebounding from cuts to their appropriations. This is relevant for research at public research I institutions that typically have higher tuition than other public institutions. It is also important to note that none of the political variables included in the model had statistical significance. Partisan differences may align or change focus during times of recession. With the most recent Great Recession it would be interesting to specifically explore recessions immediately preceding elections.

Business cycles. Using the definition from the National Bureau of Economic Research Delaney and Doyle (2018) which starts the year of a recession to the next cycle. Generally, the results were inconsistent across the business cycles with little statistical significance. In three of the business cycles there was a statistically significant relationship between spending on higher education and other budget categories. The others suggested the business cycles themselves may explain too much of the variance in spending to produce other significant results. These results combined with their analysis of decades and recessionary periods provide support for exploring periods of time with economic and political significance versus purely longitudinal studies with arbitrary ranges and cutoffs.

Appropriations Measures

There are many ways of evaluating state support of higher education. The data sources available contain different components such as tuition, fees, capital expenditures, loan programs, etc. Another level of complexity is that the sources could also report on different time periods and have varying ability to differentiate or breakdown expenditures. All sources and measures have the ability to be accurate and valid and it is more important to select the measure that fits the research question. Researchers have gone to taking the sources of appropriations data and further recalculating them to be appropriate for the question and other data being included (Tandberg & Griffith, 2013). For the purpose of my research study I am going to explore the uses of state appropriations to higher education conceptualized as the *need to pay* and the *ability to pay* as explored by Trostel and Ronca (2009).

Need to pay. The *need to pay* reflects the appropriations required to fulfill demand for higher education. Most commonly researchers have viewed *need to pay* as appropriations per FTE or per the traditional college-aged population. Appropriations per FTE may be the most popular dependent measure used in higher education research as many researchers (e.g., Bailey et al., 2004; Cheslock & Gianneschi, 2008; Humphreys, 2000; Koshal & Koshal, 2000; McLendon et al., 2009; Nicholson-Crotty & Meier, 2003; Peterson, 1976; Strathman, 1994) have employed this version of appropriations.

Some researchers have shown hesitation toward using appropriations per FTE because there is the idea that with greater state support more students would want to attend higher education. Thus, increase in support could generate growth in demand outside of independent interest. While endogeneity does exist within the calculation researchers have found the opposite relationship to be present, where institutional leaders use the growth in enrollment to generate

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appropriations and the enrollment statistics are judiciously considered by the legislatures (Leslie & Ramey, 1986; Toutkousian & Hollis, 1998).

Ability to pay. The *ability to pay* measures the effort put forth by the state compared to the resources available. The most common versions of appropriations as an *ability to pay* measure are appropriations as share of the state budget or per $1,000 of personal income. Appropriations to higher education as a percentage of the state budget has been a popular measure in more recent research (e.g., Dar & Spence, 2011; Rizzo, 2004; Tandberg, 2010a). Researchers have chosen to use this way of calculating appropriations because it can take general increases into account as well as reveal budget tensions. States are required to balance their budget and policymakers are not likely to immediately turn to tax increases to generate revenue. Share of the state budget is able to highlight tradeoffs that may happen which increase or decrease funding to higher education based on shifts happening in other areas of the state budget (Tandberg & Griffith, 2013).

Review of Theoretical Framework Literature

The nature of my research question requires a critical look at money and finances beyond a ledger or a line item. The research questions aim to investigate people, political, systems, and structures involved in the funding of higher education. Having a framework is important not only in providing structure and purpose to the research question but also in providing a lens for evaluating variables and institutions to be included in the sample. Historically, the principal-agent theory has been used for representative financial decision-making and the stewardship theory has been utilized for public budgets.

In this review of conceptual frameworks, I will begin by discussing critical account theory as the framework and lens to compare against other frameworks used in finance, public

administration, and politics. In this review I will introduce the building blocks of a critical framework and from there introduce how critical accounting theory can be being incorporated into my research.

Critical Accounting Theory

An emerging theory within public finance research is critical accounting theory (CAT). CAT has been present in accounting for many decades but is now becoming a popular topic in global research and teaching. CAT blends the ideas and purpose in critical theory with the principles of accounting. In the realm of financial accountability and public, most researchers have used principal-agent and stewardship theories to frame their work (Greiling & Spraul, 2010; Caers et al., 2006; Davis et al., 1997). Proponents of CAT, however, argue principal-agent and stewardship theories each have gaps as they relate to the accounting in the public sector. In accounting research, there are evaluations and recommendations surrounding good and bad decision-making. Determining what is a good or bad decision and how to make or not make similar choices in the future requires developing a less formal and distant relationship with finances than permitted in the academy of accounting research (Gray, 1992). Using critical theory to inform and frame accounting research provides an opportunity to account for culture and infrastructure. The culture of an organization will shape the infrastructure and review processes as well as the values that determine what is a "good" or "bad" accounting decision (Oluwadare & Samym, 2015).

Critical Accounting Theory Foundations

Critical accounting came about in the 1970s as a way to take a multi-faceted approach to accounting to incorporate non-positivist and non-financial theories into traditional accounting methods (Catchpowle & Smyth, 2016). Scholars had been more generally exploring the idea of

interdisciplinary accounting as a way to weave in other theories, but the development of critical

accounting theory specifically took a firm stance on power and politics associated

with the accounting process. Roslender and Dillard (2003) shared the view that critical

accounting is "a subset of the interdisciplinary project and provides a focus for those who wish to

devise an approach that consciously privileges the linkage of knowledge to the pursuit of a

radical political process."

A distinction in critical accounting is that as a paradigm, it wants to create knowledge

regarding what could be rather than what is. CAT aligns with the emancipatory concepts in

critical theory by displaying through research that accounting involves subjective decision-

making, and through its systems, it creates limits on people (Gendron, 2018). Critics of CAT ask

the question, "How can we compare what could be if we do not know what is?" Here, CAT

responds that it does not oppose the creation of a baseline for comparison but instead

understanding that a benchmark created for comparison does not create a single truth that applies

to all individuals (O'Regan, 2003).

Critical Accounting and People

An area of CAT that is specifically related to my research is how accounting is related to

people. CAT acknowledges that accounting incorporates elements of surveillance due to the

nature of reporting and tracking. Dahrenedorf (1980) discussed how the assumptions and

principles of accounting limit the distribution of "life-chances" of people by creating broad rules

about what is fair and right with money. By having those rules be practiced across the entire

accounting industry the limits on people and their decisions increase. Many financial transactions

are associated directly with people, and if not directly, they are close via work projects or an

organizational purchase. Thus, money comes from people and goes to people via webs of

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transactions, so when money is followed, so are people. This can provide surveillance in an undesirable fashion where those who do not have power or knowledge do not know how transactions are associated with them as people (Gallhofer & Haslam, 1997). The contrasting side of that discussion is that audits make it possible to expose inappropriate practices, decisions, people, and the associated transaction. Audits also bring to light transactions that may be legal but associate people as allies or supporters; an easy example of this is contributions to political campaigns. This again still brings to light the importance of people in accounting because even with audits, there are still people interpreting and making decisions and those people have their own values and guiding principles.

Critical Accounting Theory Research Principles

Much like the evolution of other paradigms, critical accounting theory developed as a response to traditional accounting literature. In this way, critical accounting theory acknowledges it exists based on a comparison to critical theory, as well as, the positivist and post-positivist paradigms present in mainstream accounting research (Baker & Bettner, 1997). Due to its development as a response to other research, much of the original work associated with critical accounting theory is qualitative in nature. In Richardson's (2015) review, he cited most of the work published in *Critical Perspectives on Accounting* were qualitative research studies, many of them using case study methods and historical data. In the earlier years of critical accounting, many researchers claimed critical accounting theory could not be used to inquire about specific research questions due to the ontological and epistemological lens. However, as research surrounding social and environmental performance in business became more mainstream in accounting, the idea of including more quantitative methods with a critical accounting theory framework became more of a possibility. Moore (1991) offered the important

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point that CAT is not there to reject accounting and point out practices as "mistakes"

or as "wrong" but rather to highlight the social impact of accounting and to explore areas in

reporting, financial management, and business transactions.

Critical Accounting Theory Methods and Practice

A fundamental debate in the critical accounting community is whether CAT allows for

quantitative research. Some CAT scholars argue that due to the critical nature of the

work, quantitative methods and CAT as a framework are mutually exclusive because quantitative

methods by nature attempt to create an answer or a singular truth (Richardson, 2015). Other

scholars have argued for the legitimacy of quantitative methods with CAT because a project can

still have the goal to emancipate, use CAT in a specific assembly of variables, and be critical in

the interpretation of findings (Arthur, 1993; Gaffikan, 2006). CAT has been used in research

regarding environmental issues and social discourse as a way to bring contextual and political

elements to numbers presented (Milne, 2002).

Researchers in CAT are looking to bring more interpretation and reflection to findings to

provide an improved understanding of the societal significance and the role of accounting

in an organization (Lukka, 1990). In her study of CAT, Hines (1988) showed how the use of

CAT creates more questions for future research and a greater value on disclosure in research to

explicitly call out assumptions and important questions not covered by the project. In practice,

CAT opens the door to having multiple ways of sharing accounting research. In response to the

American Accounting Association's Statement on Theory and Theory Acceptance, Chua (1986)

discussed how allowing multiple reporting styles creates more knowledge and understanding

instead of the mainstream thought that CAT complicates accounting research. CAT has the

opportunity to diversify the field of accounting research. Including alternate views in accounting

research can create tolerance and appreciation in the academy while still allowing room for traditional accounting practices and research (Merino, 1998).

Critical accounting theory serves as a valid and sound conceptual framework for my research question. I will be using historical data to explore relationships between demographic, environmental, political, and educational climate variables and the impact on state appropriations to public research universities. I plan on using quantitative methods which rules out certain theories used in education and public finance. However, I want to make sure to acknowledge the power of numbers and information as well as tensions in the relationships between constituencies and public officials who help form state budgets. It is also essential to apply a critical lens when looking at developing the models. There will be interpretations of data sets and permutations of variables. In categorizations and recalculations when it comes to politics and people I want to be thoughtful of individual experiences. When determining which variables to include in my research I will have to consider how to use critical account theory. The principles of critical accounting theory will help to develop an understanding as well as reduce the stress and oppression associated with the appropriations process. This means it will be vital for me to consider how to interpret statistical and practical significance as well as identify gaps in my work, my lens, and opportunities for future researchers.

Conclusion

This review of literature provided a significant summary of the research discovered on this topic, but it also sparked researcher curiosity. Surprisingly, there was limited research available on demographic data and the relationship to state appropriations to higher education. It is also interesting to see how the classification and calculation of similar variables changed over time and across researchers. I am curious to think about the present political and economic

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climate and what variables might be more relevant. There is also limited research discussing the

educational climate beyond enrollment numbers so I would like to pursue exploring that area

with a more critical lens using educational attainment and state grant programs. Applying CAT

with elements of stewardship theory will assist in the selection of variables and which

calculations are most appropriate for my study. Exploring these topics in a post-recession time

period will also be informative for future researchers and administrators.

CHAPTER 3: METHODOLOGY

Research Design and Rationale

The purpose of this study was to explore the relationships between economic, political, demographic, and educational variables and appropriations to public research I institutions. The goal was to compare differences across political environments in order to expose factors that may be influential in the appropriations process. Models and sub-models were developed in order to assess significant factors in public higher education appropriations compared to significant factors in public doctoral institutions with the highest research activity. With the power of this information, administrators and families voting and making college choices can be freed from some of the tension of the appropriations process.

This purpose led to twelve research questions:

1. To what extent do economic variables predict higher education appropriations as a need to pay measurement?

    1.1. To what extent does unemployment predict state appropriations measured per FTE?

    1.2. To what extent does personal income predict state appropriations measured per FTE?

    1.3. To what extent does income disparity predict state appropriations measured per FTE?

2. To what extent do political variables predict higher education appropriations as a need to pay measurement?

    2.1. To what extent does legislative professionalism predict state appropriations measured per FTE?

    2.2. To what extent does party competition predict state appropriations measured per FTE?

2.3. To what extent does citizen ideology predict state appropriations measured per
    FTE?

3. To what extent do demographic variables predict higher education appropriations as a
    need to pay measurement?

    3.1. To what extent does race predict state appropriations measured per FTE?

    3.2. To what extent does population in rural area predict state appropriations
        measured per FTE?

    3.3. To what extent does population aged 65 and over predict state appropriations
        measured per FTE?

4. To what extent do educational climate variables predict higher education
    appropriations as a need to pay measurement?

    4.1. To what extent do merit-based state grant programs predict state appropriations
        measured per FTE?

    4.2. To what extent does tuition predict state appropriations measured per FTE?

    4.3. To what extent does educational attainment predict state appropriations measured
        per FTE?

5. After considering covariance, to what extent do remaining economic, political,
    demographic, and educational attainment variables collectively predict appropriations
    as a need to pay measurement?

6. Are there differences between significant factors (economic, political, demographic,
    and educational attainment variables) and their predictive relationships with
    appropriations as a need to pay measurement when comparing all public institutions
    to research I institutions?

7. To what extent do economic variables predict higher education appropriations an ability to pay measurement?

   7.1. To what extent does unemployment predict state appropriations measured as a share of the state budget?

   7.2. To what extent does personal income predict state appropriations measured as a share of the state budget?

   7.3. To what extent does income disparity predict state appropriations measured as a share of the state budget?

8. To what extent do political variables predict higher education appropriations as an ability to pay measurement?

   8.1. To what extent does legislative professionalism predict state appropriations measured as a share of the state budget?

   8.2. To what extent does party competition predict state appropriations measured as a share of the state budget?

   8.3. To what extent does citizen ideology predict state appropriations measured as a share of the state budget?

9. To what extent do demographic variables predict higher education appropriations as an ability to pay measurement?

   9.1. To what extent does race predict state appropriations measured as a share of the state budget?

   9.2. To what extent does population in rural area predict state appropriations measured as a share of the state budget?

9.3. To what extent does population aged 65 and over predict state appropriations measured as a share of the state budget?

10. To what extent do educational climate variables predict higher education appropriations as an ability to pay measurement?

10.1. To what extent do merit-based state grant programs predict state appropriations measured as a share of the state budget?

10.2. To what extent does tuition predict state appropriations measured as a share of the state budget?

10.3. To what extent does educational attainment predict state appropriations measured as a share of the state budget?

11. After considering covariance, to what extent do remaining economic, political, demographic, and educational attainment variables collectively predict appropriations measured as appropriations as an ability to pay measurement?

12. Are there differences between significant factors (economic, political, demographic, and educational attainment variables) and their predictive relationships with appropriations as an ability to pay measurement when comparing all public institutions to research I institutions?

Understanding the predictive relationships between state appropriations to higher education and these variables calls for a quantitative design. Where relationships were found, a future qualitative design might provide further insight on the tensions within the appropriations process.

The general approach for this study, which is described in detail in the following pages, required measurement of state appropriations through a consistent mechanism as well grouping

variable in conceptually digestible categories. Measurements of institutional characteristics were important in ensuring a comparable sample. Panel data measuring the independent variables were gathered from a variety of sources and analyzed to estimate relationships with state appropriations.

Identifying Variables

Variables in this study fell into five categories: dependent appropriation variables, demographic variables, economic variables, political variables, and educational climate variables. Appendix A provides a complete list of variables mapped to their sources, definitions, and calculations. Essential design descriptions are discussed here.

Appropriations

In their review of literature across studies exploring state support of higher education Tandberg and Griffith (2013) explored the measures used to describe state appropriations. Selecting which measure is most valid depends on the research question as well as consideration of the specific types of independent variables being included. In a novel addition to the academy, Trostel and Ronca (2009) categorized appropriations measures in *need to pay* and *ability to pay* variables. Because I explored appropriations by examining the people of the state as well as political conditions this study built models with a *need to pay* measure and an *ability to pay* measure.

Ability to pay. While popular, the use of per capita income as a dependent variable limited the ability to use personal income as an independent variable. Additionally, because of the inclusion of political variables and the importance of politician platforms this study measured appropriations as a percentage of total budgetary spending. This measure has been employed a few recent studies (e.g. Dar & Spence, 2011; Tandberg, 2010). Authors tended to choose this

calculation in order to control for general increases or decrease in state spending. Additionally, thinking of the higher education share allows the researcher to explore a different dynamic of funding and the budget process that apply to higher education but perhaps not other areas of the state budget. This is an exceptionally relevant calculation given the general requirement that states balance their budget (NCSL, 2008). This measure can be deceptive because it uses portions or percentages however this does help compare against spending to mandatory programs that are often funded via their caseload or specific metrics.

Need to pay. State support of higher education per FTE has been used by many researchers (e.g., Cheslock & Gianneschi, 2008; Koshal &Koshal, 2000; McLendon, Mokher, & Doyle, 2009) and is perhaps the most commonly used measure of higher education funding in higher education research. Trostel & Ronca (2009) categorized appropriations per FTE as a *need to pay* measure due to its connection to enrollments. This is also an important measure for this study because The Great Recession aligned with the largest cohorts of graduating high school students ever which greatly expanded the needs of higher education to fund the incoming students (Long, 2014). Trostel and Ronca do have a simple concern for the use of this measure given increases in state support for higher education may also drive enrollments. If students and families see that higher education is becoming more affordable, then more might be inclined to apply and enroll. Other researchers (Clotfelter, 1976; Hoenack & Perro, 1990; Toutkoushian & Hollis, 1998) have explored this concern and found the elasticity to be appropriate. Those studies do date twenty years so in different economic climates the impact may be different. However, because there are concerns with both measures, this study will explore two models per institution to assess any differences.

Source. Appropriations data was gathered from the Integrated Postsecondary Education Data System (IPEDS) available from the National Center for Education Statistics (NCES). While there are many sources of appropriations data (e.g. Grapevine, NASBO, SHEEO-SHEF) IPEDS is the only source that continued to provide a breakout of appropriations at an institutional level (Tandberg & Griffith, 2013).

Table 3.1

Independent Variables Used in the Analysis

Economic	Political	Demographic	Educational Climate
Unemployment	Legislative professionalism	Race	Merit-based scholarship programs
Personal income	Party competition	Population in rural area	Tuition
Income disparity	Citizen ideology	Population aged 65+	Educational attainment

Economic Variables

Unemployment, personal income, and *income disparity* were the economic variables included in this research. *Unemployment* rate by state was available from the Bureau of Labor Statistics. The *unemployment rate* is the number of unemployed people as a percentage of the labor force and is commonly used to measure economic health (Bureau of Labor Statistics, 2015). %. *Personal income* was available from the Bureau of Economic Analysis and includes wages, proprietors' income, dividends, interest, rents, and government benefits. Income disparity was accessible via tables provided by the Economic Policy Institute. *Income disparity* is measured using the Gini coefficient from the American Community Survey. The Gini Index ranges from 0 to 1 where 0 represents perfect distribution and equality and 1 represent perfect inequality. When the Gini Index is multiplied by 100 and represented as a percentage it is referred to as the Gini coefficient. (U.S. Census Bureau, 2016). Values in the panel data are out

of a maximum 100. *Personal income* and *unemployment rate* are collected by individual

agencies and made available for use via the American FactFinder.

Based on prior research I hypothesized there would be a negative, significant prediction

of *appropriations measured per FTE* by *unemployment rate*, *personal income*, and *income*

disparity. I hypothesize there would be a positive, significant prediction of *appropriations*

measured as share of the state budget by *personal income*. I hypothesize there would be a

negative, significant prediction of *appropriations measured as share of the state budget* by

unemployment and *income disparity*.

Political Variables

Legislative professionalism, party competition, and *citizen ideology* were the political

variables included in the study. *Legislative professionalism* was calculated using the methods

developed by Squire most recently updated in 2015. *Legislative professionalism* is meant to

assess the ability and capacity of legislatures and legislators to create and process information in

the policy making process (Squire, 2017). The *legislative professionalism* score was computed

using legislative staffing numbers, counts of legislators in session, and legislative salaries. *Party*

competition is an index calculated to assess competition for control of state governments. The

index includes five measures: 1. the number of recent shifts of party competition, 2. an index of

party competition for state offices, 3. the closeness of president elections of the state, 4. the

effective number of political parties in the state, and 5. the ratio of Republicans to Democrats in

the electorate (Hinchliffe & Lee, 2016). Data to calculate this variable was available from the

State Politics and Policy Quarterly database. *Citizen ideology* was calculated using the methods

described by Berry et al. (1998). This calculation of citizen and

government ideology by state has been used in other higher education studies investigating appropriations (e.g., Nicholoson-Crotty & Meier, 2003; Tandberg, 2010).

Based on prior research and time period studied I hypothesized there would be a positive, significant prediction of *appropriations measured per FTE* and as *share of the state budget* by *legislative professionalism* and *citizen ideology*. I hypothesize there would be a negative, significant prediction of *appropriations per FTE* and *share of the state budget* by *party competition*.

Demographic Variables

Three demographic variables – *race*, *population in a rural area*, and *population aged 65+* – were used in this study. Race was measured as percentages of the state population in each year according to the United States Census as well as reports from intercensal years. During the years included in this study the Census survey offered 15 categories of race which is a separate question from ethnicity. (U.S. Census Bureau, 2017). There are limitations in using this categorization as over six percent of respondents identify as being in an "other" race (Krogstad & Cohn, 2014).

Rural population was also measured via Census records and intercensal estimates. Calculations were made using the rural county classification systems and population estimates by count. Population aged 65+ was measured as a percent of the state population in each year according to the United States Census as well as reports from intercensal years.

Based on prior research and time period studied I hypothesized a negative significant prediction of *appropriations measured per FTE* and as *share of the state budget* by *race*, *rural population*, and *population aged 65+*.

Educational Climate Variables

Merit-based scholarship grant programs, *tuition*, and *educational attainment* were the educational climate variables used in this study. The presence of a *merit-based state scholarship programs* points toward focus on achievement instead of equity and accessibility in higher education. This variable is an indicator variable made available via the data provided by the Education Commission of the States. Rizzo (2004) used this variable in his longitudinal study examining state higher educating funding preferences. There are many different ways of gathering tuition information but the data used in this study was from IPEDS data. The use of IPEDS is required in order to narrow down tuition to specific institutions during specific academic years. Lagged *tuition* was used in order to accurately represent the relationship between tuition pricing and state budget timing. *Educational attainment* was gathered by the Census and National Center for Education Statistics and categorized state residents into four groups according to their level of education credential (high school diploma, associate's degree, bachelor's degree, graduate or professional degree). The variable used was calculating the percent of the state's population with a baccalaureate degree or higher.

Based on prior research I hypothesis there would be a negative, significant prediction of *appropriations measured per FTE* and as *share of the state budget* by *merit-based grant programs*. I hypothesize there would be a positive, significant prediction *of appropriations measured per FTE* and as *share of the state budge*t by *tuition* and *educational attainment*.

Table 3.2

Hypotheses by Variable and Dependent Measure

	NTP Overall	NTP Submodel	ATP Overall	ATP Submodel
Economic				
Unemployment	-	-	-	-
Income	-	-	+	+
Income Disparity	-	-	-	-
Political				
Legislative Professionalism	+	+	+	+
Party Competition	-	-	-	-
Citizen Ideology	+	+	+	+
Demographic				
Race	-	-	-	-
Rural Population	-	-	-	-
65+ population	-	-	-	-
Educational Climate				
Merit-Based Grant Programs	-	-	-	-
Tuition	+	+	+	+
Educational Attainment	+	+	+	+

Measurement Validity and Reliability

Because this study crosses political, economic, and educational disciplines the data used came from a variety of sources. Much of the measurement data was gathered via federal reporting requirements so participation was widespread and has been repeated and refined over time. Collection of data on this mass level makes research being performed in this study possible as no single entity would be able to assemble this volume and variety of data for a single study. This does mean this research relies on secondary data analysis (Trseniewski, Donnellan, & Lucas, 2011; Vartanian, 2011). This reliance creates distance between the data and researcher which can support validity with lack of bias but also creates a more challenging analysis. Many researchers have written about the advantages and disadvantages of secondary data analysis. This

kind of collection remains essential to the advancement of research in politics, education, and economics (Smith, 2008).

Economic Variables

Unemployment. State unemployment data was available via the Bureau of Labor Statistics (BLS). BLS has a long-standing history of making unemployment statistics available on a predictable, monthly basis. To improve validity a variety of methods are used including signal-plus-noise models, building block approach, and disaggregation. BLS also makes seasonal adjustments to account for weather and predictable changes in employment such as school seasons (Bureau of Labor Statistics, 2018).

Personal income. Personal income is the sum of wages, benefits, dividends, interests, and rents used to assess the economic health of state residents. The Bureau of Economic Analysis has been collecting and assembling this data since the 1930s. This metric is often seen as a valid measure of income due to the adjustment for interstate commuters as well as the broad definition of income (Bureau of Economic Analysis, 2018).

Income disparity. Data on income inequality was accessed via the Current Population Survey and the American Community Survey. The use of a ratio as the measure of income inequality assisted in normalizing values and comparing incomes across states. While the data collected by the American Community Survey is consistent the surveys make it difficult to assess trends in wealthy households based on the percentages and quintiles provided (Sommeller & Price, 2018).

Political Variables

Legislative professionalism. Squire developed this index in 1992 when trying to develop a way of acknowledging there are metrics associated with government but being a member of

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congress is also a job and career path. Squire re-examined the index in 2007 to provide any updates and assess reliability and validity. Cross-year comparisons suggest a reliable measurement. Squire found the scores to have both face validity and predictive validity when comparing to qualitative measures and cause and effect scenarios in legislative bodies. The index is currently maintained and calculated by researchers at The College of New Jersey (Bowen & Green, 2014).

Party competition. Researchers at the University of Maryland combined election data made available by State Politics and Policy Quarterly to create the party competition index. In order to address reliability, the data contains a survey component in order to address issues when relying on roll call data. The use of five measurements to determine political competition achieves context validity by avoiding state rankings and instead looking at competition to control state politics (Hinchliffe & Lee, 2016).

Citizen ideology. Berry, Rinquist, Fording, and Hanson (1998) revised their measure of state ideology to reflect views of the state populous rather than the views of the elected officials in that state. Researchers evaluate the validity of the scores by comparing against other ideology indicators and assess the construct validity by analyzing the predictive power in multivariate models in state political research. The data is maintained by Dr. Richard Fording out of the University of Alabama. The scale is from zero to one hundred with a higher value indicating more liberal ideology.

Demographic Variables

Race. Race data were available via the American Community Survey from the United States Census Bureau. Census has a longstanding history of collecting demographic information in order to provide population estimates. In 2015, the estimates of race groups and American

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Indian and Alaska Native populations underwent a reliability review. The researchers found the estimates to be reliable but noted the need to improve sample size as well as address the need for detailed Hispanic groups in the ethnicity categories (King et al., 2015). The U.S. Census Bureau assists in providing reliability and validity to the data being used in research by providing extensive documentation, training, and tutorials on the use of Census Data.

Population in rural area. Rural population data were garnered using estimates from the American Community Survey as well as the rural and urban classifications from the 2010 Census. Because there were so many completely rural counties in the United States, the American Community Survey estimates are the only source of federal population estimation for those areas. Like found with the race data the US Census Bureau assists in providing reliability and validity to the data being used in research by providing extensive documentation, training, and tutorials on the use of Census Data (Holder, Fields, & Lofquist, 2016).

Validity and reliability challenges arose in for the time period studied due to limited county classification ranges of completely rural, mostly rural, or mostly urban. As of 2010, 80 percent of the United States population was considered urban with greater than 70 percent living in urbanized areas with populations of 50,000 or more. This leaves 30 percent of the population to be classified in the rural categorizations (Ratcliffe, 2016). With rural classifications only being available at the annual level by county and in three classification levels, some states were classified as having no rural population which may not be representative of their complete population. However, the researchers decided at minimum to include the rural population variable in the data to be included in the statistical analysis to see if assumptions could be met in order to be included in statistical analysis.

Population aged 65+. Age data were provided via the American Community Survey from the United States Census Bureau. Census has a longstanding history of collecting demographic information in order to provide population estimates. The Census Bureau assists in providing reliability and validity to the data being used in research by providing extensive documentation, training, and tutorials on the use of Census Data. Like other data collected via the Census, sampling error is the most obvious reliability and validity concern (Roberts et al., 2018).

Education Climate Variables

Merit-based state scholarship programs. The Education Commission of the States and the National Association of State Grant and Aid Programs regularly survey state governments as well as monitor legislation for changes in merit programs, whether need-based, merit-based, or a hybrid model. They also monitor spending on each of the type of programs. By monitoring changes in policy and legislation as well as expenditures the data gains reliability and validity.

Tuition. Tuition data was made available via the Integrated Postsecondary Data Systems (IPEDS) maintained by the National Center for Education Statistics (NCES). All institutions participating in federal financial aid programs are required to participate in the annual IPEDS survey. At the time the analysis was conducted, tuition data were available from 1980 through 2018. Due to the longitudinal data of the survey, survey designers are able to assume year-to-year variations would be minimal. When there were significant deviations from previous years, those responses are flagged for review (Ginder, Kelly-Reid, & Mann, 2017).

Educational attainment. Educational attainment data was made available via the Annual Population Survey conducted by the United State Census Bureau. The Census Bureau has a long-standing history of data collection and validation. The data documentation also notifies users of

any changes in questions as well as collection procedures. If numbers are not comparable for a time period selected due to significant change the Census Data tools will not allow a user to download.

Dependent Variables

Need to pay measure. The need to pay was based on data from IPEDS using enrollment figures by state. The IPEDS finance survey was reworked in 2002 for public institutions to provide greater validity in the data. This research project does not cross over different IPEDS formats allowing for reliable comparison over time. Review of the relevant IPEDS Methodological Report revealed sound methods and explanations for dramatic changes in survey responses (Ginder et al., 2017).

Ability to pay measure. A state's ability to pay measure looks at appropriations as a percentage of state spending. Appropriation dollars come from IPEDS and the total state expenditures from the National Association of State Business Officers (NASBO). NASBO has been collecting and presenting the State Expenditure Report since 1987 and data is self-reported by the states. NASBO does caution that while they provide a definition for budget categories states may have differences in finance categorization. Therefore, comparison across states could be challenging but comparison of single states over time is reliable.

<div align="center">

Defining the Sample

</div>

Institutional and State Characteristics

This study included broad higher education model as well as a sub-model limited to only public research institutions with the highest research activity, more casually referred to as Research I institutions, according to the classification developed by the Carnegie Commission on Higher Education (Carnegie Foundation for the Advancement of Teaching, 2015). The

overarching model included public, two-year and four-year and above institutions which totaled 1,698 public institutions from 50 states. Nebraska was omitted from the study due its unicameral legislature interfering with validity of political variables included. This reduced the institutions included to 1,683 institutions from 49 states. The Carnegie classifications were reviewed and institutions were redefined in 2010 and 2015. Because of the expansion and redefinition of categories this study was limited to include institutions classified as doctoral with the highest research activity according to the 2015 definitions. With this definition, in the sub-models there were 81 institutions from 39 states. Institutions were included at an individual level versus reporting as a system. After Nebraska's exclusion at the state level, 80 institutions remained from 38 states.

Selecting the Time Period

Many researchers have investigated political and economic variables related to appropriations. This study is different in that it will incorporate economic, political, demographic, and educational climate variables all into one model by institution, selected based on recent political outcomes. To make the study relevant to today's climate as well as to learn from recent study this research will focus on appropriations after the Great Recession. The Great Recession begin in late 2007 and continued to the third quarter of 2009. This recession was considered "Great" due to unemployment, hours work, and consumption all holding worse statistics compared to other post-war recessions (Christiano, 2017).

Another reason why the 2007 to 2009 recession was so "Great" was the length of time the economy needed to recover from the downfall. The job loss was unprecedented and related to unemployment and underemployment the Gross Domestic Product (GDP) fell below what the economy was capable of producing and did not realign until the August 2018. Unemployment

did not rise to pre-recession levels until 2015 (Mitchell et al, 2018). The Great Recession had significant impacts on higher education due to the reduced tax base as well as decreases in endowment returns. There were also losses to home equity which served as a mechanisms for many families to pay for college (Long, 2014). Due to the increased inability to pay and pressures from state governments many institutions cut their tuition or held it despite rising costs. These cuts were still not enough to cover the gap for students and student financial aid debt doubled to $1.5 trillion by 2018 (Selingo, 2018). The economy of states and families changed during and post-recession while the demand for higher education still being very present. This set of conditions highlights the importance of understanding the many factors that influence funding research I institutions during times of financial crisis compared to other points in history.

Data Preparation

Adjusting for Inflation

Adjusting the *tuition*, *appropriations*, and *personal income* for inflation requires selecting an inflation measure to convert real dollars to constant dollars. The Commonfund Institute maintains the Higher Education Price Index (HEPI) which many researchers within higher education use. However, because this study crosses into topics such as economics and politics applying a more common and generally applicable adjustment is recommended (Gillen and Robe, 2011). Therefore, this study uses the national Consumer Price Index (CPI-U) from the Bureau of Labor Statistics.

Investigation and Disposition of Suspect and Missing Cases

Before performing regression analysis, the dataset was reviewed for errors and missing values. Descriptive statistics were also performed to evaluate the sample and assess normality. A high volume of missing values was not anticipated due to source data being from federally

mandated surveys and collection tools. Due to the importance of specific data points to define the dependent variables if budget or appropriations data was not provided the case was removed. This led to the removal of 144 cases representing 44 institutions. If an institution had some cases (year data) that included appropriations and some cases that did not include appropriations only the cases with missing appropriations data were excluded. While multiple imputation is often favored in multiple regression (Young & Johnson, 2015), due to the already significant sample size and the importance of the specific data element the cases were removed. The researcher performed specific review of these institutions and many of them were branch or affiliate campuses where the appropriations numbers appeared to be included in the main campus record thus making removal appropriate in order to not over count or represent institutional financing.

When evaluating the data for other missing information the only other missing data cases were tuition reports for specific years within institutions. The researcher chose to handle this within the analysis by excluding cases pairwise in order to preserve cases for use in other statistical procedures.

Suspect Cases

In order to review outlier cases or potential data errors the researcher performed specific descriptive statistics including evaluating data minimum and maximum values, box blots, and Q-Q plots. The researcher also compared the means to trimmed means and the extreme values table in SPSS to evaluate for any significant variance and to highlight extreme values. Histograms as well as skewness and kurtosis values also underwent initial review to highlight any cases requiring further evaluation before reporting on descriptive statistics.

Only one institution was found with one cases that seemed to be particularly unusual where the institution received appropriations but had zero enrollment as well as very different

tuition reported compared to other years. Because this looked like data entry error from the institution for that specific year the case was removed but cases for that institution from other years remained in the model.

There were no other significant suspect cases in the independent variables however, there were suspect cases in fields relating to the dependent measures. Plots available in STATA were used to manage outliers and assess residuals. Tabachnick and Fidell (2013, p. 128) define outliers as those with standard residuals with an absolute value beyond 3.3. Management of dependent variable outliers was carried out during the regression analysis using the referenced cutoff values.

Data Analysis

Fitting the Regression Model

The dataset described above will develop into a balanced panel dataset with four types of variables: subject identifier (institution), a time indicator (year), outcome variables (appropriations measures), and 12 predictor variables (economic, political, demographic, and educational climate variables). Ordinary least squares (OLS) regression was not appropriate for the analysis of panel data. The relationships between variables across years, specifically measures at an institution in one year, are likely to be highly correlated and thus violates the assumptions required for OLS regression. In order adhere to the nature of the research question evaluating appropriations over time a Fixed Effects Model or Random Effects Model would be the most appropriate (Allison, 2009; Andreß, Golsch, & Schmidt, 2013).

A Fixed Effects Model is often notated using the format below (Allison, 2009):

$$y_{it} = \mu_t + \beta x_{it} + \alpha_i + \varepsilon_{it}$$

Using the first research question as an example, y_{it} represents the appropriations per student at an institution i measured in a year t; μ is the intercept of the regression line; x is one of the economic variables; α accounts for variability between institutions; and ε is an error term that is different for each institution at each point in time. The use of the institution-specific variance is what distinguishes a Fixed Effects Model from an OLS model. As the model shows, the institution-specific variance is treated as a constant for each institution, thus the name 'fixed effects'. A method used to fit a Fixed Effects Model is to create a dummy variable for each unit in the panel, which in this study would be each institution. The inclusion of those dummy variables allows between-institution variance to be treated as a constant (Andreß et al., 2013). However, the inclusion of so many dummy variables changes the degrees of freedom, which then affects the calculation of standard errors in the model's regression coefficients (Allison, 2009).

Fixed effects modeling has been used in many similarly designed studies (e.g., Bailey, Rom, & Taylor, 2004; Dar & Spence, 2011; McLendon et al., 2009; Nicholson-Crotty & Meier, 2003; Tandberg, 2010) of higher education appropriations involving similar independent variables and panel data which is another indication this design and methodology is appropriate for this study with the specific research questions mentioned above.

In the Random Effects Model the institution-specific variance term, α, is treated as a random observation. This method removes the need for variance dummy variables and therefore removes the impact on the calculation of standard errors in the regression model. Additionally, because variance is treated as a random observation the Random Effects Model can provide estimates for variation beyond between-institution variance not due to time.

While there are benefits to using a Random Effects Model, there are more stringent assumptions. Both models require an assumption of homoskedasticity, which means variance in

the error term. Homoskedasticity can be checked by plotting the error term. Where

heteroskedasticity is present, different methods for calculating standard error can be used.

STATA, the statistics program used for this portion of the analysis, uses the method to test for

heteroskedasticity developed by Huber (1967) and White (1980, 1982).

One issue with the Random Effects Model and this study is the Random Effects model

requires institution specific variance, α, to be independent of the model's independent variables

(Andreß et al., 2013). In this study that would translate to between-institution variance being due

to factors other than state politics, economics, educational climate, and demographic variables

included in this study. Due to the nature and justification for this study, that assumption seems

extremely unlikely.

The choice between Fixed Effect and Random Effects model is most typically assed using

the Hausman test (Baltagi, 2013). When performing similar analyses, Tandberg, (2010) found

lagging the variables reduced the significance so the measure of appropriations was adjusted to

percent change. If the error term in the fixed effects model lagged economic variables could be

considered. Fixed effects will control for the effects of years in this panel regression study.

Fixing year effects will assist in accounting for any variation over time that is not due to the

other explanatory variables. The use of fixed effects often assists in the interpretation of results

in econometric analysis (Mummolo & Peterson, 2017).

The use of lagged variables was also investigated when using fixed effects modeling. When

lagged values are used as dependent variables and the time period is short dynamic bias may

exist (Nickell, 1981). The statistical work reported by Nickell has been repeated and verified to

the point the author's shared finding in this area is now called the Nickell Bias. Political and

economic researchers Gaibulloev, Sandler, and Sul (2014) identified the bias may be overcome if

the data is divided into subsamples but that is likely not viable in this study with the research questions being posed. If the Nickell bias appeared in the data bootstrapping the sample would have been a consideration in order for the lagged variables to remain valid. However, the sample size in the overall model and submodel remained large enough to maintain validity and not require bootstrapping.

These two panel data regression models were used to explore the research questions in this study. Fixed Effects and Random Effects models were fitted for each measure of appropriations. Submodels for only Research I institutions for each measure were also ran using whichever method was statistically valid. The estimates produced by the preferred models will be reported in Chapter 4. SPSS version 26 was used for data assembly and descriptive statistics and STATA 16 was used to perform the regression analyses.

CHAPTER 4: RESULTS

In order to understand how societal variables (economics, politics, demographics, and educational climate) may be associated with appropriations to higher education, and specifically to Research I institutions several regression analyses were performed. The data was assembled from several sources but most widely used was IPEDS from the National Center for Education Statistics and the American Community Survey from the National Census Bureau. The data contained in the model represented six years, 2010-2015, but in some variables data spanned different years due to the use of lagged variables. Descriptive statistics were first performed to assess normality and provide context of the sample. Then regression analyses were performed using random and fixed effects methods.

Descriptive Statistics

After removing specific cases as described in Chapter 3 due to validity issues, descriptive statistics for the variables to be used in the analyses were re-calculated. These are shared in Tables 4.1 through 4.4.

Table 4.1

Overall Model: Means and Measurements of Variability for Numeric Independent Measures

	N	Minimum	Maximum	Mean	S	Skewness	Kurtosis
Unemployment (%)	9110	1.80	9.40	5.409	1.389	0.224	-0.487
Income	9110	38282.04	75847	53735.271	8374.413	0.55	-0.481
Income Disparity (Gini coefficient)	9110	16.084	39.973	27.1034	3.880	0.603	1.117
Legislative Professionalism	9110	-1.829	7.667	0.940	2.340	1.575	1.447
Party Competition	9110	0	0.330	0.087	0.062	1.386	2.948
Citizen Ideology	9110	13.482	94.954	47.926	12.507	0.39	0.958
Race (% state BIPOC pop)	9110	4.57	75.39	25.649	10.290	0.553	1.978
Rural Population (% state pop in rural counties)	9110	0	41.06	3.279	5.480	3.953	21.399
65+ Population (% state pop age 65+)	9110	7.5	19.5	14.013	1.758	0.223	0.763
Tuition	8598	591.336	19372	5233.616	2953.627	0.896	0.673
Educational Attainment (% state pop w/bacc or higher)	9110	17.5	41.5	28.749	4.617	0.267	-0.262

Table 4.2

Overall Model: Frequencies of Merit Grant Programs Categorical Independent Measure

		Frequency	Percent
Valid	N	4225	46.4
	Y	4885	53.6
	Total	9110	100.0

Table 4.3

Submodel: Means and Measurements of Variability for Numeric Independent Measures

	N	Minimum	Maximum	Mean	SD	Skewness	Kurtosis
Unemployment (%)	450	2.700	9.400	5.455	1.390	0.340	-0.594
Income	450	18.529	39.973	27.213	3.855	0.638	1.131
Income Disparity (Gini coefficient)	450	38282.040	75847.000	54016.389	7965.569	0.485	-0.503
Legislative Professionalism	450	-1.447	7.667	1.037	2.364	1.616	1.424
Party Competition	450	0.000	0.330	0.090	0.0583	1.430	3.834
Citizen Ideology	450	13.482	94.954	47.560	11.412	0.601	1.488
Race (% state BIPOC pop)	450	17.50	41.500	28.882	4.494	0.241	-0.202
Rural Population (% state pop in rural counties)	450	9.000	19.50	13.890	1.968	0.416	0.473
65+ Population (% state pop age 65+)	448	5250.210	15192.000	10059.524	2424.859	0.135	-0.935
Tuition	450	0.000	13.460	2.1660	2.902	2.052	4.583
Educational Attainment (% state pop w/bacc or higher)	450	6.110	75.390	26.3158	10.752	1.082	3.663

Table 4.4

Submodel Model: Frequencies of Merit Grant Programs Categorical Independent Measure

		Frequency	Percent
Valid	N	229	50.9
	Y	221	49.1
	Total	450	100.0

Tuition and income presented the broadest range values when evaluating the minimum and maximums (Tuition min = 591, max = 19372; income min = 38282.04, max = 75847). That is expected given the states and institution types included. Average incomes have varied greatly by state historically and did during the time period of study. Tuition also varies significantly based on many factors such as institution type and state so the range was expected with the sample included (Ma et al., 2020). Due to the other variables in the study and the dependent variables being measured, further transformations were not explored to not risk increasing collinearity measures.

When looking at normality, skewness of variables included in the study maintained within reasonable limits which was predictable given the large sample size and the use of indices for many of the factors. Kurtosis was also mostly reasonable. Rural population kurtosis was the most out of range which was expected given the limited federal classification system as discussion in chapter 3. Rural population was still included in the model was the risk is reduced with a large

sample size (200+ cases) and both the model and submodel meet this criteria (Tabanick & Fidell, 2013, p. 80).

In addition to the descriptive statistics which are provided by case it is also helpful to look at characteristics of the institutions included to provide greater context. While all states except Nebraska were able to be represented in the overall model the number of states represented did diminish when looking at the submodel. These numbers are interesting to consider when in

chapter 5 when discussing why the higher education funding discourse may not reach a critical

level in all locations.

Table 4.5

Count of Institutions by State

| | Overall Model | | | Submodel |
State	Public, 2-year	Public, 4-year or above	Subtotal: Overall Model	Doctoral Highest Research Activity
AK		3	3	
AL	26	14	40	1
AR	22	11	33	1
AZ	19	3	22	2
CA	114	34	148	8
CO	3	4	7	1
CT	14	7	21	1
DE	1	1	2	
FL	22	37	59	5
GA	20	23	43	3
HI	6	4	10	1
IA	16	3	19	2
ID	4	4	8	
IL	45	12	57	2
IN	1	13	14	2
KS	25	7	32	2
KY	16	8	24	2
LA	14	16	30	1
MA	15	14	29	1
MD	16	13	29	1
ME	7	8	15	
MI	24	19	43	3
MN	30	12	42	1
MO	15	13	28	1
MS	15	8	23	1
MT	8	6	14	
NC	58	16	74	2
ND	4	8	12	
NH	7	5	12	
NJ	19	13	32	1
NM	17	7	24	1
NV	1	6	7	

(continued on next page)

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NY	35	43	78	4
OH	25	35	60	2
OK	19	17	36	1
OR	17	8	25	2
PA	16	14	30	
RI	1	2	3	
SC	20	13	33	2
SD	4	6	10	
TN	39	9	48	1
TX	58	43	101	7
UT	3	7	10	1
VA	24	15	39	4
VT	1	5	6	
WA	17	23	40	2
WI	16	14	30	2
WV	8	11	19	1
WY	7	1	8	
Total	**914**	**618**	**1532**	**75**

Assumptions Regarding Linearity and Collinearity

An assumption of linear regression is that there is either a linear relationship or no relationship between the dependent variable and the independent variables. A non-linear relationship would indicate a transformation would be necessary to not violation the assumptions of the statistical tests. To test this assumption, each independent variable was plotted against each dependent variable and the resulting graphs were reviewed for evidence of non-linearity. No evidence of non-linear relationships was present.

Table 4.6

Correlations Amongst Independent Variables (N= 9110)[a]

	Unemployment	Income	Income Disparity	Legislative Professionalism	Party Competition	Citizen Ideology	Race	Rural Population	65+ Population	Merit Scholarship	Tuition	Educational Attainment
Unemployment	-											
Income	-0.045***	-										
Income Disparity	0.111***	0.123***	-									
Legislative Professionalism	0.339***	0.410***	0.463***	-								
Party Competition	-0.190***	0.305***	0.080***	0.078***	-							
Citizen Ideology	0.168***	0.609***	0.359***	0.462***	0.154***	-						
Race	0.289***	0.258***	0.506***	0.413***	0.053***	0.181***	-					
Rural Population	-0.028*	-0.241***	-0.107***	-0.216***	-0.381***	-0.037***	-0.133***	-				
65+ Population	-0.310***	-0.265***	-0.018*	-0.202***	0.019*	0.139***	-0.333***	0.238***	-			
Merit Scholarship	0.099***	-0.413***	0.058***	-0.147***	-0.097***	-0.155***	-0.019*	-0.033***	0.258***	-		
Tuition	-0.130***	0.156***	-0.065***	-0.132***	-0.034**	0.152***	-0.177***	0.049***	0.150***	0.058***	-	
Educational Attainment	-0.088***	0.588***	0.256***	0.313***	0.244***	0.656***	0.179***	-0.126***	-0.107***	-0.401***	0.193***	-

[a]Spearman's *rho*
*p<.05 ** p<.01 ***p<.001

Regression models are susceptible to collinearity when independent variables are highly correlated (r=.9 and above, Pallant, 2016). While some correlative relationships were statistically significant and presented in Tables 4.6 and 4.7, they were not above the threshold for inclusion in the model. Additionally, SPSS collinearity diagnostics were generated and examined. All Tolerance levels were greater than 0.1 and Variance Inflations Factors were less than 10. Both the correlation coefficient analysis and collinearity diagnostics presented no evidence of collinearity.

Regression Analyses

Addressing the first five research questions required performing regression analyses using the *need to pay* dependent variable measurement. The sixth research question also used the *need to pay* measurement but used a submodel. Because the steps are repeatable for ability to pay measurement, research questions seven through twelve, I will outline the steps in a more detailed fashion for questions one through six then more briefly thereafter. Tables are offered for each section of research questions but overall regression analyses are presented in Tables 4.7 through 4.10.

Research Questions 1 through 5:

Q.1: To what extent do economic variables predict higher education appropriations as a need to pay measurement?
      1.1. To what extent does unemployment predict state appropriations measured per FTE?
      1.2. To what extent does personal income predict state appropriations measured per FTE?
      1.3. To what extent does income disparity predict state appropriations measured per FTE?
Q.2: To what extent do political variables predict higher education appropriations as a need to pay measurement?
      2.1. To what extent does legislative professionalism predict state appropriations measured per FTE?
      2.2. To what extent does party competition predict state appropriations measured per FTE?
      2.3. To what extent does citizen ideology predict state appropriations measured per FTE?

Q.3: To what extent do demographic variables predict higher education appropriations as a need to pay measurement?

      3.1. To what extent does race predict state appropriations measured per FTE?

      3.2. To what extent does population in rural area predict state appropriations measured per FTE?

      3.3. To what extent does population aged 65 and over predict state appropriations measured per FTE?

Q.4: To what extent do educational climate variables predict higher education appropriations as a need to pay measurement?

      4.1. To what extent do merit-based state grant programs predict state appropriations measured per FTE?

      4.2. To what extent does tuition predict state appropriations measured per FTE?

      4.3. To what extent does educational attainment predict state appropriations measured per FTE?

Q.5: After considering covariance, to what extent do remaining economic, political, demographic, and educational attainment variables collectively predict appropriations as a need to pay measurement?

The *need to pay* dependent measure was regressed on the economic, political, demographic, and educational climate dependent variables using a random and fixed effects model. The two models were compared using a Hausman test to evaluate for endogeneity. The significant result (χ^2=323.73, p<0.001) suggest to reject the null hypothesis of accepting the random effects model and preferring the results of the fixed effects model. Because variance in the error term is partly due to the repeated measures from single units (in this case, institutions) heteroskedasticity is a common problem in regression using panel data sets. A Wald test (χ^2 =108.84, p<0.001) confirmed group-wise heteroskedasticity. The standard errors of the regression coefficients were recalculated using a robust estimator. Results of the model are shared in Table 4.7.

Panel data models attempt to account for both within unit and between unit variance and thus provide three R^2 options (within, between, overall) in the STATA outputs. Because fixed effects models are estimated based on within unit variance, the within R^2 value is presented.

Table 4.7

Overall Model: Need to Pay Appropriations Measure Predicted by Independent Variables

	β	*SE* β	*t*	*p*	95% Confidence Interval Lower Bound	Upper Bound
Unemployment (%)	-141.383	82.459	-1.710	0.087	-303.135	20.368
Income	0.194	0.025	7.870	0.000	0.146	0.243
Income Disparity (Gini coefficient)	-73.756	34.369	-2.150	0.032	-141.174	-6.337
Legislative Professionalism	983.769	143.219	6.870	0.000	702.829	1264.708
Party Competition	-4320.492	1847.293	-2.340	0.019	-7944.155	-696.828
Citizen Ideology	36.234	6.918	5.240	0.000	22.665	49.804
Race (% state BIPOC pop)	-16.880	64.192	-0.260	0.793	-142.800	109.041
Rural Population (% state pop in rural counties)	2823.375	361.024	7.820	0.000	2115.187	3531.563
65+ Population (% state pop age 65+)	583.080	139.798	4.170	0.000	308.850	857.309
Merit Scholarship	741.477	119.753	6.190	0.000	506.568	976.386
Tuition	-0.608	0.065	-9.320	0.000	-0.735	-0.480
Educational Attainment (% state pop w/bacc or higher)	230.661	63.900	3.610	0.000	105.314	356.007
Constant	-23600.810	3009.303	-7.840	0.000	-29503.880	-17697.740

Note. R^2= .1282, $F(12, 1445)=52.07$, $p<.001$

The regression coefficients in Table 4.7 can be interpreted as a one unit change in the independent variable if all other variables in the model are held constant. In other words, a one unit increase citizen ideology would be associated with a 36.23 increase appropriations per FTE. Another example is a one unit increase in unemployment would be associated with a 141.38 decrease in appropriations per FTE. This process was repeated for the need to pay submodel and ability to pay dependent measure and its associated submodel. Hausman tests were used to confirm the use of fixed effects over random effects but fixed effects would have been preferred in the study in order to offer consistent interpretation of results.

Q.6: Are there differences between significant factors (economic, political, demographic, and educational attainment variables) and their predictive relationships with appropriations as a need to pay measurement when comparing all public institutions to research I institutions?

Similar procedures were run on a subset of the sample included in the overall model. Cases in the overall model were limited to institutions classified as doctoral institutions with the highest research activity according to the 2015 Carnegie Classifications. Though it was decided to use fixed effects across all models the Hausman test confirmed that was the most statistically appropriate approach ($\chi^2 = 30.08$, $p<0.001$). Again, the model presented with heteroskedasticity as shown from a Wald test ($\chi^2 = 105.87$, $p<0.001$) so the coefficients were rerun using a robust estimator of the standard error. Results of the model are shared in Table 4.8.

Table 4.8

Submodel: Need to Pay Appropriations Measure Predicted by Independent Variables

| | β | *SE* β | *t* | *p* | 95% Confidence Interval | |
					Lower Bound	Upper Bound
Unemployment (%)	292.491	247.834	1.180	0.242	-201.329	786.311
Income	0.197	0.068	2.880	0.005	0.061	0.333
Income Disparity (Gini coefficient)	-161.951	71.102	-2.280	0.026	-303.624	-20.277
Legislative Professionalism	460.530	256.959	1.790	0.077	-51.471	972.531
Party Competition	-4736.361	8044.546	-0.590	0.558	-20765.47	11292.75
Citizen Ideology	85.505	26.349	3.250	0.002	33.004	138.005
Race (% state BIPOC pop)	244.724	218.121	1.120	0.266	-189.892	679.339
Rural Population (% state pop in rural counties)	-792.155	1241.903	-0.640	0.526	-3266.7	1682.39
65+ Population (% state pop age 65+)	1041.358	663.247	1.570	0.121	-280.191	2362.907
Merit Scholarship	138.606	184.772	0.750	0.456	-229.559	506.772
Tuition	-0.533	0.141	-3.770	0.000	-0.815	-0.251
Educational Attainment (% state pop w/bacc or higher)	-325.228	302.568	-1.070	0.286	-928.109	277.652
Constant	-6379.838	7824.703	-0.820	0.417	-21970.9	9211.222

Note. R^2= .17, $F(12, 74)$=13.91, p<.001

The regression coefficients in Table 4.8 can be interpreted as a one unit change in the independent variable if all other variables in the model are held constant. In other words, a one unit increase citizen ideology would be associated with an 85.50 increase appropriations per FTE. Another example is a one unit increase in unemployment would be associated with a .53 decrease in appropriations per FTE. While the full discussion on the research questions is in

chapter 5, the coefficients and significance values displayed in table 4.8 determine which

variables are significant in the submodel and allow us to compare and contrast to the variables

that are statistically significant in the overall model.

Q.7:   To what extent do economic variables predict higher education appropriations as
         an ability to pay measurement?
   7.1 To what extent does unemployment predict state appropriations measured as
        share of the state budget?
   7.2 To what extent does personal income predict state appropriations measured as
        share of the state budget?
   7.3 To what extent does income disparity predict state appropriations measured as
        share of the state budget?
Q.8:   To what extent do political variables predict higher education appropriations as
         an ability to pay measurement?
   8.1 To what extent does legislative professionalism predict state appropriations
        measured as share of the state budget?
   8.2 To what extent does party competition predict state appropriations measured as
        share of the state budget?
   8.3 To what extent does citizen ideology predict state appropriations measured as
        share of the state budget?
Q.9:   To what extent do demographic variables predict higher education appropriations
         as an ability to pay measurement?
   9.1. To what extent does race predict state appropriations measured as share of the
         state budget?
   9.2. To what extent does population in rural area predict state appropriations
         measured as share of the state budget?
   9.3. To what extent does population aged 65 and over predict state appropriations
         measured as share of the state budget?
Q.10:   To what extent do educational climate variables predict state appropriations
         measured as share of the state budget?
   10. 1. To what extent do merit-based state grant programs predict state appropriations
         measured as share of the state budget?
   10.2. To what extent does tuition predict state appropriations measured as share of
         the state budget?
   10.3. To what extent does educational attainment predict state appropriations
         measured as share of the state budget?
Q:11:   After considering covariance, to what extent do remaining economic, political,
         demographic, and educational attainment variables collectively predict
         appropriations measured as appropriations as an ability to pay measurement?

Research questions seven through eleven are similar to questions one through five but are applied to the ability to pay dependent measure, appropriations as a share of the state budget. The fixed effects regression model is presented in table 4.9. Variables contributing significantly to a prediction of appropriations as an ability to pay measure were personal income (β=.00003, $p<0.05$), citizen ideology (β=.004, $p<0.05$), race (β=-.0888, $p<0.05$), rural population (β=.576, $p<0.001$), merit-based scholarship (β=.114, $p<0.05$), and tuition (β=.00003, $p<0.05$).

Table 4.9

Overall Model: Ability to Pay Appropriations Measure Predicted by Independent Variables

	β	SE β	t	p	95% Confidence Interval	
					Lower Bound	Upper Bound
Unemployment (%)	0.070	0.036	1.920	0.054	-0.001	0.141
Income	3.12×10^{-5}	1.35×10^{-5}	2.310	0.021	0.000	0.000
Income Disparity (Gini coefficient)	0.029	0.015	1.930	0.054	-0.001	0.058
Legislative Professionalism	0.016	0.024	0.660	0.512	-0.031	0.062
Party Competition	-0.947	0.599	-1.580	0.114	-2.121	0.228
Citizen Ideology	0.005	0.002	2.510	0.012	0.001	0.009
Race (% state BIPOC pop)	-0.089	0.040	-2.240	0.025	-0.167	-0.011
Rural Population (% state pop in rural counties)	0.576	0.154	3.740	0.000	0.274	0.879
65+ Population (% state pop age 65+)	0.084	0.066	1.260	0.207	-0.046	0.214
Merit Scholarship	0.114	0.048	2.370	0.018	0.020	0.209
Tuition	-5.57×10^{-5}	2.23×10^{-5}	-2.350	0.019	0.000	0.000
Educational Attainment (% state pop w/bacc or higher)	0.032	0.027	1.190	0.234	-0.021	0.086
Constant	-3.380	1.504	-2.250	0.025	-6.330	-0.429

Note. R^2= .02, $F_{(12, 1445)}$=3.89, $p<.001$

One example of a result interpretation for table 4.10 is a one unit increase in rural population would be associated with a .576 increase in appropriations as an ability to pay measure. Another example is a one unit increase in party competition would be associated with a .947 decrease in appropriations as an ability to pay measure.

Q.12: Are there differences between significant factors (economic, political, demographic, and educational attainment variables) and their predictive relationships with appropriations as an ability to pay measurement when comparing all public institutions to research I institutions?

Research question twelve was similar to question six however the dependent measure was appropriations as the share of the state budget (ability to pay). The fixed effects regression model is presented in table 4.10. No variables were statistically significant in this regression model.

Table 4.10

Submodel: Ability to Pay Appropriations Measure Predicted by Independent Variables

	β	*SE* β	*t*	*p*	95% Confidence Interval	
					Lower Bound	Upper Bound
Unemployment (%)	-0.064	0.264	-0.240	0.809	-0.590	0.462
Income	-3.79×10^{-5}	3.85×10^{-5}	-0.990	0.327	0.000	0.000
Income Disparity (Gini coefficient)	-0.060	0.051	-1.160	0.248	-0.162	0.043
Legislative Professionalism	0.236	0.193	1.220	0.225	-0.148	0.620
Party Competition	-13.221	7.657	-1.730	0.088	-28.479	2.037
Citizen Ideology	0.045	0.026	1.710	0.091	-0.007	0.096
Race (% state BIPOC pop)	0.051	0.134	0.380	0.702	-0.215	0.318

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Rural Population (% state pop in rural counties)	1.724	1.275	1.350	0.181	-0.817	4.264
65+ Population (% state pop age 65+)	-0.026	0.888	-0.030	0.977	-1.795	1.744
Merit Scholarship	-0.003	0.191	-0.020	0.987	-0.385	0.378
Tuition	-1.225×10^{-4}	1.393×10^{-4}	-0.880	0.382	0.000	0.000
Educational Attainment (% state pop w/bacc or higher)	0.073	0.376	0.190	0.847	-0.677	0.822
Constant	3.606	6.723	0.540	0.593	-9.789	17.002

Note. R^2= .076, $F(12, 74)$=2.66, p<.01

CHAPTER 5: DISCUSSION

This chapter will discuss the results presented in chapter four in line with how the variables were outlined by category (economic, political, demographic, educational climate) in the literature review. The discussion will progress by variable category with each statistically significant variable being discussed within each category. The results will then be compared and contrasted between the overall model and submodel. In the final area regression discussion I will compare differences in the need to pay and ability to pay results. Beyond the statistical significance there will be a discussion of practical application and what the results may mean to university administrators as well as those working in state budget offices or higher education commission groups. I will also connect the research to theory discussed in the literature review and whether there were alignments or conflicting tones. Lastly, there will be a discussion on future research highlighting areas for improvement on this study or complementary work to highlight other questions that were uncovered.

Discussion of Significant Findings

The discussion of findings will be organized by groupings of variables. Approaching the discussion this way allows the focus to be on how the independent variable may be influencing appropriations in context with other variable in its category instead of discussion the significance by model or by appropriations measure. The following discussion only focuses on statistically significant findings as presented in chapter four. The *ability to pay* submodel did not have any significant independent variables in the model so they are not included in the discussion. Table 5.1 provides a summarized view of the statistically significant findings across the three other models in order to provide a snapshot for the following pages.

Table 5.1

Statistically Significant Variables Across All Models and Measures

	Need to Pay		Ability to Pay
	β Overall Model	β Submodel	β Overall Model
Economic			
Unemployment	-	-	-
Personal Income	.194***	.197**	3.12x10^{-5}*
Income Disparity	-73.756*	-161.951*	-
Political			
Legislative Professionalism	983.769***		-
Party Competition	-4320.492*	-	-
Citizen Ideology	36.234***	85.505**	.005*
Demographic			
Race	-	-	-.089*
Rural Population	2823.375***	-	.576***
65+ population	583.080***	-	-
Educational Climate			
Merit-Based Grant Programs	741.477***	-	.114*
Tuition	-.608***	-.533***	5.57×10^{-5}*
Educational Attainment	230.661***	-	-

*p<.05 **p<.01 ***p<.001

  Each discussion will include comparison of the findings with the hypothesis predicted in chapter three. Tables 5.2 offers a summary of the hypothesis with the outcomes based on if a statistically significant predictive relationship was indicated and if so, if the direction of the relationship was positive or negative.

Table 5.2

Outcomes Compared to Hypotheses

	NTP Overall		NTP Submodel		ATP Overall		ATP Submodel	
	Hypothesis	Outcome	Hypothesis	Outcome	Hypothesis	Outcome	Hypothesis	Outcome
Economic								
Unemployment	-	ns	-	ns	-	ns	-	ns
Personal Income	-	+	-	+	+	+	+	ns
Income Disparity	-	-	-	-	-	ns	-	ns
Political								
Legislative Professionalism	+	+	+	ns	+	ns	+	ns
Party Competition	-	-	-	ns	-	ns	-	ns
Citizen Ideology	+	+	+	+	+	+	+	ns
Demographic								
Race	-	ns	-	ns	-	-	-	ns
Rural Population	-	+	-	ns	-	+	-	ns
65+ population	-	+	-	ns	-	ns	-	ns
Educational Climate								
Merit-Based Grant Programs	-	+	-	ns	-	+	-	ns
Tuition	+	-	+	-	+	-	+	ns
Educational Attainment	+	+	+	ns	+	ns	+	ns

Economic Variables (Research Questions 1 and 7)

Within the economic variables unemployment was not found to be statistically significant in any of the models. Personal income was statistically significant in *need to pay* overall and submodel as well as the *ability to pay* overall model. Income disparity was significant in the *need to pay* overall and submodel. The specific results are outlined below.

Personal Income (Research Questions 1.2 and 7.2)

Income was found to be a statistically significant factor in predicting appropriations in the *need to pay* overall (β=.194, SE=.025, p<.001) and submodels (β=.197, SE=.068, p<.01) as well as the *ability to pay* (β=3.12x10^{-5}, SE=1.35x10^{-5}, p<.05) overall model. While the coefficient for the *ability to pay* looks small we have to remember this is measured as percent of the state budget so when interpreted the outcome can lead to changes on the scale of millions of dollars depending on the state. As hypothesized increases in income are associated with increases in state appropriations to higher education to matter the institution type or measure of appropriations. The availability of income could lead to less competition for state funds due to revenue availability from income tax (Kane et al., 2003; Weerts & Ronca, 2008). Relating to the result in the *need to pay* measure, the value of the coefficients may not be dramatically different in this case because as income is available the concept of scarcity and needing to fund higher education becomes less critical (Tandberg, 2008). Ideologically, income may only be a factor if resources were more limited during a recession versus a recovery period and access and affordability were more at the forefront.

Income Disparity (Research Questions 1.3 and 7.3)

Income disparity was only found to be significant in the *need to pay* models (Overall: β=.-73.756, SE=34.369, p<.05; Submodel: β=-161.951, SE=71.102, p<.05). As mentioned in the

review of literature this measure has been included in K-12 education research as well as in higher education research but has found mixed statistical significance. The translation of results here is alarming as the income disparity increases the appropriations on a need to pay basis decreases. This could be the societal mentality if enough people have the means to afford higher education then the focus may not be on appropriations for higher education. This speaks to higher education's contribution to the expanded wealth gap by lack of affordability for low and middle class students (Bailey & Dynarski, 2011; de Oliver & Briscoe, 2011).

Political Variables (Research Questions 2 and 8)

For the political variables both legislative professionalism and party competition were only statistically significant in the *need to pay* overall model. Citizen ideology, however, was statistically significant in the *need to pay* overall and submodels as well as the *ability to pay* overall model.

Legislative Professionalism (Research Questions 2.1 and 8.1)

Legislative professionalism was only significant in the overall *need to pay* model (β=983.769, SE=143.219, *p*<.001). While not significant in all models, this finding is consistent with other research discussed in the literature review (Barrilleaux & Berkman, 2003; McLendon et al., 2009; Tandberg, 2010a; Tandberg & Ness, 2011). Higher education appropriation is a complicated topic when evaluating institution type, state of institutional finances, enrollment trends, and other metrics that may impact appropriations decisions. Having legislative aides, higher legislative salaries, and a generally engaged legislature may give the legislative branch the support they need to navigate the data and reports to make informed appropriations decisions. It is not a point I have seen in other research, but I am curious how legislative staffing plays a role in the ability to take meetings and hear from advocacy groups. Tandberg (2008, 2010a, 2010b)

has done significant work on institutional advocacy as well as government structure and its role in appropriations but outside of navigating reports I would hypothesize legislative staff play a role in taking meetings from advocacy groups in order to translate practical significance from the budget requests.

Party Competition (Research Questions 2.2 and 8.2)

Party competition was found to be statistically significant in the overall need to pay model (β=-4320.492, SE=1847.293, p<.05) and aligned with my hypothesis of having a negative predictive relationship. The competition index is comprised of a few factors (1.The number of recent shifts of party competition, 2. An index of party competition for state offices, 3. The closeness of president elections of the state, 4. The effective number of political parties in the state, 5. The ratio of Republicans to Democrats in the electorate) so we cannot be certain if one aspect of party competition is more critical than any of the others (Hinchliffe & Lee, 2016). What is apparent is the partisan nature of our government plays some sort of predictive role in higher education appropriations. It is surprising to see a lack of significant result in the submodel results. The logic behind my importance to research I institutions is that most often those institutions are the state flagship institutions with a significant alumni population within the state. Therefore, as party competition increases it might become more popular to discuss higher education appropriations to appeal to the voting population. More likely, my hypothesis exposes my bias as a higher education researcher assuming the appropriation discussion would be relevant in voter decisions but is likely not as critical compared to other topics in voter choice, especially at the state level during the time period of my study (Suls, 2016).

Citizen Ideology (Research Questions 2.3 and 8.3)

As hypothesized, citizen ideology had a positive predictive relationship on appropriations in the *need to pay* overall (β=36.234, SE=6.918, p<.001) and submodels (β=85.501, SE=26.349, p<.01) as well as the *ability to pay* (β= 4.946 × 10^{-3}, SE=1.968x10^{-3}, p<.05) overall model. Like other variables included in the model these results indicate a tendency for ideas such as wealth redistribution and educational access to favor liberalism and appropriations. The results indicate this is especially true in a post-recession recovery period when education subsidies via appropriations are critical to access and equity (Mitchell et al., 2018). Because it is a recessionary recovery period that is perhaps why there is not a difference in the submodel in terms of significance but it is important to note the change in coefficient size for research I institutions in the need to pay submodel. While Research I institutions are not often thought of as the access points for higher education within a state, perhaps in a post-recession recovery period a greater focus on access exists in citizen ideology making that viewpoint more critical for research I institutions compared to other factors (Long, 2014, p. 219).

Demographic Variables (Research Questions 3 and 9)

In the demographic variables, race was only statistically significant in the *ability to pay* overall model. Rural population was statistically significant in the *need to pay* and *ability to pay* overall models. 65+ populate was statistically significant only in the *need to pay* overall model.

Race (Research Questions 3.1 and 9.1)

Race was only statistically significant in the *ability to pay* overall model (β=-.089, SE=.040, p<.05). As hypothesized, race provided a negative predictive relationship with appropriations as an *ability to pay* measure. Like other higher education appropriations researchers (Tandberg, 2008; Rabovsky, 2012; Brunner & Johnson, 2012; Rizzo, 2004) have found as the various races

and ethnicities in a population increase higher education appropriations decrease. What is interesting to consider is race is only significant in the *ability to pay measure* and not the *need to pay* measure. Various other social science and demographic research highlight racial disparities and the need to support assistance programs such as public health insurance, food access, housing, and childcare as the percent of people of color increase (Foster & Rojas, 2018). Therefore, this negative relationship could be due to competition for funding as racial demographics change because the measure is the share of the state budget.

Rural Population (Research Questions 3.2 and 9.2)

Rural population was statistically significant in the *need to pay* (β=2823.375, SE=361.02, p<.001) and *ability to pay* (β=.576, SE=.154, p<.001) overall models but not in either of the submodels focusing on research I institutions. While statistically significant, the nature of the predictive relationships was not as hypothesized. There is limited research on how the rural populous predicts appropriations decisions. Most higher education research and news related items are related to enrollment and access issues in the rural population (Marcus & Krupnick, 2018; Pew, 2018; Fluharty & Scaggs, 2007). My hypothesis, that an increase in the rural population would have a negative predictive relationship on appropriations, was based on connecting ideas between access and affordability with affordability and appropriations. Where I could have miscalculated in my hypothesizing is that even if those in the rural areas are not advocating for higher education as widely as their suburban or urban peers it does not mean that others are not advocating on their behalf (Nebraska Academy for Research on Rural Education, 2016). It is also a good reminder that while governments are there to be representatives of the people in democracy appropriations decisions will not be an exact representation (Caers et al.,

2006). In fact, that can be a good thing when we are talking about supporting underserved populations.

Population 65+ (Research Questions 3.3 and 9.3)

Percent of the population 65+ was only statistically significant in the *need to pay* (β=583.080, SE=139.798, *p*<.001) overall model, however the nature of the predictive relationship was not as hypothesized. I hypothesized a negative relationship based on findings in prior research (Lowry, 2001; McLendon et al., 2009; Okunade, 2004; Tandberg, 2008) though Bailey et al. (2004) did find a positive relationship between the elderly population and higher education appropriations and also found their results surprising. Their analysis indicated this may be due to moderate tuition increases at the time of their research study which would also be present in a post-recessionary period (Mitchell et al., 2018).

Educational Climate Variables (Research Questions 4 and 10)

Merit-based grant programs was statistically significant in the overall *need to pay* and *ability to pay* models. Tuition was found to be statistically significant in predicting appropriations in the *need to pay* overall and submodel as well as the *ability to pay* overall model Educational attainment was only statistically significant in the *need to pay* overall model.

Merit-based Grant Programs (Research Questions 4.1 and 10.1)

Merit-based grant programs was found to have statistical significance in the overall *need to pay* (β=741.477, SE=119.753, *p*<.001) and *ability to pay* (β=.144, SE=.048, *p*<.05) models but again, not in the predictive direction hypothesized. This hypothesis stemmed from research around other research regarding appropriations being a method to redistribute wealth within the state and need-base aid being the arm for redistribution versus merit-based aid (Havemen & Smeeding, 2006; Lowry, 2019). An important component of this research project is being

situated within economic recovery and McLendon et al. (2014) postulated when income availability increases the notion of redistribution is not as omnipresent therefore at least partially explaining the positive predictive relationship between merit-based grant programs and appropriations.

Tuition (Research Questions 4.2 and 10.2)

Tuition was statistically significant in the *need to pay* overall (β=-.608, SE=.065, p<.001) and submodel (β=-.533, SE=.141, p<.001) as well as the *ability to* overall *pay* (β=-5.57 $\times$ 10^{-5}, SE=2.37$\times$ 10^{-5}, p<.05) model. While the predictive relationship was consistent in direction across the three models the results were not as hypothesized. I hypothesized states would see increases in tuition and adjust appropriations perhaps not in the same relative percentage but at least increase to support affordability. Lowry (2001) as well as Coughlin & Ererkson (1986) published researching citing results with positive predictive relationships between tuition and appropriations. There is a significant body of research that supports a negative predictive relationship between tuition and appropriations (Dar & Franke, 2010; Dar & Spence, 2011; Koshal & Koshal, 2000; OKunade, 2004; Tandberg, 2008). Most of these scholars reference an increasing focus on accountability from the state to institutions and a sort of 'punishment' effect where appropriations are not increased unless an institution can demonstrate support of smarter budgeting and financial regulation. This body of work was not ignored when hypothesizing but rather considering in the time period of the study. Many institutions were coming out of tuition freezes so small tuition increases were inevitable in order to cover costs and support quality by retaining faculty and staff (Selingo, 2018; Turner, 2014). That is why my hypothesis pivoted away from much of the body of research. However, the coefficient had a smaller value in the

models than other significant variables so it has perhaps less influence on appropriations than other factors discussed.

Educational Attainment (Research Questions 4.3 and 10.3)

Educational attainment was only statistically significant in the need to pay overall model (β=230.661, SE=63.900, *p*<.001) and it was a positive predictive relationship as hypothesized. Surprisingly, educational attainment has not been widely published in appropriations research but has been studied alongside other variables tangential to appropriations. In very early research Peterson (1976) found educational attainment to be associated with increases in appropriation across all institution types when measured per capita but inconsistent results when appropriations were measured per student. I found this variable to be especially important in the time period of the study as individuals wrestled (Mattioli, 2011; Leonhardt, 2014) with the value of higher education and its preparation. Therefore, I was curious if there would be any sway, in a post-recessionary period on the interest in supporting higher education through appropriations or if there would be remnants of a 'lost cause' mentality due to significant unemployment even with degrees. Though there may have been and continues to be societal discussion on higher education's contribution (Pew, 2016) educational attainment still shows supports for increases in appropriations.

Concluding Discussion of Results

Comparing Appropriations Measures (Research Questions 5 and 11)

Across both measures of appropriations, five independent measures were found to be significant—personal income, citizen ideology, rural population, merit-based grant programs, and tuition. In the *need to pay* measure rural population, merit grant programs, and citizen ideology all had much larger coefficients compared to income and tuition. While the values

cannot be compared because the measurements are so different. Rural population and merit-based grant programs also had the largest coefficients when predicting appropriations as an *ability to pay* measure. Both measures had other variables that were statistically significant but it is interesting to note that that overlapping variables fall across all categories as presented in this researching providing some validity to presenting the study in this fashion.

The R-squared value for the need to pay measure can be interpreted as 12.82% of the variance in appropriations is explained by the variables included in the model. While this is a bit low there are other factors other researchers have included like prior year appropriations, enrollments, and student-aged population that could have been included or analyzed. The time period studied could also contain hints at a low R-squared value due to election cycles and post-recession recovery. Other economic and political variables could be influential and worth consideration by other researchers which will be discussed in future research. The R-squared value for the *ability to pay* model was even lower at .0203. Looking at other research and understanding the calculation of the measure including other state budget components in the model such as corrections, K-12, and Medicare spending could have potentially contributed to increasing the R-squared value by explaining variance in the state budget.

Comparing Institution Types: Overall Model vs. Submodel (Research Questions 6 and 12)

Unfortunately, there were not any statistically significant results in the *ability to pay* submodel so there are not comparisons to draw between the overall and submodel. However, if the significance tolerance was raised to $p < .10$ both party competition and citizen ideology would have been statistically significant. While that meant I did not include them in discussion it is worth mentioning because adjustments in the sample such as time period selected or different institutions could potentially yield statistically significant results in a slightly different project.

When looking at the *need to pay* model and submodel four variables were statistically significant in both models and the predictive relationships were in similar directions. Income, income disparity, citizen ideology, and tuition were all statistically significant in both *the need to pay* overall model and submodel. In this case the overlapping statistically significant variables existed only in three of the variable categories leaving demographic variables unrepresented as none of those variables were statistically significant in the *need to pay* submodel. It is also worth noting that while there were variables that were statistically significant in the *need to pay* overall model that were not significant in the submodel the reverse was not true meaning there were not any statistically significant variables in the *need to pay* submodel that were not also significant in the overall model.

Again, the R-squared valued for the need to pay overall model was .1282 and the R-squared value for the submodel was .1736. While this is still a low R-squared valued narrowing to the subset of institutions compared to the more comprehensive samples does seem to have slightly increased the explanatory power of the model. Given the network and size of the research I institutions I will discuss more in further research whether advocacy and governing board research could be relevant for this particular institutional category.

Similarities Across All Models

In all models with statistically significant factors, personal income, citizen ideology, and tuition were significant in both the overall versus submodel comparison and the dependent measures comparison. Citizen ideology is the most striking as it an index combining elements of sociology and political science being uses to measure higher education appropriations. While being listed as variable stands out from a researcher perspective the notion of the public versus private good conversations has been existing in higher education for decades so it should not be

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surprising that the ideology of citizens within a state has such a predictive power over appropriations. A final closing point in the discussion is that while variables changed in their statistical significance across models whether it was the overall versus submodel or *ability to pay* versus *need to pay* the direction of the predictive relationships did not change. There were not any variances between a variable having a statistically significant relationship in one model and a negative statistically significant relationship in another model. This speaks to the nuance of the appropriations conversations and understanding what factors may influence certain types of institutions in what kind of environments under what kind of conditions which creates the need for more research.

Practical Significance

The discussion above focuses on statistical significance but a focus of this project is to be able to support understanding the budgetary process and help administrators understand which institutional and state conditions may be influencing appropriations.

The *need to pay* model is informative because institutions tend to be very aware of the enrollment trends and patterns within their state and specifically how their institution contributes to supporting enrollment. If an administrator is aware of the factor association with appropriations what measured according to enrollment it is easier to predict how appropriations may be adjusting at an institution as well as engage in case-making with the legislative body.

In the case of the *ability to pay* model, while the coefficients seem small the results do translate to significant changes in institutional revenue given state budgets are typically on the scale of billions of dollars. While it was not evidenced here, an aging population while likely continue to play a role in the competition for state funding as spending on Medicaid and pensions increases as mandatory state spending. Understanding required state spending and the influence

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on appropriations can help institutions, especially research I institutions with the staff to manage government relations, understand where to direct their advocacy as well as potentially endorse legislation or policy issues (Tandberg, 2010). Understanding factors contributing to a state's ability to fund higher education could also be an opportunity for institutional public relations teams to pivot their messaging and deliver more empathetic budget requests to the state. Presenting the institution's appropriations request in a way that understands the challenging position of the state legislature might help gain more traction if the governing body feels that their position is being recognized when they are receiving requests (Derber & Wagner, 1979; Leary et al., 2013).

Looking forward the research was potential to have practical significance before future research. Higher education is becoming more of a federal policy and funding discussion versus funding remaining a state level discussion. That could make some of these results more relevant on a broad basis versus needing to tailor or interpret for a specific state population. The factors could also be helpful when thinking about how to craft financial aid packages or make appropriations arguments specifically when coming out of recessionary periods. Different populations and institutions may recover differently within a state and careful consideration of these can help provide equitable financial resources.

Theoretical Implications

Throughout this project I have offered how I would be leading with Critical Accounting Theory and including elements of Stewardship Theory. While race specifically was only a significant factor in the *ability to pay* overall model there are many other independent variables that are connected to equity issues. Income disparity draws attention to examining wealth distribution and the expanding wealth gap which when taking a critical accounting lens would

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lead to the questions which people are falling into which percentiles, who are making the policy decisions, and who controls the wealth or executes the decisions surrounding the money such as authorizing transactions (Oluwardare & Samym, 2015).

Rural population is an interesting population from a critical accounting perspective as it focuses on a specific population that while racially may not be considered oppressed it is often underserved especially in higher education (Marcus & Krupnick, 2018). There are a significant number of advocacy groups supporting rural education initiatives, specifically addressing finance and rural education. The hope and concern would be that those participating in the advocacy and making the funding decisions assess their own biases and representations. Many of them may not come from rural education backgrounds and experiences and may be making assumptions on behalf of those individuals. It is an area where qualitative research to bring in lived experiences would be extremely valuable to enhance the quantitative data used to describe need in appropriations and funding decisions.

As discussed in the results citizen ideology was statistically significant in three of the four models and as a factor is designed to measure a state's citizenry place on the conservative to liberal spectrum. With the results indicating a clear relationship between a more liberal population predicting an increase in appropriations, it would also beg the question if a population becomes more conservative do the appropriations decline? Evaluating the calculation of the citizen ideology index it is based off the electorate and citizen decision on which legislation and candidates to support (Berry et al., 1998). Connecting those ideas critical accounting theory highlights the power structure of the predictive relationship and the government decision making associate with finances and voter outcomes (Gallhofer & Haslam, 1997).

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A critical accounting theorist would also look at variables like merit-based grant programs and rural population for equity issues. When a state offers only merit-based grant programs they are taking away the focus from need (Heller & Marin, 2002). Using a critical accounting lens to assess merit-based grant programs asks the question are states truly rewarding 'merit' if they do not include equity considerations such as the merit of overcoming life challenges and circumstances such consistent racial trauma, lack of access to resources, disability management, or consistent identity discrimination (Hatch & Dohrenwend, 2007). That labor is meritorious and is often not a part of the merit-based aid award packages (Myers, 2015).

Another theory relevant to this work is stewardship theory. Stewardship theory is often referenced in public finance because government employees and representatives are selected and paid to make decisions on the state finances that in turn provide resources to the people of the state (Davis et al., 1997). That makes them the stewards of the state budget and other resources and they must be responsible for considering all of their programs and requests. That requires balancing the needs as well as equitably assessing priorities of the budget requests. While stewardship theory posits these decisions are done in consideration of the people critical theorists offer bias cannot be removed (Arthur, 1993). History, professional services firms, and generational scholars have also provided plenty of evidence regarding political financial scandals creating public trust and thus creating hesitation and mistrust in public officials (Cillizza, 2015; Deloitte, 2019; Pontefract, 2018).

Further Research

A research project like this one with multiple dependent measures and independent measures across various disciplines allows for the exploration of many other ideas when considering significant relationships and additional research questions. My ideas for further

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research fell generally into the categories of considering the time period, institutional analysis, politics, policy, and sociology.

At a few points during the discussion of significant results I offered whether certain variables where more or less relevant because of the student occurring during a recession recovery as well leading up to a tumultuous election cycle. As this work is being finalized the economy is a similar state where experienced economic downturn along with political turmoil and it will be interesting to see how higher education responds and recovers. I am not sure if the pattern will repeat itself as there are many indicators that higher education appropriations still have not recovered from the Great Recession and the covid-19 crisis could permanently change the landscape (Friga, 2020).

This project also very specifically focused on comparing a large overarching sample to a smaller set of the highest performing research institutions, often called research I institutions. More informative work could be done comparing institutional types such as community colleges, master's institutions, and doctoral levels. It would also be interesting to inform that academy on appropriations in states with organized higher education commissions that funnel appropriations requests versus systems. For examples, Pennsylvania has a systems for certain types of public institutions but there is a classification of state-related institutions where each institution submits their budget separately (Department of Education, 2021). In California, the community colleges have an organized system but the California State and University of California systems each submit theirs separately generating three separate requests. There used to be a commission including all public higher education in California but it was formally disbanded in 2011 (Murphy, 2011).

Not only do commissions alter the way appropriations requests are managed but governing board and government interaction are also influential. Tandberg (2008, 2010a, 2010b) has published significant work on governing boards but it would be interesting to consider research questions focused on flagship institutions given the political economy of those institutions with their capacity to have government relations staff, large advocacy groups as well as a large alumni base that functions as voters (Weerts et al. 2010). Because alumni of these flagship institutions, often also research I institutions, it is easy to see how there is a connection between the voter interest, politics, and potential policy changes related to higher education funding. This is an area where qualitative research could explore the experience and tension of the relations of the legislative experience as well as the assembly of the advocacy groups. There would be political ethics to navigate and perhaps time away from political experience would be required for participation but more research like Woolard's (2014) interviews could continue to unpack this political and powerful complexity.

There are a few big policy and funding discussions in higher education that could change appropriations research and which factors are significant as well as what kind of factors needs to be considered or controlled for in the research. Performance-based funding has been incorporated into appropriations for at least a two decades and has allowed for its own body of research (Ortagus et al., 2020). While the formal performance metrics are typically associated with graduation and retention rates states have informal standards with institutions that often influence their appropriations. For four-year institutions or larger systems it is often their ability to accept transfers from community college systems to promote accessibility. There are also tense negotiations regarding 'promising' certain levels of appropriations if tuition increases are managed (Delaney & Kearney, 2015). Because these are not documented as formal performance

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funding metrics it makes it challenging to assess their impact on appropriations in quantitative studies and could be a good candidate for mixed methods or qualitative research.

Lastly, higher education appropriations research could benefit from interdisciplinary collaboration with sociology and political science scholars. This project along with many others (Archibald & Feldman, 2006; Nicholson-Crotty & Meier, 2003; Tandberg & Ness, 2011) indicates ideology and public opinion is having some sort of significant influence on appropriations decisions. The United States has entered another ideological divided in a populist movement further contrasted with greater emphasis on social justice (Dimock & Wike, 2020). The reach of these issues and their connection to higher education is beyond what each discipline can tackle on their own but combined could uncover some interesting findings on how to navigate and open further discussion on encouraging higher education for the public good in a more divided society.

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Table A.1 displays the variable in the study and source of data from which the variable used was derived. This information is provided in the interest of reproducibility of the results presented in Chapter 4.

Table A.1

Derivation of the Variables in this Study

Variable	Source
Economic Variables	
Unemployment	Bureau of Labor Statistics, American FactFinder
Personal income	Bureau of Economic Analysis, American FactFinder
Income disparity	Census Bureau, American FactFinder
Political Variables	
Legislative professionalism	Squire calculation, stored in Harvard Dataverse
Party competition	State Politics and Policy Quarterly database
Citizen ideology	Berry calculation, Fording faculty website
Demographic Variables	
Race	Census Bureau, American FactFinder
Rural population	Census Bureau, American FactFinder
Educational Climate Variables	
Merit-based scholarship programs	Education Commission of the States
Tuition	IPEDS
Educational attainment	Census Bureau, American FactFinder

APPENDIX B: INSTITUTIONS INCLUDED IN SUB-MODEL

80 institutions from 38 states were included in this study. Chapter 3 describes the criteria used to determine the sample.

Table B.1

Institutions Included in the Analyses

State	Institution
AL	University of Alabama at Birmingham
AR	University of Arkansas
AZ	Arizona State University-Tempe
AZ	University of Arizona
CA	University of California-Berkeley
CA	University of California-Davis
CA	University of California-Irvine
CA	University of California-Los Angeles
CA	University of California-Riverside
CA	University of California-San Diego
CA	University of California-Santa Barbara
CA	University of California-Santa Cruz
CO	Colorado State University-Fort Collins
CO	University of Colorado Boulder
CT	University of Connecticut
DE	University of Delaware
FL	Florida International University
FL	Florida State University
FL	University of Central Florida
FL	University of Florida
FL	University of South Florida-Main Campus
GA	Georgia Institute of Technology-Main Campus
GA	Georgia State University
GA	University of Georgia
HI	University of Hawaii at Manoa
IA	Iowa State University
IA	University of Iowa
IL	University of Illinois at Chicago
IL	University of Illinois at Urbana-Champaign
IN	Indiana University-Bloomington
IN	Purdue University-Main Campus

KS	Kansas State University
KS	University of Kansas
KY	University of Kentucky
KY	University of Louisville
LA	Louisiana State University and Agricultural & Mechanical College
MA	University of Massachusetts-Amherst
MD	University of Maryland-College Park
MI	Michigan State University
MI	University of Michigan-Ann Arbor
MI	Wayne State University
MN	University of Minnesota-Twin Cities
MO	University of Missouri-Columbia
MS	University of Mississippi
NC	North Carolina State University at Raleigh
NC	University of North Carolina at Chapel Hill
NJ	Rutgers University-New Brunswick
NM	University of New Mexico-Main Campus
NY	CUNY Graduate School and University Center
NY	Stony Brook University
NY	SUNY at Albany
NY	University at Buffalo
OH	Ohio State University-Main Campus
OH	University of Cincinnati-Main Campus
OK	University of Oklahoma-Norman Campus
OR	Oregon State University
OR	University of Oregon
PA	Pennsylvania State University-Main Campus
PA	Temple University
PA	University of Pittsburgh-Pittsburgh Campus
SC	Clemson University
SC	University of South Carolina-Columbia
TN	The University of Tennessee-Knoxville
TX	Texas A & M University-College Station
TX	Texas Tech University
TX	The University of Texas at Arlington
TX	The University of Texas at Austin
TX	The University of Texas at Dallas
TX	University of Houston
TX	University of North Texas
UT	University of Utah
VA	George Mason University
VA	University of Virginia-Main Campus

VA	Virginia Commonwealth University
VA	Virginia Polytechnic Institute and State University
WA	University of Washington-Seattle Campus
WA	Washington State University
WI	University of Wisconsin-Madison
WI	University of Wisconsin-Milwaukee
WV	West Virginia University